

Feeding Disorders of Infancy: A Longitudinal Study to Middle Childhood

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ABSTRACT

Objective: To evaluate over time feeding behavior and emotional-behavioral functioning in a sample of children diagnosed with Infantile Anorexia (IA) and a group of typically developing children; and to investigate the relationship between maternal psychological functioning and the children's feeding patterns and emotional-behavioral functioning.

Method: Seventy-two children diagnosed with IA and 70 children in the control group were prospectively evaluated through several measures at two, five, and eight years of age.

Results: Our findings revealed partial improvement in the nutritional status of the children with IA. However, they continued to show ongoing eating problems and, in addition, anxiety/depression

and withdrawal, as well as rule-breaking behaviors and social problems. There were significant correlations between the children's eating problems and their emotional difficulties and their mothers' increased emotional distress and disturbed eating attitudes.

Discussion: Our longitudinal study points out that the natural course of untreated IA is characterized by the persistence of difficulties in eating behavior and emotional-behavioral adjustment in both, the children and their mothers. © 2011 by Wiley Periodicals, Inc.

Keywords: infantile anorexia; emotional-behavioral adjustment; longitudinal outcome

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Introduction

The last version of the *Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood-Revised - DC: 0-3R by Zero-To-Three*¹ introduced a classification of feeding behavior disorders for infants and young children. Different clinical pictures are included depending on the developmental period in which they appear, their clinical symptoms and their possible association with coexisting medical conditions.

Longitudinal studies serve to better understand the clinical picture and the course of various feeding behavior disorders.^{2,3} In general, current longitudinal research on feeding behavior disorders in early infancy is primarily based on studies of nonreferred populations or retrospective studies of limited clinical samples and no clear differentiation is made between different clinical conditions.^{4–6} Consequently, the long-term outcome is still poorly understood. In fact, it is not clear whether the same clinical manifestations persist (homotypical continuity), whether the feeding disorder takes on different clinical phenomenologies (heterotypical continuity) or whether remission occurs.⁷

A prospective longitudinal study of a large nonreferred population from early childhood to young adulthood showed that picky eating, eating conflicts, struggles with food and unpleasant meals in early childhood correlate with the diagnosis of Anorexia Nervosa in adolescence or young adulthood.^{4,8}

Other longitudinal studies, which investigated a shorter time period (from infancy to preschool age and mid-childhood), revealed homotypical continuity in 50–80% of the children with early food

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refusal (persistence of food refusal, selective feeding behavior, low weight) and heterotypical continuity (i.e., separation anxiety, oppositional behaviors, school phobia and social phobia).^{6,9,10} These studies indicate that children with early feeding disorders are at risk not only for ongoing eating problems, but also for anxiety disorders and behavioral adjustment.

The aim of the present longitudinal study was to study the clinical course of Infantile Anorexia (IA). On the basis of the criteria of DC: 0-3R^{1, a} IA is defined as a feeding disorder of infancy and early childhood characterized by the child's refusal to eat adequate amounts of food for at least one month. The child with IA rarely communicates hunger, lacks interest in food and eating, would rather play than eat, and has growth deficiency. The child's food refusal does not follow a traumatic event and is not due to an underlying medical illness. The onset of food refusal often occurs during the transition to spoon- and self-feeding, typically between six months and three years of age. Cross-sectional studies of IA, conducted on children ranging in age from six months to three years and their mothers,¹¹⁻¹⁴ showed that when compared to control samples: (1) the feeding interactions between children with IA and their mothers are characterized by low dyadic reciprocity, greater interactional conflict and negative affects in both mother and child; (2) children with IA have a fussy-difficult temperament, have a heightened level of physiological arousal, are less adaptive, and show irregular feeding and sleeping patterns. In addition, as toddlers, their emotional-behavioral functioning is characterized by both internalizing and externalizing problems; (3) their mothers show psychopathological indexes, characterized by depression and dysfunctional eating attitudes.

In this study, the clinical evolution of IA was assessed in a broad sample of children initially diagnosed during the first three years of life, and followed at five and seven years of age. The children were compared to healthy children assessed at the same ages. The children's pattern of development, particularly with regard to feeding and emotional-behavioral functioning, and the psychological profiles of the mothers, were compared to the development of healthy control children

and their mothers. The specific aims of the study were:

1. To examine whether the malnutrition of the children with IA would persist over time.
2. To examine whether the eating behaviors of the children with IA would change over time.
3. To identify difficulties in the emotional-behavioral development of the children with IA compared to the control group of healthy children.
4. To examine the psychological profiles of the mothers of the children with IA compared to the mothers of the healthy children over time.
5. To evaluate whether there are any correlations between maternal psychological profiles and the children's eating and emotional-behavioral development.

