Original Articles

Relationships Between Child Temperament and Eating Behaviors in Vietnamese School-age Children

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Abstract

Background: *School-age children develop physically and fat accumulates to prepare for puberty. They can have their own choices of food selection and consumption. Evidence showed that child temperament have influenced on eating behavior of school-age children. It has been found that temperament in childhood has been linked to later eating problems.*

Objectives: *This descriptive cross-sectional correlational study aimed to examine child temperament and eating behaviors and determine relationships between child temperament including negative reactivity, task persistence, withdrawal, and motor activity and eating behaviors of Vietnamese school-age children.*

Method: *A cluster random sampling technique was used to recruit a sample of 225 school-age children who were studying in two primary schools in Hue city, Viet Nam. Data were collected from January to March, 2015. Research instruments included a demographic questionnaire, the Child Eating Behavior Questionnaire, and the School-Age Temperament Inventory-teacher version. Internal consistency reliabilities ranged from 0.62-0.88. Data were analyzed by using descriptive statistics, and Pearson's product moment correlation.*

Results: *Results revealed that the mean score of temperament of negative reactivity was 2.25 (SD = 0.57), task persistence's was 3.82 (SD = 0.81), withdrawal's was 3.12 (SD = 0.60) and motor activity's was 2.35 (SD = 0.91). Mean total score of eating behaviors was 2.49 (SD = 0.39). There were significantly negative correlation between task persistence and eating behaviors ($r = -0.268$, $p < 0.001$), and significantly positive correlation between motor activity and eating behaviors ($r = 0.187$, $p < 0.01$).*

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***Conclusion**: Child temperament of task persistence and motor activity related to eating behaviors in Vietnamese school-age children. Nurses and health care providers who are responsible for young children and preadolescent health should promote task persistence and decrease motor activity in school-age children. Consequently, their eating behaviors could be more appropriate.*

Keywords: child temperament; eating behaviors; school-age children; Viet Nam

Background

School-age children are about 6-12 years old and in the middle childhood in which their developmental stage is between early childhood and adolescence. It is important time for developmental advances that establish children's sense of identity. During these years, children could make stride toward adulthood by becoming competent, independent, self-aware, and involved in the world beyond their families[1]. In addition, they can have their own for food choices and preference of eating. Eating behavior is defined as a set of actions related to food intake carried out by individual in response to biological, psychological and sociocultural stimuli[2]. This behavior related to eating habits, food selection and consumption, cooking methods and the amount of eaten[3]. Eating behavior influenced energy intake through choices about when and where to eat, and the types and amounts of foods chosen, including decisions about starting and stopping eating[4-5]. Unhealthy diets were the key risk factors for non-communicable diseases such as obesity, cardiovascular diseases, cancer and diabetes. At present, it has been estimated that there were 35.5% of 6-11 years old were considered overweight[6]. Similarly, Ho Chi Minh City has obese children more than any other cities in Viet Nam with 16% of overweight children, followed by 9.9% in Hanoi, and 5.1% in Hue city[7]. Children's eating behavior is an important priority given the prevalence of childhood obesity and chronic disease[8]. These evidences have shown outcomes of unhealthy eating diet, a type of eating behavior, which could have somewhat liking to temperament of the school-age children.

Temperament has been defined as personal characteristics that are biologically based, evident from birth onwards, consistently across situations and have some degree of stability[9]. An individual child could have different temperament[10]. Lyons-Thomas and McClowry[11] categorized temperament of school-age children into four dimensions: negative reactivity, task persistence, withdrawal, and motor activity. Negative reactivity described the intensity and frequency with which a child expresses negative affection. Task persistence depicted the degree of self-direction that a child exhibits in fulfilling tasks and other responsibilities. Withdrawal was a child's initial response to new people or situations. Motor activity was a child's large motor activity level. Besides, temperament has been linked to later eating problems in childhood[12-13]. Temperament is connected with behavioral issues, which include both internalized and externalized problems[14]. Besides, there is a strong correlation between children's behavioral problems and their temperamental

characteristics[15]. So, temperament could be related to eating behavior of children. In some cases, child temperament may be an independent factor related to eating behavior[16]. In preschool-age children, a significant correlation was observed between the temperament subscale of reactivity and external problems subscale of behavioral problems ($p < 0.05$)[17]. Moreover, a significant correlation was observed between the temperament subscale of reactivity and externalizing problems subscale of behavioral problems ($p < 0.05$). Many researchers have replicated the finding that aspects of temperament related to behavioral adjustment when measured concurrently during the preschool years[18]. Moreover, a Canadian study of 81 sibling pairs concluded that shyness was correlated with increased risk for food neophobia[19].

