Mother-infant feeding interactions in mothers with and without eating disorder history: Results of a structured observational study

Annica Franziska Doersam [a,b,c,d,*], Jana Katharina Throm [a,b,c], Ferdinand Sörensen [d,e,f], Peter Martus [g], Ingeborg Kraegeloh-Mann [e], Hubert Preissl [h,i,j], Nadia Micali [k,l], Katrin Elisabeth Giel [a,b,c]

[a] Department of Psychosomatic Medicine and Psychotherapy, University Hospital Tuebingen, Tuebingen, Germany
[b] Centre of Excellence for Eating Disorders (KOMET), University Hospital Tuebingen, Tuebingen, Germany
[c] German Center for Mental Health (DZPG), Tuebingen, Baden-Wuerttemberg, Germany
[d] Graduate Training Centre of Neuroscience, International Max Planck Research School, Eberhard Karls University Tuebingen, Tuebingen, Germany
[e] Pediatric Neurology & Developmental Medicine, University Children's Hospital Tuebingen, Tuebingen, Germany
[f] Department of Psychiatry and Psychotherapy, Tübingen Center for Mental Health (TüCMH), University of Tuebingen, Tuebingen, Germany
[g] Institute for Medical Biometrics and Clinical Epidemiology, University Hospital Tuebingen, Tuebingen, Germany
[h] Institute for Diabetes Research and Metabolic Diseases (IDM) of the Helmholtz Center Munich at the Eberhard Karls University of Tuebingen, FMEG Center, German Centre for Diabetes Research (DZD), Tuebingen, Germany
[i] Department of Internal Medicine IV, Division of Endocrinology, Diabetology, and Nephrology, University Hospital Tuebingen, Tuebingen, Germany
[j] Institute of Pharmaceutical Sciences, Department of Pharmacy and Biochemistry, Interfaculty Centre for Pharmacogenomics and Pharma Research at the Eberhard Karls University Tuebingen, Tuebingen, Germany
[k] Mental Health Services of the Capital Region of Denmark, Center for Eating and Feeding Disorders Research, Psychiatric Centre Ballerup, Ballerup, Denmark
[l] University College London, Great Ormond Street Institute of Child Health, London, UK

ARTICLE INFO

ABSTRACT

Background: A growing body of evidence suggests that children of mothers with eating disorders (EDs) have a greater risk of early feeding problems. Recognizing and reacting adequately to the infant's signals during feeding is crucial for the child's development of internal and external regulatory mechanisms of food intake. Parental EDs might affect this ability. Therefore, we investigated the quality of mother-infant interactions during feeding using video recording and a structured coding system.

Methods: The data of this pilot study was collected in a prospective cohort study investigating the influence of maternal EDs on child outcomes. Twenty women with ED history and 31 control women were videotaped while feeding their infant during a main meal at ten months postpartum. The mother-infant interactions were evaluated by two raters using the Chatoor Feeding Scale. We assessed birth outcomes, the mother's ED and depression status, breastfeeding practices, infant feeding problems and infant temperament by maternal self-report.

Results: Mothers with and without ED history scored very similar on the Feeding Scale, however mothers from the control group experienced more struggle for control with their infants during feeding (p = 0.046) and made more negative comments about the infant's food intake (p = 0.010). Mothers with ED history were more concerned about infant feeding at three months postpartum and reported significantly more problems with solid foods in their children. Birth outcomes were comparable between groups, except for lower weight-for-length birth percentiles in children of women with ED history.

Conclusion: Whilst examined mothers with ED history are more concerned about feeding their children, ED psychopathology does not affect the quality of mother-infant interaction during feeding at the transition to autonomous eating at ten months of age.

---

* Corresponding author. Department of Psychosomatic Medicine and Psychotherapy, University Hospital Tuebingen, Osianderstrasse 5, 72076, Tuebingen, Baden-Wuerttemberg, Germany.
E-mail address: annica.doersam@med.uni-tuebingen.de (A.F. Doersam).

1. Introduction

Eating disorders (EDs) run in families (Zipfel et al., 2015) and there is evidence for an intergenerational transmission of EDs (Bould et al., 2015; Bulik et al., 2016; Treasure et al., 2020). EDs – anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED) – are complex disorders influenced by genetic, epigenetic, and environmental factors (Bulik et al., 2016; Jones et al., 2017; Watson et al., 2019). Therefore, children of mothers with EDs could both inherit risk alleles for disordered eating and be exposed to environmental factors, such as the mother-child feeding environment (Reba-Harrelson et al., 2010). Thus, environmental factors may act as facilitators of the expression of an underlying genetic predisposition (Bulik, 2005; Campbell et al., 2011). A growing body of evidence suggests that children of mothers with EDs have a greater risk of behavioral and emotional difficulties and possibly also developmental delay (Mantel et al., 2019; Martini et al., 2020; Micali et al., 2014; Watson et al., 2014), as well as early feeding problems (Martini et al., 2020; Micali et al., 2009, 2011).

The first years of life are crucial in the child's development of internal and external regulatory mechanisms of food intake and the differentiation between physical perceptions of hunger and satiety and emotional states such as anger or the desire for attention (Chatoor, 2016). Parents who react in a sensitive way to the child's signals of hunger, satiety and emotional needs, support their infant to differentiate between these inner feelings (Black & Aboud, 2011; Silva et al., 2016). If the child's signals are unclear and/or are not interpreted and responded to appropriately by the caregivers, maladaptive feeding behaviors can emerge (Birch et al., 2003; Moore et al., 2006). It has been argued that people with EDs have particular difficulty distinguishing physical perceptions such as hunger from emotional states such as affection or anger (Treasure et al., 2020). If this is the case, mothers with EDs might show different reactions to the infant's somatic and psychological signals as compared to mothers with no such history (Martini et al., 2018; Stein et al., 1994) and may find infant feeding especially challenging due to their disrupted eating habits and preoccupations with body weight and shape (Agras et al., 1999; Mazzeo et al., 2005). Mothers with ED history had more negative experiences and emotional problems during breast-feeding (Kaβ et al., 2021) and showed less awareness of infant hunger and satiety cues at two months postpartum (Martini et al., 2018). Moreover, data from the Generation R Study indicated that mothers with a lifetime history of EDs, particularly those with AN, used less pressuring feeding strategies and that their four-year-old children showed a tendency toward overeating in response to emotional cues (Barse et al., 2015). The presence of eating problems in early childhood as well as maternal dysfunctional eating attitudes (Lucarelli et al., 2018) are significant risk factors for the development of an ED in later life (Kotler et al., 2001). It is therefore important to investigate whether maternal ED psychopathology is associated with alterations in the mother-child interaction during feeding.

Observing mothers and infants during feeding provides information about the mother's ability to interpret the infant's hunger and satiety cues and to distinguish them from emotional cues. Such observational data is to date very scarce with a focus on maternal ED history. Stein et al. (1994) observed mothers with EDs occurring in the postnatal year and their infants aged 12–14 months during mealtime. Compared to controls, mothers with EDs exerted more intrusive and controlling behaviors over their child's eating and displayed higher levels of conflict at mealtimes. Moreover, mothers with EDs expressed more negative emotion towards their infants (Stein et al., 1994). After a follow-up period of ten years, children of mothers with ED history exhibited more dietary restraint and placed greater value on weight/shape in their self-evaluation than children of mothers without exposure to maternal EDs (Stein et al., 2006). In the study by Waugh and Bulik (1999), mothers with current or past AN and/or BN made significantly fewer positive comments about food and eating during mealtime interaction with their children aged one – four years than controls and tended to avoid eating with their children. A more recent observational study by Squires et al. (2014) used the Chatoor Feeding Scale to assess the quality of mother-infant feeding interactions in mothers with AN or BN history and their three-months-old newborns. Principal component analysis of the correlation matrix of Eating Disorder Examination Questionnaire and Feeding Scale scores revealed that the more mothers were preoccupied with ED symptoms, the less they related to their infant and the less they engaged in dyadic interaction during mealtime (Squires et al., 2014). Moreover, the authors proposed that infant temperament might play a mediating role in mother-child interactions during feeding; i.e., mothers with EDs may experience infant temperament as more difficult (Zerwas et al., 2012). In addition, the mother's perception of the child's temperament as well as maternal psychopathological risk factors were associated with conflictual feeding interactions in the context of infantile anorexia (Ammaniti et al., 2010; Chatoor et al., 2000). Cimino et al. (2016) longitudinally investigated the influence of BED diagnosis, in one or both parents, on parent-infant feeding interactions at 18 and 36 months postpartum (204 mother/father-child dyads) using the Italian version of the Chatoor Feeding Scale. Parent-child dyads of the BED group showed poorer feeding interactions than the control group (Cimino et al., 2016). In summary, the observational studies show that mothers with ED histories have difficulties in responding adequately to infant cues, resulting in higher levels of conflict, controlling and intrusive behavior, and a general negative emotional climate.