Material and Method

Participants

The participants were recruited at the "Bambino Gesù" Pediatric Hospital in Rome. They were part of a large sample of 184 Italian children diagnosed, on the basis of the criteria of the DSM-IV-TR¹⁵ with Feeding Disorder of Infancy or Early Childhood and of the criteria of DC: 0-3R,^{1,3} with different feeding disorders, including Infantile Anorexia ($N = 114$), Post-traumatic Feeding Disorder ($N = 24$), Sensory Food Aversions ($N = 31$) and Feeding Disorder Associated with a Concurrent Medical Conditions ($N = 15$). Here we report the data regarding the children with IA and their mothers, who received nutritional and psychological counseling at the end of the diagnostic process but, for various reasons, did not pursue any specific psychotherapeutic treatment (living in other areas of Italy without appropriate resources, refusal by one or both parents, or precocious interruption of treatment, after participating in no more than three meetings, often motivated by partial improvement of the child's nutritional status).

The longitudinal sample (who filled out the measures at all times) was comprised of 142 children and their mothers; 72 of the children had a diagnosis of IA (IA group) and 70 had no physical or psychiatric disorders and had a normal growth rate (ND group). The gestational age and psychomotor development of all the children, at the time of the first assessment, were in the normal range, which was one of the inclusion criteria. The children's mean age of the IA-group and ND-group was

^aThe DC:0-3, published in 1994 and revised in 2005, was designed to address the need for a systematic, developmentally based approach to the classification of mental health and developmental difficulties in the first four years of life. It has the aim to complement, but not replace, existing frameworks such as the DSM-IV (American Psychiatric Association, 1994).

2.1 (years, months) at the assessment Time 1 (S.D. = 0.4), 5.05 (S.D. = 0.6) at Time 2 and 7.7 (S.D. = 0.58) at Time 3. At Time 1, maternal mean age for IA-group was 31.3 and 32 years for ND-group (S.D. = 4.6 and 5.6, respectively). Most of the children had been breastfed (about 76%) and were firstborn (about 78.5%). Most of the mothers were married (about 91%), and had obtained a secondary school diploma (about 85%). Most families were of middle socio-economic status (SES) (about 93%).

For the children in the clinical group, the diagnosis of IA was made at time 1 by two independent clinicians ($k = 0.93$). Subsequently, the mothers of the children with IA were recontacted by telephone and invited to take part in a pediatric and psychological assessment (participants' initial response rate: 63.2%). Participants for the control group were recruited from the normal population of several nursery schools. The parents were invited to participate in a longitudinal study on child development (participants' initial response rate: 56%). The children were screened by a pediatrician and a clinical psychologist, and they were evaluated at each of the follow-ups along with the children who were initially diagnosed with IA. The study protocol was reviewed and approved by the Hospital Review Board and all parents signed informed consent forms.

Procedures

During the three evaluation sessions all dyads underwent the following assessments: (1) clinical screening was carried out by a pediatrician who assessed the child's growth and level of malnutrition and by a clinical psychologist who interviewed the parents regarding the child's patterns of feeding and eating behavior; evaluation of (2) the child's psychological profile by means of the Child Behavior Checklist 1½-5 and 6-18,^{16,17} which was filled out by the mothers; (3) the mother's psychological profile and eating attitudes by administering the following instruments in counterbalanced order: (a) Symptom Checklist-90-Revised¹⁸; (b) Eating Attitude Test-40.¹⁹

Measures

Assessment of Child's Malnutrition. This was based on the Waterloo²⁰ criteria, assuming that during periods of nutritional deprivation, a weight deficit is followed by a height deficit. The children's weight and height were recorded on the growth charts of the National Center for Health Statistics²¹ and translated into the percentage ideal body weight (IBW). The normal range of IBW is from 90% to 110%. To determine acute malnutrition, actual weight is divided by the expected weight for the child's actual height; mild, moderate, and severe acute malnutrition corresponds with 80–89%, 70–79%, and less than 70% of ideal body weight, respectively. To calculate chronic malnutrition, actual height is divided by the expected height at the 50th percentile for the child's

chronological age; mild, moderate, and severe chronic malnutrition correspond with 90–95%, 85–89%, and less than 85% of ideal height, respectively. The child's degree of malnutrition (acute and chronic) was evaluated on a 4-point scale (from 0 = none, 1 = mild, 2 = moderate, to 3 = severe).

To evaluate the child's eating behavior at the follow-up sessions, the mother was asked several questions during an interview which was based on the Children's Eating Behavior Questionnaire.²² We created 10 closed-response items along a 3-step Likert scale, concerning three dimensions of: Satiety Responsiveness, Lack of Enjoyment of Food, and Food Fussiness.²² Satiety Responsiveness (SR) is usually demonstrated by reduced food intake; Lack of Enjoyment of Food (LEF) refers to the expressed lack of desire to eat, showing a general lack of interest in eating; Food Fussiness (FF) refers to the child's high selectivity about the range of foods s/he will accept and being very difficult during meals, especially with new foods. In this study the Cronbach's alphas showed good internal consistency (LEF = 0.73, FF = 0.77, and SR = 0.89).

