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The quality of mother-child feeding interactions during COVID-19 pandemic: An exploratory study on an Italian sample

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## **The quality of mother-child feeding interactions during COVID-19 pandemic: an exploratory study on an Italian sample.**

**Abstract:** The COVID-19 pandemic has impacted the life of individuals in several realms such as work, education, and interpersonal interactions. Although many studies have considered the effect of the pandemic on the caregiving practices, no research has so far investigated the possible influence of the sanitary emergency on quality of mother-child exchanges during feeding. The present study aimed to do so in a sample of mothers and children (N=359) recruited in the general population. The SVIA was used to evaluate the quality of the dyadic feeding interactions; the SCL-90/R and the BSFC were employed to assess mothers' psychopathological risk and caregiving distress. The CBCL 1,5-5 was used to tap mothers' perception of their offspring's emotional/behavioral functioning. All measures were administered at 18 (T1) and 36 months (T2) of the children (respectively pre-pandemic and during the pandemic periods). Our results showed that the quality of the feeding interactions worsened from T1 to T2. Moreover, mothers' psychopathological risk, maternal depression, anxiety and obsessive-compulsion scores and caregiving distress significantly increased. Children's emotional/behavioral functioning also worsened during the pandemic, with significantly higher Internalizing and Externalizing scores. This is the first study to focus on the quality of mother-child feeding interactions during the pandemic. This exploratory study can expand the knowledge on the possible negative outcomes of COVID-19 on family life and caregiving.

**Keywords:** COVID-19; mother-child interactions; feeding; caregiving distress; psychopathological symptoms.

### **Introduction**

The COVID-19 is an unprecedented, highly contagious disease with a so far death toll of almost three million and fifty thousand individuals worldwide (WHO, 2021). The Sars-Cov-2 virus has spread all over the world starting from February 2020 and it continues to impact the life of individuals in several realms, from interpersonal and social interactions, to work and school routines; from freedom of movement and travel, to family household and caregiving styles (Xiong

et al., 2020). With schools closed in most affected countries, mothers and fathers have had to rearrange daily habits and re-assign responsibilities, due to lockdowns and lack of community support (Epifanio et al., 2021; Wang, Zhang, Zhao, Zhang, Jiang, 2020). In Italy in particular, the period from the 9<sup>th</sup> of March to the 3<sup>rd</sup> of May 2020 has been characterized by a global lockdown of non-essential services, and high rates of deaths among the population, especially among elderly individuals (Mazza, Ricci, Biondi, Colasanti, Ferracuti, Napoli & Roma, 2020).

Recent studies of families showed that these stressors have been strongly perceived by those caring for children (Fegert, Vitiello, Plener, Clemens, 2020). Some studies specifically focused on the possible consequences of the lockdown and quarantine (and of the pandemic in general) on parents and their children (Xiang, Zhang & Kuwahara, 2020; Wong, Ming, Maslow & Gifford, 2020); however, little is known about how and in which areas this heightened stress would influence relationships between children and parents (e.g. play, feeding). In a Developmental Psychopathology and Transactional perspective (Rutter, 1989; Sroufe, Egeland, Carlson & Collins, 2005), these negative outcomes may refer to the individual emotional well-being of the parent and of the children, and/or to the reduced quality of their interactions. With regards to adults, research has concentrated on the huge changes occurring in people's lives and the specific dangers that COVID-19 is posing to individuals' medical health, which have been associated with a surge of mental health problems (Franic & Dodig-Curkovic, 2020). In particular, adults have shown (and continue to show) symptoms of anxiety, insomnia, isolation, depression, and poor concentration (Lebel, MacKinnon, Bagshawe, Tomfohr-Madsen & Giesbrecht, 2020). Even more severe symptoms have been reported from quarantined individuals and those who lost a loved one, such as trauma-related mental health disorders, and emotional disturbance (Patrick et al., 2020). Children, on their part, are suggested to be exposed to alarming consequences. Worsening economic conditions and lockdowns can negatively affect their physical health, nutrition, care, and education; they can also suffer displacement, and family separations and can experience the burden of a distressing situation, in which almost every habit has been subverted and the future is uncertain (Fegert & Schulze, 2020). Predictability and stability, on the contrary, have been consistently indicated as key factors protecting children from both physical and psychological harm (Sroufe, 2009). These reflections, of course, apply to all families, and above all to those who were already experiencing difficulties (economic, environmental, social, and psychological) in the pre-pandemic period (Cameron et al., 2020). These outcomes, in fact, have been observed above all in subjects with pre-existing emotional and behavioral problems (Phelps & Sperry, 2020). However, even individuals who did not show clinical manifestations before the pandemic, seem to suffer the impact of this environmental risk factor that, by its characteristics, has greatly modified and impoverished