1.1. Study objectives

Taken together, studies using video analysis to assess the quality of mother-infant interaction during feeding in mothers with ED history are scarce and mostly rely on small samples (Squires et al., 2014; Waugh & Bulik, 1999) and/or do not include all ED types (Cimino et al., 2016; Squires et al., 2014; Waugh & Bulik, 1999), or do not use validated tools for the assessment of mother-child interaction (Stein et al., 1994). Therefore, the aim of this pilot study was to include women across the whole ED spectrum and compare them to healthy controls (HC) in relation to: (a) maternal feeding practices from birth to ± ten months postpartum; and (b) the quality of mother-infant interactions during a videotaped feeding session evaluated with the Chatoor Feeding Scale. We also aimed to explore pregnancy and birth outcomes, infant temperament, and the association between the quality of mother-infant interaction during feeding and ED psychopathology as well as infant temperament.

We hypothesized that mothers with ED history would report more newborn/infant feeding problems and difficult infant temperament and show more difficult mother-infant interactions during feeding. Moreover, we hypothesized that maternal ED psychopathology and difficult infant temperament would be associated with the quality of mother-infant interaction during feeding.

2. Material and method

2.1. Ethics

The study was approved by the Ethics Committee of the Medical Faculty of the Eberhard-Karls-University and the University Hospital Tuebingen (#219/2018BO1). All study participants provided written informed consent.

2.2. Participants

Women with and without ED history were recruited between 2018 and 2022 for a family cohort study (EMKIE) which follows families from the 3rd trimester of pregnancy until 30–42 months postpartum. We included pregnant women with a previous or current ED according to DSM-5 criteria for the ED group (APA, 2000). These disorders comprise AN, BN, BED and other specified feeding or eating disorders (OSFED).

Pregnant women without previous or current mental and severe somatic disorders served as a control group (HC). To be included in the study, women had to be between 18 and 40 years old and have an inconspicuous singleton pregnancy. Exclusion criteria for both groups comprised insufficient proficiency of the German language, severe chronic medical disorders, chromosomal abnormalities of the fetus, prematurity (birth <37 weeks of gestation), birth asphyxia (Apgar scores 0–3 > 5 min, umbilical cord pH value < 7.0), and multiple birth. We recruited women from the general public and women previously treated for an ED at the University Hospital Tuebingen.

In short, the EMKIE study assesses the influence of maternal EDs on fetal development and pregnancy outcomes from late pregnancy (≥28th week of pregnancy) until 42 months postpartum. The study consists of four assessment points and uses various methods, such as fetal magnetoencephalography (Doersam et al., 2022), structured interviews, self-report (online) questionnaires, and structured video observations. See Fig. 1 for more information about the EMKIE study.

2.3. Procedures

Pregnant women were screened for EDs using the Eating-Attitudes-Test (EAT-8) (Richter et al., 2016). The EAT-8 reflects core symptoms of EDs and is characterized by a high level of user-friendliness (8 items, dichotomous answer format: agree/dis-agree) and very good reliability ($\alpha = 0.85$) in a German representative sample (Richter et al., 2016). Moreover, the EAT-8 was proposed for use in clinical management algorithms for pregnant women with EDs (Paslakis & Zwaan, 2019); for more details see (Dörsam et al., 2022). Pregnant women were informed about the research design and asked to sign a consent form to participate. At 28–37 weeks of pregnancy (assessment ①), the Eating Disorder Examination Interview (Hilbert et al., 2004) was administered by a trained study staff member to specify past or current ED diagnosis. Socioeconomic status was assessed by maternal self-report on household net income and educational level. Three months after delivery (assessment ②), a telephone call was organized in order to maintain contact with the mothers. Furthermore, mothers answered online questionnaires about ED symptomatology, depressive symptoms, stress experience and infant feeding. Between eight and twelve months postpartum, the families were visited in their homes by a member of the study team (December 2018–August 2023; assessment ③). During this age period, transition to self-feeding begins, and usually children are not yet neophobic towards food. In order to remain close to routine, the assessment was scheduled to coincide with the child's regular mealtime. Using a

table tripod and a smartphone, the mother was filmed feeding her child. During this time, the study employee left the room to avoid distracting the child. Before feeding, an interview about the child's eating behavior was conducted with the mother and also with the father if he was available. The weight of the mother and child was recorded. Medical data was taken from the child examination booklet and the mother's maternity record. After the home visit, the mother had access to the self-report online questionnaires (see Measures). Due to the corona pandemic and imposed contact restrictions or due to long distances, some families recorded the feeding video themselves and the interview about the child's eating behavior was conducted by telephone. Assessment ④ which is not included in this work, is a replication of assessment ③ at 30–42 months postpartum using different questionnaires for infant feeding/eating behavior.

2.4. Measures

Eating Disorder Examination Questionnaire and Eating Disorder Examination. At study inclusion, a trained member of study staff conducted the German version (Hilbert et al., 2004) of the Eating Disorder Examination (EDE; (Cooper & Fairburn, 1987; Fairburn & Cooper, 1993, pp. 317–360), a semi-structured clinical interview considered the method of choice for ED diagnosis and assessment according to DSM-5 criteria. The Eating Disorder Examination-Questionnaire (EDE-Q; (Fairburn, 2008; Fairburn & Beglin, 1994) is the self-report version of the EDE, which the women completed at each assessment point via an online tool. All 28 items of the EDE-Q refer to the previous 28 days, and frequency and intensity are rated on a 7-point rating scale. Both instruments include four subscales focusing on cognitive aspects of EDs: Restraint (RS), Eating Concern (EatC), Weight Concern (WeiC) and Shape Concern (ShaC). Additionally, they include items that measure diagnostically relevant behavioural features, e.g., number of episodes/days of objective overeating, loss of control over eating, objective binge eating, self-induced vomiting, laxative misuse and excessive exercising. Mean subscale scores and a mean total score were calculated. Higher scores on each subscale represent more severe ED cognitions. The subscale and global score vary from 0 to 6. The EDE-Q was administered at all assessment points.

Chatoor Feeding Scale. The Chatoor Feeding Scale (FS) was used to analyze the videotaped mealtime situation at ten months postpartum. The FS measures normal and/or at-risk feeding interactions between mother and child in the first three years of life (Chatoor et al., 1997). The scale was forward translated from English to German by two
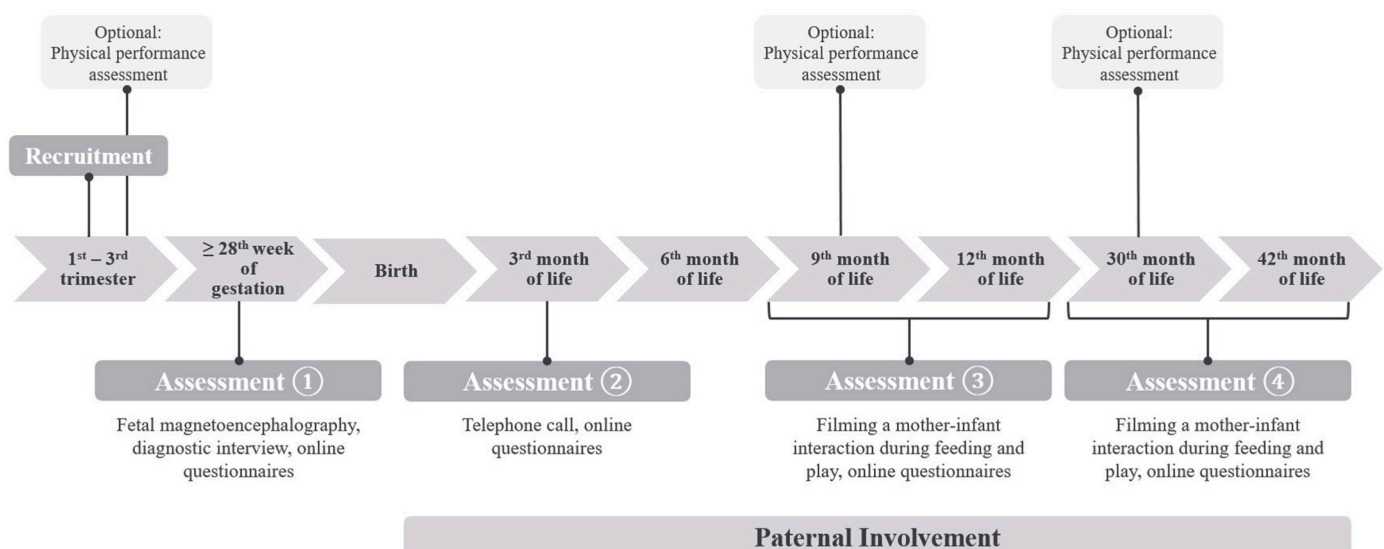

Fig. 1. EMKIE study procedure.

independent fluent speakers and subsequent discussion about phrasing and choice of words led to the final translation. The FS is a global rating scale comprised of 26 mother items and 20 infant items, rated on a four-point Likert scale, and five subscales: Dyadic reciprocity (DR), dyadic conflict (DC), talk and distraction (TD), struggle for control (SC), and maternal non-contingency (MNC). DR reflects the quality of relatedness and affective engagement between the mother and the infant. Dyads with high DR scores appear to be in synchrony and to experience joy during feeding. DC mirrors an obvious conflict between mother and infant over eating, as manifested by the infant's rejection of food, oppositional behavior and distress and the mother's frustration and distress. The TD scale behaviors indicate attempts by mother and infant to engage and/or control each other by talking and/or distracting each other during feeding. A high score on the SC subscale reflects overt conflict over control. MNC is reflected by the mother's inability to interpret the infant's cues and to respond contingently. The infant items reflect the infant's response to those maternal interventions. A higher subscale score reflects a more intensive or frequently occurring behavior of the corresponding subscale. Mean subscale scores were calculated. All videotapes were independently evaluated by two trained observers; for the reliability analysis, a subsample of n = 29 videos was used, with ratings provided by three trained observers. One of the observers was blind to the mother's diagnosis.