Assessment of Child's Emotional/Behavioral Functioning. Depending on the child's age, two versions of Achenbach and Rescorla's^{16,17} Child Behavior Checklist (CBCL) were used in the three follow-up sessions. The CBCL/1½-5, which includes 99 items, evaluates the 1½-5-year-old child's behaviors and emotions in different areas of daily functioning. It measures three syndrome scales: Internalizing, Externalizing, and Neither Internalizing Nor Externalizing. The Internalizing scale includes the following syndromes: Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn; the Externalizing scale includes: Attention Problems and Aggressive Behavior; and the Neither Internalizing Nor Externalizing scale identifies syndromes involving Sleep Problems and Other Problems not exclusively associated with other symptoms of the internalizing or externalizing scales. The CBCL/6-18 is a 118-item report-form questionnaire containing descriptions of emotions and behaviors in various areas and social contexts. The subscales Anxious/Depressed, Withdrawn/Depressed and Somatic Complaints belong to the Internalizing Syndrome Scale. The Externalizing Syndrome Scale comprises the Rule-Breaking Behavior and Aggressive Behavior subscales. Finally, the Neither Internalizing Nor Externalizing Scale comprises Social Problems, Attention Problems, and Thought Problems. The parent evaluates the child on a 3-point scale according to whether the behavior is absent = 0, rarely = 1, often or always = 2. The internal coherence coefficients of the CBCL Scale are satisfying and the validity of these instruments is supported by their ability to differentiate accurately between referred and nonreferred populations of subjects during child development.^{16,17}

Assessment of Mother's Psychological Symptom Status. The Symptom Checklist-90-Revised,¹⁸ a 90-item self-report symptom inventory, is a measure of current psychological symptom status scored on nine subscales—Somatization, Obsessive-compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, Psychoticism—and three Global Indices of Distress (Global Severity Index, Positive Symptom Distress Index, Positive Symptom Total) that indicate the severity and depth of individual psychological distress. Internal consistency of the SCL-90-R is quite satisfactory (α ranging from 0.77 to 0.90) and high levels of construct and convergent-discriminant validity have been demonstrated.¹⁸ The Eating Attitudes Test¹⁹ is a 40-item self-report symptom inventory that identifies concerns with eating and weight in the adult population, scored on three subscales: Dieting, Bulimia/Food Preoccupation and Oral Control. A high total score reflects dissatisfaction with body image and a desire to be thinner, preoccupation with eating and its effect on body size and self-control when eating. It has shown a high degree of internal reliability (α coefficient from 0.79 to 0.94) and has been validated on adult patients with anorexia nervosa.¹⁹

Data Analysis

An initial screening of data showed few data missing for each instrument (less than 5% for each instrument at each time). Missing data were corrected according to each test norms or by inserting the scale average for the participant with missing data. To investigate changes in the level of malnutrition over time, acute and chronic malnutrition were considered as a continuum from 0 (no malnutrition) to 6 (severe chronic), where 1, 2, and 3 correspond to mild, moderate and severe acute malnutrition and 4, 5, and 6 to the 3 chronic levels. A Kendall's test for repeated measures was carried out on malnutrition scores of the clinical group. Mixed analyses of variance (ANOVAs) were run with group (clinical vs. control) and gender at two levels and time at three levels on Satiety Responsiveness, Lack of Enjoyment of Food, and Food Fussiness, to examine changes in feeding behavior patterns during development.

A further 2×3 mixed ANOVAs (Group \times Time) were carried out on standardized CBCL scores (Total Score of the Scale, Total of Internalizing and Externalizing Scales). To examine differences between the subscales of the CBCL, separate analyses were run considering the children's age and the different versions of the instrument used. In particular, to reveal differences between the children at the first two evaluation sessions (CBCL/1½-5), mixed ANOVAs were performed on the raw scores of the Internalizing and Externalizing Scales, considering group (clinical vs. control) and gender (male vs. female) as independent factors and time (first vs. second) as repeated measure. On CBCL/6-18 subscales a multivariate analysis

of variance was run, with group and gender as between variables.

To investigate the presence and the trend of the scores regarding maternal psychopathological status, a series of mixed multivariate analyses of variance (MANOVAs) were carried out on the scores (transformed in their square root whenever the distribution deviated from normality) obtained by the mothers on the SCL-90-R (the three global indexes of distress and, subsequently, the subscales) and the EAT-40 (total score and, subsequently, the subscales), using group as independent variable and the three evaluation sessions as repeated measures. In all of the MANOVAs, univariate analyses were then conducted on significant effects and Duncan test (Bonferroni correction) was used for contrasts.

