Physiology & Behavior xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Physiology & Behavior

journal homepage: www.elsevier.com/locate/phb

Bi-directional associations between child fussy eating and parents' pressure to eat: Who influences whom?

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HIGHLIGHTS

- Children's food fussiness and parents' pressure to eat often co-occur.
- The direction of effect in this association remains unknown.
- Longitudinal analyses indicate a bi-directional fussy – pressure relation.
- Fussy eating elicits parents' use of pressure to eat, which precedes more fussiness.
- Parents should be advised to use other feeding strategies than pressure to eat.

ARTICLE INFO

Article history:
Received 30 November 2016
Received in revised form 3 February 2017
Accepted 15 February 2017
Available online xxxx

Keywords:
Fussy eating
Pickiness
Pressure to eat
Controlling feeding
Children
Longitudinal

ABSTRACT

Background: Fussy eating is common in young children, often raising concerns among parents. The use of pressuring feeding practices may provoke or worsen child fussiness, but these practices could equally be a parent's response to child fussy eating.
Objective: In longitudinal analyses, we assessed directionality in the relation between fussy eating and parent's pressure to eat across childhood.
Methods: Study participants were 4845 mother-child dyads from the population-based Generation R cohort in the Netherlands. The Child Behavior Checklist was used to assess fussy eating (2 items) at child ages 1½, 3 and 6 years. Parents' pressure to eat was assessed with the Child Feeding Questionnaire (4 items) when children were 4 years old. All scale scores were standardized.
Results: Linear regression analyses indicated that preschoolers' fussy eating prospectively predicted higher levels of parents' pressure to eat at child age 4 years, independently of confounders (adjusted B = 0.24, 95% CI: 0.21, 0.27). Pressure to eat at 4 years also predicted more fussiness in children at age 6 years, independently of confounders and of fussy eating at baseline (adjusted B = 0.14, 95% CI: 0.11, 0.17). Path analyses indicated that the relation from fussy eating at 3 years to parenting one year later was stronger than from pressure at 4 years to fussy eating two years later ($p < 0.001$).
Conclusions: Our findings suggest bi-directional associations with parental pressuring feeding strategies being developed in response to children's food avoidant behaviors, but also seemingly having a counterproductive effect on fussiness. Thus, the use of pressure to eat should be reconsidered, while providing parents alternative techniques to deal with their child's fussy eating.

1. Introduction

Fussy eating is a common phenomenon in young children, peaking around the age of 3 years when the prevalence may rise to 50% [1–3]. Fussy eating – also known as 'picky', 'selective' or 'choosy' eating – is

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http://dx.doi.org/10.1016/j.physbeh.2017.02.015
0031-9384/

characterized by the unwillingness to eat familiar or new foods, accompanied by a restricted dietary variety [1,3]. Particularly if the fussiness is severe or enduring, it may lead to nutrient deficiencies [2,4], functional constipation [5] and underweight [6,7]. As such, fussy eating often vexes parents and causes concerns about healthy development [8].

Parents can influence their children's food consumption by the foods they offer and through role modelling [9–11]. Parents may also shape children's eating behaviors and attitudes by the food-related parenting practices they employ [9,10]. In the context of fussy eating, researchers have focused on the parenting behavior "pressure to eat" [9]. In general, parents employ pressuring feeding strategies in an attempt to promote quantity or quality of children's food intake, beyond what a child wants to eat [12]. Multiple specific strategies can be used in this context, including gentle encouragements or prompts, use of reward and punishment, and having rules about having to try or finishing meals [13–15]. The current study is focused on the broad concept of pressure to eat referring to parents' general attempts to convince their child to eat (more) even if s/he does not want to, as measured with the Child Feeding Questionnaire [12].

Although pressuring feeding strategies are often meant to improve children's food intake [12] pressure to eat might be counterproductive through eliciting more rather than less food refusals, as shown in a laboratory-based study [16]. In a review, Loth [9] describes that several – though not all – cross-sectional studies in this field found that mothers' use of pressure to eat was related to a lower fruit and vegetable consumption and a higher overall fat intake, and that these associations were independent of sociodemographic characteristics of the families.

Importantly, these cross-sectional evaluations do not shed light on whether children who do not eat their vegetables or meat provoke pressure from their parents, or if parents' pressure promotes children's fussy eating, or both. In one of the few longitudinal studies, a high level of pressure to eat was associated with more sugar-sweetened beverage intake two years later, but the relation with children's fussiness and a possible reverse direction of effect was not examined [17]. The only evidence for a reverse association, i.e. that parents vary their feeding practices according to children's appetitive traits, comes from two recent cross-sectional studies employing a within-family design showing that fussier children were more pressured to eat than their less fussy siblings [18,19].