Patient Health Questionnaire. The validated German version of the 'PRIME MD Brief Patient Health Questionnaire' (brief PHQ) was used to screen for depressive disorders and panic disorders (Gräfe et al., 2004). The nine items of the depression module (referred to as PHQ-9) were used for the calculation of the depressiveness scale score. Values are assigned on a four-point Likert scale. The score varies from 0 to 27. A score below 5 corresponds to the absence of a depressive disorder, a score between 5 and 10 corresponds to a mild or subthreshold depressive disorder (mild severity). A score above 10 marks a major depression with moderate (10–14), marked (15–19) and most severe (20–27) levels of disorder. The PHQ-9 was administered at all assessment points.

Perceived Stress Scale. Maternal psychosocial stress was measured using the German version (Klein et al., 2016) of the Cohen Perceived Stress Scale (PSS-10) (Cohen et al., 1983). The PSS-10 measures the degree to which life in the past month has been experienced as unpredictable, uncontrollable and overwhelming (e.g., "In the last month, how often have you felt nervous and stressed?") on a five-point response scale. After reversing the scores on the four positively stated items (item # 4, 5, 7, and 8), a PSS-10 total score was obtained by summing up all ten items. The score varies from 0 to 40. Scores indicate low (0–13), moderate (14–26) and high (27–40) perceived stress. The PSS-10 was administered at all assessment points.

Infant Behavior Questionnaire–Revised Very Short Form. The IBQ-R-VSF is one of the most common parent-report instruments for assessing infant temperament (Gartstein & Rothbart, 2003; Putnam et al., 2014). The IBQ-R-VSF is designed to measure three broad factors of infant temperament: positive affectivity/surgency (PAS), negative affectivity (NEG), and orienting/regulatory capacity (ORC). There are 37 questions in total, and each one asks parents to report how often their baby behaved in a particular way over the last seven days. The items were rated on an eight-point response scale. Items rated as 0 (does not apply) were treated as missing. Subscale scores vary from 1 to 7 with higher scores indicating a more difficult temperament. The German version was translated by two work groups (Fuchs & Pillhofer, 2013; Kristen et al., 2007). The IBQ-R-VSF was administered at assessment points ② and ③.

Parent questionnaire. During the home visit at ten months postpartum, a study employee conducted the infant's eating and feeding history with the mother/parents using the parent questionnaire by Hofacker et al. (von Hofacker et al., 2002). The current feeding situation, feeding and eating skills, feeding and feeding history (breastfeeding), as well as eating habits of the parents and siblings were assessed. The data on the initiation of complementary feeding and the occurrence of feeding problems were extracted for the analysis.

Questionnaires on infant feeding. The questionnaires on infant feeding practices and maternal attitudes about feeding and infant weight were partly self-designed and partly extracted from two existing questionnaires. We used the feeding section of the questionnaire for crying, feeding and sleeping which showed high internal consistency in a clinical and a non-clinical sample (Gross et al., 2013). Additionally, we extracted questions from the parent questionnaires of the KiGGS baseline survey (KiGGS = study on the health of children and adolescents in Germany) (Robert Koch-Institut, 2019). The data extracted for analysis included information on the initiation, duration and problems associated with breastfeeding, as well as maternal concerns related to the quantity of milk consumed by their three-month-old infants. The mothers completed the questionnaires via the online portal at assessment points ② and ③.

2.5. Data analysis

The data collected was analyzed using the statistical software IBM SPSS Statistics for Windows, Version 28.0, Armonk, NY: IBM Corp, released 2021. First, all metric data were checked for normal distribution using skewness/kurtosis, histograms and Shapiro-Wilk tests. Differences in the central tendencies were calculated using the Student's t-test for independent samples or the Mann-Whitney-U-test, depending on the presence of a normal distribution. The level of significance was 0.05 (two-sided). Bonferroni-Holm correction was applied for FS group differences, to control for type 1 error (#5 tests) and for the item-level analysis of the 46 FS items. Bivariate relationships between two variables were analyzed using correlations depending on scaling and distribution of data (Bravais-Pearson, rank correlation according to Spearman, Eta coefficient).

3. Results

3.1. Preliminary analyses: quality assessment of the feeding scale ratings

Observer agreement. All raters (authors one – three) completed training in the use of the FS; AFD was personally trained by I. Chatoor and L. Lucarelli. For reliability assessment, 29 video ratings of author one, two and three (who was blind to the mother's diagnosis) were available. Intraclass correlation coefficients (one-way random effects, absolute agreement, multiple raters) for FS subscales between authors one – three were good, except for the MNC scale (fair) (see Table 1).

Consensus evaluation. Chatoor and colleagues suggest to conduct a consensus evaluation for ratings which have more than one-point discrepancy. Ratings of AFD and JKT were used for this evaluation, since those two raters rated all videos. We included 51 video recordings in our final analysis. The FS consists of 46 items. This results in 51 x 46 = 2346 items in total. Of the 2346 items, 20 items (0.85%) were so-called conflict items, i.e. an item which has more than one-point discrepancy between the ratings of AFD and JKT. Ten conflict items were found in videos from the ED group and 10 conflict items were found in videos from the HC group. The 20 conflict items were distributed across 16 videos, of which 12 videos contained one conflict item and four videos contained two conflict items. The conflict items were

Table 1
Intraclass correlation coefficient for Feeding Scale subscales.

	ICC	CI	n	reliability[a]
Dyadic Reciprocity	0.832	0.712–0.913	27	good
Dyadic Conflict	0.817	0.689–0.904	27	good
Talk and Distraction	0.841	0.726–0.918	27	good
Struggle for Control	0.848	0.741–0.919	29	good
Maternal Non-Contingency	0.582	0.376–0.755	29	fair

Intraclass correlation coefficient (ICC), 95% confident interval (CI).
[a] reliability according to Koo & Li, 2016

distributed across all subscales, but the DR scale was overrepresented with n = 10 conflict items. AFD and JKT reviewed video segments relevant to the conflict items and discussed their observations until a consensus was reached. The occurrence of conflict items was primarily due to missing certain behaviors/expressions of the mother-child dyads while rating the videos. All calculations are performed using the adjusted data of AFD's ratings.

3.2. Sample characteristics

The sample studied consisted of 20 women with previous or current EDs and 31 women without ED history. At the time of the video observation, the women were on average 33.06 ± 4.28 years old and their children were 10.45 ± 0.73 months of age. Maternal body mass index (BMI) was in the normal weight range and did not significantly differ between the groups. Socio-demographic data were comparable across the two groups. The educational level of the sample was very high; 98 % (n = 50) of the women completed school with a high school diploma and 78.4 % (n = 40) had a university or college degree. The monthly net household income was ≥ € 4000 per month for 58.8 % (n = 30) of the women, which is above the German average (≈€ 3813 in 2021; Federal Office of Statistics 2022). All but two women of the ED group had a permanent partner at the time of study inclusion. At ten months postpartum, PHQ-9 scores were significantly higher in women with ED history, suggestive of mild depression (ED: 8.95 ± 5.07, range: 2–21; HC: 5.29 ± 3.69, range: 0–15; p = 0.009; r = 0.366); perceived stress scores indicated moderate stress levels and did not significantly differ between groups (ED: 17.65 ± 7.07, range: 6–30; HC: 15.03 ± 7.29, range: 5–33; p = 0.170; r = 0.192) (see Table 2).

Characterization of the ED group. AN was the most common ED (AN restrictive subtype = 8; AN purging subtype = 5), followed by BN (n = 3) and OSFED (n = 3). One woman was diagnosed with BED. ED duration was two to 28 years, with an average duration of 9.70 ± 7.26 years. Most of these mothers (70 %) had a documented clinical history of their ED. At the time of study inclusion (3rd trimester of pregnancy), 11 women (55.0 %) had active ED symptomatology and 9 women (45.0 %) had previous EDs with an average of 4.55 ± 5.59 ED-remitted years.

