



A test to identify persistent picky eaters[☆]

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ABSTRACT

Background: Picky eating is common and usually relatively brief as new foods are accepted. Persistent picky eating, however, is often associated with comorbid psychopathology.

Objective: The aim of this study was to use parent-reported child feeding behaviors to identify which picky eaters persist.

Design: Participants were a subsample from the Stanford Infant Growth Study a prospective study of child development. Out of the 216 infants, 86 were identified as picky eaters. Picky eaters were separated into two groups using a median split: short-term ($n = 40$) and persistent picky eaters ($n = 46$).

Results: Recursive Partitioning detected three significant parent-reported feeding questions that may identify persistent picky eaters at an early age: Is your child a picky eater? (yes), does s/he have strong likes with regard to food (yes), does your child accept new foods readily? (no).

Discussion: These results provide a first step allowing providers to identify persistent picky eaters and possibly enable intervention at an early age. Further studies are needed to replicate and extend these findings in another sample of picky eaters.

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1. Introduction

Picky eating is a common problem among children and often stressful for parents (Dubois, Farmer, Girard, Peterson, & Tatone-Tokuda, 2007a; Nicklaus, Boggio, Chabanet, & Issanchou, 2005). A variety of terms have been used to define the disorder including: picky eating, selective eating, neophobia, sensory food aversion, faddy or fussy eating. However as Bryant-Waugh et al. note (Bryant-Waugh, Markham, Kreipe, & Walsh, 2010), it is difficult to distinguish between such terms. Others (Dovey, Staples, Gibson, & Halford, 2008) suggest that the term neophobia should be reserved for children who refuse to eat novel foods whereas individuals with picky eating refuse many familiar foods as well as novel foods, i.e. picky eating consists of eating a restricted range of familiar foods along with a refusal to eat novel foods. While most children with picky eating show transient symptoms, probably reflecting a normal developmental process, a proportion of picky eaters persist into adolescence and even adulthood (Kauer, Pelchat, Rozin, & Zickgraf, 2015; Mascola, Bryson, & Agras, 2010).

Studies show consistent patterns of behaviors associated with picky eating including: avoidance of familiar foods, lack of consumption of vegetables and/or fruits, refusal to try new foods and consuming less fat and fewer calories than non-picky eaters (Dubois, Farmer, Girard, & Peterson, 2007b; Horodyski, Stommel, Brophy-Herb, Xie,

& Weatherspoon, 2010; Jacobi, Schmitz, & Agras, 2008). These problematic behaviors are often associated with caregiver stress, negatively impacting family relationships and often pose a problem for pediatricians (Goh & Jacob, 2012). Persistent picky eating is related to a range of health concerns, behavior problems, and comorbid psychopathology that occur later in childhood and adolescence (Dubois et al., 2007b; Equit et al., 2013; Jacobi et al., 2008; Lewinsohn et al., 2005; Li, Shi, Wan, Hotta, & Ushijima, 2001; Mascola et al., 2010; Micali et al., 2011; Zucker et al., 2015). Health concerns include: underweight, poor nutrition (Dubois et al., 2007a) and behavioral problems such as tantrums, withdrawal, somatic complaints, anxiety and depression and higher levels of aggressive, oppositional or delinquent behaviors (Bryant-Waugh et al., 2010; Equit et al., 2013; Mascola et al., 2010). In addition, picky eating appears to be related to eating disorders. In one of the first studies (Marchi & Cohen, 1990) investigated the relationship between children's maladaptive eating behaviors and eating disorders. Behaviors such as food avoidance, eating too little, and eating too slowly persisted into adolescence. Problem meals and pica in early childhood were found to increase the risk for BN in adolescence and picky eating in early childhood was associated with symptoms of anorexia nervosa in later adolescence. Kotler, Cohen, Davies, Pine, and Walsh (2001) found that eating conflicts, struggles with family meals and unpleasant meals, all problems associated with picky eating, were risk factors for the development of eating disorders in adolescence.

Given these problems associated with picky eating that persist, it may be helpful for health care providers to identify such children early in the course of picky eating in order to provide early treatment. To address this issue we examined parent-reported feeding variables to

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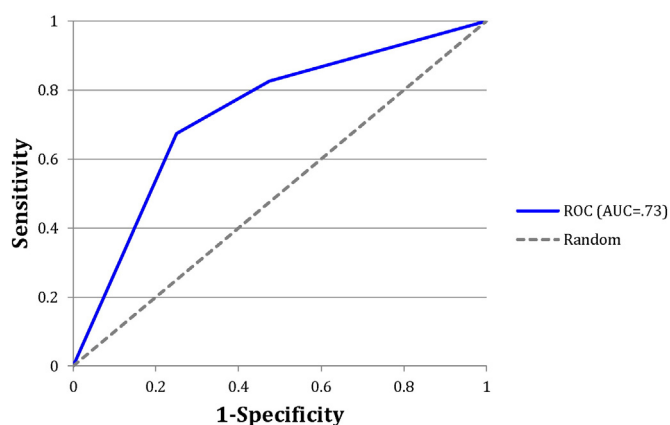


Fig. 1. Sensitivity and specificity of the predictor variables showing the area under curve (AUC = 0.73).

identify persistent picky eating by examining a cohort of infants followed longitudinally from ages 2 to 11 years old.