As a final step, correlation analyses (Pearson, Bonferroni correction) were performed to investigate the relationships between the child's eating behavior patterns (SR, LEF, FF) and emotional-behavioral functioning (CBCL) and maternal dimensions (SCL-90 and EAT-40 subscales) at each assessment time.

Results

Assessment of Child's Malnutrition and Current Feeding Behavior

A significant difference between the three evaluation times ($\chi^2(2) = 117.5; p < 0.001$, Kendall's $\tau = 0.82$) indicated a decrease in malnutrition from the first to the second evaluation (mean ranges = from 2.83 to 1.99) and a further decrease at the third evaluation session (mean range = 1.18). At time 1, about 51% of the children in the IA-group showed chronic malnutrition (22.2% severe chronic malnutrition). At Time 2, 44% of the children presented a chronic malnutrition, and about 69% presented a decrease in malnutrition (Wilcoxon test, $z = 6.2; p < 0.001$). Between Time 1 and 3, 97% of the children showed a decrease in malnutrition status, whereas the remaining 3% showed no change (Wilcoxon test, $z = 7.3; p < 0.001$). Furthermore, at time 3, none of the children had severe acute or chronic malnutrition, and about 87% had either no or mild malnutrition.

According to the screening carried out by the family pediatricians, the normally developing children, in the control group, showed no evidence of malnutrition at any of the follow-up's evaluations.

In regard to the eating behavior patterns, analyses showed an effect of the Group \times Time interaction ($df = 2,276$ and $p < 0.001$ for all dimensions; $F = 52.76$, $\eta^2_p = 0.41$ for Satiety Responsiveness; $F =$

48.55, $\eta^2_p = 0.40$ for Lack of Enjoyment of Food; $F = 115.9$, $\eta^2_p = 0.62$ for Food Fussiness), the main effect of Group ($df = 1,138$ and $p < 0.05$ for all dimensions; $F = 178.2$ and $\eta^2_p = 0.56$ for SR; $F = 6.4$ and $\eta^2_p = 0.27$ for LEF; $F = 177.5$ and $\eta^2_p = 0.56$ for FF) and of Time ($df = 2,276$ and $p < 0.001$ for all dimensions; $F = 64.9$ and $\eta^2_p = 0.46$ for SR; $F = 79.8$ and $\eta^2_p = 0.53$ for LEF; $F = 105.3$ and $\eta^2_p = 0.59$ for FF). Analyses showed that the ND group of children had stable scores over time (SR: Time 1 = 1.9, Time 2 = 2.1, Time 3 = 1.7; LEF: Time 1 = 1, Time 2 = 1, Time 3 = .8; FF: Time 1 = 1.3, Time 2 = 1.6, Time 3 = 1.2), whereas in the IA-group of children the scores of Satiety Responsiveness (Time 1 = 5.9, Time 2 = 4.6, Time 3 = 3.3) and Lack of Enjoyment of Food (Time 1 = 2.8, Time 2 = 2.2, Time 3 = 0.8) dimensions decreased from the first to the second and from the second to the third evaluation session (Duncan's test, $p < 0.05$). However analysis of the Food Fussiness dimension revealed an increase in the score of the children with IA at the second and third evaluation sessions (Time 1 = 1.7, Time 2 = 3.8, Time 3 = 5.6). No effects emerged for gender or for its interaction with the other factors in any of the three dimensions considered.

Evaluation of Child's Emotional–Behavioral Functioning

Analyses showed a significant effect of the Group \times Time interaction on both the Total Scale ($F(2,280) = 133.4$; $p < 0.0001$, $\eta^2_p = 0.81$) and the Total Internalizing ($F(2,280) = 14.7$; $p < 0.001$, $\eta^2_p = 0.62$) and Externalizing ($F(2,280) = 7.2$; $p < 0.001$, $\eta^2_p = 0.13$) Scales. For the Total Score, comparisons revealed a decrease in the control group's score at the second evaluation session, but no difference between the scores obtained at the first and third sessions. By contrast, for the group with IA, scores were stable at the first and second evaluation sessions and increased significantly at the third session. For the Total of the Internalizing scales at the second session, the scores of the control group decreased and those of the IA-group increased, whereas at the third session the scores of both groups remained stable. At all time intervals, the children in the IA-group presented significantly higher scores than those in the control group ($p < 0.001$ for all comparisons).

