Mother–Child Touch Patterns in Infant Feeding Disorders: Relation to Maternal, Child, and Environmental Factors

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ABSTRACT

Objective: To examine mother and child's touch patterns in infant feeding disorders within a transactional framework. **Method:** Infants (aged 9–34 months) referred to a community-based clinic were diagnosed with feeding disorders (n = 20) or other primary disorder (n = 27) and were case matched with nonreferred controls (n = 47). Mother–child play and feeding were observed and the home environment was assessed. Microcoding detected touch patterns, response to partner's touch, and proximity at play. Relational behaviors were coded during feeding. **Results:** Compared with infants with other primary disorder and case-matched controls, less maternal affectionate, proprioceptive, and unintentional touch was observed in those with feeding disorders. Children with feeding disorders displayed less affectionate touch, more negative touch, and more rejection of the mother's touch. More practical and rejecting maternal responses to the child's touch were observed, and children were positioned more often out of reach of the mothers' arms. Children with feeding disorders exhibited more withdrawal during feeding and the home environment was less optimal. Feeding efficacy was predicted by mother–child touch, reduced maternal depression and intrusiveness, easy infant temperament, and less child withdrawal, controlling for group membership. **Conclusions:** Proximity and touch are especially disturbed in feeding disorders, suggesting fundamental relationship difficulties. Mothers provide less touch that supports growth, and children demonstrate signs of touch aversion. Touch patterns may serve as risk indicators of potential growth failure. *J. Am. Acad. Child Adolesc. Psychiatry,* 2004;43(9):1089–1097. **Key Words:** feeding disorders, DC 0–3, touch, mother–infant relationship, Home Observation for Measurement of Environment.

Empirical and clinical evidence suggests that feeding and eating problems in infancy are associated with significant disturbances in the mother–infant relationship (Skuse et al., 1995). Several authors have proposed to view feeding disorders (FDs) in terms of a relationship or transactional disorder (Chatoor et al., 1998; Goodlin-Jones and Anders, 2001). Such conceptualization implies that a multirisk assessment of child dispositions, maternal personality and behavior, and the rearing environment is required for understanding the disorder, predicting its developmental course, and devising intervention programs (Belsky, 1984; Sameroff, 1993). However, the relationship difficulties specific to FDs, apart from the global relational problems that accompany any form of maladaptive development, have not yet been fully described.

Although nonorganic failure-to-thrive (FTT) was initially considered to result from extreme maternal neglect (Spitz, 1946), a reappraisal of this stance has been advocated and the dichotomy of organic and nonorganic FTT has been questioned (Wittenberg, 1990). Large community studies detected no signs of maternal deprivation in nonorganic FTT (Vilensky et al., 1996; Wolke, 1996). Recently, the diagnosis of FDs has largely replaced that of FTT in the context of psychi-

Accepted April 23, 2004.

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The authors thank Dr. Mona Ackerman of the Ricklis Family Foundation for her financial support and the parents and children who participated in the study.

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DOI: 10.1097/01.chi.0000132810.98922.83

atric evaluation and treatment (Chatoor et al., 1998). Chatoor (2000) coined the term the *feeding relationship* to emphasize the dyadic nature of the disorder and the importance of direct mother–child observations for differential diagnosis. Mother–child reciprocity, contingent interactions, and low struggle for control were pinpointed as the interactive components that promote an efficacious feeding relationship.

Studies comparing children with FDs and controls detected higher maternal intrusiveness (Stein et al., 1994), more negative affect and struggle for control (Sanders et al., 1993; Wolke et al., 1990), and less optimal home environment (Drotar, 1991) in the FD group. Generally, interactions between mothers and infants with FDs contained fewer of the interactive components that support attachment security, including maternal sensitivity, contingent responsiveness, and positive emotionality (Drotar et al., 1990). Children with FDs expressed more negativity and withdrawal (Polan et al., 1991) and were described as apathetic and fussy/difficult (Chatoor et al., 2000; Wolke et al., 1990). These indicators, however, are not specific to FDs. Similar maladaptive patterns have been reported for clinic-referred infants with a variety of diagnoses (Keren et al., 2001) and are common in cases of sleep (Sadeh and Anders, 1993) and conduct (Crowell et al., 1988) problems. Studies have typically compared mother–infant interactions in FDs with those of healthy controls or examined differences between subcategories of FDs. It is thus impossible to discern which relational patterns are specific to FDs and which belong to a more global relational disturbance observed in clinic populations.

It has long been suggested that infant growth failure is associated with maternal deprivation and difficulties in maintaining physical closeness (Pollit et al., 1975). Proximity-seeking is a central component of the attachment system (Bowlby, 1969), and a decrease in maternal–infant contact may indicate difficulties in the dyadic relationship. During interactions, mothers of infants with FDs tended to pay less attention to the children's physical presence and overlook signals of proximity-seeking (Berkowitz and Senter, 1987). Polan and Ward (1994) found lower levels of maternal instrumental (e.g., handing toy) and unintentional (e.g., brushing accidentally against child) touch during interactions and marginally significant findings emerged for proprioceptive touch (kinesthetic stimulation). Nonblinded case observations suggested that children with FTT show more withdrawal from the mother's touch and are at higher risk of developing touch aversion.