2. Method

2.1. Participants

The study was approved by the Stanford University human subjects committee and all parents consented to participate after being fully informed of the study requirements. The participants were a subsample from the Stanford Infant Growth Study (Agras, Hammer, McNicholas, & Kraemer, 2004). Of the 216 infants and their parents enrolled in the study, 40% ($n = 86$) were identified as picky eaters (Jacobi, Agras, Bryson, & Hammer, 2003).

2.2. Assessments

2.2.1. Picky eating

Beginning at 2-years of age at each annual assessment (except for years 8 and 10) a parent (usually mother) was asked, "Is your child a picky eater?" To be considered a picky eater, parents had to report at

least "often or always," a score of 4 or 5 out of a 5 point scale. Scores of 4 or 5 were recoded as "yes" and scores 1–3 were recoded as "no." This method of identifying picky eaters was validated in a previous study (Jacobi et al., 2003) by comparing the eating behaviors of picky and non-picky eaters in a laboratory meal and finding that picky eaters ate fewer foods and avoided vegetables compared with non-picky eaters. In addition, picky girls ate fewer calories than non-picky girls. The duration of picky eating was calculated by counting the number of years for which picky eating, as defined above, was present. Missing data on the presence of picky eating over time was interpolated for 4 participants for 1 assessment point each.

2.2.2. Child and parent feeding behaviors

The Stanford Feeding Questionnaire was administered at each assessment as described above. Questions assessed feeding behaviors including items such as a limited variety of foods, food prepared in specific ways, accepts new foods readily, has strong likes, dislikes, etc. (Mascola et al., 2010). Some questions used a yes/no response, while others used a scale of 1–5 (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always). Thus to keep the response formats consistent, the responses were recoded to yes/no using the same rule as for the picky eating question.

2.3. Statistical analysis

There is no existing clinical definition to distinguish between short and long term picky eaters; therefore, we dichotomized total picky eating years using a median split to maximize power (Kraemer & Thiemann, 1987). The resulting binary outcome defined those children with 3 or more years of picky eating (persistent picky eaters) and those with 2 or less years of picky eating (short term picky eaters). In the persistent group of picky eaters, duration of picky eating ranged from 3 to 10 years ($M = 5.54$, $SD = 2.40$) and short-term picky eaters, duration ranged from 1 to 2 years ($M = 1.18$, $SD = 0.385$). A Chi-square test was used to examine the association between each feeding behavior and the binary outcome. Feeding behaviors found statistically significant ($p < 0.05$) were then used in a signal detection procedure (Kraemer, 1992) (a type of recursive partitioning) to characterize the sample and determine which sub-groups were more likely to be picky eaters. The analysis was carried out using The Signal Detection Software

Table 1

Parent-reported feeding behavior variables.

Feeding behavior variables	First response yes ^a		χ^2
	Short term $n = 40$	Long term $n = 46$	
Parent behaviors			
Frequent struggles over food	10 (25%)	13 (28.3%)	.116
Argue with spouse about child's eating	2 (5%)	11 (23.9%)	5.964
Verbally encourage if child doesn't eat	19 (47.5%)	35 (76.1%)	7.484**
Offer reward if child doesn't eat	6 (15%)	16 (34.8%)	4.398*
Threaten if child doesn't eat	0 (0%)	1 (2.2%)	.880
Do nothing if child doesn't eat	3 (7.5%)	11 (23.9%)	4.229*
Limit sweets	7 (17.5%)	10 (21.7%)	.242
Limit non-sweets	1 (2.5%)	0 (0%)	1.164
Prepare separate meal for child	2 (5%)	9 (19.6%)	4.069*
Child has tantrums when parents say no to food	12 (30%)	26 (56.5%)	6.102*
Child eating behaviors			
Has strong likes	19 (47.5%)	38 (82.6%)	11.800***
Is a fast eater	4 (10%)	7 (15.2%)	0.522
Is a slow eater	18 (45%)	20 (43.5%)	.02
Limited variety of foods	16 (40%)	32 (69.6%)	7.583**
Food prepared in specific ways	12 (30%)	20 (43.5%)	1.664
Accepts new foods readily	18 (45%)	9 (19.6%)	6.426*
Has strong dislikes	23 (57.5%)	34 (73.9%)	2.579

^a First response yes refers to the earliest age that the child was reported picky and responded "yes" to the parent reported feeding behaviors.

* $p \leq 0.05$

** $p \leq 0.01$

*** $p \leq 0.001$

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