3.3. Maternal eating disorder psychopathology

EDE-Q total scores and subscale scores were significantly higher in women with ED history compared to control women (see Table 2). Shape concern was the most pronounced ED symptom followed by weight concern. Women with ED history reported the following ED specific behaviors: objective overeating (n = 7 women), objective binge eating (n = 4), loss of control over eating (n = 5), self-induced vomiting (n = 3) and driven physical exercise (n = 5). Compared to the German sex- and age-specific norms of the EDE-Q total score (Hilbert et al., 2012), women with ED history (1.78 ± 1.08) were clearly above and HC women (0.40 ± 0.48) were slightly above the 50th percentile of the EDE-Q total score norm of 0.34 (women, <44 years).

3.4. Pregnancy and birth outcomes

A total of 17 (33.3 %) women already had children at study inclusion (ED: 35.0 %; HC: 32.3 %). Pregnancy weight gain ranged from 2.20 kg to 22.80 kg and was significantly lower in women with ED history (10.19 ± 5.23 kg) compared to control women (13.69 ± 4.20 kg; p = 0.015; n = 47; r = 0.354). The women gave birth between the 38th and 42nd week of pregnancy (40.55 ± 0.99 week of pregnancy). The majority of children (72.5 %, n = 37) was born spontaneously, 11.8 % (n = 6) of children by caesarean section and 15.7 % (n = 8) of children by vaginal assistance. Children of women with ED history had significantly lower (p = 0.039; r = 0.289) weight-for-length birth percentiles (P: 35.65 ± 26.72; z: 0.39 ± 0.91) than children of control women (P: 52.45 ± 29.00; z: 0.08 ± 0.94). The birth percentiles for head circumference were not significantly different (p = 0.156; r = 0.199) between children of women with ED (P: 35.85 ± 26.73; z: 0.46 ± 0.83) and without ED (P: 47.26 ± 27.39; z: 0.08 ± 0.89). 52.9 % of children were female, 47.1 % were male. Infant temperament did not significantly differ between infants of mothers with and without EDs at ten months postpartum (see Table 2).

3.5. Breastfeeding and complementary feeding

All mothers breastfed their newborns in the first days after birth.

Table 2
Maternal and child characteristics at ten months postpartum.

	Total sample		ED		HC		p-value	Effect size
	M ± SD	n	M ± SD	n	M ± SD	n		
Maternal characteristics								
Age (years)	33.06 ± 4.28	51	33.75 ± 4.17	20	32.61 ± 4.36	31	0.359[a]	0.265[d]
BMI (kg/m²)	21.95 ± 3.54	50	22.29 ± 4.41	19	21.74 ± 2.95	31	0.912[b]	0.016[r]
EDE-Q								
Total score	0.94 ± 1.02	51	1.78 ± 1.08	20	0.40 ± 0.48	31	**< 0.001**[b]	0.646[r]
Restraint	0.88 ± 1.31	51	1.80 ± 1.67	20	0.28 ± 0.40	31	**< 0.001**[b]	0.518[r]
Eating concern	0.40 ± 0.60	51	0.81 ± 0.73	20	0.14 ± 0.28	31	**< 0.001**[b]	0.588[r]
Weight concern	1.08 ± 1.32	51	2.07 ± 1.48	20	0.45 ± 0.68	31	**< 0.001**[b]	0.628[r]
Shape concern	1.41 ± 1.39	51	2.43 ± 1.41	20	0.75 ± 0.92	31	**< 0.001**[b]	0.575[r]
PHQ-9	6.73 ± 4.61	51	8.95 ± 5.07	20	5.29 ± 3.69	31	**0.009**[b]	0.366[r]
PSS-10	16.06 ± 7.25	51	17.65 ± 7.07	20	15.03 ± 7.29	31	0.170[b]	0.192[r]
Child characteristics								
Age (months)	10.45 ± 0.73	51	10.52 ± 0.95	20	10.40 ± 0.56	31	0.824[b]	0.031[r]
Weight Percentile	68.30 ± 28.57	51	66.19 ± 28.96	20	69.67 ± 28.70	31	0.582[b]	0.077[r]
z-score	0.71 ± 1.25	51	0.57 ± 1.25	20	0.80 ± 1.26	31	0.523[a]	−0.185[d]
Infant temperament								
PAS	5.25 ± 0.62	51	5.21 ± 0.63	20	5.27 ± 0.62	31	0.753[a]	−0.091[d]
NEG	3.86 ± 0.84	51	3.78 ± 0.67	20	3.92 ± 0.95	31	0.556[a]	−0.170[d]
ORC	5.07 ± 0.67	51	5.07 ± 0.77	20	5.07 ± 0.60	31	0.996[a]	0.002[d]

Data presented as mean (M) ± standard deviation (SD).

Abbreviations: ED (eating disorder group), HC (healthy control group), BMI (body mass index), EDE-Q (eating disorder examination questionnaire), PHQ-9 (patient health questionnaire), PSS (perceived stress scale), PAS (positive affectivity/surgency), NEG (negative affectivity), ORC (orienting/regulatory capacity).

[a] Student's *t*-Test.
[b] Mann-Withney-U-Test; d Cohen's d; r effect size r.

Three months postpartum, 90.2 % of mothers breastfed and 72.5 % of mothers *exclusively* breastfed their children (ED: 70.0 %; HC: 74.2 %). Almost half of the mothers (49.0 %) reported breastfeeding problems at three months postpartum (ED: 60 %; HC: 41.9 %; p = 0.212; r = 0.175), while significantly more women from the ED group (45.0 %) were concerned that the child was not eating enough compared to control women (19.4 %; p = 0.038; r = 0.291). Complementary foods were introduced between three and a half to eight months of age, with an average age of 5.51 ± 1.04 months (ED: 5.75 ± 1.07 months; HC: 5.35 ± 1.00 months; p = 0.175; r = 0.192). Women with ED history (50.0 %) reported significantly more problems during the transition to solid foods than control women (20.0 %; p = 0.027; r = 0.312). 74.5 % of children were breastfed at ten months postpartum (ED: 80.0 %; HC: 71.0 %; p = 0.474; r = 0.100).

3.6. Feeding scales outcomes

FS outcomes are presented in Table 3. Mother-child dyads of the ED group scored significantly lower on the SC subscale than dyads of the HC group (p = 0.046; r = 0.028). This indicates a higher level of conflict over control, exemplified by the mother's approach to directing the meal, which is driven by her own emotions and intentions rather than the child's signals. There were no significant differences between the two groups for the other subscales. Single item analysis revealed that out of the 46 items included in the FS, one item of the DC scale was significantly different between mother-child dyads of the ED and HC group. Mothers with ED history did not make any negative statements about the infant's feeding compared to n = 8 (28.6 %; p = 0.010; r = 0.373) mothers of the HC group, who made several negative statements about the infant's poor food intake or rejection of certain types of food.

Confounding variables of the feeding scale. A total of 29 videos were recorded by study staff during the home visits; 22 videos were filmed by the study participants themselves (ED: 45.0 %; HC: 41.9 %). There were no significant differences in FS outcomes between mother-infant feeding interaction videos which were recorded by the study staff vs. videos that were filmed by the study participants. Moreover, there were no significant correlations between the filming mode and the FS. Four videos of the ED group (20.0 %) and five videos of the HC group (16.1 %) were so-called family meals, i.e., the child's father sat at the table, but was not primarily involved in feeding the child. However, mother-child dyads scored significantly lower on the DC (2.00 ± 0.87 vs. 4.38 ± 2.86; p = 0.008; r = 0.382) and TD scales (2.44 ± 1.89 vs. 4.33 ± 2.07; p = 0.018; r = 0.341) when the father was present. The duration of the feedings varied from five to 28 min (14:35 ± 06:05 mm:ss) with shorter feedings in dyads of the ED group (12:34 ± 04:40 mm:ss vs. 15:53 ± 06:36 mm: ss; p = 0.064; r = 0.259). FS subscales were not significantly associated with the duration of the feeding.

Maternal factors associated with the feeding scale. FS subscales were not associated with maternal ED psychopathology (EDE-Q) in the ED group, depressive symptoms (PHQ-9) or stress levels (PSS-10). The mother's parity, age and BMI had no association with the FS scores. A total of 20 mothers ate something themselves while feeding their children (ED: 45.0 %; n = 9; HC: 35.5 %, n = 11). Mothers, who did not eat themselves scored significantly higher on DC (4.66 ± 3.04 vs. 2.84 ± 1.86; p = 0.024; r = 0.325) and TD scales (4.48 ± 2.15 vs. 3.21 ± 1.96; p = 0.044; d = 0.613).

