DOI: 10.1111/infa.12517

RESEARCH ARTICLE

INFANCY THE OFFICIAL JOURNAL OF THE INTERNATIONAL CONGRESS OF INFANT STUDIES WILEY

Mother-infant emotional availability through the COVID-19 pandemic: Examining continuity, stability, and bidirectional associations

Nila Shakiba[1] | **Gal Doron**[2] | **Avigail Gordon-Hacker**[2] | **Alisa Egotubov**[2] | **Nicholas J. Wagner**[1] | **Noa Gueron-Sela**[2]

[1]Department of Psychological and Brain Sciences, Boston University, Boston, Massachusetts, USA

[2]Department of Psychology, Ben-Gurion University of the Negev, Beer-Sheva, Israel

Correspondence
Noa Gueron-Sela, Department of Psychology, Ben-Gurion University of the Negev, Beer-Sheva, Israel.
Email: gueron@post.bgu.ac.il

Funding information
Israel Science Foundation, Grant/Award Number: (879/18)

Abstract

The COVID-19 pandemic may impact the development of infants' social communication patterns with their caregivers. The current study examined continuity, stability, and bidirectional associations in maternal and infant dyadic Emotional Availability (EA) before and during the COVID-19 pandemic. Participants were 110 Israeli mother-infant dyads (51% girls) that were assessed prior to (*M*age = 3.5 months) and during (*M*age = 12.4 months) the pandemic. At both time points, mother-infant interactions were observed during play (nonstressful context) and tasks designed to elicit infant frustration (stressful context). Maternal and child EA were coded offline. Maternal EA demonstrated no significant mean-level changes from before to during the COVID-19 pandemic, whereas infant responsiveness and involvement increased over time. Stability and bidirectional associations in EA differed by context and were evident only in the stressful context. Mothers' perceived levels of social support further moderated these associations. Specifically, infants' pre-pandemic responsiveness and involvement predicted maternal EA during the pandemic only when mothers reported low

Nila Shakiba and Gal Doron are joint first authors.

levels of social support. Our findings suggest that maternal and child EA were not adversely impacted by the COVID-19 pandemic. However, patterns of EA demonstrated moderate-to-no stability over time, suggesting considerable individual differences in trajectories of EA.

1 | INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic outbreak has significantly affected the well-being of families across the world. Facing challenges, such as social distancing, financial insecurity, changes to structure and routine, and caregiving burden, may negatively impact family functioning and parent-child relationships (Prime et al., 2020). Indeed, emerging evidence shows that, during the COVID-19 outbreak, mothers of young children reported higher levels of parenting stress, harsh parenting behaviors, and difficulties in mother-child relationships compared to the pre-pandemic period (McRae et al., 2021; Sari et al., 2021; Taubman-Ben-Ari et al., 2021). However, a fundamental limitation of these findings that stems from COVID-19-related data collection restrictions is the exclusive use of self-report measures of parent-child relationship quality. The goal of the current study was to address this gap by examining changes in observed mother-child interactions from *before* to *during* the pandemic when infants were 3 and 12 months old, respectively. We also examined whether changes in mother-child interactions are moderated by social support, one of the important resources that can protect families from the negative effects of stress on parenting (Belsky, 1984; Leinonen et al., 2003).

1.1 | Emotional availability (EA)

Biringen and colleagues (Biringen, 2008; Biringen et al., 1999) define EA as a relationship construct that can be assessed using observational scales that include both caregiver and child dimensions. The caregiver dimensions include *sensitivity* to the child's cues, *structuring* of interactions based on the child's lead, and the ability to remain *nonintrusive* and *nonhostile* during interactions. The child dimensions include social *responsiveness* to the caregiver and *involvement* of the caregiver in the child's activities. EA in parent-child relationships predicts a wide range of child outcomes, including attachment security, adaptive emotion regulation strategies, empathy, and social competence (see Saunders et al., 2015 for review). Although the caregiver dimensions are distinguished from the child dimensions, the EA scales are viewed from a transactional context, in which both members of the dyad reciprocally influence each other's behavior (Biringen et al., 2014). Caregivers' sensitivity to children's signals and appropriate structuring supports children's ability to respond to caregivers' bids and actively involve caregivers in their activities. Conversely, children's greater social responsiveness and involvement reinforce sensitive caregiving and facilitate appropriate nonintrusive structuring of children's play. Thus, the current study takes a transactional approach (Bell, 1968; Paschall & Mastergeorge, 2016; Sameroff, 2010) to assess the reciprocal relations between maternal and child EA through two time points: prior to and during the COVID-19 pandemic.

EA has also been assessed in a variety of contexts, including nonstressful settings, such as unstructured and semi-structured play interactions (Célia et al., 2018; MacMillan et al., 2021), and stressful settings, such as separation–reunion situations (Easterbrooks et al., 2012) and the still-face procedure

(Korja & McMahon, 2021). Based on a domain-specificity perspective (Grusec & Davidov, 2010), previous research suggests that caregiving behaviors in stressful contexts are distinct from caregiving behaviors in nonstressful contexts (Leerkes et al., 2009, 2012; Vrijhof et al., 2020) and have unique contributions to children's socialization (Grusec & Davidov, 2010). For example, sensitive caregiving behaviors in response to infant distress uniquely predicted infant attachment security, higher levels of empathy, and lower behavior problems (Davidov & Grusec, 2006; Leerkes & Siepak, 2006; McElwain & Booth-Laforce, 2006). Studies have reported mixed findings regarding the effect of task context on parent and child behaviors. Whereas some studies reported that more stressful and challenging contexts yielded less sensitive and more negative parent and child behaviors (Blacher et al., 2013; Kwon et al., 2013), other studies found that caregivers were more sensitive and positive in challenging contexts compared to low-stress contexts (Dittrich et al., 2017; Volling et al., 2002). To the best of our knowledge, no studies have examined how EA in different contexts can be differentially affected by exposure to external stressors. Due to the stressful nature of the context in which the current study occurs (i.e., the COVID-19 pandemic), this study will attempt to fill this gap in the literature by exploring whether changes in EA through the pandemic differ between stressful and nonstressful contexts.

1.1.1 | Continuity and stability over time

Despite the large body of empirical research on mother-child EA, only a few studies have directly examined changes in EA across infancy and toddlerhood (Biringen et al., 1999; Bornstein et al., 2010; Célia et al., 2018; Lovas, 2005). These studies usually differentiated between *continuity* (i.e., differences in the means of the EA scores at the group level over time) and *stability* (i.e., changes in the individual's rank-order position compared to others over time). With respect to continuity, previous studies have shown inconsistent findings regarding maternal EA with some studies reporting continuity in maternal EA scales (i.e., no mean-level changes) across time (Célia et al., 2018; Lovas, 2005), and others reporting increases or decreases (Biringen et al., 1999; Bornstein et al., 2010). However, both child EA scales (i.e., responsiveness and involvement) show a consistent pattern of increases with time (Biringen et al., 1999; Célia et al., 2018; Lovas, 2005). With respect to stability, overall, maternal and child EA scales demonstrate moderate stability (i.e., positive associations between time points) over time (Biringen et al., 1999; Bornstein et al., 2010; Célia et al., 2018; Lovas, 2005). These findings suggest that individual differences in EA are established early in life and are relatively stable and that children show developmentally appropriate increases in their social responsiveness and involvement across time. However, contextual factors, such as exposure to trauma and stressful life events, have been associated with individual differences in EA (Cohen & Shulman, 2019; MacMillan et al., 2021). For example, higher exposure to traumatic events (mainly political violence) was associated with both mothers' and children's lower EA in a sample of toddlers (Cohen & Shulman, 2019). Similarly, stressful life events during the postpartum period were associated with lower maternal EA at 6 months postpartum (MacMillan et al., 2021).

1.2 | Parent-child relationships during the Covid-19 pandemic

Drawing on key theoretical models of human development and family functioning (Bronfenbrenner & Morris, 2006; Carr, 2015; Conger et al., 2002), Prime et al. (2020) suggest that when facing elevated levels of emotional stress, caregivers' mental, and emotional resources are depleted. This may impede

the ability to respond sensitively to children's cues and lead to an overreliance on less effective parenting behaviors, such as coerciveness and hostility (Prime et al., 2020). For example, previous research on the effects of a global crisis on parenting found that the great recession in 2008 was associated with a high risk of child abuse and that economic uncertainty during this time increased the risk of abuse or neglect (Schneider et al., 2017). During the COVID-19 pandemic, alongside financial and health concerns, caregivers also face the unique role of meeting their children's emotional and developmental needs around the clock with the closure of childcare centers while also complying with changes to work roles and routines. Indeed, recent research has shown that mothers of young children reported higher levels of difficulties in parenting compared to the pre-pandemic period (McRae et al., 2021; Sari et al., 2021; Taubman-Ben-Ari et al., 2021). Longitudinal studies show that parents of young children reported increases in parenting stress and decreases in parent-child relationship quality when assessed during the COVID-19 pandemic compared to before the pandemic (McRae et al., 2021; Taubman-Ben-Ari et al., 2021). Many countries have also indicated increases in reported child maltreatment, abuse, and neglect (Humphreys et al., 2020; Kuehn, 2020). A study conducted in the Netherlands found that harsh parenting behaviors, such as threatening, name-calling, slapping, and shaking, were significantly elevated among parents of toddlers during COVID-19 lockdown periods compared to a matched sample (based on factors, such as child age, biological sex, ethnicity, parental age, parental education, and family income) collected prior to the pandemic (Sari et al., 2021). Nevertheless, individual experiences related to the COVID-19 pandemic are subjective and complex. Some families reported that the unique parenting roles (i.e., serving as sole providers of children's physical, emotional and educational needs) during this period allowed them to be more involved in their children's upbringing and improve communication, emotional expressiveness, and teamwork spirit at the family level (Gelir & Duzen, 2021; Günther-Bel et al., 2020). Moreover, research conducted prior to the COVID-19 pandemic suggests that parental emotional distress is not necessarily related to lower EA (Rossen et al., 2018).