Associations between proximity and touch and infant physical growth are reported in studies of premature infants. Massage therapy (i.e., structured proprioceptive stimulation applied to premature infants) was found to increase physical growth (Field, 1995). Mother–infant skin-to-skin contact has similarly shown to improve growth rates in preterm infants (Ludington-Hoe and Swinth, 1996). Maternal affectionate touch, a form of touch that is unique to parents compared with that of caregivers (Miller and Holditch-Davis, 1992), was associated with better cognitive and neurobehavioral development in preterm infants (Feldman and Eidelman, 2003). Mother and child affectionate touch was correlated, increased after a daily regimen of skin-to-skin contact (Feldman et al., 2003), and decreased with the level of maternal depression (Feldman et al., 2002). It is thus possible that infant FDs and growth failure may be associated with a decrease in maternal and child touch, in particular the affectionate and proprioceptive types of touch, and with difficulties in accepting and maintaining physical closeness.

The goal of the current study was to detect the specific indicators of mother–infant relationship difficulties in FDs. Guided by a transactional perspective, we examined indicators originating in the mother, the child, and the environment as correlates of feeding behavior. Maternal depression and relational patterns were examined as the maternal factors, difficult temperament and social behavior of the child as the child factors, and the home environment and social support networks as the environmental factors. To examine the specificity of these indicators of FD, three groups of children were compared: children with FDs, children with nonfeeding Axis I disorders of infancy, and case-matched controls. Non-FDs included the dysregulation of behavior (sleep problems, hyperactivity, aggression) and disorders of affect (anxiety, depression, mixed). Infants in this group were referred after substantial disruption to normative development and were diagnosed with primary disorders of infancy but did not present feeding symptoms and were thus considered adequate clinical controls for FDs.

Mothers and infants were observed during play and feeding interactions. Microlevel analysis of maternal

and child touch patterns, responses to partner's touch, and proximity position was conducted for play, to examine mother–infant contact during relaxed moments, unrelated to the stressful feeding interaction typical of FDs. Global patterns of the feeding relationship were assessed, including maternal sensitivity and intrusiveness, child involvement and withdrawal, and dyadic reciprocity. We hypothesized that FD dyads would exhibit less overall touch, spend more time in out-of-reach proximity positions, and respond more negatively to partner's touch compared with both nonfeeding clinic dyads and community controls. We expected that global maladaptive relational patterns, including diminished visual contact, sensitivity, and reciprocity, would not be specific to FDs and differences would emerge between clinic and control dyads. Finally, we examined factors that may facilitate or undermine the development of adaptive feeding behavior in young children. Based on transactional (Sameroff, 1993) and multirisk models of infancy disorders (Lyons-Ruth et al., 2003), factors originating in the mother, child, and context were expected to exert both independent and cumulative effects on maladaptive feeding behavior, regardless of diagnosis.

METHOD

Subjects

Infants referred to a community-based 0–3 mental health clinic located in a medium-sized Israeli town were diagnosed using the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (Zero to Three/National Center for Clinical Infant Programs, 1994). The DC 0–3 is a widely used system for classifying disorders of infancy with established reliability and validity (see special sections in the *Journal of the American Academy of Child and Adolescent Psychiatry*, 2001, volume 40, issue 1, and *Infant Mental Health Journal*, 2003, volume 24, issue 4). It includes five axes: I, primary diagnosis; II, parent–infant relational disorders; III, physical, neurological, and developmental disorders; IV, psychosocial stressors; and V, functional emotional developmental level. Diagnoses were conducted by a trained child and adolescent psychiatrist, and 20% of the cases were independently diagnosed by a trained clinical psychologist, with a 90% agreement. Disagreements were resolved by discussion. Since its establishment, our clinic has diagnosed approximately 700 infants and maintains close contact with infant clinics across the world.

Twenty infants had an Axis I diagnosis of FDs, presenting symptoms of food refusal, chronic malnutrition, restriction of foods, struggle during feeding, or vomiting (group 1). Group 2 included 27 clinic-referred children diagnosed with Axis I disorders other than FDs (OD). Diagnoses included (in descending order) sleep, mood (anxiety), mood (depression), mixed disorder of affect, aggressive, regulatory, posttraumatic stress disorder, hyperactivity, and communication disorders. Group 3 included 47 case-matched controls (MC). For each case in groups 1 and 2, a random case was selected by the well-baby clinic nurses from the pool of children living in the same neighborhood who matched the referred child for gender, age, birth order (first born/later born), and socioeconomic background. The well-baby clinics provide medical and developmental follow-up to nearly all Israeli infants, and their records contain a pool of the entire population. Controls were screened for social-emotional disorders using our screening questionnaire (Feldman and Keren, 2004). Controls and clinic infants were born at term and were in adequate physical health.

Infants were between 9 and 34 months of age, the age of infants with FDs referred during the study period. Demographic information appears in Table 1 and shows no group differences. The study was approved by the Institutional Review Board, and all parents signed informed consent.