social interactions, imposing interpersonal distance, sometimes even within the same family (Gassman-Pines, Ananat & Fitz-Henley, 2020).

A bulk of previous literature has demonstrated that attentive and receptive parenting is critical for children's adaptive psychological development (Ainsworth, Bell, & Stayton, 1991; Field, 2000; Sroufe, 1985) and that face-to-face contact, positive facial expressions, and contingent communication are protective factors towards emotional-behavioral difficulties in children. (Field, Hernandez-Reif, & Diego, 2006). On the other hand, maternal anxiety (Creswell, Cooper, & Murray, 2015) and depression (Verkuijl et al., 2014), (Micali, Stavola, Ploubidis, Simonoff, & Treasure, 2014) have been linked to offspring negative outcomes. In fact, consolidated research has demonstrated that parental psychopathological symptoms are frequently associated with children's cognitive and socio-emotional development (Lau et al., 2018; Reupert & Maybery, 2016) by reducing parental sensitivity to children. Reduced sensitivity and contingency to offspring cues and needs may in fact increase the risk of inadequate support or comforting and harsh parenting (Wolford, Cooper, & McWey, 2019). In the field of child feeding, this could translate into an impairment of parents' ability to read hunger and satiety signals from the child, reduced emotional attunement and parental intrusive behaviors (e.g. forcing food in the mouth of the child, ignoring child's refusal to be fed, etc.). Recent studies focusing on families in the period of pandemic suggested that parents with younger children were suffering from higher psychopathological symptoms and perceived greater impoverishment of the quality of dyadic interactions compared to parents with older children (Patrick et al., 2020; Wu et al., 2020). The present longitudinal study aimed to evaluate the quality of mother-child interactions during feeding in dyads assessed prior and during the pandemic in a sample recruited in the general population. We hypothesized that the quality of feeding interactions would decrease, while psychopathological risk in mothers and children, and caregiving distress would increase during the COVID-19 pandemic.

## **Methods**

### ***Sample and Procedure***

Three hundred and fifty-nine (N=359) mothers and children were selected from the sample recruited for a previous research (Cerniglia, Cimino & Ammaniti, 2020) in the pre-pandemic period (May 2019) and were re-contacted during the COVID-19 lockdown (November 2020). Inclusion criteria were: a) no referred psychiatric diagnosis in the mothers and/or in their children; b) no medical condition present in the subjects at the moment of the recruitment; c) no medical and/or

psychological treatment pursued; d) no COVID-19 contagion in any member of the family and no death of any close relative associated with COVID-19; e) no maternal psychopathological symptoms at T1 (no mother in this sample exceeded the clinical cut-off of >1 at SCL-90/R at T1). At T1 children were 18 months old; at T2 children were 36 months old (demographic characteristics of mothers and children are shown in Table 1).

*Table 1. Demographic characteristics of the subjects of the study*

	<b>T1</b>	<b>T2</b>	<b>N<sub>tot</sub></b>
<i>Children's gender, n (%)</i>	184 M (51.2) 175 F (48.8)	184 M (51.2) 175 F (48.8)	359
<i>Children's age, M (SD)</i>	18.02 (1.16)	36.05 (1.21)	
<i>Mothers' age, M (SD)</i>	34.27 (2.63)	36.24 (2.47)	
<i>Household income</i>	approx. 2500 euros/month	approx. 2500 euros/month	
<i>Educational level</i>	At least 12 years of schooling	At least 12 years of schooling	