1.2.1 | The moderating role of social support

The extent to which chronic adversities such as the COVID-19 pandemic will affect families may depend on risk and resilience factors present in their daily lives. For example, preexisting vulnerabilities such as caregiver's coping behaviors (e.g., substance use) or low income can increase the risk for mental health problems (Feinberg, et al., 2021). On the contrary, high income, supportive relationships, and positive interactions within and beyond the immediate family can mitigate the adverse effects on children and parents (Prime et al., 2020). One key factor that was found to minimize the negative effects of the COVID-19 pandemic on parents' emotional distress and family functioning is perceived social support (Brown et al., 2020; Li et al., 2021; McRae et al., 2021). In the literature, perceived social support is considered a better predictor of wellbeing than received social support. Perceived social support has been found associated with numerous outcomes (e.g., personal adjustment, mental and physical health), while received social support shows fewer predictive associations and smaller effect sizes (Haber et al., 2007; Helgeson, 1993; Prati & Pietrantoni, 2010). A plethora of research has demonstrated that different sources of perceived social support buffered the impact of stressful experiences, such as economic pressure, parental depressive symptoms, and parenting stress on parenting behaviors (e.g., Lee et al., 2009; Leinonen et al., 2003; Taraban et al., 2019; Yan et al., 2021). In the context of the COVID-19 pandemic, greater parental perceived levels of social support were associated with lower perceived stress and child abuse potential (Brown et al., 2020). Perceived Social support also buffered the negative effect of parental emotional distress on increases in harsh parenting during lockdown periods (McRae et al., 2021).

1.3 | The current study

Despite the growing body of literature on parent-child relationships during the COVID-19 pandemic (McRae et al., 2021; Sari et al., 2021; Taubman-Ben-Ari et al., 2021), we still know little about stability and continuity in parent-child interaction patterns during this unprecedented period, particularly during infancy. Our knowledge is also currently limited to self-report measures of parenting that are subjected to report the bias. To address this gap in the literature, in the current study, we followed a sample of mother-infant dyads that we assessed using observational measures of parenting *prior* to the pandemic. We conducted an additional observational assessment *during* the pandemic using an online video platform. This unique study design enabled us to objectively examine changes in the quality of mother-child interactions during the COVID-19 pandemic. In addition, as recent research suggests that the effects of the COVID-19 pandemic on children and families can vary depending on the presence of risk or resilience factors (Domínguez-Álvarez et al., 2020; Feinberg et al., 2021; Prime et al., 2020), we also examined whether continuity and stability in maternal and child EA are moderated by social support, a key factor found to enhance adaptive coping under stressful conditions (e.g., Brown et al., 2020; McRae et al., 2021).

Based on extant research conducted during the COVID-19 pandemic (McRae et al., 2021; Sari et al., 2021; Taubman-Ben-Ari et al., 2021), we predicted that maternal and child EA dimensions will show mean-level decreases (low continuity) between the pre-pandemic and pandemic assessments, contrary to past findings that show increases in child EA scales with time and mixed findings regarding maternal EA (Biringen et al., 1999; Célia et al., 2018; Lovas, 2005). We also hypothesized that maternal and child EA would demonstrate moderate stability (i.e., positive associations between time points) based on previous research indicating that patterns of EA show relative stability during infancy (Biringen et al., 1999; Bornstein et al., 2010; Célia et al., 2018; Lovas, 2005). Maternal and child EA dimensions were also expected to show bidirectional associations across time (Biringen et al., 2014). That is, maternal pre-pandemic EA was expected to positively predict the child dimensions during the pandemic and vice versa. Finally, we predicted that social support would moderate the hypothesized longitudinal associations. Specifically, maternal and child EA will show higher continuity (i.e., more minor mean-level differences), stability, and bidirectional associations between the two time points when mothers perceived high social support compared to when mothers perceived low social support.

Given that previous research suggests that caregiving behaviors differ between stressful and nonstressful contexts (Leerkes et al., 2009, 2012; Vrijhof et al., 2020), an additional goal was to assess whether hypothesized associations differed by task type (i.e., play vs. stressful context). We did not propose a directional hypothesis for this goal because, to the best of our knowledge, this study will be the first to address this question.

2 | METHODS

2.1 | Participants

Participants for this study were drawn from a longitudinal study following mothers and infants from the prenatal period through the first two postpartum years in Israel (Maternal Affect, Mood and Attention Study; MAMA). This study was conducted according to guidelines laid down in the Declaration of Helsinki with written informed consent obtained from a parent or guardian for each child before any assessment or data collection. All procedures involving human subjects in this study were approved by the Helsinki committee at Soroka Medical center, Beer-Sheva, Israel. The main

TABLE 1 Sample demographic information

Maternal age (years)	M(SD)	30.87 (4.5)
Maternal years of education	M(SD)	15.04 (3.14)
Household monthly income	Up to 3500 NIS	2.9%
	3501–6000 NIS	3.8%
	6001–8500 NIS	15.2%
	8501–12,500 NIS	14.3%
	12,501–20,000 NIS	39%
	20,001–40,000 NIS	23.8%
	Above 40,000 NIS	1%
Child sex	Female	50.9%
	Male	49.1%
Child age T1 (months)	M(SD)	3.5 (0.58)
Child age T2 (months)	M(SD)	12.4 (0.61)

Abbreviation: NIS, New Israeli Shekels.

goal of this study was to examine the associations between maternal emotional distress, mother-child interaction quality, and the development of children's attention abilities. For the current study, we used data collected at two time points, based on the infant's age: 3 months (T1) and 12 months (T2). Data for T1 were collected at participants' homes between June 2019 and mid-December 2020 ($N = 137$). In March 2020, COVID-19-related home confinement regulations were first implemented in Israel, and in-person data collection was put on hold. In June 2020, these regulations were temporarily amended with the decrease in infection rates, and we collected data from the remaining participants. Therefore, 22% of the sample for T1 was collected after the COVID-19 outbreak. Data for T2 were collected between August 2020 and July 2021. Due to the uncertainty regarding data collection regulations in the context of the COVID-19 pandemic and to reduce infection risk, we altered our research protocol, and this time point was collected remotely using an online video platform ($N = 110$). In light of the ecological context in which data were collected (i.e., a global pandemic) and the longitudinal nature of our research design, we were able to address novel research questions (in addition to the original study goals), such as the potential changes in mother-child interactions through the pandemic.

Mothers were recruited during the second trimester of pregnancy through social media platforms and the obstetrics and gynecology division at Soroka Medical center. Women were included in the study if they were physically healthy, above 21 years of age, with no report of substance abuse, and without diagnosed psychiatric conditions besides major depressive disorder and anxiety disorders. Participants were included in the current study if they had valid data from at least one of the three focal variables of interest during the 12-month visit: (a) maternal EA., (b) child EA, or (c) social support. The final analytic sample included 110 mother-infant dyads (56 girls). See Table 1 for full sample demographic information.

2.2 | Procedures

At both time points, mother-infant dyads participated in age-appropriate tasks to assess EA during play and frustration. Data for T1 were collected during home visits when infants were 3 months of age. During the home visit, mother-child dyads participated in a face-to-face play task and a task designed

to elicit infants' frustration. In the play task, infants were seated on a rocker facing their mothers, and mothers were asked to play with their infants as they usually do without any toys for 5 min. This type of interaction is often used in the early months to assess mother-child interactions (Deák, et al., 2018; Flykt, et al., 2012; Richter & Reck, 2013). In the frustration task, mothers were asked to place their infants on their abdomens (i.e., "tummy time") for 5 min. This task was chosen because along with the developmental benefits of placing infants in this potion, infants often protest and become fussy when placed on their abdomens, and parents report frustration at not knowing how to help their infants to tolerate this position (Palmer et al., 2019). Data for T2 were collected when infants were 12 months of age using an online video platform (Zoom©). Before the scheduled meeting, we provided mothers with a set of toys (a toy car and stacking cups) to use in the data collection session. A research assistant led the assessment remotely and guided mothers through various tasks that were based on previous research with 12-months-old infants, including mother-child structured and free-play task (Atzaba-Poria et al., 2010) and an adapted version of the LAB-TAB Toy Removal Task (Goldsmith & Rothbart, 1996) designed to elicit infants' frustration. Children were seated on a highchair that faced the web camera during the evaluation, and mothers sat beside the infant. In the structured play task, mothers were asked to teach their infants how to build a tower using the stacking cups for 5 minutes. In the free-play task, mothers were asked to play with their children as they usually do with or without the provided toys for additional 5 minutes. In the frustration task, mothers were asked to let their child play with a desired object of choice (e.g., car keys or remote control). After approximately 15 s, or if the child began to lose interest, the experimenter signaled the mother to remove the toy and place it at plain sight but out of the child's reach for 2 minutes. Mothers were allowed to comfort the child while seated on the highchair but refrain from introducing other toys or removing the child from the chair. After 2 minutes, mothers returned the toy to the infant. Mothers also completed several questionnaires, including a measure of perceived social support.