Procedure

After diagnosis at the clinic, home visits were scheduled around the child's mealtime and lasted approximately 2 hours. Mother and child were videotaped in a 15-minute free play and a 15-minute feeding session. During play, the dyads sat on the floor with age-appropriate toys with no instructions provided to assess natural modes of proximity and touch. After that, the home environment was assessed and mothers completed self-report measures. Home visits were conducted by assistants unaware of group membership.

Measures

Home Environment. The Home Observation for Measurement of Environment (Caldwell and Bradley, 1978) evaluates the quality of

TABLE 1
Demographic Information

	Feeding Disorders		Other Disorders		Matched Controls		
	Mean	SD	Mean	SD	Mean	SD	*F*
Child age (mo)	25.25	6.78	25.22	8.84	25.14	8.25	0.04
Mother age	32.53	4.20	33.00	6.21	32.88	4.82	0.17
Mother education[a]	3.54	1.21	3.02	0.88	3.05	1.13	0.21
Maternal employment[b]	1.00	0.70	0.96	0.59	1.20	0.55	0.37
Male/female	13/7		20/7		33/14		0.74

[a] Education: 1 = no high school, 2 = high school, 3 = some college, 4 = college degree.
[b] Employment: 0 = not employed, 1 = part time, 2 = full time.

children's home environment. It includes 55 items and information noted during a 1.5-hour observation period in addition to direct questions to parents. Six composites are computed, and a total score is calculated by summing these composites. Observers were trained to 95% reliability before performing home visits.

Maternal Depression. The Beck Depression Inventory (Beck, 1978) includes 21 items that measure the level of depressive symptoms on a 3-point scale. It is widely used in the assessment of depressive symptoms with good reliability and validity.

Parenting Self-Efficacy. The Parent Scale of Competence and Satisfaction (Johnston and Mash, 1989) is a 17-item instrument assessing parental competence, problem-solving efficacy, and resourcefulness with acceptable reliability and validity.

Social Support. The Social Support Scale (Cutrona, 1984) is a 12-item scale that examines the parent's subjective perception of support availability in different domains (attachment, guidance, sense of worth) with good reliability and validity.

Infant Difficult Temperament. The Infant Characteristic Questionnaire (Bates et al., 1979) consists of 24 items measured on a 9-point scale. It is a widely used instrument with good reliability and validity and has been used in FD research (Chatoor et al., 2000).

Coding

Play Interactions. Proximity and touch patterns were microcoded using a computerized system (Noldus Co., Waggenigen, The Netherlands) with a coding scheme developed for this study based on previous work (Feldman and Eidelman, 2003; Feldman et al., 2002). The coding scheme is process oriented and examines both touch and response to partner's touch. Coding was conducted while the tape was running at normal speed, switching to slow motion when behavior change occurred. Six behavior categories were coded, and within each category codes were mutually exclusive.

Proximity: Child clings to mother, child within reach of mother's arms, child far with visual contact, child far with no visual contact.

Touch patterns: No touch, affectionate touch (hug, kiss, caress, tickle, loving pokes, stroke), proprioceptive touch (mother only: kinesthetic stimulation, flexion-extension of child's limbs), instrumental touch (hands toy), unintentional touch (accidental contact), and negative touch (push away, hit). Because touch patterns are short events, the frequencies of touch patterns were used.

Partner's response to touch: Approach, acceptance, practical response (hands toy), withdrawal (distancing), or rejection (push).

Gaze pattern: Joint attention (look at same object), social gaze (look at each other), and no eye contact.

Microcoding was conducted at a university laboratory by coders unaware of group membership. Interrater reliability was conducted for 15 dyads. Reliability for all codes exceeded 85%, and reliability averaged 91.5% ($\kappa = 0.80$). The proportions of proximity positions, gaze patterns, and response to partner's touch; the frequencies of mother and child touch patterns, and the latencies to each touch pattern were extracted from the computerized data.

Feeding interactions were coded using the Coding Interactive Behavior Manual (CIB) (Feldman, 1998). Th CIB is a global rating system of parent–infant interaction including 42 codes each rated on a 5-point scale. Codes are aggregated into six composites: maternal sensitivity, maternal limit-setting, maternal intrusiveness, child involvement, child withdrawal, and dyadic reciprocity. The CIB has been validated on several clinic and nonclinic samples (Feldman and Klein, 2003; Feldman et al., 2002, 2003). Four codes for feeding were added: distractibility, independence, negotiation, and feeding efficacy. Feeding efficacy addressed whether the feeding session was successful and the child completed the food prepared by the mother and was used as a criterion variable. CIB coding was conducted by a different team of coders. Reliability, conducted for 15 interactions, exceeded 85% on all codes. Intraclass r averaged 0.92 (range 0.85–0.97).

Data Analytic Plan

Group differences in relational patterns were examined with multivariate analysis of variance with child gender and group as the between-subject factors. Following significant main effects, post hoc comparisons with Scheffé tests were done. Proportion variables were log-transformed before analysis. Analyses of variance were used for the maternal, child, and environmental factors. A hierarchical multiple regression predicted feeding efficacy from maternal, child, environmental, and relational factors. The sample provides enough power to detect large effect size at power = 0.80, for $\alpha = .05$ on all statistical tests (Cohen, 1992).