Although there were many studies about temperament and eating behavior of children. There were primarily focused on population of infants, toddlers, preschoolers or adolescents. It is a paucity of literature, which has examined these associations among school-age children, when children's autonomy over eating becomes more evident. Therefore, the current study aimed to address this gap in the literature by examining associations between children's temperament and eating behavior. There was also limited examination of relationships between temperament and eating behavior in Vietnamese school-age children. Its result will be useful for developing an effective intervention program to improve eating behaviors of children, especially in Viet Nam.

Objectives

The objectives of this study were to examine child temperament and eating behaviors and determine relationships between child temperament including negative reactivity, task persistence, withdrawal and motor activity, and eating behaviors in Vietnamese school-age children.

Conceptual Framework

Pender's Health Promotion Model (HPM) was used to guide this study. Pender's model meant to be a "guide for exploration of the complex bio-psychosocial processes that motivate individuals to engage in behaviors directed toward the enhancement of health"[20]. There were three major concepts in Pender's model including: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcome, were further subdivided into narrower, more specific concepts. The model was used to assess an individual's background and perceived perceptions of self among other factors to predict health behaviors. It identified many relationships between concepts. Health promoting behavior was identified as the ultimate outcome of the model. Personal factors influenced behavior-specific cognitions and also directly influenced the specific health promoting behavior. Health promoting behaviors were also both indirectly and directly influenced by prior related behaviors, and directly influenced by intermediate competing demands[20]. Eating behavior is a behavior that can be promoted to be healthy, especially in school children

who are old enough to have their own food choices and preferences. In addition, their eating habits could have an influence from their own moods, characteristics and environment. Temperament of school-age children was one of individual characteristics. It could be shaped by influencing from family, friend and environment. It could also be based on the child later behaviors, including eating behaviors. This study aims to examine eating behavior and temperament of school-age children and their relationship. Although the school age is the period of dynamic and complex transitions in a life span before changing to adolescence. The physical, development, and social changes that occur during school-age can markedly affect eating behaviors. School-age temperament with four dimensions of the school-age temperament of negative reactivity, task persistence, withdrawal, and motor activity, was included in the basic conditioning factors as explanation in the Pender's Health Promotion Model.

Methods

A descriptive cross-sectional correlational design was used. The target population was Vietnamese children studying at grade 3-5 of primary schools, Hue city, Viet Nam, and primary teachers of classrooms where the children were studying. Sample was recruited through a cluster random sampling from the target population.

Sample size

The sample size in this study was 225, which calculated by using power analysis[21], where n was sample size, power was 0.80, moderate effect size was 0.13 and level of significance was 0.05.

Sampling technique

A cluster random sampling technique was used for sample recruitment following the inclusion criteria. There were totally 33 public primary schools in Hue city, Viet Nam, which were similar environment and characteristics. There were about 35 students per one class in the primary school. Randomly selection of the school was used by drawing 2 out of the total with blindness. Then, 2 primary schools were used for subsequent step. Students from each primary school were randomly selected by room and grade level. In each school, one class randomly selected from each grade level for a total 6 classes (one class × three grade levels × two schools). As such, the school number 1 was random 1 classroom of grade 3, 1 classroom of grade 4, 1 classroom of grade 5. The school number 2 was random 1 classroom of grade 3, 1 classroom of grade 4, 1 classroom of grade 5. This was 1 classroom of each grade per one primary school. All students in a selected classroom, and the primary teacher were invited to participate in this study. Thus, a total number of the sample was 225.

Research instruments

A demographic questionnaire was developed by the researcher. It included child, parent and teacher's characteristics. The child characteristics were age, gender, years of study, weight, and height. The parent characteristics were mother's age, father's age, marital status, mother's education, father's education, and income of the family. The teacher's characteristics were age, gender, highest educational level, and number of years of teaching.

The Child Eating Behavior Questionnaire (CEBQ)[22] was used to measure eating behaviors of the school children, and also given permission to translate and use with Vietnamese children. The children were asked to complete information about their behavior of eating in the questionnaire. It consisted of 35 items of 8 dimensions regarding to food responsiveness (5 items), emotional over-eating (4 items), enjoyment of food (4 items), desire to drink (3 items), satiety responsiveness (5 items), slowness in eating (4 items), emotional under-eating (4 items), and food fussiness (6 items). Each item score ranged from 1-5, with 1 = never, 2 = rarely, 3 = sometimes, 4 = oftens, and 5 = always. The total score was calculated mean from its items. Dimension scores were calculated by taking the mean of the item ratings. Higher scores reflected inappropriate eating behavior, and lower score indicated appropriate eating behaviors[22-23]. In this study, internal consistency reliability of Cronbach's alpha was 0.74.