To validate the frustration tasks, trained research assistants rated infants' distress from the videotaped assessments using a 5-point scale ranging from 0 to 4 with 0 = no distress (no distress expression), 1 = slight distress (visible distress manifested nonvocally through bodily postures or facial expressions), 2 = moderate distress (whimpering expressed vocally), 3 = pronounced distress (full-blown crying), and 4 = intense distress (intensive crying; Zahn-Waxler et al., 1992). Three trained research assistants coded the observations (interrater reliability coefficient = 0.92). At T1, 89% of the infants expressed some level of observed distress ($M = 2.43$, $SD = 1.24$) and at T2 98% of the infants expressed distress ($M = 3.3$, $SD = 0.90$).

2.3 | Measures

Emotional Availability (EA) Coding. Mother and child EA was assessed at T1 and T2 using the fourth edition of the EA scales (Biringen, 2008). The EA scales consist of four caregiver scales: sensitivity, structuring, nonintrusiveness, and nonhostility, and two child scales: responsiveness and involvement. The scores on each scale range from 1 to 7 with higher scores reflecting higher EA. *Sensitivity* refers to the caregiver's ability to understand the child's responses and needs and act accordingly. It considers the caregiver's affect, correct perceptions of the child's cues, timing, flexibility, acceptance, conflict resolution, and amount of interaction with the child. *Structuring* assesses the degree to which the caregiver appropriately structures the child's play by following the child's lead. It also considers the amount of structuring, limit setting, and verbal and nonverbal structuring use. *Nonintrusiveness* refers to the caregiver's ability to interact with the child without being intrusive (e.g., being overprotective or overstimulating). *Nonhostility* assesses negative behaviors and emotions of the caregiver toward the

child, including boredom, mocking, ridiculing, threats of separation, frightening behavior, silences, hostile themes, and physical punishment. Child *responsiveness* to the parent assesses the child's reactions to the caregiver's suggestions and their overall affect during the interaction. This scale also considers autonomy, physical proximity to the caregiver, role reversal, and attention to the caregiver during tasks. Young infants use certain types of responsive behaviors that are developmentally appropriate. For example, as young infants have a limited ability to move their bodies toward the caregiver, they may show responsiveness by gazing at the caregiver's face, reaching out and babbling. Each infant's apparent level of ability is taken into account when scoring responsiveness. Child *involvement* assesses the degree to which the child attends to and engages with the parent in play, including simple initiatives (i.e., an involving behavior i.e., brief and does not lead to an ongoing exchange), elaborative initiatives (i.e., involving in a way that creates an extended period of engagement), and verbal and nonverbal suggestions toward the caregiver (e.g., eye contact, touch, gestures, and laughter).Younger infants may involve their caregivers via more simple initiatives, such as looking or babbling toward the caregiver. Because fewer elaborative involving behaviors would likely be manifested by younger infants, they are less likely to receive the highest rating.

It is important to note that intermediate scores (a score between 3.5 and 5) in both child dimensions reflect a mixed pattern of emotional availability, in which children are responsive to their caregivers and involve them in their activities, but are either overresponsive/involving (e.g., always ready to engage with the adult showing diminished autonomy and over dependency) or use negative affect (e.g., whining and tantrums) for maintaining connection with the caregiver.

Interactions were coded by four coders, two coders for T1 and two for T2. Play interactions were coded as a whole (unstructured and structured) to obtain a wide range of behaviors (Atzaba-Poria et al., 2010). Each team reached initial reliability with a master coder (ICC >0.70). To assess interrater reliability, 22% of the interactions were randomly selected for each team and coded by both coders. The interrater reliability coefficients ranged between 0.72 and 0.82 for the 3-month interactions and 0.74 and 0.84 for the 12-month interactions. During the coding process, regular reliability checks were conducted for an additional 7% of the interactions to ensure that ICC values remained above 0.70. Disagreements in coding were discussed with the master coder and resolved by reaching a consensus among the coders.

In line with previous research using the EA scales (Din et al., 2009; Kim et al., 2012), we created a maternal EA composite score by averaging the scales sensitivity, structuring, and nonintrusiveness. The nonhostility scale (range 1–7) was not included in the composite due to its low variability in our sample. Approximately 90% of scores at T1 were above six, and about 80% of scores at T2 were above five. The child EA scales were examined as two separate scales.

Social Support. Perceived maternal social support was assessed using the Multidimensional Scale on Perceived Social Support (MSPSS; Zimet et al., 1988) at T2 during the ongoing COVID-19 pandemic. The MSPSS includes 12 items that assess perceived social support from family (e.g., my family really tries to help me), friends (e.g., I can count on my friends when things go wrong), and partner (e.g., there is a special person in my life who cares about my feelings). Participants rated support on a seven-point Likert scale (1 = Very Strongly Disagree, 7 = Very Strongly Agree). We computed a total social support score by summing all 12 items ($\alpha = 0.842$).

Covariates. Covariates included child biological sex, maternal education, and monthly household income, all of which were correlated with EA scores in previous research (Biringen et al., 2014). Our choice of covariates was also informed by recent research on parenting practices during the COVID-19 pandemic (e.g., Sari et al., 2021). Maternal education level was rated on a scale ranging between 1 and 5 (high school, B.A., MA, Ph.D., and other). Household monthly income was rated on a scale ranging between 1 (Below 3500 NIS) and 7 (Above 40,000 NIS) with the average monthly household income in Israel being 21,063 NIS. Because 22% of the sample for T1 was collected after the COVID-19

outbreak, we also included a dichotomous control variable that indicated whether data were collected before or during the COVID-19 pandemic.

2.4 | Missing data

At T1, rates of missingness were 29% for maternal and child EA during play and 21% for maternal and child EA during frustration. The main reason for missing data was the inability to conduct in-person home visits due to COVID-19 home lockdown periods. At T2, 12% of mothers and children had missing EA data for play, and 29% had missing EA data for frustration. There was a higher percentage of missing data for the frustration task due to noncompliance (i.e., infants were too tired/fussy to complete the task). The rate of missingness for mothers' reported levels of social support at T2 was 12%. We performed Little's Missing Completely at Random (MCAR; Little, 1988) test to assess the pattern of missing data. Results supported the assumption that the missing values are MCAR (χ^2 (158) = 160, p = 0.44). The full-information maximum likelihood estimation (Enders & Bandalos, 2001) was used to handle the missing data across the two time points.

2.5 | Analytic strategy

To assess the continuity (i.e., mean-level differences) in maternal and child EA between T1 and T2 assessments, we conducted Wald's test with k-1 degrees of freedom. We also examined whether the mean-level difference differs between the low and high social support groups. Next, we employed autoregressive cross-lagged modeling (ARCL; Collins & Sayer, 2001) to examine stability (i.e., rank-order associations) in maternal and child EA between T1 and T2 assessments among the full sample and stratified by maternal reported levels of the social support. ARCL is an approach often used for examining the bidirectional and longitudinal associations between two or more constructs across multiple time points (Selig & Little, 2012). The autoregressive component of the model estimates whether the same variable is stable over time (e.g., if maternal EA at T1 predicts maternal EA at T2), whereas the cross-lagged component estimates whether a variable at T1 predicts a different variable at T2 (i.e., if maternal EA at T1 predicts child EA at T2, and vice versa). All models were saturated and accounted for the possible effects of the covariates. EA during play and frustration were estimated in two separate models. We first estimated an unconstrained model (Model I) that freely estimated all full sample paths. Next, we performed multigroup comparisons. We specifically conducted the Wald test with k-1 degrees of freedom using the MODEL TEST command in Mplus 8.6 (Muthen & Muthen, 1998–2017) to assess the differences in paths between high and low levels of social support in the ARCL models. We used the median split (Mdn = 69, range: 32–84) to characterize the low (below the median, n = 48) and high (above the median, n = 48) levels of social support. Models were estimated using Mplus version 8.6 (Muthen & Muthen, 1998–2017) with full-information maximum likelihood (FIML) estimation (Enders & Bandalos, 2001) to retain cases with missing outcome data.