*M=male; F=female*

Previous studies have shown that these measurement points are relevant for the assessment of dyadic feeding exchanges. At T1, the child has developed a healthy internal dietary control (i.e. the capacity to discriminate and react to internal signs of frustration or satiety) and at T2, observational procedures will accurately capture the child's ability to coordinate the feeding pattern (e.g., using a fork, choosing some foods over others, etc.) (Ammaniti, Lucarelli, Cimino, D'Olimpio & Chatoor, 2012). All contacted mothers agreed to participate in this study and signed the written informant consent, consistent with the Declaration of Helsinki. Before its start, the present study was authorized by the Ethical Committee of Sapienza (n. 0000809-2020). During T1 and T2, mother–infant dyads were video-recorded during a main meal via an online platform. In fact, consistent with the indications of the Horizon Program 2020 (H2020) that recommended to focus on assessment, prevention and intervention, also via technology-mediated tools and with the COVID-19-related guidelines suggesting interpersonal distancing, our research group adapted the Feeding Scale-Observational Scale for Mother-Infant Interaction during feeding to the new context of remote administration.

We used the SVIA (Scala di Valutazione delle Interazioni Alimentari, Italian version of the Feeding Scale) to evaluate the quality of the dyadic feeding interactions; for the assessment of mothers' psychopathological risk and distress, the present study respectively used the Symptom Check-List/90-R and the Burden Scale for Family Caregivers. The Child-Behavior Check-List 1,5-5 was used to tap mothers' perception of their offspring emotional/behavioral functioning. All measures were administered at T1 and T2. A survey including all self-report and report-form questionnaires

was prepared using an online platform. In the first section of the survey the aims, procedures and theoretical background of the study were illustrated. Then, mothers were invited to explicitly agree or refuse to participate in the study and to eventually complete the survey if they agreed to participate. The mother-child interactions during feeding were video-recorded remotely through another web-based videoconferencing platform. The mothers were preliminarily instructed about how to prepare the room in order to guarantee visibility of both the mother and the child during feeding.

### *Measures*

An ad-hoc questionnaire has been created by the authors of this study to collect information about: a) social and demographic factors that previous literature documented to affect children feeding practices (one item: “Do you think that COVID-19 brought changes in feeding routines with your child?” Yes/No); b) the impact of COVID-19 mothers perceived on family habits and couple adjustment (one item: “Do you think that COVID-19 brought changes in your family habits and adjustment with your partner?” Yes/No); c) the impact of COVID-19 mothers perceived on their activities (one item: “Do you think that COVID-19 brought changes in your work, exercise, shopping habits and in the way you engage in online social activities?” Yes/No).

To assess maternal depressive symptoms, the SCL-90/R (Derogatis, 1994; Prunas, Sarno, Preti, Madeddu & Perugini, 2011) was completed by the mothers. The SCL is a 90-item self-report symptom inventory measuring psychological symptoms and psychological distress rated on a Likert scale of 0 (not at all) to 4 (extremely), and asks participants to report if they have suffered in the past week from symptoms of somatization (e.g., headaches), obsessive-compulsivity (e.g., having to check and double-check what you do), interpersonal sensitivity (e.g., feeling that people are unfriendly or dislike you), depression (e.g., feeling blue), anxiety scale (e.g., feeling fearful), hostility (e.g., having urges to beat, injure, or harm someone), phobic anxiety (e.g., feeling afraid to go out of your house alone), paranoid ideation (e.g., persecutory beliefs concerning a perceived threat toward oneself), and psychoticism (e.g., having thoughts that are not your own). Aside from these nine primary scales, the questionnaire provides a global severity index (GSI). The SCL-90/R has shown a good internal consistency in adults in this sample (Cronbach’s  $\alpha = 0.83$ ).

The mothers also completed the CBCL 1,5-5 (Achenbach & Rescorla, 2001). The CBCL 1,5/5 is a questionnaire completed by caregivers to assess children’s abilities and their specific behavioral/emotional characteristics. This instrument comprises eight specific subscales (i.e., Anxious/ Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought

Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior), as well as two global scales: Internalizing Problems (consisting of Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints subscales), and Externalizing Problems (consisting of Rule-Breaking Behavior and Aggressive Behavior subscales).

