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Picky eating in preschool children: The predictive role of the child's temperament and mother's negative affectivity

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ABSTRACT

Objective: The objective of this study is to describe the development and examine predictors of picky eating from 1.5 to 4.5 years of age in a community sample of children.
Methods: Mothers completed a questionnaire, assessing picky eating and a range of child and maternal factors, when their children were aged 1.5 ($n = 913$), 2.5 ($n = 777$), and 4.5 ($n = 727$) years.
Results: Picky eating increased significantly from 1.5 to 4.5 years. Lower maternal age, higher levels of child emotionality, and maternal negative affectivity at the child's age 1.5 predicted an increase in picky eating from 1.5 years to 2.5 and 4.5 years. Having siblings protected against the development of picky eating.
Conclusion: Child and maternal temperament at a very early stage in the child's life increase the risk for picky eating later on.

1. Introduction

Picky eating, i.e. the consumption of an insufficient amount or an inadequate variety of food through rejection of food items (Galloway, Fiorito, Lee, and Birch, 2005; Lewinsohn et al., 2005), has been found to affect children's nutritional status and weight and may thus constitute a significant health concern. In particular, it has been associated with an increased risk of being underweight (Dubois, Farmer, Girard, Peterson, and Tatone-tokuda, 2007), and overweight (Faith & Hittner, 2010), as well as with a deficiency in important vitamins and fiber in children's diet (Galloway, Lee, and Birch, 2003). Early eating problems may also constitute a risk for developing more serious eating disorders in adolescence, such as anorexia nervosa (Marchi and Cohen, 1990). Accordingly, it is important to understand the factors that contribute to these behaviors.

A number of cross-sectional studies have shown individual factors, such as low birth weight (Dubois et al., 2007), negative affectivity and difficult temperament (Haycraft, Farrow, Meyer, Powell, and Blissett, 2011; Jacobi, Agras, Bryson, and Hammer, 2003), to be correlated with picky eating. Environmental concomitants of picky eating, such as low maternal age, parental financial problems and maternal negative affectivity, have as well been identified (Dubois et al., 2007; Jacobi et al., 2003). However, only one prospective study has examined factors predicting picky eating in preschool children longitudinally. This study showed that infants with a lower sucking frequency during breast-feeding were significantly more likely to be picky eaters at ages 2, 3 and 5 years (Jacobi et al., 2003). The findings also indicated older siblings may affect the presence of picky eating; boys who had older siblings were less likely to be picky eaters, whereas girls with older siblings had a higher risk of being picky eaters at the age of 5 years (Jacobi et al., 2003). Although our understanding of what characterizes children who are picky eaters has increased over the last few years, we still lack findings from longitudinal studies about child and environmental risk factors for picky eating. In particular, understanding more of the characteristics of the children and their mothers that precede the development of picky eating may help determine whether prevention is possible at an early age. The aim of this study was therefore to examine the development of picky eating, and to identify child and maternal factors that prospectively predict picky eating.

2. Methods

2.1. Participants and procedures

The sample consisted of Norwegian children and their mothers, who participated in the longitudinal community study 'Tracking Problems and Opportunities' (TOPP). Families were recruited during a scheduled visit to a child health clinic when their child was 18 months old (T1). Of

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1081 eligible families, 913 mothers (84%) completed a questionnaire at T1. Non-respondents did not differ from respondents with respect to maternal age, education, employment status, number of children, or marital status. The families were followed up through the health clinics when the children were 2.5 years old (T2) and 4.5 years old (T3). At T2, 777 mothers (85% of T1) participated, whereas 727 (80%) participated at T3. The study was approved by the Regional Committee for Medical and Health Research Ethics.

2.2. Measures

2.2.1. Child variables

We used the two eating-related items from the Behaviour Checklist (Richman and Graham, 1971) designed to assess *picky eating*, i.e. *lack of appetite* and *food fussiness*. The items were scored 1–3, and mean scores were computed with higher scores reflecting more picky eating. The correlation between picky eating at age 1.5 and 2.5 was 0.44 ($p < .001$), and 0.52 ($p < .001$) between ages 2.5 and 4.5. Cronbach's α was 0.42 at T1, 0.48 at T2, and 0.47 at T3, with a mean corrected item-total correlation of 0.35. The low α might be expected due to the small number of items on the scale, and the average inter-item correlations are comparable to levels reported elsewhere for this type of scale. The concept, as measured by parental report, has been validated through a study including both parental reports and observational data of children in feeding situations (Jacobi et al., 2003).

At T1, mothers reported child birth weight and whether they experienced any *complications during delivery* (yes/no).

At T1 one question was included (yes/no) assessing whether the mother had experienced feeding problems in the child before the child was 3 months of age.

Three items from the Behaviour Checklist (Richman and Graham, 1971), assessing *difficulties falling asleep at bedtime*, *nightly awakenings*, and *unwillingness to sleep alone*, were used to indicate problematic sleep-related behavior in the child. Cronbach's α was 0.64 at T1, 0.62 at T2, and 0.56 at T3.