Furthermore, analyses on CBCL/1½-5 subscales revealed a significant Group \times Time interaction ($\eta^2_p = 0.06$) for the Internalizing dimensions: Emotional reactivity, Somatic complaints and Withdrawal and the Externalizing Subscales: Attention problems, and Aggressive behavior. Post-hoc comparisons revealed the same pattern for all scales,

with a higher score obtained by the children in the IA- group, which increased significantly at the second follow-up session. By contrast, the score of the children in the control group remained stable over time and was significantly lower. No significant effects emerged for Gender or its interactions with Group factor. Finally, analysis of the CBCL/6-18 subscales revealed a Group \times Gender interaction effect ($\Lambda = 0.84$; $F(8,131) = 3.06$; $p < 0.01$, $\eta^2_p = 0.16$). Univariate analyses showed that in the Aggressive behavior and Attention problems subscales both males and females in the IA-group had significantly higher scores than the children in the control group; moreover the females, in the IA-group, had higher scores than the males in the same group on both subscales, although these average ratings are under the clinical cut-off score. Analyses also pointed out a main effect of group for all subscales, on which the children in the IA-group had a higher score than those in the control group ($\Lambda = 0.11$; $F(8,131) = 135.2$; $p < 0.001$, $\eta^2_p = 0.89$) for all dimensions; there were no main gender effects (Table 1).

Evaluation of Mother's Psychological Symptom Status

Analyses of the global indices of the SCL-90-R showed a significant Group \times Time interaction in the Global Severity Index ($F(2,278) = 9.47$; $p < 0.001$, $\eta^2_p = 0.02$) and in the Positive Symptom Total ($F(2,278) = 20.41$; $p < 0.001$, $\eta^2_p = 0.15$). On the GSI, the mothers of children with a history of IA had higher and more stable scores over time compared with the control sample, whereas their score on the PST increased significantly at Time 3; the mothers of the children in the control group showed a significant decrease in the scores of both indices at the third evaluation session (Duncan's test, $p < 0.01$). Finally, the Positive Symptom Distress Index analyses showed a main effect of group ($F(1,139) = 335.28$; $p < 0.001$, $\eta^2_p = 0.7$), with the mothers of the IA-group presenting a higher score than those of the control group. Analyses on the SCL-90-R subscales showed an interaction effect on Somatization ($F(2,278) = 5.14$; $p < 0.01$, $\eta^2_p = 0.06$), Interpersonal Sensitivity ($F(2,278) = 11.94$; $p < 0.001$, $\eta^2_p = 0.1$), Depression ($F(2,278) = 14.44$; $p < 0.001$, $\eta^2_p = 0.1$), Anxiety ($F(2,278) = 3.35$; $p < 0.05$, $\eta^2_p = 0.03$) and Psychoticism ($F(2,278) = 4.21$; $p < 0.05$, $\eta^2_p = 0.04$), where the mothers of the children with IA presented higher scores than mothers of the control group that were stable over time for the Somatization, Anxiety, and Psychoticism dimensions, whereas for the Depression and Interpersonal sensitivity dimensions, their scores

TABLE 1. Means (standard deviations) of the CBCL subscales scores by group and evaluation time (1 and 2) and gender (time 3)

CBCL/1½-5 subscales	Time 1 [^]		Time 2 [^]		F(1,140)	Cut-off scores
	IA-Group N = 72	ND-Group N = 70	IA-Group N = 72	ND-Group N = 70		
Emo React	6.7 (4.6) ^a	2.3 (1.8) ^b	8.5 (2.7) ^c	2 (1.6) ^b	11.78 ^{**}	>7
Anx/Dep	5.6 (3.5) ^a	3.3 (2.2) ^b	5.9 (2.3) ^a	3.3 (2.3) ^b	46.33 ^{**}	>8
Som Comp	6.8 (4.6) ^a	2.1 (1.6) ^b	9 (3.2) ^c	2.7 (1.9) ^b	6.92 [*]	>6
Withdrawn	5.8 (3.7) ^a	1.6 (1.4) ^b	7.8 (2.7) ^c	2 (1.7) ^b	8.22 [*]	>4
Att Prob	4.7 (2.1) ^a	2.3 (1.3) ^b	5.8 (1.8) ^c	2.5 (1.5) ^b	7.28 [*]	>7
Agg Beh	14.6 (5.9) ^a	8.5 (4.4) ^b	17.1 (8.3) ^c	8.3 (5.5) ^b	5.45 [*]	>6