RESULTS

Touch

Overall main effects for the group were found for mother–child proximity (Wilks F [df = 8, 170] = 2.18, p = .031) and for maternal response to child-initiated touch (Wilks F [df = 10, 168] = 2.43, p = .016). Univariate tests of proximity position showed that children with FDs spend more time beyond the reach of their mother's arms (Table 2). Univariate analysis of the five maternal responses to child touch indicated that mothers of children with FDs showed more practical (F [df = 2, 168] = 3.22, p = .042) and rejecting (F [df = 2, 168] = 3.10, p = .049) responses to child-initiated touch compared with the other groups.

Examination of maternal touch frequencies showed an overall main effect for group (Wilks F [df = 8, 170] = 2.45, p = .015). Univariate analyses (Table 2) indicated that mothers of children with FDs showed less affectionate, proprioceptive, and unintentional touch compared with the other groups (Fig. 1).

Overall main effects for group were found for the frequencies of child touch (Wilks F [df = 8, 170] = 2.25, p = .032) and for the five child responses to maternal touch (Wilks F [df = 10, 168] = 2.12, p = .045). Univariate analysis of touch frequencies (Table 2) indicated that children with FDs showed less affectionate touch and more negative touch (Fig. 2). Univariate analyses of children's response to mother touch indicated that children with FDs showed more withdrawal (F [df = 2, 168] = 3.65, p = .039) and rejection (F (df =

TABLE 2
Touch, Feeding Relational Behavior, and Background Variables in the Three Groups

	Feeding Disorders (a)		Other Disorders (b)		Matched Controls (c)		Univariate
	Mean	SD	mean	SD	Mean	SD	*F*
Play							
Proximity (proportions)							
Child on mother	0.14	0.25	0.13	0.21	0.10	0.19	0.61
Within arms' reach	0.63	0.31	0.70	0.27	0.80	0.24	3.55* a < b < c
Far + visual contact	0.19	0.25	0.13	0.18	0.07	0.11	3.39* a > b > c
Far no visual contact	0.01	0.01	0.01	0.06	0.01	0.04	0.70
Mother touch (frequencies)							
Affectionate	1.72	1.51	2.29	2.74	5.46	4.96	3.76* a < b < c
Proprioceptive	0.02	0.00	0.28	0.73	0.90	0.75	3.25* a < b < c
Instrumental	9.75	6.43	8.25	7.12	13.42	10.27	2.06
Unintentional	1.22	1.10	1.95	1.51	3.34	2.72	3.47* a < b < c
Negative	0.34	0.64	0.21	0.37	0.09	0.16	2.55
Child touch (frequencies)							
Affectionate	0.37	0.91	0.63	1.02	1.22	1.34	3.72* a < b < c
Instrumental	4.82	3.40	5.15	4.92	5.41	4.75	1.02
Unintentional	2.25	1.77	2.55	1.65	4.20	3.29	1.76
Negative	0.90	0.74	0.40	0.30	0.12	0.19	3.10* a > b > c
Gaze patterns (proportions)							
Joint attention	0.67	0.19	0.64	0.22	0.80	0.17	6.78** c > a, b
Social gaze	0.05	0.07	0.05	0.07	0.06	0.05	0.88
No eye contact	0.27	0.17	0.32	0.22	0.14	0.15	0.98
Feeding							
Mother sensitivity	2.87	1.02	2.90	1.73	3.64	1.03	3.61* c > a, b
Mother limit-setting	3.86	0.95	3.71	1.15	4.28	1.07	0.66
Mother intrusiveness	2.10	0.68	1.73	0.57	1.37	0.50	3.38* a > b > c
Child involvement	2.35	1.14	2.66	0.97	3.47	0.88	6.73** c > a, b
Child withdrawal	2.31	0.93	1.85	0.69	1.34	0.67	9.12*** a > b > c
Dyadic reciprocity	2.30	1.07	2.65	1.12	3.79	1.22	9.17*** c > a, b
Background variables							
HOME	50.91	6.37	53.61	9.44	56.76	5.10	3.79* a < c
Difficult temperament	26.19	10.65	25.00	9.95	19.34	6.47	5.02** c < a, b
Mother depression	14.75	9.13	11.76	8.00	5.31	4.96	10.17***c < a, b
Self-efficacy	31.62	9.70	40.00	4.93	39.07	7.29	7.34*** a < b, c
Social support	31.62	15.12	29.30	11.41	29.39	10.61	0.58

Note: HOME = Home Observation for Measurement of Environment.
* $p < .05$; ** $p < .01$; *** $p < .001$.

2, 168] = 3.07, $p = .048$) compared with other groups. No differences were found for latency variables or between older (>25 months) and younger infants.