Infant factors associated with the feeding scale. Infant age at the time of the video recording was significantly correlated with the SC subscale, but only for dyads of the ED group ($r_{Pearson}$ = 0.446, p = 0.049). Infant sex, weight percentiles and z-scores were not associated with the FS. Breastfeeding and reported eating problems were not correlated with the FS. SC was significantly associated with the burden caused by the child's nutrition (η_p^2 = 0.303, p = 0.047, f = 0.659) in the ED group. DR was significantly positively correlated with infant positive affectivity/surgency (PAS), in dyads of the ED group ($r_{Pearson}$ = 0.495, p = 0.027).

4. Discussion

This study investigated mother-infant interaction during feeding in mothers with ED history compared to healthy controls at ten months postpartum. This is one of only a few studies (Cimino et al., 2016; Squires et al., 2014; Stein et al., 1994, 2006; Waugh & Bulik, 1999) which assessed mothers with AN, BN, BED, and OSFED history in the context of observational mother-infant interactions during feeding. It is important to note that the results presented are preliminary and based on a small sample size. Moreover, we investigated time and effort in the quality of the FS ratings, which required special training of study staff members. The FS allowed us to evaluate dyadic interaction at a behavioral level. It is important to emphasize that the ED group was characterized by rather subthreshold and not clinical ED cases. Another indication for a more mildly affected ED cohort is the finding that although infants showing significantly lower weight-for-length birth percentiles, they were born healthy and did not differ from the children of control women with respect to head circumference, an indicator for brain volume (Bartholomeusz et al., 2002). Contrary to our hypotheses, mother-child dyads of the ED group scored similar to mother-child dyads of the HC group with respect to the FS; moreover, mother-child dyads of the HC group scored significantly higher on the SC subscale, i.e., HC mothers tended to ignore infant's cues stronger, were more concerned about messiness due to the customary spilling and "accidents" with food that occur when feeding infants as compared to mothers with ED history.

Table 3
Feeding scale outcomes.

	Total sample		ED		HC		p-value		Effect size
	M ± SD [min – max]	n	M ± SD [min – max]	n	M ± SD [min – max]	n	non-adjusted	adjusted[c]	
Feeding scale									
Dyadic reciprocity DR [0–48]	32.96 ± 4.78 [18–42]	48	33.15 ± 5.34 [18–40]	20	32.82 ± 4.43 [24–42]	28	0.817[a]	>0.999	0.068[d]
Dyadic conflict DC [0–36]	3.94 ± 2.76 [0–10]	48	4.05 ± 2.98 [0–10]	20	3.86 ± 2.65 [0–10]	28	0.916[b]	>0.999	0.015[r]
Talk and distraction TD [0–12]	3.98 ± 2.15 [0–9]	48	3.95 ± 2.28 [1–9]	20	4.00 ± 2.09 [0–8]	28	0.938[a]	>0.999	−0.023[d]
Struggle for control SC [0–21]	2.90 ± 1.70 [0–7]	51	2.35 ± 1.87 [0–7]	20	3.26 ± 1.50 [1–6]	31	**0.046**[b]	**0.046**	0.028[r]
Maternal non-contingency MNC [0–21]	1.82 ± 1.37 [0–5]	51	1.80 ± 1.40 [0–5]	20	1.84 ± 1.37 [0–5]	31	0.874[b]	>0.999	0.022[r]

Data presented as mean (M) ± standard deviation (SD), [minimum (min) – maximum (max)].
[a] Student's *t*-Test.
[b] Mann-Withney-U-Test; d Cohen's d; r effect size r.
[c] adjusted according to Bonferroni-Holm.

Furthermore, HC mothers made significantly more negative statements about infant's food intake or preferences compared to mothers with ED history, who did not make any negative statements.

Unlike previous publications, our research showed that women with ED history were more responsive to infant's signals during feeding, as shown by lower SC scores compared to HC mothers: Mothers with ED history were more likely to tailor the pace of the feeding according to the infant's non-verbal cues and to permit self-feeding when the infant indicated readiness. Moreover, mothers with ED patiently handled the infant's poor food intake or rejection of certain types of food and did not make any negative statements about it (Item 18, DC subscale). In contrast, Squires et al. (2014) showed that mothers with EDs were less sensitive when feeding their babies, more stressed and with dysregulated interaction patterns. However, the sample size (ten vs. 20 women with ED history), the child's age (three months vs. ten months) and the eating situation (milk vs. solid food) between Squire's and our sample were different and therefore, difficult to compare.

Comparable scores on the FS of mothers with and without a history of ED is a positive outcome and can be explained by various factors. The fear of passing on disordered eating behavior to their children could explain the lower SC scales in dyads of the ED group. Since controlling behavior is one of the most central aspects of ED, and especially of AN psychopathology (Treasure et al., 2020), mothers with EDs might not want to use controlling behavior towards their children. In addition, mothers with ED history may overcompensate their urge for control during feeding, which is reflected in the positive FS outcome, e.g., mothers with ED history refrained from expressing negative statements about their child's food intake (Item 18, DC subscale) and they demonstrated heightened sensitivity to their child's eating cues (lower SC scores). It is important to note that social desirability may have had an impact on mothers' behavior during infant feeding. Contrary to our hypotheses and to previous research (Squires et al., 2014), the absence of significant correlations between FS and EDE-Q subscales might indicate that ED symptoms do not seem to affect mother-child interactions during feeding and that women with ED history might be able to set aside their own problems with eating while feeding their child. This finding is in line with the later analysis by Stein's cohort, which revealed that mealtime conflict was less likely when mothers were able to acknowledge infant's cues and put aside their own concerns related to ED psychopathology (Stein et al., 1999). Another explanation for the positive FS scoring of mothers with ED history might be the fact that the majority of women in our sample might have suffered from a milder disorder compared with clinical or active cases, since only seven women had an EDE-Q total score above the clinical cut-off value ($\geq$2.3). Moreover, to test for possible influences of the ED case mix in our sample, later analyses that solely included women with AN history showed no significant differences in FS subscales between women with AN history and control women. Furthermore, women with and without ED history had a high socioeconomic status, especially a high educational level, which is associated with less conflictual relations with their children (Silva et al., 2016). Lastly, there is evidence that breastfeeding may promote sensitivity to infant hunger and satiety cues (Ventura, 2017) as it eliminates the option of feeding a set quantity of food (Hoffman et al., 2014). 80.0 % of mothers with ED history breastfed their children at ten months postpartum. Thus, the high prevalence of breastfeeding in our sample may explain the observed responsiveness of mothers with EDs to infant's signals during feeding.

We found no differences between the groups in their positive statements about infant's food intake. In contrast, in the observational study by Waugh and Bulik (1999), mothers with ED history did not show any positive appreciation of the taste of the food or the experience of eating during mealtime interaction with their children (Waugh & Bulik, 1999). Furthermore, they tended to avoid eating with their children. Even though food and mealtimes might be an uncomfortable experience for women with ED history (Mazzeo et al., 2005; Stein et al., 1999), more women with ED history than controls ate in front of their children during

mealtimes in our sample. Parents have a significant influence on children's early experiences with food and eating (Savage et al., 2007). Modeling and encouragement are important components of promoting healthy eating patterns (Savage et al., 2007; Waugh & Bulik, 1999). Therefore, mothers with ED history might be especially motivated to encourage a healthy attitude towards food and eating by serving as models of eating. An interesting side finding was that mother-child dyads scored significantly lower on the DC and TD scales when the father was present. This could be an indication that fathers might play a protective role in the family system affected by maternal EDs (Claydon et al., 2018).

In line with our hypothesis, at three months postpartum, 60.0 % of women with ED history reported breastfeeding problems and significantly more women with ED history were concerned that the child was not eating enough compared to control women. This finding indicates that women with ED history are worried about infant feeding and whether they are providing the child with enough (breast) milk (Kaß et al., 2021). At ten months postpartum, more women with ED history reported problems with solid foods. There is evidence, that women with previous and current ED psychopathology are not systematically over-reporting feeding problems in their children (Whelan & Cooper, 2000). The nature of the relationship between parental eating disturbances and infant feeding difficulties can be explained by child and parental factors, including genetic influences, infant temperament (Farrow & Blissett, 2006) and appetite, parental eating psychopathology, affective psychopathology, and learned behaviors (Coulthard et al., 2004). Data from the population-based ALSPAC study suggests that the effect of maternal EDs on feeding difficulties (both at one and six months) is mediated by maternal anxiety and depression (Micali, Simonoff, Stahl, et al., 2011). In our study, scores on depressive symptoms were significantly higher in women with ED history, however, they were not associated with FS scores or problems with eating solid foods.

4.1. Strengths and limitations

A strength of this study is the observation and videotaping of mothers and their infants during feeding in their homes which allowed objective assessment of dyadic interactions based on the well-established and validated FS. Moreover, we mostly recruited women from the general population and prospectively collected data on maternal and child factors.