CBCL/6-18 subscales	Time 3 ^{^^} Males		Time 3 ^{^^} Females		F(1,138)	Caseness
	IA-Group N = 37	ND-Group N = 35	IA-Group N = 35	ND-group N = 35		
Anx/Dep	12.4 (2.5) ^a	1.65 (2.4) ^b	12.1 (2.4) ^a	1.94 (2.5) ^b	630.4 ^{**}	>12; >10
Withdrawn	17.8 (3.1) ^a	2.57 (3.1) ^b	19 (3.1) ^a	2.62 (3) ^b	908.7 ^{**}	>6; >6
Som Comp	5.72 (2.6) ^a	1.17 (3.5) ^b	6.83 (2.5) ^a	1.2 (2.5) ^b	140.7 ^{**}	>4; >5
Soc Prob	6.78 (2.3) ^a	1.51 (2.4) ^b	6.43 (2.4) ^a	1.17 (2.4) ^b	168.6 ^{**}	>6; >6
Thought Prob	7.76 (2.8) ^a	1.34 (2.9) ^b	8.14 (2.9) ^a	1.14 (2.8) ^b	193.3 ^{**}	>2; >2
Att Prob	5.62 (1.9) ^a	1.69 (1.9) ^c	6.77 (1.8) ^b	1.31 (1.9) ^c	5.6 [*]	>11; >10
Rule Break Beh	7.78 (2.7) ^a	1.4 (2.8) ^b	8.82 (2.8) ^a	1.31 (2.7) ^b	224.5 ^{**}	>4; >4
Agg Beh	9.03 (3.4) ^a	2.29 (3.7) ^c	10.9 (3.7) ^b	1.74 (3.7) ^c	4.6 [*]	>20; >17

Means in rows not sharing a common letter differ significantly ($p < 0.05$). The last column reports cut-off scores in the referring population.

Emo React, emotionally reactive; Anx/Dep, anxious/depressed; Som Comp, somatic complaints; Withdrawn, withdrawn/depressed; Att Prob, attention problems; Agg Beh, aggressive behavior; Soc Prob, social problems; Thought Prob, thought problems; Rule Break Beh, rule-breaking behavior.

* $p < .05$.

** $p < .001$.

[^] Internalizing scale (Total): >16; Externalizing scale (Total): >21; ^{^^} Internalizing scale (Total): Males: >11, Females: >12; Externalizing scale (Total): Males: >17, Females: >13.

increased significantly at the third session. By contrast, the scores of the mothers of the control group decreased significantly at the third evaluation session. Furthermore, analyses showed a main effect of group on the Hostility subscale ($F(1,139) = 196.12$; $p < 0.001$, $\eta^2_p = 0.58$), where the mothers of children with a history of IA had higher scores than those of the control group.

Analyses of the EAT-40 showed a significant effect of the Group \times Time interaction ($F(2,278) = 10.59$; $p < 0.001$, $\eta^2_p = 0.07$). Duncan's test ($p < 0.01$ for all comparisons) showed that the mothers of the control sample had significantly lower scores than the mothers of the children diagnosed with IA at all evaluation sessions. Moreover, contrasts showed that in the third evaluation session, where the scores of the mothers of the control group decreased significantly, the scores of the mothers of the IA-group increased. Analyses on the Dieting and Oral control subscales showed the same pattern of results: the group of mothers of children diagnosed with IA had significantly higher scores than those of the control group at the three evaluation sessions (Dieting: $F(2,278) = 5.66$, $p < 0.005$, $\eta^2_p = 0.08$; Oral control: $F(2,278) = 3.7$, $p < 0.05$, $\eta^2_p = 0.08$), with a decrease in the Dieting and Oral Control scores in the control group at Time 3 (Duncan's test, $p < 0.05$); moreover, the Bulimia/Food Preoccupation subscale presented a main effect of group ($F(1,139) = 646.8$; $p < 0.001$, $\eta^2_p = 0.65$),

where the mothers of children with IA had significantly higher scores than those of the control group (Table 2).

Correlations Among Mothers' Psychological Status and Children's Emotional-Behavioral Functioning and Eating Patterns

Significant correlations emerged at Time 1 both between the maternal and children symptomatic characteristics and two dimensions of the child's eating behavior patterns (Satiety Responsiveness and Lack of Enjoyment of Food); Time 2 showed a significant relation even for Food Fussiness, which becomes more intense at Time 3 (Table 3).

Moreover, correlations between maternal psychological status and children emotional-behavioral characteristics showed a general positive significant correlation between all of the maternal and the children's dimensions.

Discussion

Our longitudinal study of nontreated children, diagnosed with IA in early childhood, and for various reasons received very little or no intervention, shows the natural course of IA into middle childhood up to the age of about eight years. Although the nutritional status improved for the majority of

TABLE 2. Means (standard deviations) of the nontransformed SCL-90-R (total and single scales) scores and of the EAT-40 (total scales and subscales) for group and time of evaluation

