

The influence of parental eating behaviors, child-feeding practices, and infants' temperaments upon infants' eating behaviors

To the Editor

Young children's eating behavior is very important for kids to form a healthy eating habit throughout their life and to prevent a disease related to a diet. Preschool children who show a desirable eating behavior have few cases of revealing obesity, hypertension, diabetes, hyperlipidemia and an eating disorder when reaching adulthood. Accordingly, what children are allowed to have a desirable eating habit is very crucial for establishing the nation's health policy and reducing its cost. However, there are many children unfortunately who do not have a desirable eating habit. To make therapeutic intervention in order for these young kids to be capable of having a good habit in the period of infants and toddlers that the early habit is formed, it may be considered to be significant to examine which influential factors there are upon infants' eating behaviors and to look into what the most influential factor is.

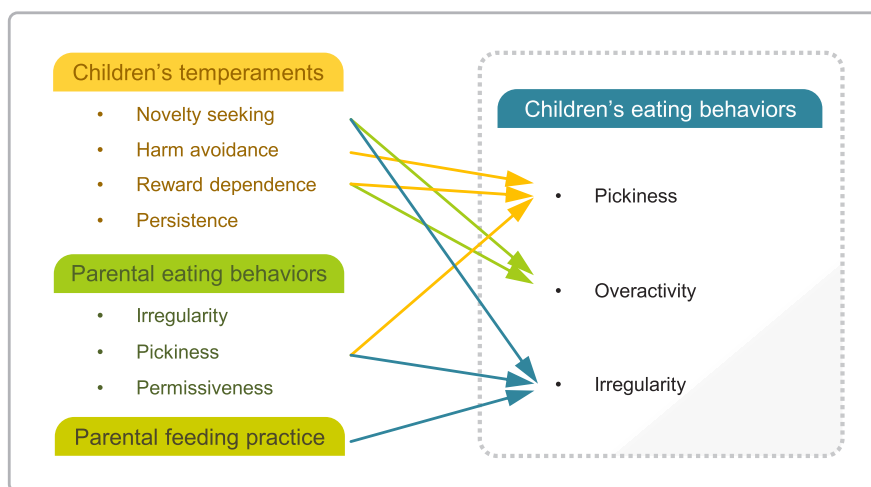
A questionnaire survey was conducted targeting healthy children aged 36–72 months who visited a pediatric clinic, and their parents. Totally 166 children participated in the survey. Examining the distribution of the collected data, the ratio of gender amounted to 80 little boys (48.2%) and 86 little girls (51.8%). The proportion of ages came to 32 people at age 3 (19.3%), 58 people at age 4 (34.9%), 76 people at age 5 (45.8%). This study was progressed by receiving the approval of Institutional Review Board (approval number: HYUIRB-

202105-007-1).

To see infants' problematic eating-behavior scale, the child-domain questionnaire in the eating behavior test for infant and young children¹⁾ was used. The child eating-behavior domain includes three factors in pickiness, overactivity, irregularity. To look for parental eating behaviors, the parent-domain questionnaire in the eating behavior test for infant and young children¹⁾ was used. The parent eating-behavior domain includes 3 factors of irregularity, pickiness, permissiveness. And to see parental feeding styles, the questionnaire in the parent domain for the eating behavior test for infant and young children¹⁾ was used. Infants' temperaments were evaluated by using the Junior Temperament and Character Inventory.²⁾ Infants' temperament domain includes 4 factors in novelty seeking, harm avoidance, reward dependence, and persistence.

Statistical processing was applied IBM SPSS Statistics ver. 22.0 (IBM Co., Armonk, NY, USA). A relationship among the child age, the parental eating behaviors, the parents' feeding practices, the children's temperaments, and the children's eating behaviors was analyzed by using Pearson correlation analysis. To figure out the influence upon problematic eating behaviors in the factors of showing a correlation with children's problematic eating behaviors, the multiple regression analysis was carried out by using the Forward Selection Method.

The pickiness among children's eating behaviors presented a



Graphical abstract

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positive correlation with parents' picky eating behavior, parents' permissive dietary behavior, children's novelty-seeking temperament, harm-avoidance temperament, and reward dependence. Next, overactivity among children's eating behaviors reflected a positive correlation with parents' permissive eating behavior, children's novelty-seeking temperament, and children's reward dependence. And it indicated a negative correlation with children's persistence. Lastly, irregularity among children's eating behaviors expressed a positive correlation with pickiness among parental eating behaviors and novelty seeking among children's temperaments. It showed a negative correlation with parents' feeding practice and persistence among children's temperaments.