3 | RESULTS

3.1 | Descriptive statistics and correlations

Table 2 presents unweighted means, standard deviations, and bivariate correlations among all study variables. Mothers with higher levels of monthly income perceived and reported more social support

TABLE 2 Means, standard deviations, and correlations among study variables

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Household monthly income	---																
2	Maternal education level	−0.06	---															
3	Infant biological sex	0.04	0.07	---														
4	COVID T1	−0.07	0.01	−0.04	---													
5	Maternal EA T1 (play)	0.08	−0.08	0.16	−0.00	---												
6	Maternal EA T2 (play)	0.10	−0.22	−0.16	−0.04	0.04	---											
7	Maternal EA T1 (frustration)	0.01	−0.08	−0.09	0.06	0.24	0.01	---										
8	Maternal EA T2 (frustration)	−0.07	−0.20	−0.15	0.03	0.28*	0.20	0.33**	---									
9	Child responsiveness T1 (play)	0.20	0.00	0.15	0.06	0.69***	−0.03	0.18	0.19	---								
10	Child responsiveness T2 (play)	0.18	0.03	−0.06	−0.05	0.16	0.63***	0.08	0.23*	0.09	---							
11	Child responsiveness T1 (frustration)	0.09	−0.15	0.00	−0.25*	0.10	0.03	0.37***	0.00	0.13	0.04	---						
12	Child responsiveness T2 (frustration)	0.02	−0.20	−0.01	−0.27**	0.25*	0.01	0.10	0.63***	0.14	0.28**	−0.04	---					
13	Child involvement T1 (play)	0.21	−0.09	0.10	−0.02	0.67***	0.00	0.25*	0.15	0.85***	0.13	0.13	0.13	---				
14	Child involvement T2 (play)	0.20*	−0.00	−0.07	−0.20*	0.08	0.67***	0.02	0.22*	0.03	0.87***	0.07	0.29**	0.07	---			
15	Child involvement T1 (frustration)	0.06	−0.17	−0.04	−0.12	0.18	0.12	0.45***	0.11	0.19	0.15	0.83***	−0.01	0.20	0.13	---		
16	Child involvement T2 (frustration)	−0.07	−0.24*	−0.06	−0.18	0.27*	−0.00	0.20	0.64***	0.12	0.24*	−0.05	0.84***	0.13	0.20	−0.00	---	
17	Social support	0.29**	0.01	−0.12	−0.15	−0.01	0.09	0.18	0.18	−0.14	0.00	0.14	0.00	−0.09	0.05	0.07	0.00	---
Mean		4.58	9.39	-	-	5.80	5.73	5.67	5.80	5.50	5.80	4.89	5.34	4.81	5.57	4.43	5.11	68.33
SD		1.28	19.07	-	-	0.60	0.81	0.56	0.74	0.84	0.90	0.77	0.82	1.11	1.07	0.69	0.79	10.86

Note: $N = 110$, Infant biological sex: 1 = female, 2 = male; EA = emotion availability; T1 = Time 1 (3 months of infant age), T2 = (12 months of infant age), COVID T1 = T1 assessment was conducted during the COVID-19 pandemic.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

during the COVID-19 pandemic than those with lower levels of monthly income. In addition, at each time point and during both play and frustration tasks, maternal EA was highly and positively associated with both child EA scales (i.e., responsiveness and involvement). Maternal EA assessed through the frustration task at two time points was also positively associated. By contrast, in both play and frustration tasks, we found no significant associations between child responsiveness and involvement at T1 (pre-pandemic) and child responsiveness and involvement at T2 (during the pandemic), respectively.

3.2 | Continuity in EA

Overall, for both play *Wald's χ2 (1)* = 0.51, $p = 0.47$ and frustration *Wald's χ2 (1)* = 1.62, $p = 0.20$ tasks, maternal EA did not change significantly from T1 to T2. However, child involvement significantly increased for both play *Wald's χ2 (1)* = 21.42, $p < 0.001$ and frustration tasks *Wald's χ2 (1)* = 34.03, $p < 0.001$. Likewise, child responsiveness increased between the two time points when it was assessed through the frustration *Wald's χ2 (1)* = 13, $p < 0.01$ and the play tasks *Wald's χ2 (1)* = 5.64, $p = 0.01$.

Next, we examined whether the low and high social support groups differ in maternal and child EA continuity from T1 to T2 assessment. Results showed that, for the low social support group, there were no significant differences between maternal EA at T1 and T2 for both play *Wald's* $\chi^2(1) = 1.27$, $p = 0.26$ and frustration *Wald's* $\chi^2(1) = 1.46$, $p = 0.22$ tasks, suggesting that maternal EA did not change over time. Similarly, within the high social support group, maternal EA at T1 and T2 did not differ (play: *Wald's* $\chi^2(1) = 0.06$, $p = 0.80$; frustration: *Wald's* $\chi^2(1) = 2.00$, $p = 0.15$). By contrast, child responsiveness significantly increased from T1 to T2 assessment for the high social support group and within both play *Wald's* $\chi^2(1) = 4.99$, $p = 0.02$ and frustration *Wald's* $\chi^2(1) = 4.58$, $p = 0.03$ tasks. Child responsiveness also increased significantly for the low social support group when assessed through the frustration *Wald's* $\chi^2(1) = 7.27$, $p = 0.007$, but not the play task *Wald's* $\chi^2(1) = 0.45$, $p = 0.50$. Similarly, child involvement increased for both low social support (play: *Wald's* $\chi^2(1) = 7.15$, $p = 0.007$; frustration: *Wald's* $\chi^2(1) = 14.18$, $p < 0.001$) and high support groups (play: *Wald's* $\chi^2(1) = 8.76$, $p = 0.003$; frustration: *Wald's* $\chi^2(1) = 16.65$, $p < 0.001$) during both tasks. Overall, there was no evidence for different patterns of continuity in maternal and child EA between high and low levels of social support.

3.3 | Stability in EA

To examine stability (i.e., rank-order associations) in EA between the two assessments, we estimated two separate ARCL models for play and frustration (see Table 3).

3.4 | EA during play

For the play task, results of the unconstrained model for the full sample showed no significant autoregressive associations for maternal EA, child responsiveness, and child involvement, suggesting that both maternal and child EA did not demonstrate stability from T1 to T2. Moreover, we found no significant cross-lagged associations between maternal EA and child EA dimensions between the two time points, suggesting that maternal EA at T1 did not predict child EA at T2, and vice versa.

TABLE 3 Standardized coefficients for the autoregressive and cross-lagged associations between maternal and child emotional availability during the play and frustration tasks

	Play			Frustration		
	Full sample			Full sample		
Path coefficients	***β***	***SE***	***p***	***β***	***SE***	***p***
Maternal education → Maternal EA 12m	−0.20	0.11	0.08	−0.13	0.12	0.26
Household income → Maternal EA 12m	0.09	0.10	0.40	−0.04	0.10	0.67
Child sex → Maternal EA 12m	−0.15	0.10	0.13	−0.08	0.10	0.44
COVID T1 → Maternal EA 12m	−0.02	0.10	0.83	−0.06	0.11	0.57
Maternal education → Child resp 12m	0.08	0.12	0.47	−0.13	0.12	0.30
Household income → Child resp 12m	0.16	0.10	0.11	0.06	0.11	0.59
Child sex → Child resp 12m	−0.09	0.10	0.34	0.00	0.10	0.94
COVID T1 → Child resp 12m	−0.03	0.10	0.72	−0.33	0.10	<0.01
Maternal education → Child inv 12m	0.03	0.11	0.75	−0.17	0.12	0.17
Household income → Child inv 12m	0.20	0.10	0.05	−0.02	0.11	0.85
Child sex → Child inv 12m	−0.10	0.10	0.31	−0.02	0.10	0.83
COVID T1 → Child inv 12m	−0.18	0.10	0.06	−0.25	0.11	0.02
Maternal EA 3m ⇔ Child resp 3m	0.69	0.06	<0.001	0.37	0.09	<0.001
Maternal EA 3m ⇔ Child inv 3m	0.66	0.06	<0.001	0.46	0.08	<0.001
Child resp 3m ⇔ Child inv 3m	0.85	0.03	<0.001	0.83	0.03	<0.001
Maternal EA 12m ⇔ Child resp 12m	0.65	0.06	<0.001	0.65	0.06	<0.001
Maternal EA 12m ⇔ Child inv 12m	0.70	0.05	<0.001	0.61	0.07	<0.001
Child resp 12m ⇔ Child inv 12m	0.87	0.02	<0.001	0.81	0.04	<0.001
Autoregressive paths						
Maternal EA 3m → Maternal EA 12m	0.11	0.15	0.45	0.37	0.13	<0.01
Child resp 3m → Child resp 12m	−0.15	0.22	0.50	−0.39	0.20	0.05
Child inv 3m → Child inv 12m	0.01	0.21	0.93	0.10	0.21	0.64
Cross-lagged paths						
Maternal EA 3m→ Child resp 12m	0.24	0.15	0.11	0.19	0.13	0.16
Maternal EA 3m→ Child inv 12m	0.15	0.15	0.31	0.30	0.13	0.02
Child resp 3m → Maternal EA 12m	−0.07	0.22	0.74	−0.41	0.20	0.03
Child inv 3m → Maternal EA 12m	−0.02	0.21	0.92	0.25	0.20	0.22
Child resp 3m → Child inv 12m	−0.09	0.21	0.68	−0.37	0.20	0.07
Child inv 3m → Child resp 12m	0.07	0.21	72	0.15	0.20	0.47

Note: $N = 110$.

Abbreviations: EA, emotional availability; Child resp, child responsiveness; Child inv, child involvement.