Correlations of Mother and Child Touch. Mother affectionate touch correlated with child affectionate touch ($r_{92} = 0.34$, $p < .001$), mother unintentional touch correlated with child unintentional touch ($r_{92} = 0.35$, $p < .001$), and associations were found between mother and child negative touch ($r_{92} = 0.47$, $p < .001$). Mother affectionate touch was negatively related to maternal depression ($r_{92} = -0.23$, $p < .05$).

Gaze Patterns

Overall main effect for group was found for gaze (Wilks F [$df = 6, 172$] = 3.73, $p = .006$). Univariate analyses (Table 2) showed differences between community and clinic children only, with clinic children spending less time in joint attention and no special effect found for FD.

Feeding Behavior

Overall main effect for group was found for the six CIB composites during feeding (Wilks F [$df = 12$,

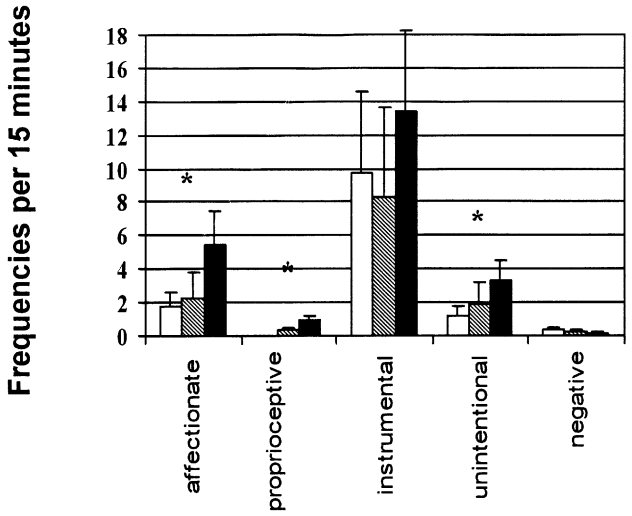

Fig. 1 Frequencies of maternal touch during free play among mothers of children with feeding disorders (open columns), other primary disorders (hatched columns), and case-matched controls (solid columns). *$p < .05$; feeding disorders < other primary disorders < case-matched controls.

166] = 2.42, $p = .025$). Differences between clinic and control children were found for most factors (Table 2). Mothers of clinic-referred children were less sensitive and more intrusive, clinic-referred children were less involved and more withdrawn, and the level of dyadic reciprocity was lower. Significant effects for FDs were found only for maternal intrusiveness and child withdrawal. Children with FDs were more withdrawn and their mothers were more intrusive compared with the other two groups. Children with FDs showed less feeding efficacy (F [$df = 2, 91$] = 4.90, $p = .010$), more distractibility (F [$df = 2, 91$] = 4.79, $p = .011$), and less independence (F [$df = 2, 91$] = 5.99, $p = .004$) compared with other groups, and no differences emerged for negotiation during feeding.

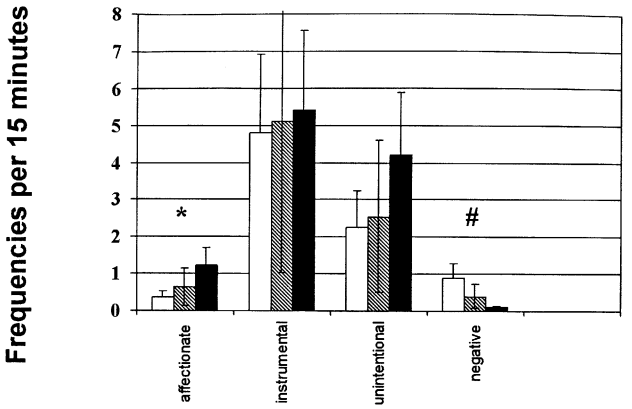

Fig. 2 Frequencies of child touch during free play among children with feeding disorders (open columns), other primary disorders (hatched columns), and case-matched controls (solid columns). *$p < .05$, feeding disorders < other primary disorders < case-matched controls; #$p < .05$, feeding disorders > other primary disorders > case-matched controls.

Maternal, Child, and Environmental Factors

Group differences were found between clinic and control infants in home environment, maternal depression, self-efficacy, and child difficult temperament (Table 3). The home environment of children with FDs was less optimal compared with controls, but the results for ODs did not differ from either group. Mothers of clinic-referred children reported more depression than controls and perceived their infants as more difficult, but no special effects emerged for FDs. However, mothers of children with FDs reported the lowest sense of parenting self-efficacy of all groups.

Finally, a hierarchical multiple regression was used to examine maternal, child, environmental, and relational correlates of feeding efficacy. Variables were entered in a theoretically determined order. In the first block, two dummy variables were entered: clinic (1) versus nonclinic (0) and FDs (1) versus ODs (0) to partial variance related to group membership. Second, the weighted sum of mother and child touch according to their factor loading was entered. A factor analysis of all touch patterns was computed, and one factor emerged with an eigenvalue above 2 (loadings >0.50 for mother and child affectionate and instrumental

TABLE 3
Predicting Feeding Efficacy

Predictors	β	R	R^2 Change	F Change	df
Group	–.16	0.11	0.03	1.56	1, 92
Feeding disorder	.37***	0.32	0.07	3.88**	2, 91
Total touch	.30**	0.42	0.07	3.95**	3, 90
HOME	.01	0.42	0.00	0.12	4, 89
Mother depression	–.29**	0.46	0.04	3.35**	5, 88
Self-efficacy	.06	0.46	0.00	0.44	6, 87
Social support	.08	0.46	0.00	0.24	7, 86
Infant difficulty	–.26**	0.50	0.03	2.73*	8, 85
Mother intrusiveness	–.34**	0.58	0.10	5.87***	9, 84
Child withdrawal	–.31**	0.69	0.12	6.46***	10, 83

R^2 total = 0.46: $F(df = 10, 83) = 4.46$, $p < .001$

Note: HOME = Home Observation for Measurement of Environment.