The SVIA is the Italian adaptation (Lucarelli et al., 2002) of the Feeding Scale (Chatoor, Getson, Loeffler, McGee, & Menvielle, 1998) and can be applied to children 1 to 36 months of age. It measures interactive behaviors and identifies normal and/or risky relational modes in the exchanges between a parent and child during feeding. In this measure, parent–infant interactions during feeding are recorded for at least 20 min, and then a wide range of interactive mother–infant behaviors is coded and evaluated. The SVIA consists of 41 items that are distributed among four subscales: (a) Parent’s Affective State (index of the parent’s affective states; e.g., the parent appears sad during feeding); (b) Interactive Conflict (index of interactions characterized by conflictual, non collaborative, and non empathetic communication; e.g., the parent forces food into the child’s mouth); (c) Food Refusal Behavior (habits associated with challenged status regulation during meals and with limited food consumption; e.g., the child refuses to open his or her mouth); and (d) Dyad’s Affective State (index of the extent to which the infant’s feeding patterns are, or are not, the result of an interactive regulation to which both partners contribute; e.g., the parent and the child show joy during feeding). Scores are measured on Likert scale ranging from 0 (none) to 4 (a lot). The inter-evaluator agreement for SVIA items for this sample was excellent (Pearson  $r = 0.9$ ). Moreover, the instrument showed good reliability in terms of internal consistency, Cronbach’s  $\alpha = 0.94$ . Higher scores on the affective state of the parent refer to the parent’s greater difficulties in showing positive affects and to a higher frequency of negative affects such as sadness or distress. The Interactional Conflict sub- scale evaluates both the presence and the intensity of conflictual exchanges within the dyad (e.g., the parent directs the meal according to his or her own emotions and intentions rather than following the signals from the child). The Food Refusal Behaviors subscale of the child explores the behavioral and emotional characteristics of the feeding patterns of the child (e.g., being easily distracted and showing opposition or negativity). Higher scores on the affective state of the dyad refer to the difficulties of the caregiver in supporting the autonomous initiatives of the child (e.g., requests, insistent orders, and criticism) while the child demonstrates distress and is generally oppositional. In the present study, the means of the four subscales were also used to derive a total monodimensional score. We chose to use a general score according to Fadda and Lucarelli (2017). It has been posited that when using the measure to discriminate adaptive from maladaptive parent–child interactions (rather than discerning feeding disorders in children), the sum of the four scores is appropriate (Chatoor, et al., 1998). In this case, higher scores

defined more dysfunctional dyadic interactions during feeding. Lucarelli et al. (2002) indicated a cutoff  $>54$  (2 *SDs* from the *M*; Italian validation of the measure) to discriminate clinical scores.

The Burden Scale for Family Caregivers (Graessel, Berth, Lichte & Grau, 2014) is a 10-item measure that assesses the perceived burden of caregiving responsibilities in the past 2 weeks using a 4-point Likert scale ranging from 0 “strongly disagree” to 3 “strongly agree”. Example items include: “From time to time I wish I could run away from the situation I am in” and “The care takes a lot of my own strength”. Items are summed to create a combined score ranging from 0 to 30; higher scores indicate increased burden levels. Categories of burden levels for this scale include: 0–4 indicating mild to no burden, 5–14 indicating moderate burden, and scores from 15 to 30 indicate severe to very severe burden. Reported Cronbach’s alphas are excellent ( $\alpha = 0.92$ ), as in the present study ( $\alpha = 0.93$ ).

### ***Data Analysis***

The scores at T1 and T2 on all measures were compared with analyses of variance (ANOVAs) for repeated measures. The calculated *p* values are reported, with values  $<0.05$  being accepted as significant. Mean values are reported with *SDs*. A power analysis was conducted accordingly to Cohen’s (2013) suggestions,  $\alpha$  was set at 0.05 and a power of 0.854 was obtained with a large effect size of ( $f^2 = 0.43$ ).

### **Results**

Most of the families participating in the study (91%) had a middle socio-economic class (Bornstein and Bradley, 2014) and a vast majority (94%) were intact family groups of which the infant was the firstborn of both parents. The families were 96% Caucasian and 76% were based on more than one income. The families reported that their economic situation did not significantly change in the pandemic period.