Figure 1 presents the results of the ARCL models for the low and high social support groups during the play task. To test whether the autoregressive and cross-lagged paths significantly differ between the low and high social support groups, we performed multigroup comparisons between the unconstrained model and models in which each path was constrained to equality across the groups. The results of the omnibus Wald's test of parameter constraints indicated that the two groups appeared to be different in the pathways predicting maternal EA at T2 from both child involvement *Wald's* χ^2 (1) = 8.04,

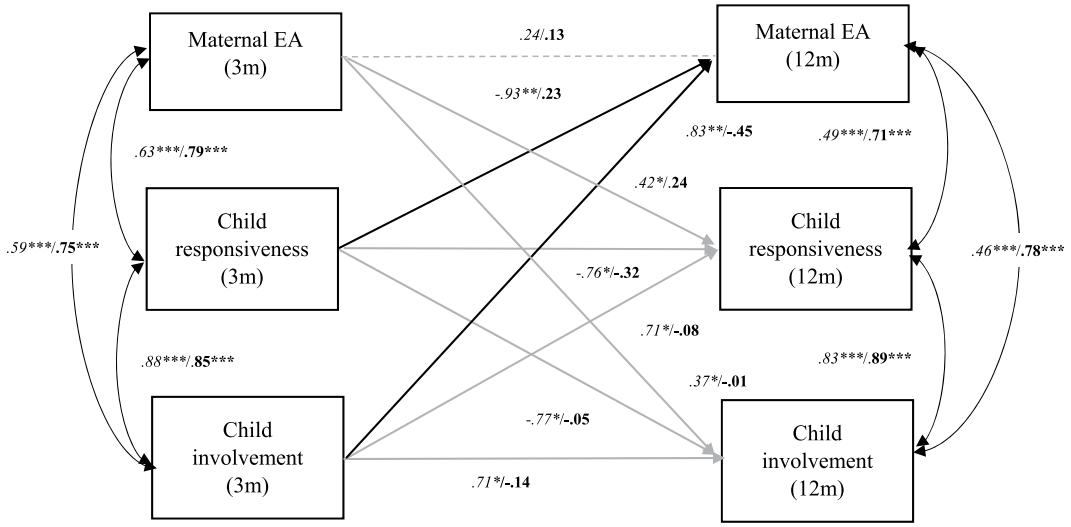

FIGURE 1 Multigroup Comparisons Based on Maternal Perceived Social Support in the Play ARCL Model. *Note*: Standardized Coefficients for the Multigroup Comparisons in the Play ARCL Model. Italic values represent coefficients in the low social support group, and bold values represent coefficients in the high social support group. Dashed lines represent nonsignificant paths for both groups, gray lines are significant paths but with no significant group differences, and black lines are both significant paths and significant group differences. Covariates were not included in the figure for clarity. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

$p = 0.004$ and responsiveness *Wald's* χ^2 (1) = 6.00, $p = 0.01$ at T1. Specifically, these paths were significant only in the low social support groups (responsiveness: $\beta = -0.93$, $p = 0.003$; involvement: $\beta = 0.83$, $p = 0.007$). No other paths differed significantly between the two groups.

3.5 | EA during frustration

Table 3 presents the results of the ARCL models examining the stability of maternal and child EA across the two time points during the frustration task. First, the unconstrained ARCL model revealed a significant autoregressive association for maternal EA within the full sample ($\beta = 0.37$, $p = 0.004$) but not for child responsiveness and involvement, indicating the stability of maternal EA over time. Maternal EA at T1 was also positively associated with child involvement at T2 ($\beta = 0.30$, $p = 0.02$). At T1, child responsiveness negatively predicted maternal EA at T2 ($\beta = -0.41$, $p = 0.03$). No other significant cross-lagged associations were identified within the full sample during the frustration task.

Figure 2 presents the results of the ARCL models for the low and high social support groups during the frustration task. Results of the omnibus Wald's test of parameter constraints indicated that the two groups differed in the autoregressive paths predicting child responsiveness *Wald's* χ^2 (1) = 9.21, $p = 0.002$ and child involvement *Wald's* χ^2 (1) = 7.09, $p = 0.007$) at T2. Specifically, in the high social support group, the autoregressive path was significant and positive for responsiveness ($\beta = 0.95$, $p = 0.02$), and significant and negative for involvement ($\beta = -1.31$, $p = 0.002$). In the low social support group, the autoregressive path was negative and significant for child responsiveness ($\beta = -0.37$, $p = 0.04$).

With respect to the cross-lagged paths, the two groups differed in the associations between child involvement *Wald's* χ^2 (1) = 8.96, $p = 0.002$ and responsiveness *Wald's* χ^2 (1) = 6.08, $p = 0.03$ at T1 in

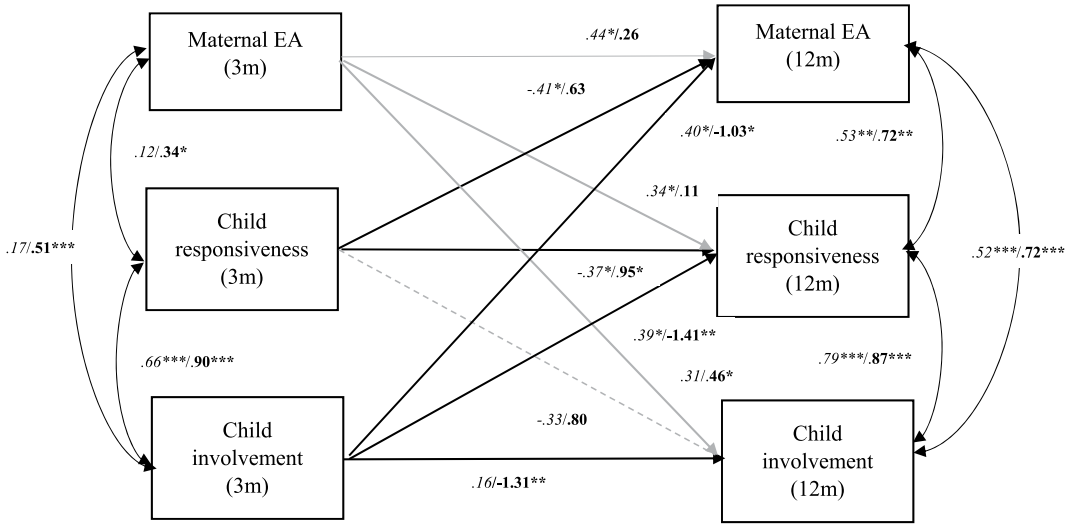

FIGURE 2 Multigroup Comparisons Based on Maternal Perceived Social Support in the Frustration ARCL Model. *Note*: Standardized coefficients for the multigroup comparisons in the frustration ARCL model. Italic values represent coefficients in the low social support group, and bold values represent coefficients in the high social support group. Dashed lines represent nonsignificant paths for both groups, gray lines are significant paths but with no significant group differences, and black lines are both significant paths and significant group differences. Covariates were not included in the figure for clarity. $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

predicting maternal EA at T2. Specifically, in the low social support group, child responsiveness at T1 was negatively associated with maternal EA at T2 ($\beta = -0.41$, $p = 0.03$), whereas child involvement at T1 was positively related to maternal EA at T2 ($\beta = 0.40$, $p = 0.03$).

4 | DISCUSSION

Past research has shown developmental increases in both dimensions of child EA (i.e., responsiveness and involvement) through the first 2 years of life (Biringen et al., 1999; Célia et al., 2018; Lovas, 2005). In the current study, we leveraged the COVID-19 pandemic to investigate whether exposure to an acute environmental stressor may disturb the normative developmental patterns of EA in infants and caregivers. Extant research suggests that chronic experiences of stress may compromise mothers' ability to be sensitive to children's emotional and distress cues and respond appropriately and efficiently (Breaux et al., 2016; Goodman & Brumley, 1990; Lovejoy et al., 2000). The overarching goal of the present study was to examine individual differences in developmental patterns of continuity (i.e., consistency in mean level across time) and stability (rank-order associations) in maternal and child EA from before to during the global COVID-19 pandemic, when infants were 3 and 12 months old, respectively. Furthermore, we applied a transactional approach to test the possible bidirectionality between maternal and child EA within a dyadic relationship between the two time points. We observed maternal and child EA during play and frustration tasks to assess whether the mother-child dyad may interact and respond distinctively in stressful versus nonstressful settings. The second aim of this study was to examine whether mothers' perceived level of social support during the pandemic may serve as a potential resilience factor that mitigates the negative effects that the COVID-19 pandemic may have on the development of EA, and moderate continuity, stability, and bidirectional associations in the observed mother-child EA from before to during the pandemic.

4.1 | Continuity of EA across the pandemic

Overall, maternal EA assessed through both play and frustration tasks demonstrated patterns of continuity across time, with no significant mean-level changes from before to during the COVID-19 pandemic. Based on the extant research that documents the adverse effects of the COVID-19 pandemic on caregiving and parents' mental health (McRae et al., 2021; Sari et al., 2021; Taubman-Ben-Ari et al., 2021), we expected maternal EA to decrease across the two assessments. However, our findings indicated that the pandemic did not impact maternal EA in our sample. These inconsistent findings can be attributed to the different designs and measures used across studies to assess parent-child relationship quality during the COVID-19 outbreak (Dang et al., 2020). Past studies exclusively used self-report measures that mainly capture parents' perceptions of caregiving and child behaviors and differ based on their psychometric properties. However, in the present study, we used observational measures of parenting both before and during the pandemic to minimize the potential biases associated with self-report measures and conduct a more objective assessment of parent-child EA in specific settings (i.e., play and frustration tasks). Our findings are also consistent with prior research that indicated no associations between mother's experiences of psychosocial stress (i.e., maternal postpartum stress, depression, and substance use) and EA (Rossen et al., 2018, 2019). Similarly, a recent study by Layton et al. (2021) showed that mothers who were seeking treatment for postpartum depression during the COVID-19 reported increased depression and anxiety symptoms compared to the pre-pandemic period. However, there were no differences in their report on the quality of mother-infant bonding pre to during the pandemic assessment. The authors suggested that the lack of change in maternal-infant bonding scores may be due to mothers' ability to mobilize additional personal strengths or having additional support from their partners during this period (Layton et al., 2021).