* $p < .10$; ** $p < .05$; *** $p < .01$.

touch and mother proprioceptive touch), confirming that one factor underlies touch patterns in the dyad. This variable was entered second due to its centrality to the study's goals. Next, the Home Observation for Measurement of Environment score was entered to examine the contribution of the immediate environment. Then maternal depression, self-efficacy, social support, and child temperament were entered. According to Belsky (1984), maternal characteristics, social support, and child factors affect parenting in a descending order. Finally, mother intrusiveness and child withdrawal were entered to examine the unique contribution of feeding behaviors.

Results of the regression model (Table 3) indicated that the weighted sum of mother and child touch, less maternal depression and child difficult temperament, and reduced maternal intrusiveness and child withdrawal each had an independent contribution to the prediction of feeding efficacy. In combination, these variables explained 46% of the variability in feeding efficacy, pointing to the multiple correlates of children's feeding behavior above and beyond diagnostic criteria.

DISCUSSION

Disorders of infancy, particularly those involving the dysregulation of basic functions such as sleep or feeding, are typically accompanied by mother–infant relationship problems. With the construction of a diagnostic system for classifying disorders of infancy, research can move to the differentiation of disorder-specific manifestations from the global relational difficulties typically associated with maladaptive development. This study is among the first to examine maternal, child, contextual, and relational correlates of FDs in comparison with both non-FD clinic children and community controls. As hypothesized, both disorder-specific and global difficulties were observed. The domain of physical intimacy marked a special area of concern for FDs. Mother and child showed less overall touch, were not receptive to the partner's touch, and remained more often outside the reach of each other's arms. Feeding interactions were characterized by high maternal intrusiveness and child withdrawal, the home environment was less optimal, and mothers reported low self-efficacy. Other risk indicators, such as reduced sensitivity and reciprocity, maternal depression, and difficult temperament, were nonspecific and did not differentiate infants with FDs from other clinic populations. These specific and global indicators may be useful to clinicians in detecting early signs of infancy disorders and in reaching a differential diagnosis.

Growth failure has long been associated with maternal deprivation and avoidance of closeness (Spitz, 1946), and the current findings validate these impressions in a case-control study. The mother's tendency to position the child beyond her reach was probably an unconscious behavior, yet it reduced the chances of accidental child touch. This tendency may reflect the mother's need to avoid physical closeness or unpredictable child touch, and future research should look into the origins of this need. As seen, children with FDs may indeed be suffering from touch deprivation. Three forms of maternal touch were reduced in FD: affectionate touch, a form of touch that is unique to parents and promotes cognitive development (Feldman and Eidelman, 2003; Miller and Holditch-Davis, 1992); proprioceptive touch, which supports physical growth (Field, 1995); and unintentional touch, an indicator of the free-floating closeness between mother and child (Polan and Ward, 1994). Mothers responded more often to child touch with practical or rejecting behavior, pointing to discomfort with reciprocal intimacy. During feeding, on the other hand, maternal behavior was more intrusive and consisted of frequent controlling or forceful touch. Mothers of children with FDs reported the lowest sense of self-efficacy and provided the least optimal home environment, findings consistent with previous research (Vilensky et al., 1996). Feeding is the most basic life-sustaining maternal function and difficulties in providing nurturance combined with discomfort in maintaining closeness possibly colors the mother's sense of herself as a parent.

Child touch of mother has not been studied in clinic populations and has rarely been investigated in typically developing infants. The data support theoretical positions suggesting that children's capacity for intimacy develops within the reciprocal regulation of closeness in the mother–infant relationship (Bowlby, 1969; Winnicott, 1956). Specific forms of maternal touch, such as affectionate, unintentional, or negative touch, correlated with similar touch patterns of the child. Thus, children growing in the context of nonrestricted, loving physical closeness appear to give more touch to their caregivers, a tendency likely to be internalized and

transferred to significant others throughout life. Children with FDs, on the other hand, demonstrated clear signs of touch aversion. They responded with withdrawal and rejection to the mother's touch, were more withdrawn during feeding, and showed more negative touch in the form of pushing the mother away. Sustained withdrawal behavior in infancy is considered a risk indicator for childhood depression (Guedeney, 1997). The high withdrawal and low touch of children with FDs should raise concern, particularly in light of the associations between reduced affectionate touch and higher maternal depression.