Two hundred and sixty-two mothers (73%) perceived that COVID-19 brought changes in feeding routines with their child. One hundred and ninety-nine mothers (54%) perceived that COVID-19 brought changes in their family habits and adjustment with their partner. Three hundred and five mothers (85%) perceived that COVID-19 brought changes in their work, exercise, shopping habits and in the way they engaged in online social activities.

An ANOVA revealed main effects of time point (all  $p < 0.001$ ) on all four SVIA subscale scores.



Bonferroni's post hoc tests demonstrated that SVIA scores at T1 were significantly lower (i.e., less maladaptive) than T2 for all four subscales: mother's affective state; interactive conflict; food refusal; dyad's affective state. Moreover, the general quality of the feeding interactions worsened from T1 to T2, with 52% of dyadic exchanges exceeding the clinical cut-off at the SVIA measure (at T1 only 12% of dyads exceeded this cut-off). The mothers' average scores for each SVIA subscale at T1 and T2, and  $\eta^2$  values are reported in Table 2.

*Table 2. Average scores and standard deviations of the SVIA subscales and general quality of mother-child feeding interactions*

	<b>T1</b>	<b>T2</b>	<b><math>\eta^2</math></b>
	<b>M (SD)</b>	<b>M (SD)</b>	
<i>Mother's Affective state</i>	9.83 (4.52)	24.16 (2.01)**	0.65
<i>Interactive conflict</i>	7.97 (4.30)	22.14 (2.01)**	0.46
<i>Food refusal behavior</i>	5.24 (2.18)	13.02 (1.45)**	0.57
<i>Dyad's Affective state</i>	4.30 (2.64)	15.13 (1.62)**	0.68
<i>General Quality</i>	37.47 (.73) <sup>§</sup>	55.30 (4.43) <sup>§§</sup>	0.57

<sup>§</sup> At T1 12% of dyads exceeded the SVIA clinical cut-off of >54

<sup>§§</sup> At T2 52% of dyads exceeded the SVIA clinical cut-off of >54

$\eta^2$ : eta-squared

\*\*  $p < 0.001$

An ANOVA of the SCL-90/R subscales and GSI scores for mothers across time points revealed a significant main effect of time point ( $p < 0.001$ ). GSI scores were significantly higher at T2, with 21% of mothers exceeding the clinical cut-off (no mothers exceeded the cut-off at T1). In particular, mothers showed high scores in the subscales of Depression, Anxiety and Obsessive-Compulsion. The perceived burden of caregiving also significantly worsened from T1 to T2, with (42%) of mothers indicating moderate, severe and very severe burden at T2 compared to 14% at T1. Table 3 shows means and  $\eta^2$  values.

*Table 3. Maternal scores at SCL-90/R and The Burden Scale for Family Caregivers.*

	<b>T1</b>	<b>T2</b>	<b><math>\eta^2</math></b>
	<b>M (SD)</b>	<b>M (SD)</b>	
SOM	0.18 (0.54)	0.30 (0.45)	0.16
O-C	0.15 (0.52)	0.69 (0.55)**	0.64
I-S	0.16 (0.49)	0.34 (0.23)	0.08
DEP	0.18 (0.34)	0.73 (0.89)**	0.82
ANX	0.13 (0.52)	0.66 (0.78)**	0.96
HOS	0.18 (0.43)	0.31 (0.24)	0.10
PHOB	0.24 (0.61)	0.02 (0.11)	0.14
PAR	0.13 (0.52)	0.43 (0.24)	0.11
PSY	0.21 (0.53)	0.13 (0.43)	0.15

GSI	0.54 (0.41) <sup>§</sup>	0.84 (0.75) <sup>§§</sup>	0.64
BSFC	3.52 (0.66) <sup>∞</sup>	19.45 (4.21) <sup>∞∞</sup>	0.71

<sup>§</sup> At T1 0% of mothers exceeded the clinical cut-off of >1 at the SCL-90/R Global Severity Index (GSI)

<sup>§§</sup> At T1 21% of mothers exceeded the clinical cut-off of >1 at the SCL-90/R Global Severity Index (GSI)

<sup>∞</sup> At T1 14% of mothers reported moderate, severe and very severe caregiving burden.