Interestingly, and consistent with pre-pandemic research (e.g., Biringen et al., 1999; Célia et al., 2018), both dimensions of child EA increased between the two time points. Together, these findings indicate that, contrary to our expectation, the COVID-19 pandemic did not disturb the typical development of EA in infants as they continued to show increases in social responsiveness and involvement with their caregivers over time. Given the recent concerns raised regarding the negative effects of COVID-related practices on infants' social development, these findings are reassuring. For example, it has been suggested that social distancing and wearing face masks can hinder infants' ability to develop facial processing and orientating abilities and accurately recognize emotions (Green et al., 2021). It is possible that during the first year of life, particularly in times when lockdowns and social distancing were implemented, infants spent most of their time interacting with their mask-free caregivers in the home, preserving the typical patterns of face-to-face social exchanges. Mothers may have also extended their maternity leave beyond the typical 26-week period in Israel due to factors associated with the COVID-19 pandemic, such as childcare closures during lockdowns and the fear of high infection rates in childcare settings. Further research is needed to examine whether the COVID-19 pandemic has resulted in different social communication patterns with unfamiliar people due to infants' reduced exposure to these types of interactions.

4.2 | Stability of EA across the pandemic

Next, we examined whether and how patterns of stability in maternal and child EA may vary across contexts (nondistress vs. stress-inducing settings). Our findings showed that the stability of maternal and child EA is context dependent. Specifically, we found no evidence for stability in mother-child EA during the play task across the two assessment points. Contrary to our findings, previous pre-pandemic

studies have reported moderate stability in mother-child EA over time (Bornstein et al., 2010; Célia et al., 2018). Several factors may have contributed to the individual differences in stability of EA evident in our sample. For example, maternal emotional distress during the pandemic could have altered mothers' ability to be emotionally available toward their infants. Maternal prenatal depressive symptoms during COVID-19 predicted impaired maternal-infant bonding after postpartum (Kornfield et al., 2021). Similarly, parents' emotional distress during lockdown predicted decreases in warm/responsive parenting and parent-child relationship quality (McRae et al., 2021). Moreover, the instability in mother-child EA during play could be because mother and child play interactions were observed and assessed in two different contexts before and during the pandemic. At the pandemic assessment, the play task was conducted online through the Zoom video platform, which added additional complexity to the nature of the task. Mothers were required to make specific preparations and technical adjustments ahead of time, and perhaps this made the play task less natural and more stressful than the play task that took place at T1 during a home visit. Moreover, our assessment of the mother-infant dyads at T1 was involved the face-to-face interaction without any toys. However, during the pandemic at T2, the implemented play task included both structured-play and free-play tasks. Taken together, the variation in the nature and implementation of the play tasks between the two time points is a limitation of the study that should be considered when interpreting the findings.

Contrary to the play task, maternal EA demonstrated moderate stability across the two time points in the frustration task. These findings suggest that mothers' ability to respond to their children's distress cues continued to be stable despite the uncertainty and turmoil that they experienced during this unprecedented time. In addition, we found evidence supporting bidirectionality between maternal and child EA for the frustration task. Specifically, maternal EA prior to the onset of the pandemic predicted child involvement during the pandemic. Children who received more emotionally available care from their mothers at 3 months later became more involving, initiated more interactions with their mothers, and relied on their reassurance at times of frustration. Attachment theory emphasizes the contribution of sensitive and responsive caregiving in times of distress to children's trust in the parent–child relationship (Ainsworth, 1989). Caregivers' sensitive responses to the child's negative affect demonstrate to the child that these emotional expressions are tolerable and can be regulated via social interactions with significant others (Sroufe, 1995). Therefore, it is possible that EA in stressful contexts particularly promotes children's ability to involve and rely on their mothers in times of distress. In addition, child responsiveness before the pandemic was negatively associated with maternal EA during the pandemic. It is important to consider the range of the responsiveness scale in our sample to understand this finding, which may appear as counterintuitive at first. The lowest score in our sample for child responsiveness was 3.5, reflecting children with elevated negative affect in the mother-child interaction. Mothers with more irritable children may invest greater resources to be emotionally available to their children compared to mothers of children who are less emotionally reactive. For example, characteristics, such as irritability during the first months of life, have been associated with higher maternal contact and stimulation later in infancy (Calkins et al., 2004; Crockenberg, 1986; Kiff et al., 2011; Sanson & Rothbart, 1995). These associations may be stronger in stressful contexts that elicit more negative affective expressions.

4.3 | The moderating role of social support

Mothers' perceived levels of social support did not moderate patterns of continuity in maternal and child EA. However, in both contexts, we found evidence for individual differences in the bidirectional associations and stability of mother-child EA based on mothers' perceived levels of social support

during the pandemic. For both play and frustration, the two dimensions of pre-pandemic child EA predicted maternal EA during the pandemic, but only in the *low* social support group and not in the high social support group. Specifically, child involvement at pre-pandemic was positively associated with maternal EA during the pandemic. That is, when infants displayed high levels of involvement prior to the onset of pandemic, their mothers displayed higher levels of EA during the pandemic. Conversely, child pre-pandemic responsiveness was negatively associated with maternal EA during the pandemic. These findings suggest that, in the face of low levels of social support, mothers' parenting behaviors were more likely to be shaped and influenced by their infants' behaviors. It is possible that mothers with lower social support spent more time as exclusive caregivers of their infants and were more strongly affected by their behavior. Additionally, parenting behaviors of mothers receiving higher levels of support could have been impacted by additional factors, such as the quality of their relationships with their friends, partners, and extended family.

4.4 | Strengths, limitations, and future directions

To our knowledge, this is the first study that examined the developmental patterns of mother and child EA during the COVID-19 pandemic. The study's unique design and observational assessment of mother-child interaction before and during the pandemic in two contexts enabled us to explore the potential effects of this acute environmental stressor on continuity and stability in mothers and infants' EA. Despite these strengths, the present study has several limitations worth noting as they could provide directions for future studies. First, the research design of this study was altered due to the COVID-19 pandemic and the study was not originally designed to address these specific questions. Therefore, there are several methodological limitations that should be considered. For example, our assessment of caregiving behaviors is limited to mother and child EA, disregarding the role of fathers and other primary caregivers. Likewise, we investigated mothers perceived levels of social support as the only factor that moderates these associations and explain individual differences in patterns of stability and continuity in EA. However, as documented extensively by prior studies (Feinberg et al., 2021; Prime et al., 2020), other contextual and individual factors, such as caregivers' mental health and well-being, coping behaviors, child temperamental characteristics, financial resources, and preexisting trauma, may be involved in exacerbating or mitigating the effects of the COVID-19 pandemic on family functioning and child development. Future studies should consider these intervening factors when they examine individual differences in patterns of EA, particularly under stressful conditions.

Second, our assessment of maternal and child's EA was restricted to two time points. To comprehensively explore the effects of the pandemic on trajectories of child socioemotional development, future studies should observe and assess parent and child EA for an extended period and across multiple time points. This is particularly important as the COVID-19 pandemic is still ongoing, and some of its effects on family well-being and child adjustment are likely to be longstanding. Relatedly, for some families (~22%), the T1 assessment took place at the beginning of the COVID-19 pandemic. Although we controlled for these differences, families assessed before and after the pandemic may show different patterns of changes in EA. Another limitation of this study is that we did not control for mothers' pre-pandemic perceived levels of social support. Changes in mothers' sources of social support per se may likely be associated with individual differences in patterns of stability and continuity of mother and child EA. For instance, the effects of social support are expected to be less tangible and determinant among parents who experienced equivalent levels of support before and during the pandemics. By contrast, the moderating effects of social support would be more substantial among those who experienced significant decreases in their social resources throughout the pandemic.

In summary, the current study's findings indicate that the COVID-19 pandemic has not adversely impacted the *continuity* of maternal and child EA as one may expect. Despite physical and social distancing mandates, closure of childcare centers, and restrictions to families' social activities and daily routines, Israeli infants showed developmentally appropriate increases in their social responsiveness and involvement with their caregivers across time. Similarly, we observed mean-level consistency in maternal EA from before to during the pandemic. However, the results suggested that *stability* and mother-child bidirectional associations in EA were evident only in the stressful and frustrating contexts and not in play interactions. Moreover, these associations seemed to be stronger among mothers reporting low levels of social support. These findings lend additional support to the growing literature that suggests that the COVID-19 pandemic has not impacted all families in the same way (Gunnar, 2021).

ACKNOWLEDGMENTS

This study was supported by funding from the Israel Science Foundation (879/18) awarded to N. Gueron-Sela.

CONFLICT OF INTEREST

The authors declare no conflicts of interest with regard to the funding source for this study.

REFERENCES

Ainsworth, M. S. (1989). Attachments beyond infancy. *American Psychologist*, *44*(4), 709–716. https://doi.org/10.1037/0003-066x.44.4.709

Atzaba-Poria, N., Meiri, G., Millikovsky, M., Barkai, A., Dunaevsky-Idan, M., & Yerushalmi, B. (2010). Father–child and mother–child interaction in families with a child feeding disorder: The role of paternal involvement. *Infant Mental Health Journal*, *31*(6), 682–698. https://doi.org/10.1002/imhj.20278

Bell, R. Q. (1968). A reinterpretation of direction of effects in studies of socialization. *Psychological Review*, *75*(2), 81–95. https://doi.org/10.1037/h0025583

Belsky, J. (1984). The determinants of parenting: A process model. *Child Development*, *55*(1), 83–96. https://doi.org/10.2307/1129836

Biringen, Z. (2008). *The emotional availability (EA) scales* (4 ed). Department of Human Development and Family Studies, Colorado State University.