	IA-Group (N = 72)			ND-Group (N = 70)			Ref. Score
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Caseness
SCL-90-R							
GSI	1.1 (0.6) ^a	1.1 (0.6) ^a	1.2 (0.4) ^a	0.13 (0.4) ^b	0.1 (0.04) ^b	0.08 (0.4) ^c	>0.78
PSDI	1.8 (0.4) ^a	1.8 (0.4) ^a	1.7 (0.3) ^a	1.1 (0.16) ^b	1 (0.1) ^b	1.03 (0.3) ^b	>1.88
PST	53.3 (19) ^a	53.6 (20.4) ^a	57 (14.2) ^b	11 (3.7) ^c	9.7 (3.1) ^c	7.04 (14) ^d	>46
SOM	1.2 (0.8) ^a	1.2 (0.8) ^a	1.2 (0.6) ^a	0.16 (0.1) ^b	0.14 (0.1) ^b	0.1 (0.6) ^c	>1.03
O-C	1.5 (0.8) ^a	1.5 (0.8) ^a	1.5 (0.8) ^a	0.19 (0.9) ^b	0.17 (0.9) ^b	0.12 (0.8) ^b	>1.03
I-S	0.98 (0.6) ^a	1 (0.6) ^b	1.1 (0.3) ^b	0.11 (0.1) ^c	0.11 (0.1) ^c	0.07 (0.3) ^d	>0.91
DEP	1.5 (0.7) ^a	1.5 (0.7) ^a	1.57 (0.4) ^b	0.13 (0.1) ^c	0.12 (0.1) ^c	0.07 (0.4) ^d	>1.11
ANX	1.14 (0.8) ^a	1.1 (0.7) ^a	1.14 (0.5) ^a	0.12 (0.1) ^b	0.1 (0.1) ^b	0.07 (0.5) ^c	>0.91
HOS	0.9 (0.6) ^a	0.9 (0.6) ^a	0.9 (0.5) ^a	0.13 (0.2) ^b	0.1 (0.2) ^b	0.07 (0.4) ^b	>0.83
PHOB	0.98 (0.6) ^a	0.99 (0.6) ^a	1.0 (0.5) ^a	0.09 (0.6) ^b	0.1 (0.6) ^b	0.05 (0.5) ^b	>0.58
PAR	1.03 (0.7) ^a	1.05 (0.7) ^a	1.12 (0.7) ^a	0.15 (0.7) ^b	0.14 (0.7) ^b	0.10 (0.7) ^b	>0.91
PSY	1 (0.78) ^a	1.01 (0.8) ^a	1.12 (0.6) ^a	0.17 (0.14) ^b	0.15 (0.1) ^b	0.1 (0.5) ^c	>0.42
EAT-40							
Total	46 (19.4) ^a	44.6 (19.7) ^a	53 (18.6) ^b	8.1 (7.4) ^c	8.4 (7.7) ^c	5 (18.6) ^d	>29
D	15.5 (7.7) ^a	14.9 (7.9) ^a	17.6 (7.5) ^b	3.05 (5.2) ^c	3.2 (5.1) ^c	1.3(7.5) ^d	—
BFP	6.3 (4) ^a	6.2 (3.9) ^a	7.4 (3.2) ^a	0.3 (.8) ^b	0.3 (.8) ^b	0.2 (3.3) ^b	—
OC	7.5 (3.8) ^a	7.1 (3.6) ^a	8.2 (3) ^b	1 (2.3) ^c	1.2 (2.4) ^c	0.6(2.9) ^d	—

Means in rows not sharing a common letter differ significantly ($p < 0.05$). The last column report the cut-off score, when available, in the referring population.

GSI, global severity index; PSDI, positive symptom distress index; PST, positive symptom total; SOM, somatization; O-C, obsessive compulsive; I-S, interpersonal sensitivity; DEP, depression; ANX, anxiety; HOS, hostility; PHOB, phobic anxiety; PAR, paranoid ideation; PSY, psychoticism; D, dieting; BFP, bulimia and food preoccupation; OC, oral control.

TABLE 3. Correlations (Pearson coefficients) between child (emotional-behavioral ratings) and maternal dimensions (SCL-90 and EAT-40 subscales) and the child’s eating behavior patterns at each assessment time