<sup>∞∞</sup> At T2 42% of mothers reported moderate, severe and very severe caregiving burden.

*Note.* SOM: Somatization; O-C: Obsessive-Compulsive; I-S: Interpersonal Sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHOB: Phobic Anxiety; PAR: Paranoid Ideation; PSY: Psychoticism. BSFC: Burden Scale for Family Caregivers.  $\eta^2$ : eta-squared

\*\*  $p < 0.001$

Children’s emotional/behavioral functioning was rated by mothers as more maladaptive at T2, especially in the subscales of Withdrawn, Anxious/Depressed, and Aggressive Behavior. Children showed significantly higher scores also in the Internalizing and Externalizing subscales. Table 4 shows means and  $\eta^2$  values.

*Table 4. – Means (standard deviation) of child’s CBCL subscales.*

	T1	T2	$\eta^2$
E-R	2.55 (1.68)	3.67 (2.17)	0.22
A-D	2.20 (1.75)	7.52 (1.95)**	0.75
S-C	3.38 (1.37)	4.32 (2.12)	0.16
WIT	2.78 (1.43)	6.72 (1.59)**	0.69
A-P	1.67 (1.40)	5.07 (1.02)	0.24
A-B	9.66 (5.18)	21.10 (5.07)**	0.65
INT	10.45(3.55)	27.53 (4.32)**	0.62
EXT	10.61(2.43)	26.42 (3.54)**	0.71

*Note.* E-R: Emotionally Reactive; A-D: Anxious/Depressed; S-C: WIT: Withdrawn; A-P: Attention Problems; A-B: Aggressive Behavior; INT: Internalizing Problems; EXT: Externalizing Problems.

$\eta^2$ : eta-squared

\*\*  $p < 0.001$

## Discussion

Research has so far overlooked the possible effect of the COVID-19 pandemic on parent-children feeding interactions (Jansen et al., 2021). However, feeding is an important relational context in which the child is able to communicate his or her inherent capacity to participate in bidirectional contact and to show early maturity in exchanges with his or her primary caregivers (Salvatori, Andrei, Neri, Chirico, Trombini, 2015). This study aimed to fill the gap in the literature through a preliminary exploratory study that showed how even those dyads that had had a good-enough quality of exchanges before the pandemic, experienced an impairment in their interactions. Moreover, the results of this study showed that maternal psychopathological risk and caregiving

distress have significantly increased during the pandemic, along with children's psychological difficulties. Some authors had already recognized an increase in the likelihood of maternal depression and anxiety during the pandemic, underlining how mothers could be at a specific high-risk for psychological distress (Davenport, Meyer, Meah, Strynadka & Khurana, 2020). Some studies have suggested that the problematic situation linked to the COVID-19 pandemic can negatively affect women's perceptions and experiences of motherhood, including their ability to overcome practical challenges, and their decisions about their child (Fallon et al., 2021). However, this is to our best knowledge the first study to focus on dyadic feeding interactions. Noteworthy, previous work of the same research group (Cerniglia, Cimino & Ammaniti, 2020) allowed an interesting comparison between the psychological/psychopathological characteristics of the same subjects in the pre-pandemic and in the pandemic period.

The preliminary results of this study showed that the vast majority of mothers noticed modifications in the family habits, and work and social activities. In particular, most of the mothers reported changes in the characteristics of feeding interactions with their offspring during the COVID-19 pandemic. This descriptive data are consistent with previous research and come as expected. In fact, several authors have suggested that the COVID-19 pandemic should be considered a global social phenomenon potentially impacting emotional and behavioral functioning of children, adolescents and adults. However, psychological distress by social distancing, lockdowns and quarantines, although investigated, has so far received secondary attention, given the huge toll the world has been paying in terms of deaths and economic impoverishing.

Our results also showed that the quality of mother-child interactions decreased significantly from the pre-pandemic period to the current period. Importantly, more than 50% of these exchanges exceeded the clinical cut-off at the SVIA measure, whereas in the pre-pandemic period only 12% of dyads in this sample showed clinically relevant scores. During the pandemic mother-child dyads showed more maladaptive scores in all SVIA sub-scales and also the general quality of the feeding interactions worsened from T1 to T2.