To develop effective interventions aimed at improving children's dietary intake, it is important to fully understand the parent – child feeding relationship and to ascertain whether parents indeed negatively affect children's fussy eating. Therefore, the aim of this study is to examine whether parents' use of pressure to eat is prospectively associated with child fussy eating, and reversely, whether fussiness might lead to pressure, by conducting a longitudinal examination from the preschool years until late childhood in a large population-based study in the Netherlands. We hypothesized to find bi-directional associations. In line with the experimental study of Galloway et al. [16], we expected that pressuring feeding strategies of parents predict more fussy eating behavior in children. We also expected that child fussiness precedes pressuring feeding strategies, following a child-responsive model which suggests that parents adapt their child rearing strategies in response to their child's characteristics and behaviors [20].

2. Materials and methods

2.1. Design and study population

This study was embedded in Generation R, a population-based cohort focusing on health and development from fetal life onwards [21,22]. Participating children were born in Rotterdam, the Netherlands, between April 2002 and January 2006 (participation rate: 61%). Written informed consent was obtained from parents of all children. Full consent for the preschool phase of the Generation R Study was obtained from 7295 children and their parents. Children with missing data on *all* three assessments on fussy eating (at ages 1½, 3 and 6 years, $n = 1026$, 14.1%) and those without information on parents' use of pressure to eat at age 4 years ($n = 1424$, 19.5%) were excluded, yielding a sample of 4845 mother-child dyads for the current study (66.4%). As data on fussy eating were not complete at all assessment waves, the study population varied per analysis (n between 4250 and 4364).

Comparison of the included ($n = 4845$) and excluded ($n = 2450$) children indicated that data were more often missing among children of lower educated mothers who had a non-Dutch background (both $p < 0.001$). Body mass index (BMI) at 2 years did not differ between children with and without missing data ($p = 0.37$).

2.2. Measures

2.2.1. Pressure to eat

Parents completed a postal questionnaire around the fourth birthday of their child which included three subscales of the Child Feeding Questionnaire (CFQ) [12]. One of these subscales assessed parents' use of pressuring feeding strategies (four items). Examples of items are 'My child should always eat all of the food on his/her plate' and 'If my child says *I am not hungry*, I'll try to get him/her to eat anyway'. Parents – in most cases the mothers (88.4%) – answered these items on a five-point Likert scale from 1 = never to 5 = always. Scale scores were calculated by summing the items (range sum score: 4–20). Research has provided good evidence for concurrent validity of the CFQ with actual observations of mothers' feeding behaviors [23]. Internal consistency of the administered pressure to eat scale in our sample was moderate ($\alpha = 0.66$) [24].

2.2.2. Fussy eating

Fussy eating was assessed with the Child Behavior Checklist/1½–5 (CBCL) at age 1½, 3 and 6 years [25]. This questionnaire assesses a wide range of emotional and behavioral problems, including two items on children's eating behavior [2]. In each assessment wave, parents indicated whether in the past two weeks their child 'did not eat well' and 'refused to eat' on a 3-point Likert scale from 0 (not at all) to 2 (often). Sum scores of these two items were calculated for each assessment wave (range sum score: 2–6). As it was not feasible in the large, broad-focused Generation R Study to repeatedly assess fussy eating with an elaborate multi-item scale, we choose to use the two items of the CBCL which previously showed good concurrent validity with food intake and other eating behavior assessments [2,3]. The internal consistency of fussy eating in our sample was moderate to good at the different ages (1½ years $\alpha = 0.75$; 3 years $\alpha = 0.77$; 5 years $\alpha = 0.67$).

The models with parental pressure to eat at age 4 years predicting fussy eating at age 6 years were adjusted for baseline fussy eating, which we assessed when children were 4 years old. At this age, the validated Children's Eating Behaviour Questionnaire (CEBQ) [26] was assessed simultaneously with the CFQ – pressure to eat scale. The CEBQ is a parent report of various eating behaviors of children, including the six-item food fussiness scale. Examples of items are 'My child refuses new foods at first' and 'My child is difficult to please with meals'.

Each item is rated on a five-point Likert scale from 1 = never to 5 = always. Scale scores were calculated by summing the items (range sum score: 6–30). Internal consistency of this scale was good with a Cronbach's α of 0.89 [4,24].

2.2.3. Covariates

Several possible confounding factors were accounted for in the analyses, including maternal ethnicity, education, psychopathological symptoms and BMI, child gender and breast feeding duration. Maternal ethnicity (categorized as Dutch, Western and Non-western) and educational level (academic, higher vocational, secondary school, <3 years of secondary school) were assessed by questionnaire during pregnancy. Maternal psychopathology symptoms were also assessed in a prenatal

Please cite this article as: P.W. Jansen, et al., Bi-directional associations between child fussy eating and parents' pressure to eat: Who influences whom?, Physiol Behav (2017), http://dx.doi.org/10.1016/j.physbeh.2017.02.015