Biringen, Z., Derscheid, D., Vliegen, N., Closson, L., & Easterbrooks, M. A. (2014). Emotional availability (EA): Theoretical background, empirical research using the EA Scales, and clinical applications. *Developmental Review*, *34*(2), 114–167. https://doi.org/10.1016/j.dr.2014.01.002

Biringen, Z., Emde, R. N., Brown, D., Lowe, L., Myers, S., & Nelson, D. (1999). Emotional availability and emotion communication in naturalistic mother-infant interactions: Evidence for gender relations. *Journal of Social Behavior & Personality*, *14*(4), 463.

Blacher, J., Baker, B. L., & Kaladjian, A. (2013). Syndrome specificity and mother–child interactions: Examining positive and negative parenting across contexts and time. *Journal of Autism and Developmental Disorders*, *43*(4), 761–774. https://doi.org/10.1007/s10803-012-1605-x

Bornstein, M. H., Suwalsky, J. T., Putnick, D. L., Gini, M., Venuti, P., de Falco, S., Heslington, M., Zingman de Galperin, C., & Zingman de Galperín, C. (2010). Developmental continuity and stability of emotional availability in the family: Two ages and two genders in child-mother dyads from two regions in three countries. *International Journal of Behavioral Development*, *34*(5), 385–397. https://doi.org/10.1177/0165025409339080

Breaux, R. P., Harvey, E. A., & Lugo-Candelas, C. I. (2016). The role of parent psychopathology in emotion socialization. *Journal of Abnormal Child Psychology*, *44*(4), 731–743. https://doi.org/10.1007/s10802-015-0062-3

Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology*, *Theoretical models of human development* (6th ed., Vol. 1, pp. 793–828). Wiley.

Brown, S. M., Doom, J. R., Lechuga-Peña, S., Watamura, S. E., & Koppels, T. (2020). Stress and parenting during the global COVID-19 pandemic. *Child Abuse & Neglect*, *110*, 104699. https://doi.org/10.1016/j.chiabu.2020.104699

Calkins, S. D., Hungerford, A., & Dedmon, S. E. (2004). Mothers' interactions with temperamentally frustrated infant-s*Infant Mental Health Journal*, *25*(3), 219–239.

Carr, A. (2015). The evolution of systems theory. In T. L. Sexton & J. Lebow (Eds.), *Handbook of family therapy* (pp. 13–29). https://doi.org/10.4324/9780203123584-2

Célia, M. G., Stack, D. M., & Serbin, L. A. (2018). Developmental patterns of change in mother and child emotional availability from infancy to the end of the preschool years: A four-wave longitudinal study. *Infant Behavior and Development*, *52*, 76–88. https://doi.org/10.1016/j.infbeh.2018.05.005

Cohen, E., & Shulman, C. (2019). Mothers and toddlers exposed to political violence: Severity of exposure, emotional availability, parenting stress, and toddlers' behavior problems. *Journal of Child & Adolescent Trauma*, *12*(1), 131–140. https://doi.org/10.1007/s40653-017-0197-1

Collins, L. M., & Sayer, A. G. (2001). *New methods for the analysis of change*. American Psychological Association.

Conger, R. D., Wallace, L. E., Sun, Y., Simons, R. L., McLoyd, V. C., & Brody, G. H. (2002). Economic pressure in African American families: A replication and extension of the family stress model. *Developmental Psychology*, *38*(2), 179–193. https://doi.org/10.1037/0012-1649.38.2.179

Crockenberg, S. B. (1986). *Are temperamental differences in babies associated with predictable differences in care giving?* (pp. 53–73). New Directions for Child and Adolescent Development.

Dang, J., King, K. M., & Inzlicht, M. (2020). Why are self-report and behavioral measures weakly correlated? *Trends in Cognitive Sciences*, *24*(4), 267–269. https://doi.org/10.1016/j.tics.2020.01.007

Davidov, M., & Grusec, J. E. (2006). Untangling the links of parental responsiveness to distress and warmth to child Outcomes. *Child Development*, *77*(1), 44–58. https://doi.org/10.1111/j.1467-8624.2006.00855.x

Deák, G. O., Krasno, A. M., Jasso, H., & Triesch, J. (2018). What leads to shared attention? Maternal cues and infant responses during object play. *Infancy*, *23*(1), 4–28. https://doi.org/10.1111/infa.12204

Din, L., Pillai Riddell, R., & Gordner, S. (2009). Brief report: Maternal emotional availability and infant pain-related distress. *Journal of Pediatric Psychology*, *34*(7), 722–726. https://doi.org/10.1093/jpepsy/jsn110

Dittrich, K., Fuchs, A., Führer, D., Bermpohl, F., Kluczniok, D., Attar, C. H., Jaite, C., Zietlow, A. L., Licata, M., Reck, C., Herpertz, S. C., Brunner, R., Mohler, E., Resch, F., Winter, S. M., Lehmkuhl, U., & Bödeker, K. (2017). Observational context of mother-child interaction: Impact of a stress context on emotional availability. *Journal of Child and Family Studies*, *26*(6), 1583–1591. https://doi.org/10.1007/s10826-017-0678-8

Domínguez-Álvarez, B., López-Romero, L., Isdahl-Troye, A., Gómez-Fraguela, J. A., & Romero, E. (2020). Children coping, contextual risk and their interplay during the COVID-19 pandemic: A Spanish case. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.577763

Easterbrooks, M. A., Bureau, J. F., & Lyons-Ruth, K. (2012). Developmental correlates and predictors of emotional availability in mother-child interaction: A longitudinal study from infancy to middle childhood. *Development and Psychopathology*, *24*(1), 65–78. https://doi.org/10.1017/S0954579411000666

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, *8*(3), 430–457. https://doi.org/10.1207/s15328007sem0803_5

Feinberg, M. E., Mogle, J. A., Lee, J. K., Tornello, S. L., Hostetler, M. L., Cifelli, J. A., Bai, S., & Hotez, E. (2021). Impact of the COVID-19 pandemic on parent, child, and family functioning. *Family Process*, *61*(1), 361–374. https://doi.org/10.1111/famp.12649

Flykt, M., Punamäki, R. L., Belt, R., Biringen, Z., Salo, S., Posa, T., & Pajulo, M. (2012). Maternal representations and emotional availability among drug-abusing and nonusing mothers and their infants. *Infant Mental Health Journal*, *33*(2), 123–138. https://doi.org/10.1002/imhj.21313

Gelir, I., & Duzen, N. (2021). Children's changing behaviors and routines, challenges and opportunities for parents during the COVID-19 pandemic. *Education*, *3–13*(7), 1–11. https://doi.org/10.1080/03004279.2021.1921822

Goldsmith, H. H., & Rothbart, M. K. (1996). *The laboratory temperament assessment battery (LabTAB): Locomotor version 3.0 technical manual*. Department of Psychology, University of Wisconsin.

Goodman, S. H., & Brumley, H. E. (1990). Schizophrenic and depressed mothers: Relational deficits in parenting. *Developmental Psychology*, *26*(1), 31–39. https://doi.org/10.1037/0012-1649.26.1.31

Green, J., Staff, L., Bromley, P., Jones, L., & Petty, J. (2021). The implications of face masks for babies and families during the COVID-19 pandemic: A discussion paper. *Journal of Neonatal Nursing*, *27*(1), 21–25. https://doi.org/10.1016/j.jnn.2020.10.005

Grusec, J. E., & Davidov, M. (2010). Integrating different perspectives on socialization theory and research: A domain-specific approach. *Child Development*, *81*(3), 687–709. https://doi.org/10.1111/j.1467-8624.2010.01426.x

Gunnar, M. R. (2021). Not in the same boat: Commentary on COVID-19 special section. *Child Development*, *92*(5), e904–e906.

Günther-Bel, C., Vilaregut, A., Carratala, E., Torras-Garat, S., & Pérez-Testor, C. (2020). A Mixed-method study of individual, couple, and parental functioning during the state-regulated COVID-19 lockdown in Spain. *Family Process*, *59*(3), 1060–1079. https://doi.org/10.1111/famp.12585

Haber, M. G., Cohen, J. L., Lucas, T., & Baltes, B. B. (2007). The relationship between self-reported received and perceived social support: A meta-analytic review. *American Journal of Community Psychology*, *39*(1), 133–144. https://doi.org/10.1007/s10464-007-9100-9

Helgeson, V. S. (1993). Two important distinctions in social support: Kind of support and perceived versus received 1. *Journal of Applied Social Psychology*, *23*(10), 825–845. https://doi.org/10.1111/j.1559-1816.1993.tb01008.x

Humphreys, K. L., Myint, M. T., & Zeanah, C. H. (2020). Increased risk for family violence during the COVID-19 pandemic. *Pediatrics*, *146*(1). https://doi.org/10.1542/peds.2020-0982

Kiff, C. J., Lengua, L. J., & Zalewski, M. (2011). Nature and nurturing: Parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, *14*(3), 251–301. https://doi.org/10.1007/s10567-011-0093-4

Kim, B. R., Teti, D. M., & Cole, P. M. (2012). Mothers' affect dysregulation, depressive symptoms, and emotional availability during mother–infant interaction. *Infant Mental Health Journal*, *33*(5), 469–476. https://doi.org/10.1002/imhj.21326

Korja, R., & McMahon, C. (2021). Maternal prenatal mood problems and lower maternal emotional availability associated with lower quality of child's emotional availability and higher negative affect during still-face procedure. *Infancy*, *26*(6), 901–919. https://doi.org/10.1111/infa.12428

Kornfield, S. L., White, L. K., Waller, R., Njoroge, W., Barzilay, R., Chaiyachati, B. H., Himes, M. M., Rodriguez, Y., Riis, V., Simonette, K., Elovitz, M. A., & Gur, R. E. (2021). Risk and resilience factors influencing postpartum depression and mother-infant bonding during COVID-19: Study examines postpartum depression and mother-infant bonding during the COVID-19 pandemic. *Health Affairs*, *40*(10), 1566–1574. https://doi.org/10.1377/hlthaff.2021.00803

Kuehn, B. M. (2020). Surge in child abuse, harm during COVID-19 pandemic reported. *JAMA*, *324*(7), 621. https://doi.org/10.1001/jama.2020.14433

Kwon, K. A., Bingham, G., Lewsader, J., Jeon, H. J., & Elicker, J. (2013). Structured task versus free play: The influence of social context on parenting quality, toddlers' engagement with parents and play behaviors, and parent–toddler language use. *Child and Youth Care Forum*, *42*(3), 207–224.