Chatoor's (2000) concept of the feeding relationship emphasizes the embedded nature of children's feeding behavior and the need to evaluate multiple risk and resilience factors in relation to feeding outcomes. The results indicate that maternal and child factors, observed in feeding and nonfeeding interactions, were each associated with feeding behavior. Mother and child touch at play was related to efficacious feeding, pointing to the link between positive touch during relaxed encounters and infant growth. These findings are consistent with animal research on the role of early maternal proximity and touch in the regulation of physiological systems (Hofer, 1995). Maternal depression and child difficult temperament explained unique variance in feeding efficacy. Clinical and empirical accounts describe mothers of children with nonorganic FTT as depressed and withdrawn (Pollit et al., 1975). The interrelationships between maternal depression, reduced touch, child withdrawal, and eating problems may suggest that these risk factors tend to cohere into a clinical syndrome, and observed difficulties in one domain should raise concern with regards to the others.

Limitations

Because children were not followed longitudinally, it is impossible to assess whether touch problems emerged after birth or developed with the onset of the disorder. Similarly, there is no information on the links between early touch patterns and children's later development. Additionally, the sample size does not provide enough power to conclusively determine that FDs and ODs do not differ on a range of interactive or self-report factors.

Clinical Implications

Maladaptive early development expresses the distress of the nonverbal infant that is not contained by the mother–child relationship. The combination of the global reduction in maternal sensitivity and the restriction of physical closeness may place children with FDs at higher risk of optimal development, even in comparison with other clinic populations. Benoit et al. (2001) found that in FDs, interventions focusing on maternal sensitivity were more beneficial than feeding-focused behavioral therapy, suggesting that targeting specific relational patterns is useful. In cases of FDs, there is a special need for early detection before irreversible damage to physiological systems has occurred. Thus, raising professional awareness to early signs of touch aversion may lead to the construction of specific interventions that focus on physical closeness before relational patterns have escalated into mutually reinforcing negative feeding interactions.

Clinicians rarely pay attention to patterns of proximity and touch. However, maternal discomfort with closeness or infant touch aversion can be observed during routine clinic visits or in the waiting room, once the importance of such patterns is brought to professional attention. Future research may examine the emotional origins of maternal difficulties with physical intimacy using elaborations on existing narrative instruments. The links between infant attachment security and disorder, maternal attachment style, and touch patterns are of theoretical and clinical interest. Assessing the longitudinal relations between early touch and later social-emotional adaptation may elucidate the role of touch in normative development. Finally, it is important to construct interventions that may reverse some of the negative effects of touch deprivation on children's physical and emotional growth.

REFERENCES

Bates JE, Freeland CA, Lounsbury ML (1979), Measurement of infant difficultness. *Child Dev* 50:794–803

Beck AT (1978), *Beck Depression Inventory*. San Antonio, TX: The Psychological Corporation

Belsky J (1984), The determinants of parenting: a process model. *Child Dev* 55:83–96

Benoit D, Madigan S, Lecce S, Shea B, Goldberg S (2001), Atypical maternal behavior toward feeding-disordered infants before and after intervention. *Infant Ment Health J* 22:611–626

Berkowitz CD, Senter SA (1987), Characteristics of mother-infant interactions in nonorganic failure-to-thrive. *J Fam Pract* 25:377–381

Bowlby J (1969), *Attachment and Loss, Vol. 1: Attachment*. New York: Basic

Caldwell B, Bradley R (1978), *Home Observation for Measurement of the Environment*. Little Rock: University of Arkansas

Chatoor I (2000), Feeding and eating disorders of infancy and early childhood. In: *Comprehensive Textbook of Psychiatry, Vol. VII*, Kaplan HI, Sadock BJ, eds. Baltimore: Williams & Wilkins, pp 2704–2710

Chatoor I, Ganiban J, Hirsch R, Borman-Spurrell A, Mrazek D (2000), Maternal characteristics and toddler temperament in infantile anorexia. *J Am Acad Child Adolesc Psychiatry* 39:743–751

Chatoor I, Ganiban J, Colin V, Plummer N, Harmon RJ (1998), Attachment and feeding problems: a reexamination of nonorganic failure to thrive and attachment insecurity. *J Am Acad Child Adolesc Psychiatry* 37:1217–1224

Cohen J (1992), A power primer. *Psychol Bull* 112:155–159

Crowell JA, Feldman SS, Ginsberg N (1988), Assessment of mother-child interaction in preschoolers with behavior problems. *J Am Acad Child Adolesc Psychiatry* 27:303–311

Cutrona CE (1984), Social support and stress in the transition to parenthood. *J Abnorm Psychol* 93:378–390

Drotar D (1991), The family context of nonorganic failure to thrive. *Am J Orthopsychiatry* 61:23–34

Drotar D, Eckerle D, Satola J, Pallotta J, Wyatt B (1990), Maternal interactional behavior with nonorganic failure-to-thrive infants: a case comparison study. *Child Abuse Negl* 14:41–51

Feldman R (1998), *Coding Interactive Behavior (CIB) Manual*. Unpublished Manual, Bar-Ilan University (available from Dr. Feldman at feldman@mail.biu.ac.il)