As per the mothers' psychopathological risk, maternal depression, anxiety and obsessive-compulsion scores significantly increased and the global severity index (GSI) of the measure (that signify a general representation of the subject's psychopathological risk) was significantly higher in mothers at T2, with several subjects exceeding the clinical cut-off. We can speculate, as proposed by previous literature (Cluver et al., 2020; Liu, Bao, Huang, Shi & Lu, 2020) that the COVID-19 pandemic constitutes a very distressing environmental event that is able to worsen current mental health in those already at-risk in the pre-pandemic period, and lead to the onset of psychological difficulties even in subjects who did not display symptoms. The question remains if these

psychopathological symptoms are an acute clinical manifestation or they will persist over time. Further studies should clarify this point.

Mothers also showed an increased distress linked to their caregiving from T1 to T2 with several mothers (42%) indicating moderate, severe and very severe burden at T2 (it was 14% at T1). We hypothesize that decreased face-to-face contact encouragement from other family members, friends and colleagues could have adversely impacted women's expectations and perspectives of motherhood, including their capacity to resolve realistic obstacles, their decisions about child care and even their relationship with their children. Moreover, mainstream information has not always been clear about the risks and the correct behavior to adopt during parent-child interactions. Mothers and fathers have been forced to confront these challenges with uncertainty, preoccupation and anxiety.

As regards to children's emotional/behavioral functioning, offspring scores become more maladaptive during the pandemic (as reported by mothers), showing significantly higher Internalizing and Externalizing scores and especially in the subscales of Depression, Anxiety, and Aggression. Heightened maternal psychopathological symptoms and the general distressing situation (which included no school attending, frequent confinement at home, no sharing of any social context with peers, etc.) may have had an important role in predicting this result. In adaptive development, the environment is generally predictable and interpretable for the child, who can rely on a relatively stable context. In this sense, the mother constitutes the first, fundamental environment for the child who can interpret reality and modulate his/her own affective and behavioral functioning through maternal sensitivity and contingency, responsiveness and intersubjective attunement. We argue that the COVID-19 pandemic, with its devastating effects (both material and affective) may have influenced these experiences (primarily by increasing maternal psychological difficulties and caregiving distress), hindering and/or impoverishing the child's self-regulation, which in turn resulted in heightened psychopathological symptoms in offspring (Beebe & Lachmann, 2001; Cohn & Tronick, 1989; Murray, Woolgar, Cooper, & Hipwell, 2003).

It is evident that the above hypotheses must be tested in further studies. The present one chose a descriptive (although longitudinal) study design, therefore being unable to propose causal effects between the considered variables. This point constitutes the first limit of the study. Another limit is the fact that we did not focus on fathers in the present study, neither as dyadic (and triadic) partners in the feeding interactions with children nor as possible moderating or mediating factors of maternal psychopathology possibly predicting offspring symptoms. Instead, previous literature has demonstrated that fathers have an important role in family functioning. During the pandemic and

especially during the lockdown, a considerable increase of fathers' involvement in childcare has been observed, as parents have been frequently called to operate in smart-working, with children at home due to school closure (Bloemen, Pasqua & Stancanelli, 2010). A third limit of this study is that we chose not to verify causal links between variables and opted for a descriptive study, although in a longitudinal design. This choice makes it impossible to draw causal conclusions.

Notwithstanding the above limits this study has several strengths. Most importantly, this is the first study to our best knowledge to evaluate changes in the quality of mother-child feeding interactions comparing pre-pandemic and pandemic periods. Second, most studies in this field have concentrated on subjects with pre-existing psychopathological symptoms, overlooking possible psychological difficulties of individuals that were not at risk before the pandemic. This study, instead, sheds light on those situations that would not have been observed under the threshold of clinical attention. Lastly, this is one of the first studies employing an online assessment procedure to observe parent-child feeding interactions, as promoted by the WHO (2021), which has encouraged researchers to experiment with Web-based and technology-mediated systems to prevent and/or intervene on psychopathology, especially in case of children's depressive and anxiety symptoms and difficulties in feeding.

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### **Data availability statement**

Data available on request from the authors.

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