Childhood temperament was assessed at T1 with the 20-item Emotionality, Activity, Shyness and Sociability Temperament Survey (EAS) for children, which covers four dimensions (Buss and Plomin, 1984). Cronbach's α ranged from 0.71 to 0.79 for shyness, 0.62 to 0.67 for emotionality, 0.68 to 0.74 for activity, and 0.54 to 0.73 for sociability at the three assessment points.

At all three time points, a sum score was computed based on parents' report of different possible chronic physical diseases of their children. Moreover, parents were asked to indicate whether their child had any physical impairment (yes/no).

2.2.2. Maternal variables

Socio-demographic characteristics including age, marital status, education, and number of children in the family were assessed by self-report at T1.

The 25-item version of the Hopkins Symptom Checklist (SCL-25) measuring *symptoms of anxiety and depression* was used (Derogatis, Linman, Rickles, Uhlenhuth, and Covi, 1974). Two questions about suicidal ideation and loss of sexual interest or pleasure were excluded from the questionnaire after piloting. Cronbach's α was 0.90, 0.87, and 0.89 at T1, T2, and T3, respectively.

Temperament was assessed by the EAS for adults, which covers five dimensions (Buss and Plomin, 1984). Cronbach's α ranged from 0.69 to 0.76 for shyness, 0.80 to 0.84 for activity, 0.56 to 0.57 for fearfulness, 0.73 to 0.75 for distress, and 0.57 to 0.61 for anger at the three time points.

3. Results

Table 1 presents summary statistics for the studied variables at T1, T2, and T3. The average picky eating scores (possible range from 1 to 3) indicated that overall, parents reported that their children were seldom or sometimes picky with a slight, but significant, increase in the mean score from T1 to T3 ($t = 96.32$, $df = 756$, $p < .001$). Likewise, the proportion of parents reporting that their children were sometimes or always picky increased from 22% at T1 to 35% at T2, and to 40% at T3.

We developed a random intercept model to investigate the longitudinal associations among the predictor variables at T1 and picky eating at T2 and T3 as outcomes (Table 2). As physical illness and impairments could confound the associations, we controlled for these variables in all analyses. The mean picky eating score was modeled as a combination of population characteristics (β) assumed to be shared by all individuals (fixed effects) and subject-specific characteristics (random effects). Maximum likelihood estimates were applied. In Table 2, Model 1, the effect of each predictor variable was only controlled for picky eating and physical illness at baseline (T1). By controlling for initial levels of picky eating, we were able to examine whether a variable predicted subsequent changes in picky eating. In Model 1, low birth weight, higher levels of sleep problems, shyness, emotionality, and lower levels of sociability predicted increases in picky eating over the study period. Having siblings predicted a decline in picky eating. Moreover, mothers' negative affectivity, fearfulness, and distress all predicted increases in picky eating.

In Model 2, all predictors were included simultaneously and only predictors with $p < .2$ were kept in the final fitted model. Initial higher levels of picky eating and emotionality remained significant predictors of picky eating at 2.5 and 4.5 years. Among the maternal variables, low maternal age and high negative affectivity served as significant predictors. Moreover, having a many siblings significantly reduced the level of picky eating between the ages of 2.5 and 4.5 years.

4. Discussion

The finding that the child's emotionality was a longitudinal predictor of picky eating supports the reasonably well-established association

Table 1
Summary statistics for the study variables.

	Time 1 $N = 934$	Time 2 $N = 802$	Time 3 $N = 757$
Child variables	*M/N (SD/%)*	*M/N (SD/%)*	*M/N (SD/%)*
Sex (girl)	476 (50.9%)	399 (49.7%)	387 (51.1%)
Number of siblings			
No sibling	453 (48.5%)		
One	346 (37.0%)		
Two	109 (11.7%)		
Three or more	26 (2.8%)		
Birth weight in grams	3550 (610)		
Birth complications (Yes)	173 (18.5%)		
Feeding problem before 3 months (Yes)	48 (5.2%)		
Picky eating	1.38 (0.44)	1.56 (0.47)	1.63 (0.46)
Sleep problems	1.41 (0.41)	1.45 (0.42)	1.46 (0.41)
Shyness	2.01 (0.62)	2.08 (0.61)	2.23 (0.64)
Emotionality	3.21 (0.62)	3.20 (0.61)	3.14 (0.60)
Activity	4.32 (0.55)	4.19 (0.56)	4.10 (0.59)
Sociability	3.80 (0.49)	3.87 (0.42)	3.86 (0.44)
Maternal variables			
Maternal age	30 (19–46)		
Education			
0–10 years	94 (10.1%)		
10–13 years (High school)	475 (51.2%)		
>13 years (College/university)	358 (38.2%)		
Marital status (Married)	639 (65.7%)		
Negative affect	1.35 (0.34)	1.30 (0.29)	1.28 (0.28)
Shyness	1.24 (0.70)	2.24 (0.60)	2.27 (0.62)
Activity	2.98 (0.70)	2.90 (0.69)	2.83 (0.70)
Fearfulness	3.76 (0.64)	3.79 (0.60)	3.82 (0.57)
Distress	3.64 (0.74)	3.67 (0.73)	3.69 (0.68)
Anger	3.02 (0.70)	3.06 (0.69)	3.08 (0.66)