Feldman R, Eidelman AI (2003), Direct and indirect effects of breast milk on the neurobehavioral and cognitive development of premature infants. *Dev Psychobiol* 43:109–119

Feldman R, Eidelman AI, Sirota L, Weller A (2002), Comparison of skin-to-skin (kangaroo) and traditional care: parenting outcomes and preterm infant development. *Pediatrics* 110:16–26

Feldman R, Keren M (2004). Expanding the scope of infant mental health assessment: a community-based approach. In: *Handbook of Infant Mental Health Assessmen*t, Del-Carmen-Wiggins R, Carter AS, eds. Cambridge: Oxford Press, pp 443–465

Feldman R, Klein PS (2003), Toddlers' self-regulated compliance with mother, caregiver, and father: implications for theories of socialization. *Dev Psychol* 39:680–692

Feldman R, Weller A, Eidelman AI, Sirota L (2003), Testing a family intervention hypothesis: the contribution of mother-infant skin-to-skin contact (kangaroo care) to family interaction and touch. *J Fam Psychol* 17:94–107

Field TM (1995), Massage therapy for infants and children. *J Behav Dev Pediatr* 16:105–111

Goodllin-Jones BL, Anders TF (2001), Relationship disturbances and parent-child therapy. Sleep problems. *Child Adolesc Psychiatr Clin N Am* 10:487–499

Guedeney A (1997), From early withdrawal reaction to infant depression: a baby alone does exist. *Inf Mental Health J* 18:339–349

Hofer MA (1995), Hidden regulators: implication for a new understanding of attachment, separation, and loss. In: *Attachment Theory: Social, Developmental, and Clinical Perspectives*, Goldberg S, Muir R, Kerr J, eds. Hillsdale, NJ: The Analytic Press, pp 203–230

Johnston C, Mash EJ (1989), A measure of parenting satisfaction and efficacy. *J Clin Child Psychol* 18:167–175

Ludington-Hoe SM, Swinth JY (1996), Developmental aspects of kangaroo care. *J Obstet Gynecol Neonat Nurs* 25:691–703

Keren M, Feldman R, Tyano S (2001), Emotional disturbances in infancy: diagnostic classification and interactive patterns of infants referred to a community-based infant mental health clinic. *J Am Acad Child Adolesc Psychiatry* 40:27–35

Lyons-Ruth K, Zeanah CH, Benoit D (2003), Disorder and risk for disorder during infancy and toddlerhood. In: *Child Psychopathology*, 2nd ed., Mash EJ Barkley RA, eds. New York: Guilford, pp 589–631

Miller DB, Holditch-Davis D (1992), Interactions of parents and nurses with high-risk preterm infants. *Res Nurs Health* 15:187–197

Polan HJ, Leon A, Kaplan MD, Kessler DB, Stern DN, Ward MJ (1991), Disturbances of affect expression in failure-to-thrive. *J Am Acad Child Adolesc Psychiatry* 30:897–903

Polan HJ, Ward MJ (1994), Role of the mother's touch in failure to thrive: a preliminary investigation. *J Am Acad Child Adolesc Psychiatry* 33:1098–1105

Pollit E, Eichler AW, Chan CK (1975), Psychosocial development and behavior of mothers of failure-to-thrive children. *Am J Orthopsychiatry* 45:525–537

Sadeh A, Anders T (1993), Sleep disorders. In: *Handbook of Infant Mental Health*, Zeanah CH, ed. New York: Guilford, pp 305–316

Sameroff A (1993), Models of development and developmental risk. In: *Handbook of Infant Mental Health*, Zeanah C, ed. New York: Guilford, pp 3–13

Sanders M, Patel R, LeGrice B, Shephard R (1993), Children with persistent feeding difficulties: an observational analysis of the feeding interactions of problem and non-problem eaters. *Health Psychol* 12:64–73

Skuse DH, Gill D, Reilly S, Wolke D, Lynch MA (1995), Failure to thrive and the risk of child abuse; a prospective population survey. *J Med Screen* 2:145–149

Spitz R (1946), Anaclitic depression. *Psychoanal Study Child* 2:313–342

Stein A, Wooley H, Cooper SD, Fairburn CG (1994), An observational study of mothers with eating disorders and their infants. *J Child Psychol Psychiatry* 35:733–748

Vilensky DS, Ginsberg G, Altman M, Tulchinsky TH, BenYishay F, Aurbach J (1996), A community based study of failure to thrive in Israel. *Arch Dis Child* 75:145–148

Winnicott DW (1956), *Collected Papers: Through Pediatrics to Psychoanalysis*. New York: Basic

Wittenberg JV (1990), Feeding disorders in infancy classification and treatment considerations. *Can J Psychiatry* 35:529–533

Wolke D (1996), Failure to thrive: the myth of maternal deprivation. *The Signal* July–Dec:1–6

Wolke D, Skuse D, Mathisen B (1990), Behavioral style in failure-to-thrive infants: a preliminary communication. *J Pediatr Psychol* 15:237–254

Zero to Three (1994), *Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood*. Arlington, VA: Zero to Three/National Center for Clinical Infant Programs