It is important to emphasize that we assessed the whole spectrum of EDs and that we included women with previous and active EDs, since there is evidence that maternal active ED symptomatology in pregnancy increases the risk for feeding difficulties via the same pathways as maternal lifetime ED history (Micali et al., 2009). It is conceivable that some women of our sample may have suffered from a milder disorder compared with clinical samples, since the women were able to have children. Notably, only one woman with BED was included, despite BED being the most prevalent ED in a large antenatal sample (>77,000 women) (Watson et al., 2013) and pregnancy being a risk factor for the onset of BED (Bulik et al., 2007). This discrepancy may be attributed to self-selection bias of mothers interested in the study or the fact that BED is frequently unrecognized and untreated (Giel et al., 2022). Due to the nature of our study, we were not able to objectively measure ED symptomatology before pregnancy. We used the original, theoretically derived factor structure of the EDE-Q. However, a robust body of research suggests a four-factor model with factors corresponding to themes of (a) dietary restraint, (b) preoccupation and restriction, (c) weight and shape concern, and (d) eating shame (Rand-Giovannetti et al., 2020). Using a four-factor model may have improved our interpretations of the EDE-Q.

It must be stressed that on a number of outcome measures (e.g., BMI), there was considerable variability within the ED group. The sample was highly educated, so findings may not be generalizable to all mothers with histories of EDs. Lastly, the exclusion criteria pertaining to

the physical health of the mother and the inconspicuous birth outcomes may restrict the generalizability of the findings.

The FS was standardized for use in a laboratory setting, where a 20-min meal is observed and videotaped from behind a one-way mirror. Filming the mother-child dyads in their homes increased ecological validity. We used a smartphone for filming the mother-child interaction because we assumed that children of this age were familiar with this "object". However, it cannot be ruled out that the presence of the smartphone may have been a distraction for the mother-child dyads and that the interactive behavior might have been influenced. It was a priority for us to draw back on a well-established scoring schedule for this study, hence we used the FS by Chatoor (Chatoor et al., 1997). However, the German version of the FS used in this study has not yet been validated. Furthermore, the intraclass correlation coefficient for the MNC subscale was found to be insufficient, indicating that MNC subscale scores should be interpreted with caution. It is also possible that the FS, published in 1997, no longer fully fits in with modern parenting styles. There is evidence that non-food related parenting styles are associated with children's eating behavior (van der Horst & Sleddens, 2017). Moreover, overprotective parenting, which is characterized by interfering with the development of child autonomy (Padilla-Walker & Nelson, 2012) has been positively associated with overweight in children aged ten to eleven years (Hancock et al., 2014). In context of the representativeness of a single videotaped feeding situation, future studies should consider the importance of multiple assessments, since the passing of time seemed to reduce difficulties in mother-child feeding interactions (Cimino et al., 2016).

The sample size was rather small and we lacked statistical power to detect small or medium effect sizes, more precisely, sample size calculations with 48 vs. 20 persons revealed that effect sizes of 0.757 were measurable in the *t*-test with 80% power. Subgroup analysis might have been possible with a larger sample. Furthermore, only maternal report was used as a measure of feeding difficulties and infant temperament and might be subject to social desirability bias.

5. Conclusions and implications

To conclude, feeding is one of the basic early interactions of parents with their infants, and is one of the most important ways in which parents communicate with them (Patel et al., 2002). We videotaped and rated mother-infant dyads during the transition from being fed to self-feeding in children of mothers with and without ED history. During this transition, a great deal of sensitivity is required on the part of the parents, as the child is striving for autonomy but still needs support with eating. Therefore, observing mother-infant interactions during feeding can be a window through which the patterns of their dyadic interaction can be objectively assessed. Early feeding interactions have also been discussed as one potential trajectory within transgenerational transmission of EDs. Overall, we found similar feeding scale outcomes in women with and without ED history, however mothers from the control group experienced more struggle for control with their infants during feeding and made more negative comments about the infant's food intake. Though we would like to emphasize the preliminary nature of these findings based on the small sample size.

It will be of interest to ascertain whether the outcomes of the feeding scale between mother-child dyads of the ED and HC groups will differ at the final assessment point of the EMKIE study at 32–42 months post-partum (assessment ④). As previous literature has indicated, dyadic conflict increases with the child's age (Chatoor et al., 1997) and feeding disorders, specifically infantile anorexia, may emerge during the transition to autonomous eating (Ammaniti et al., 2010). Moreover, it will be crucial to determine, whether maternal ED psychopathology has an impact on feeding scale outcomes at 32–42 months postpartum. Furthermore, follow-up on children of mothers with dysfunctional eating attitudes is pivotal, since previous literature demonstrated increased eating pathology and associated psychopathological

symptoms in 11-year old girls and their mothers (Lucarelli et al., 2018). Furthermore, positive maternal internal working models of attachment should be considered in further studies as they may moderate the effect of maternal EDs on mother-child interactions and child development, as recently shown for maternal depression (Santona et al., 2015).

Our results are encouraging as they support maternal sensitivity and competency around mealtimes irrespective of ED history, strengthening the confidence of women with past and current EDs in interacting with their child in a food context. Additional research is required to verify these findings and explore potential variations in FS outcomes among women with different ED diagnoses, as well as fathers with EDs. Video analysis of mother-child interactions during feeding could be a promising method in the prevention of early maladaptive feeding and eating problems, regardless of maternal ED status.

Data and code availability

Data and code for this study will be made available on request. The corresponding author has full access to the data reported in the manuscript.

Ethical statement

The study was approved by the Ethics Committee of the Medical Faculty of the Eberhard-Karls-University and the University Hospital Tuebingen (#219/2018BO1). All study participants provided written informed consent.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

CRediT authorship contribution statement

Annica Franziska Doersam: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Jana Katharina Throm:** Writing – review & editing, Investigation, Formal analysis, Data curation. **Ferdinand Sörensen:** Writing – review & editing, Formal analysis. **Peter Martus:** Writing – review & editing, Supervision, Methodology. **Ingeborg Kraegeloh-Mann:** Writing – review & editing, Supervision. **Hubert Preissl:** Writing – review & editing, Supervision, Conceptualization. **Nadia Micali:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Katrin Elisabeth Giel:** Writing – review & editing, Supervision, Project administration, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article to disclose.

Data availability

Data will be made available on request.

Acknowledgements

References

Agras, S., Hammer, L., & McNicholas, F. (1999). *A prospective study of the influence of eating-disordered mothers on their children, 25*(3), 253–262. https://doi.org/10.1002/(SICI)1098-108X(199904)25:3%3C253::AID-EAT2%3E3.0.CO;2-Z

Ammaniti, M., Lucarelli, L., Cimino, S., D'Olimpio, F., & Chatoor, I. (2010). Maternal psychopathology and child risk factors in infantile anorexia. *International Journal of Eating Disorders, 43*(3), 233–240. https://doi.org/10.1002/eat.20688

APA. (2000). *Diagnostic and statistical manual of mental disorders (DSM-IV-TR), text revision (No Title).*

Barse, L. M., Tharner, A., Micali, N., Jaddoe, V. V. W., Hofman, A., Verhulst, F. C., Franco, O. H., Tiemeier, H., & Jansen, P. W. (2015). Does maternal history of eating disorders predict mothers' feeding practices and preschoolers' emotional eating? *Appetite, 85*, 1–7. https://doi.org/10.1016/j.appet.2014.10.031

Bartholomeusz, H. H., Courchesne, E., & Karns, C. M. (2002). Relationship between head circumference and brain volume in healthy normal toddlers, children, and adults. *Neuropediatrics, 33*(5), 239–241. https://doi.org/10.1055/s-2002-36735

Birch, L. L., Fisher, J. O., & Davison, K. K. (2003). Learning to overeat: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *American Journal of Clinical Nutrition, 78*(2), 215–220. https://doi.org/10.1093/ajcn/78.2.215

Black, M. M., & Aboud, F. E. (2011). Responsive feeding is Embedded in a theoretical Framework of responsive parenting. *Journal of Nutrition, 141*(3), 490–494. https://doi.org/10.3945/jn.110.129973

Bould, H., Sovio, U., Koupil, I., Dalman, C., Micali, N., Lewis, G., & Magnusson, C. (2015). Do eating disorders in parents predict eating disorders in children? Evidence from a Swedish cohort. *Acta Psychiatrica Scandinavica, 132*(1), 51–59. https://doi.org/10.1111/acps.12389

Bulik, C. M. (2005). Exploring the gene–environment nexus in eating disorders. *Journal of Psychiatry & Neuroscience, 30*(5), 335–339. https://www.jpn.ca/content/jpn/30/5/335.full.pdf.

Bulik, C. M., Holle, A., Hamer, R., Knoph Berg, C., Torgersen, L., Magnus, P., Stoltenberg, C., Siega-Riz, A. M., Sullivan, P., & Reichborn-Kjennerud, T. (2007). Patterns of remission, continuation and incidence of broadly defined eating disorders during early pregnancy in the Norwegian Mother and Child Cohort Study (MoBa). *Psychological Medicine, 37*(8), 1109–1118. https://doi.org/10.1017/S0033291707000724

Bulik, C. M., Kleiman, S. C., & Yilmaz, Z. (2016). *Genetic epidemiology of eating disorders, 29*(6), 383–388. https://doi.org/10.1097/yco.0000000000000275

Campbell, I. C., Mill, J., Uher, R., & Schmidt, U. (2011). Eating disorders, gene-environment interactions and epigenetics. *Neuroscience & Biobehavioral Reviews, 35*(3), 784–793. https://doi.org/10.1016/j.neubiorev.2010.09.012

Chatoor, I. (2016). *Fütterstörungen bei Säuglingen und Kleinkindern* (Zweite Auflage ed.). Klett-Cotta http://www.worldcat.org/oclc/951672534.