The pickiness among infants' problematic eating behaviors could be known to be affected by harm avoidance ($\beta=0.258$), reward dependence ($\beta=0.196$) out of young children's temperaments and parents' picky dietary life ($\beta=0.154$). The overactivity out of young children's problematic eating behaviors appeared to be influenced by novelty seeking ($\beta=0.275$) and reward dependence ($\beta=0.191$). Among infants' problematic

eating behaviors, the irregularity was indicated to be affected by parents' picky dietary life ($\beta=0.237$) parents' feeding practice ($\beta=-0.261$) and children's novelty seeking temperament ($\beta=0.148$) (Table 1).

A child with high harm-avoidance propensity may express strong resistance while the child feels that a stimulus to new food is dangerous. Children with high reward dependence can be sensitive to irritation around them, they also can respond to new food stimulation sensitively. In case of picky eating behaviors of parents, the parents themselves can be seen to be serious in picky eating or to be strong in aversion to new food. The parents' picky senses might be inherited by their children,³⁾ and even by which the parents' eating behaviors were modeled on their children, resulting in having been learnt in living.⁴⁾

Children with high novelty-seeking temperament get excited easily by new stimuli and may represent a difficulty in observing the rule of eating during mealtime. Children with high reward dependence reflect the problem of overactive eating habit. In accordance with the research, the eating disorders (anorexia nervosa, bulimia nervosa) may develop into reward-dependent syndromes. The abnormal behavior and the abnormal reward process in patients with eating disorders have influence upon energy balance and hormones (leptin, ghrelin). And so the patients with eating disorders can present hyperactivity which is potentially rewarding for eating disorder patients.⁵⁾ Moreover, the adult attention-deficit hyperactivity disorder children who show hyperactivity are sensitive to rewards, but the pattern of reinforcement may be different from that of normal children.⁶⁾

For the last, the irregularity in eating behavior is the scale that shows whether being constant in the amount of food, whether looking for food at regular times, and whether being the same in an eating pattern. Children who have higher novelty-seeking temperament are more impulsive and have difficulties in accepting the rules and keeping regular eating habits. And 'pickiness' among parental eating-behavior problems implies parents' serious picky eating or repulsion against strong scent or new food. Children have a high tendency to model the eating behavior of a person who has a close relationship. Thus, the parental eating behavior may have an effect on children.⁷⁾ Parents' appropriate feeding practice is what shows how much the parents are involved in and control their children's meals. Thus, the lower the parents' feeding practices may lead to showing the irregular eating behaviors. Children who were nurtured with parents' well-structured parenting style can be known to have a more regular eating habit.⁸⁾

According to other research, the eating behavior was represented depending on age.⁹⁾ But this study could not evaluate the difference in eating behaviors depending on the age because of the narrow range of age. Furthermore, parents' behavior and child-rearing attitude may affect on the formation of children's temperament.¹⁰⁾ Consequently, a more in-depth further research is needed between children's temperament and parents' behavior and child-rearing attitude.

Table 1. Stepwise multiple regression analysis on the factors of influencing children's picky eating behaviors, overactive eating behavior, and irregular eating behaviors

Variable	β	F	R^2	Adjusted R^2
Picky eating behaviors		10.539***	0.163	0.148
Children's temperament				
Harm avoidance	0.258**			
Reward dependence	0.196**			
Novelty seeking	0.082			
Parental eating behavior				
Pickiness	0.154*			
Permissiveness	0.041			
Overactive eating behavior		11.221***	0.121	0.11
Children's temperament				
Novelty seeking	0.275***			
Reward dependence	0.191**		g	
Persistence	-0.175			
Parental eating behavior				
Permissiveness	0.116			
Irregular eating behavior		12.569***	0.189	0.174
Children's temperament				
Novelty seeking	0.148*			
Persistence	0.063			
Parental eating behavior				
Pickiness	0.237**			
Parents' feeding practice				
Parents' feeding style	-0.261***			

A relationship among the child age, the parental eating behaviors, the parents' feeding practices, the infants' temperaments, the young children's eating behaviors was parsed with Pearson simple correlation analysis. After then, to look into the influence upon problematic eating behaviors in factors of reflecting a correlation with children's problematic eating behaviors, the multiple regression analysis was executed by using the Forward Selection Method.

* $P<0.05$. ** $P<0.01$. *** $P<0.001$.

Goh Woon Lim, MD, Kyoung Min Shin, PhD

Department of Counseling Psychology, Hanyang Cyber University, Seoul, Korea

Corresponding Author: Kyoung Min Shin, PhD

Department of Counseling Psychology, Hanyang Cyber University, 220, Wangsimni-ro, Seongdong-gu, Seoul 04763, Korea

✉ Email: kms shin@hycu.ac.kr

<https://orcid.org/0000-0002-6385-2169>

Footnotes

Conflicts of interest: No potential conflict of interest relevant to this article was reported.

ORCID:

Goh Woon Lim  <https://orcid.org/0000-0002-8293-2199>

Kyoung Min Shin  <https://orcid.org/0000-0002-6385-2169>

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