Layton, H., Owais, S., Savoy, C. D., & Van Lieshout, R. J. (2021). Depression, anxiety, and mother-infant bonding in women seeking treatment for postpartum depression before and during the COVID-19 pandemic. *Journal of Clinical Psychiatry*, *82*(4), 35146. https://doi.org/10.4088/jcp.21m13874

Lee, C. Y. S., Anderson, J. R., Horowitz, J. L., & August, G. J. (2009). Family income and parenting: The role of parental depression and social support. *Family Relations*, *58*(4), 417–430. https://doi.org/10.1111/j.1741-3729.2009.00563.x

Leerkes, E. M., Blankson, A. N., & O'Brien, M. (2009). Differential effects of maternal sensitivity to infant distress and nondistress on social-emotional functioning. *Child Development*, *80*(3), 762–775. https://doi.org/10.1111/j.1467-8624.2009.01296.x

Leerkes, E. M., & Siepak, K. J. (2006). Attachment linked predictors of women's emotional and cognitive responses to infant distress. *Attachment & Human Development*, *8*(1), 11–32. https://doi.org/10.1080/14616730600594450

Leerkes, E. M., Weaver, J. M., & O'Brien, M. (2012). Differentiating maternal sensitivity to infant distress and non-distress. *Parenting*, *12*(2–3), 175–184. https://doi.org/10.1080/15295192.2012.683353

Leinonen, J. A., Solantaus, T. S., & Punamäki, R. L. (2003). Social support and the quality of parenting under economic pressure and workload in Finland: The role of family structure and parental gender. *Journal of Family Psychology*, *17*(3), 409–418. https://doi.org/10.1037/0893-3200.17.3.409

Li, F., Luo, S., Mu, W., Li, Y., Ye, L., Zheng, X., Xu, B., Ding, Y., Ling, P., Zhou, M., & Chen, X. (2021). Effects of sources of social support and resilience on the mental health of different age groups during the COVID-19 pandemic. *BMC Psychiatry*, *21*(1), 16. https://doi.org/10.1186/s12888-020-03012-1

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*(404), 1198–1202. https://doi.org/10.1080/01621459.1988.10478722

Lovas, G. S. (2005). Gender and patterns of emotional availability in mother-toddler and father-toddler dyads. *Infant Mental Health Journal*, *26*(4), 327–353. https://doi.org/10.1002/imhj.20056

Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review*, *20*(5), 561–592. https://doi.org/10.1016/s0272-7358(98)00100-7

MacMillan, K. K., Lewis, A. J., Watson, S. J., Bourke, D., & Galbally, M. (2021). Maternal social support, depression and emotional availability in early mother-infant interaction: Findings from a pregnancy cohort. *Journal of Affective Disorders*, *292*, 757–765. https://doi.org/10.1016/j.jad.2021.05.048

McElwain, N. L., & Booth-Laforce, C. (2006). Maternal sensitivity to infant distress and nondistress as predictors of infant-mother attachment security. *Journal of Family Psychology*, *20*(2), 247–255. https://doi.org/10.1037/0893-3200.20.2.247

McRae, C. S., Overall, N. C., Henderson, A. M. E., Low, R. S. T., & Chang, V. T. (2021). Parents' distress and poor parenting during a COVID-19 lockdown: The buffering effects of partner support and cooperative coparenting. *Developmental Psychology*, *57*(10), 1623–1632. https://doi.org/10.1037/dev0001207

Palmer, C. F., Rindler, D., & Leverone, B. (2019). Moving into tummy time, together: Touch and transitions aid parent confidence and infant development. *Infant Mental Health Journal*, *40*(2), 277–288. https://doi.org/10.1002/imhj.21771

Paschall, K. W., & Mastergeorge, A. M. (2016). A review of 25 years of research in bidirectionality in parent-child relationships. *International Journal of Behavioral Development*, *40*(5), 442–451. https://doi.org/10.1177/0165025415607379

Prati, G., & Pietrantoni, L. (2010). The relation of perceived and received social support to mental health among first responders: A meta-analytic review. *Journal of Community Psychology*, *38*(3), 403–417. https://doi.org/10.1002/jcop.20371

Prime, H., Wade, M., & Browne, D. T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologist*, *75*(5), 631–643. https://doi.org/10.1037/amp0000660

Richter, N., & Reck, C. (2013). Positive maternal interaction behavior moderates the relation between maternal anxiety and infant regulatory problems. *Infant Behavior and Development*, *36*(4), 498–506. https://doi.org/10.1016/j.infbeh.2013.04.007

Rossen, L., Mattick, R. P., Wilson, J., Burns, L., Macdonald, J. A., Olsson, C., Allsop, S., Elliott, E. J., Jacobs, S., McCormack, C., & Hutchinson, D. (2018). Mother–infant and partner–infant emotional availability at 12 months of age: Findings from an Australian longitudinal study. *Infancy*, *23*(6), 893–916. https://doi.org/10.1111/infa.12247

Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, *81*(1), 6–22. https://doi.org/10.1111/j.1467-8624.2009.01378.x

Sanson, A., & Rothbart, M. K. (1995). Child temperament and parenting. In *Handbook of parenting* (Vol. 4, pp. 299–321). Lawrence Erlbaum Associates, Inc.

Sari, N. P., van IJzendoorn, M. H., Jansen, P., Bakermans-Kranenburg, M., & Riem, M. M. E. (2021). Higher levels of harsh parenting during the COVID-19 lockdown in The Netherlands. *Child Maltreatment*, *27*(2), 1–7. https://doi.org/10.1177/10775595211024748

Saunders, H., Kraus, A., Barone, L., & Biringen, Z. (2015). Emotional availability: Theory, research, and intervention. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.01069

Schneider, W., Waldfogel, J., & Brooks-Gunn, J. (2017). The Great Recession and risk for child abuse and neglect. *Children and Youth Services Review*, *72*, 71–81. https://doi.org/10.1016/j.childyouth.2016.10.016

Selig, J. P., & Little, T. D. (2012). Autoregressive and cross-lagged panel analysis for longitudinal data. In B. Laursen, T. D. Little, & N. A. Card (Eds.), *Handbook of developmental research methods*. Guilford Press.

Sroufe, L. A. (1995). *Emotional development: The organization of emotional life in the early years*. Cambridge University Press.

Taraban, L., Shaw, D. S., Leve, L. D., Natsuaki, M. N., Ganiban, J. M., Reiss, D., & Neiderhiser, J. M. (2019). Parental depression, overreactive parenting, and early childhood externalizing problems: Moderation by social support. *Child Development*, *90*(4), e468–e485. https://doi.org/10.1111/cdev.13027

Taubman-Ben-Ari, O., Ben-Yaakov, O., & Chasson, M. (2021). Parenting stress among new parents before and during the COVID-19 pandemic. *Child Abuse & Neglect*, *117*, 105080. https://doi.org/10.1016/j.chiabu.2021.105080

Volling, B. L., McElwain, N. L., Notaro, P. C., & Herrera, C. (2002). Parents' emotional availability and infant emotional competence: Predictors of parent-infant attachment and emerging self-regulation. *Journal of Family Psychology*, *16*(4), 447–465. https://doi.org/10.1037/0893-3200.16.4.447

Vrijhof, C. I., Euser, S., Bakermans-Kranenburg, M. J., van den Bulk, B. G., Bosdriesz, J. R., Linting, M., van Wijk, I. C., de Visser, I., & van IJzendoorn, M. H. (2020). Effects of parental sensitivity in different contexts on children's hot and cool effortful control. *Journal of Family Psychology*, *34*(4), 459–468. https://doi.org/10.1037/fam0000618

Yan, T., Hou, Y., & Deng, M. (2021). Direct, indirect, and buffering effect of social support on parental involvement among Chinese parents of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *52*(7), 1–13. https://doi.org/10.1007/s10803-021-05170-x

Zahn-Waxler, C., Robinson, J. L., & Emde, R. N. (1992). The development of empathy in twins. *Developmental Psychology*, *28*(6), 1038–1047, https://doi.org/10.1037/0012-1649.28.6.1038

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2

How to cite this article: Shakiba, N., Doron, G., Gordon-Hacker, A., Egotubov, A., Wagner, N. J., & Gueron-Sela, N. (2023). Mother-infant emotional availability through the COVID-19 pandemic: Examining continuity, stability, and bidirectional associations. *Infancy*, *28*(1), 34–55. https://doi.org/10.1111/infa.12517