Chatoor, I., Ganiban, J., Hirsch, R., Borman-Spurrell, E., & Mrazek, D. A. (2000). Maternal characteristics and toddler temperament in infantile anorexia. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*(6), 743–751. https://doi.org/10.1097/00004583-200006000-00013

Chatoor, I., Getson, P., Menvielle, E., Brasseaux, C., O'Donnell, R., Rivera, Y., & Mrazek, D. A. (1997). *A feeding scale for research and clinical practice to assess mother—infant interactions in the first three years of life, 18*(1), 76–91. https://doi.org/10.1002/(SICI)1097-0355(199721)18:1<76::AID-IMHJ6>3.0.CO;2-Z

Cimino, S., Cerniglia, L., Porreca, A., Simonelli, A., Ronconi, L., & Ballarotto, G. (2016). Mothers and fathers with binge eating disorder and their 18-36 Months old children: A longitudinal study on parent-infant interactions and Offspring's emotional-behavioral Profiles. *Frontiers in Psychology, 7*, 580. https://doi.org/10.3389/fpsyg.2016.00580

Claydon, E. A., Davidov, D. M., Zullig, K. J., Lilly, C. L., Cottrell, L., & Zerwas, S. C. (2018). Waking up every day in a body that is not yours. *BMC Pregnancy and Childbirth, 18*(1), 463. https://doi.org/10.1186/s12884-018-2105-6

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396.

Cooper, Z., & Fairburn, C. (1987). The eating disorder examination: A semi-structured interview for the assessment of the specific psychopathology of eating disorders. *International Journal of Eating Disorders, 6*(1), 1–8. https://onlinelibrary.wiley.com/doi/10.1002/1098-108X(198701)6:1%3C1::AID-EAT2260060102%3E3.0.CO;2-9.

Coulthard, H., Blissett, J., & Harris, G. (2004). The relationship between parental eating problems and children's feeding behavior: A selective review of the literature. *Eating Behaviors, 5*(2), 103–115. https://doi.org/10.1016/j.eatbeh.2003.07.003

Doersam, A. F., Moser, J., Throm, J., Weiss, M., Zipfel, S., Micali, N., Preissl, H., & Giel, K. E. (2022). Maternal eating disorder severity is associated with increased latency of foetal auditory event-related brain responses. *European Eating Disorders Review, 30*(1), 75–81. https://doi.org/10.1002/erv.2870

Dörsam, A. F., Bye, A., Graf, J., Howard, L. M., Throm, J., Müller, M., Wallwiener, S., Zipfel, S., Micali, N., & Giel, K. E. (2022). Screening instruments for eating disorders in pregnancy: Current evidence, challenges, and future directions. *International Journal of Eating Disorders, 55*(9), 1208–1218. https://doi.org/10.1002/eat.23780

Fairburn, C. G. (2008). *Cognitive behavior therapy and eating disorders.* Guilford Press.

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16*(4), 363–370. https://doi.org/10.1002/1098-108X(199412)16:4%3C363::AID-EAT2260160405%3E3.0.CO;2-%23

Fairburn, C. G., & Cooper, Z. (1993). The eating disorder examination. *Binge eating: Nature, assessment, and treatment* (12th ed.).

Farrow, C., & Blissett, J. (2006). Maternal cognitions, psychopathologic symptoms, and infant temperament as predictors of early infant feeding problems: A longitudinal study. *International Journal of Eating Disorders, 39*(2), 128–134. https://doi.org/10.1002/eat.20220

Fuchs, C., & Pillhofer, M. (2013). *Deutsche Version des IBQ-R-VSF.* Unpublished work.

Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via the revised infant behavior questionnaire. *Infant Behavior and Development, 26*(1), 64–86. https://doi.org/10.1016/S0163-6383(02)00169-8M4-Citavi

Giel, K. E., Bulik, C. M., Fernandez-Aranda, F., Hay, P., Keski-Rahkonen, A., Schag, K., Schmidt, U., & Zipfel, S. (2022). Binge eating disorder. *Nature Reviews Disease Primers, 8*(1), 16. https://doi.org/10.1038/s41572-022-00344-y

Gräfe, K., Zipfel, S., Herzog, W., & Löwe, B. (2004). Screening psychischer Störungen mit dem "Gesundheitsfragebogen für Patienten (PHQ-D). *Diagnostica, 50*(4), 171–181. https://doi.org/10.1026/0012-1924.50.4.171

Gross, S., Reck, C., Thiel-Bonney, C., & Cierpka, M. (2013). Empirische Grundlagen des Fragebogens zum Schreien, Füttern und Schlafen (SFS) [Empirical basis of the Questionnaire for Crying, Feeding and Sleeping]. *Praxis der Kinderpsychologie und Kinderpsychiatrie, 62*(5), 327–347. https://doi.org/10.13109/prkk.2013.62.5.327

Hancock, K. J., Lawrence, D., & Zubrick, S. R. (2014). Higher maternal protectiveness is associated with higher odds of child overweight and obesity: A longitudinal Australian study. *PLoS One, 9*(6), Article e100686. https://doi.org/10.1371/journal.pone.0100686

Hilbert, A., Tuschen-Caffier, B., & Ohms, M. (2004). Eating Disorder Examination: Deutschsprachige Version des strukturierten Essstörungsinterviews. *Diagnostica, 50*(2), 98–106. https://doi.org/10.1026/0012-1924.50.2.98

Hilbert, A., Zwaan, M., & Braehler, E. (2012). How frequent are eating disturbances in the population? Norms of the eating disorder examination-questionnaire. *PLoS One, 7*(1), Article e29125. https://doi.org/10.1371/journal.pone.0029125

Hoffman, E. R., Bentley, M. E., Hamer, R. M., Hodges, E. A., Ward, D. S., & Bulik, C. M. (2014). *A comparison of infant and toddler feeding practices of mothers with and without histories of eating disorders, 10*(3), 360–372. https://doi.org/10.1111/j.1740-8709.2012.00429.x

Jones, C., Pearce, B., Barrera, I., & Mummert, A. (2017). Fetal programming and eating disorder risk. *Journal of Theoretical Biology, 428*, 26–33. https://doi.org/10.1016/j.jtbi.2017.05.028

Kaß, A., Dörsam, A. F., Weiß, M., Zipfel, S., & Giel, K. E. (2021). The impact of maternal eating disorders on breastfeeding practices: A systematic review. *Archives of Women's Mental Health.* https://doi.org/10.1007/s00737-021-01103-w

Klein, E. M., Brähler, E., Dreier, M., Reinecke, L., Müller, K. W., Schmutzer, G., Wölfling, K., & Beutel, M. E. (2016). The German version of the Perceived Stress Scale - psychometric characteristics in a representative German community sample. *BMC Psychiatry, 16*, 159. https://doi.org/10.1186/s12888-016-0875-9

Kristen, S., Eisenbeis, H., Thoermer, C., & Sodian, B. (2007). *Deutsche Version des IBQ-R.* Unpublished work.

Lucarelli, L., Sechi, C., Cimino, S., & Chatoor, I. (2018). Avoidant/restrictive food intake disorder: A longitudinal study of malnutrition and psychopathological risk factors from 2 to 11 Years of age. *Frontiers in Psychology, 9*, 1608. https://doi.org/10.3389/fpsyg.2018.01608

Mantel, Ä., Lindén Hirschberg, A., & Stephansson, O. (2019). Association of maternal eating disorders with pregnancy and neonatal outcomes. *JAMA Psychiatry.* https://doi.org/10.1001/jamapsychiatry.2019.3664

Martini, M. G., Barona-Martinez, M., & Micali, N. (2020). Eating disorders mothers and their children: A systematic review of the literature. *Archives of Women's Mental Health.* https://doi.org/10.1007/s00737-020-01019-x

Martini, M. G., Taborelli, E., Schmidt, U., Treasure, J., & Micali, N. (2018). *Infant feeding behaviours and attitudes to feeding amongst mothers with eating disorders, 27*(2), 137–146. https://doi.org/10.1002/erv.2626

Mazzeo, S. E., Zucker, N. L., Gerke, C. K., Mitchell, K. S., & Bulik, C. M. (2005). Parenting concerns of women with histories of eating disorders. *International Journal of Eating Disorders, 37*(Suppl), S77–S79. https://doi.org/10.1002/eat.20121. discussion S87-79.