N = 142		Time 1			Time 2			Time 3		
		SR	LEF	FF	SR	LEF	FF	SR	LEF	FF
CBCL	Emo React	0.48*	0.23	0.15	0.54*	0.43*	0.54*	—	—	—
	Anx/Dep	0.33*	0.15	0.14	0.27	0.28	0.31*	0.38*	-0.04	0.74*
	Som Comp	0.51*	0.28	0.15	0.51*	0.32*	0.52*	0.34*	-0.02	0.55*
	Withdrawn	0.56*	0.27	0.07	0.52*	0.37*	0.51*	0.42*	-0.02	0.76*
	Att Prob	0.55*	0.32*	0.23	0.51*	0.37*	0.49*	0.35*	-0.04	0.66*
	Agg Beh	0.40*	0.12	0.13	0.43*	0.42*	0.51*	0.36*	0.01	0.69*
	Soc Prob	—	—	—	—	—	—	0.32*	-0.02	0.64*
	Thought Prob	—	—	—	—	—	—	0.34*	-0.01	0.69*
	Rule Break Beh	—	—	—	—	—	—	0.36*	-0.04	0.62*
SCL-90-R	SOM	0.46*	0.46*	0.17	0.42*	0.34*	0.48*	0.38*	-0.01	0.64*
	O-C	0.46*	0.46*	0.17	0.42*	0.34*	0.48*	0.38*	-0.01	0.64*
	I-S	0.46*	0.43*	0.16	0.39*	0.34*	0.48*	0.41*	-0.02	0.66*
	DEP	0.60*	0.52*	0.15	0.49*	0.44*	0.56*	0.42*	0.04	0.71*
	ANX	0.45*	0.47*	0.20	0.40*	0.35*	0.51*	0.36*	0.04	0.65*
	HOS	0.39*	0.40*	0.09	0.33*	0.31*	0.42*	0.39*	-0.02	0.59*
	PHOB	0.35*	0.39*	0.19	0.30*	0.21	0.42*	0.35*	0.01	0.59*
	PAR	0.47*	0.45*	0.23	0.41*	0.37*	0.49*	0.38*	0.01	0.63*
	PSY	0.37*	0.41*	0.12	0.31*	0.32*	0.44*	0.37*	-0.02	0.55*
EAT-40	D	0.57*	0.46*	0.17	0.46*	0.40*	0.47*	0.32*	-0.01	0.57*
	BFP	0.59*	0.42*	0.17	0.46*	0.41*	0.50*	0.35*	-0.04	0.58*
	OC	0.50*	0.40*	0.18	0.39*	0.34*	0.42*	0.41*	-0.01	0.61*

SR, satiety responsiveness; LEF, lack of enjoyment of food; FF, food fussiness.

* Significant at $p < 0.05$ after Bonferroni correction for number of comparisons.

the children with IA, about 10% of them continued to show moderate malnutrition at the last follow-up. But it is remarkable to note that their eating behavior continued to be characterized by dysfunctional satiety responsiveness, lack of enjoyment of food, and increased food fussiness. The children remain “fussy eaters” who, as described by other

authors,²² “eat small meals, eat slowly and are often selective and less interested in food”. Moreover, during middle childhood, poor internal regulation of eating was associated with internalizing and externalizing problems, particularly anxiety, moodiness, somatic complaint, oppositional, uncooperative behaviors, and social problems.

In summary, our longitudinal study reveals homotypic continuity⁷ of symptoms in the area of eating behavior as well as in the emotional-behavioral adjustment from infancy to middle childhood. It has been reported previously,¹¹⁻¹⁴ the group of children with IA showed early signs of difficult temperament and heightened emotional reactivity, aggressive behavior, somatic complaints and withdrawal during the toddler years, and anxiety, depression, somatic complaints, rule-breaking behaviors and social difficulties during the follow-up assessments. These observations are in line with suggestions from other studies regarding the association between early food refusal and emotional problems during infancy and later during childhood.⁴⁻⁶

Furthermore, we observed that mothers of the children with IA continued to show increased symptoms of emotional distress, anxiety, depression, somatization, and difficulty with their own regulation of eating. Interestingly the longitudinal study pointed out significant associations between the mothers' psychopathological symptoms and the continuing eating and emotional regulation difficulties in their children. In particular during Time 1, when the children were toddlers, their quick and disturbed satiety responsiveness correlated significantly with emotional reactivity, anxiety, and with withdrawal, attention and aggressive behavior problems. In addition, there were significant correlations between the children's satiety responsiveness ratings and lack of enjoyment of food with the mothers' eating problems and emotional difficulties. During Time 2, when the children were five years old, food fussiness became apparent and added to the correlations between the children's disturbed eating behavior, their anxiety and behavioral problems and the mothers' eating disordered and general emotional symptoms. During Time 3, when the children were eight years old, the children's early satiety responses continued to produce significant correlations, and in addition, the children's food fussiness, which had increased over the years, produced very high correlations with the children's emotional symptoms and the mothers' symptomatic eating behavior and emotional distress. Although correlations do not help to better understand causality, they point to an ongoing circular pattern of disturbed eating behavior and emotional symptoms in both, the children and their mothers, and highlight the need for early intervention.¹¹⁻¹³

We would like to emphasize some limitations of the study. Most of the information was gathered by parent questionnaires and parent interview since

the children were too young to be interviewed, especially during the earlier assessments. The children have not reached adolescence, the period in which eating disorders show a consistent level of increase, primarily in the female population. Future expansion of our research into adolescence, by further evaluations of the same sample, it will give us the possibility to fully understand the longitudinal course of difficulties in both eating behavior and emotional-adjustment during development. Another limitation of this study is the lack of a systematic investigation of the fathers and their role in the mother-child care-giving system, in the process of the child's regulation of eating and affective differentiation, an area not yet sufficiently explored in clinical samples of early feeding disorders.²³

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