Micali, N., Simonoff, E., Stahl, D., & Treasure, J. (2011). *Maternal eating disorders and infant feeding difficulties, 52*(7), 800–807. https://doi.org/10.1111/j.1469-7610.2010.02341.x

Micali, N., Simonoff, E., & Treasure, J. (2009). Infant feeding and weight in the first year of life in babies of women with eating disorders. *The Journal of Pediatrics, 154*(1), 55–60.e51. https://doi.org/10.1016/j.jpeds.2008.07.003

Micali, N., Stavola, B., Ploubidis, G. B., Simonoff, E., & Treasure, J. (2014). *The effects of maternal eating disorders on offspring childhood and early adolescent psychiatric disorders, 47*(4), 385–393. https://doi.org/10.1002/eat.22216

Moore, A. C., Akhter, S., & Aboud, F. E. (2006). Responsive complementary feeding in rural Bangladesh. *Social Science & Medicine, 62*(8), 1917–1930. https://doi.org/10.1016/j.socscimed.2005.08.058

Padilla-Walker, L. M., & Nelson, L. J. (2012). Black hawk down?: Establishing helicopter parenting as a distinct construct from other forms of parental control during emerging adulthood. *Journal of Adolescence, 35*(5), 1177–1190. https://doi.org/10.1016/j.adolescence.2012.03.007

Paslakis, G., & Zwaan, M. (2019). *Clinical management of females seeking fertility treatment and of pregnant females with eating disorders, 27*(3), 215–223. https://doi.org/10.1002/erv.2667M4-Citavi

Patel, P., Wheatcroft, R., Park, R. J., & Stein, A. (2002). The children of mothers with eating disorders. *Clinical Child and Family Psychology Review, 5*(1), 1–19. https://doi.org/10.1023/a:1014524207660

Putnam, S. P., Helbig, A. L., Gartstein, M. A., Rothbart, M. K., & Leerkes, E. (2014). Development and assessment of short and very short forms of the infant behavior questionnaire-revised. *Journal of Personality Assessment, 96*(4), 445–458. https://doi.org/10.1080/00223891.2013.841171

Rand-Giovannetti, D., Cicero, D. C., Mond, J. M., & Latner, J. D. (2020). Psychometric properties of the eating disorder examination-questionnaire (EDE-Q): A confirmatory factor analysis and assessment of measurement invariance by sex. *Assessment, 27*(1), 164–177. https://doi.org/10.1177/1073191117738046

Reba-Harrelson, L., Holle, A., Hamer, R. M., Torgersen, L., Reichborn-Kjennerud, T., & Bulik, C. M. (2010). Patterns of maternal feeding and child eating associated with eating disorders in the Norwegian Mother and Child Cohort Study (MoBa). *Eating Behaviors, 11*(1), 54–61. https://doi.org/10.1016/j.eatbeh.2009.09.004

Richter, F., Strauss, B., Braehler, E., Altmann, U., & Berger, U. (2016). Psychometric properties of a short version of the Eating Attitudes Test (EAT-8) in a German representative sample. *Eating Behaviors, 21*, 198–204. https://doi.org/10.1016/j.eatbeh.2016.03.006

Robert Koch-Institut, A. f. E. u. G.. (2019). *Studie zur Gesundheit von Kindern und Jugendlichen in Deutschland (KiGGS-Basiserhebung)*. Scientific Use File, 5. Version.

Santona, A., Tagini, A., Sarracino, D., De Carli, P., Pace, C. S., Parolin, L., & Terrone, G. (2015). Maternal depression and attachment: The evaluation of mother-child interactions during feeding practice. *Frontiers in Psychology, 6*, 1235. https://doi.org/10.3389/fpsyg.2015.01235

Savage, J. S., Fisher, J. O., & Birch, L. L. (2007). Parental influence on eating behavior: Conception to adolescence. *Journal of Law Medicine & Ethics, 35*(1), 22–34. https://doi.org/10.1111/j.1748-720X.2007.00111.x

Silva, G. A. P., Costa, K. A. O., & Giugliani, E. R. J. (2016). Infant feeding: Beyond the nutritional aspects. *Jornal de Pediatria, 92*(3 Suppl 1), S2–S7. https://doi.org/10.1016/j.jped.2016.02.006

Squires, C., Lalanne, C., Murday, N., Simoglou, V., & Vaivre-Douret, L. (2014). *The influence of eating disorders on mothers' sensitivity and adaptation during feeding, 14*(1), 274. https://doi.org/10.1186/1471-2393-14-274

Stein, A., Woolley, H., Cooper, S. D., & Fairburn, C. G. (1994). *An Observational Study of Mothers with Eating Disorders and Their Infants, 35*(4), 733–748. https://doi.org/10.1111/j.1469-7610.1994.tb01218.x

Stein, A., Woolley, H., Cooper, S., Winterbottom, J., Fairburn, C. G., & Cortina-Borja, M. (2006). Eating habits and attitudes among 10-year-old children of mothers with eating disorders. *British Journal of Psychiatry, 189*(4), 324–329. https://doi.org/10.1192/bjp.bp.105.014316

Stein, A., Woolley, H., & McPherson, K. (1999). Conflict between mothers with eating disorders and their infants during mealtimes. *British Journal of Psychiatry, 175*, 455–461. https://doi.org/10.1192/bjp.175.5.455

Treasure, J., Duarte, T. A., & Schmidt, U. (2020). Eating disorders. *The Lancet, 395* (10227), 899–911. https://doi.org/10.1016/S0140-6736(20)30059-3

van der Horst, K., & Sleddens, E. F. C. (2017). Parenting styles, feeding styles and food-related parenting practices in relation to toddlers' eating styles: A cluster-analytic approach. *PLoS One, 12*(5), Article e0178149. https://doi.org/10.1371/journal.pone.0178149

Ventura, A. K. (2017). Associations between breastfeeding and maternal responsiveness: A systematic review of the literature. *Advances in Nutrition, 8*(3), 495–510. https://doi.org/10.3945/an.116.014753

von Hofacker, N., Tortorella, S., & Sobanski, P. (2002). *Fragebogen zur Ess- und Fütteranamnese.* https://link.springer.com/content/pdf/10.1007/978-3-642-40742-0.pdf.

Watson, H. J., Holle, A., Hamer, R. M., Knoph Berg, C., Torgersen, L., Magnus, P., Stoltenberg, C., Sullivan, P., Reichborn-Kjennerud, T., & Bulik, C. M. (2013). Remission, continuation, and incidence of eating disorders during early pregnancy: A validation study on a population-based birth cohort. *Psychological Medicine, 43*(8), 1723–1734. https://doi.org/10.1017/S0033291712002516

Watson, H. J., Torgersen, L., Zerwas, S., Reichborn-Kjennerud, T., Knoph, C., Stoltenberg, C., Siega-Riz, A. M., Holle, A., Hamer, R. M., Meltzer, H., Ferguson, E. H., Haugen, M., Magnus, P., Kuhns, R., & Bulik, C. M. (2014). Eating disorders, pregnancy, and the postpartum period: Findings from the Norwegian mother and child cohort study (MoBa). *Norsk epidemiologi = Norwegian journal of epidemiology, 24*(1–2), 51–62. https://doi.org/10.5324/nje.v24i1-2.1758

Watson, H. J., Yilmaz, Z., Thornton, L. M., Hübel, C., Coleman, J. R. I., Gaspar, H. A., Bryois, J., Hinney, A., Leppä, V. M., Mattheisen, M., Medland, S. E., Ripke, S., Yao, S., Giusti-Rodríguez, P., Hanscombe, K. B., Purves, K. L., Adan, R. A. H., Alfredsson, L., Ando, T., … Bulik, C. M. (2019). Genome-wide association study identifies eight risk loci and implicates metabo-psychiatric origins for anorexia nervosa. *Nature Genetics, 51*(8), 1207–1214. https://doi.org/10.1038/s41588-019-0439-2

Waugh, E., & Bulik, C. M. (1999). *Offspring of women with eating disorders, 25*(2), 123–133. https://onlinelibrary.wiley.com/doi/10.1002/(SICI)1098-108X(199903)25:2%3C123::AID-EAT1%3E3.0.CO;2-B.

Whelan, E., & Cooper, P. J. (2000). The association between childhood feeding problems and maternal eating disorder: A community study. *Psychological Medicine, 30*(1), 69–77. https://doi.org/10.1017/s0033291799001543

Zerwas, S., Holle, A., Torgersen, L., Reichborn-Kjennerud, T., Stoltenberg, C., & Bulik, C. M. (2012). Maternal eating disorders and infant temperament. *International Journal of Eating Disorders, 45*(4), 546–555. https://doi.org/10.1002/eat.20983

Zipfel, S., Giel, K. E., Bulik, C. M., Hay, P., & Schmidt, U. (2015). Anorexia nervosa: Aetiology, assessment, and treatment. *The Lancet Psychiatry, 2*(12), 1099–1111. https://doi.org/10.1016/S2215-0366(15)00356-9