The School-Age Temperament Inventory Teacher version (SATI-T)[11] was used to measure temperament of the school children, and also given permission to translate and use with Vietnamese children. The teachers were asked to complete information about children's response and activity related to the child temperament. It consisted of 33 questions of 4 dimensions regarding to negative reactivity (11 items), task persistence (9 items), withdrawal (8 items), and motor activity (5 items). Each item score ranged from 1-5, with 1 = never, 2 = rarely, 3 = half of the time, 4 = frequently, and 5 = always. Score of each dimension was calculated mean from its items. The higher the scores, the child had higher negative reactivity, task persistent, motor activity, and more withdrawal in new situations[24]. In this study, internal consistency reliability of Cronbach's alpha of 4 temperament dimensions ranged from 0.62-0.88.

Ethical considerations

This proposal was submitted to grant approval for ethical consideration for the Institutional Review Board, Faculty of Nursing, Burapha University, Thailand and the director of Department of Education and Training Hue City and director of two selected primary schools. The data collection and result representation were done with thoughtful concern for the dignity, value, and consequence to the child and the family. The researcher introduced and described the study aims and confidential information, benefit, the method, and the right of subjects. The researcher used the consent form to ensure that all participants were willing to participate. The participants were then explained the objectives of this study, the protection of confidentiality and their right to withdrawn from

the study without penalty. There was no obligation of cost to them. All information will be destroyed completely after at least five years later from publication of the study findings.

Data Collection

The data collection procedures were performed only by the researcher. After the proposal was approved by the Ethical Committee of Faculty of Nursing, Burapha University, letters from the Dean to the head of Department of Education and Training, and Principal of primary schools of Hue city, Viet Nam were issued to request the permission for data collection. At the selected primary schools, the researcher explained the purposes of the study and the method of collecting data to the principal and teachers. Then, the researcher contacted school-age children and provided briefing information related to study objectives and right to participate to the students and explained how to answer all items in the child eating behavior questionnaire. After they understood and agreed to join the research, the researcher gave permission form to their parents and made appointment with them. The researcher made appointment with the school children at appropriate time together with their teacher. The child eating behavior questionnaire Vietnamese version for the student's self-report was filled in classroom by the students. They were taken approximately 10-15 minutes to complete the questionnaire. At that time, the researcher followed their answers, if they had any questions or problems about the questionnaire. The researcher explained and made clear to them.

The primary teachers were also provided briefing information related to study objectives, their right to participate and how to answer all items in the SATI Vietnamese version. The SATI Vietnamese version was filled by teachers at their free time. After one week, the researcher had appointment with the teachers to receive the filled SATI.

Data Analysis

Data were analyzed by using a statistic software program. Statistical significant level was set at a level at $p < 0.05$. Descriptive statistics in terms of frequency, percent, mean, range and standard deviation were calculated to describe the sample characteristics, the child eating behavior, and temperament. Pearson's product moment correlation were used to analyze relationships between temperament including negative reactivity, task persistence, withdrawal, motor activity and eating behaviors of school-age children.

Results

Demographic characteristics

Vietnamese school-age children: There were 225 school-age children. Their mean age was 9.96 years old (SD = 0.82) with range from 9 to 11 years old. There were 53.30% of boys and 46.70% of girls. Their years of study were classified into 3 levels of grade 3, 4, and 5. There were 35.60% in grade 3, 32.40% in grade 4, and 32.00% in grade 5. The mean children's BMI

was 18.39 (SD = 3.09).

Parents: Most of parents were living together (97.30%). The mean mother's age was 39.51 years (SD = 5.34) with range from 28 to 58 years old. The mean father's age was 43.22 years (SD = 5.89) with range from 29 years to 61 years old. Most of their parents completed general education. Most of mothers was completed high school (30.30%) and university or above (30.70%). Most of father was completed university or above (41.80%), and high school (28.40%). The mean family income per month was 5,003,111.11 VND (SD = 1,564,659.68) with range from 1,700,000 VND to 8,900,000 VND (1 Thai Baht is approximately 700 VND).

Teachers: Mean age of teacher was 41.41 years (SD = 10.06) with range from 23 to 55 years old. All of teachers were female (100%). Most of teachers completed university education (82.20%). The mean years of teaching was 18.08 years (SD = 10.06).

Descriptive statistics of child temperament and eating behaviors

Temperament: Mean scores of temperament of negative reactivity was 2.25 (SD = 0.57), task persistence was 3.82 (SD = 0.81), withdrawal was 3.12 (SD = 0.60) and motor activity was 2.35 (SD = 0.91). Details were presented in Table 1.

Table 1 Mean, standard deviation, and range of temperament for total and subscale scores (n = 225)

Temperament	M	SD	Range	Possible range
Negative reactivity	2.25	0.57	1.81-3.91	1.00-5.00
Task persistence	3.82	0.81	1.22-5.00	1.00-5.00
Withdrawal	3.12	0.60	1.57-5.00	1.00-5.00
Motor activity	2.35	0.91	1.00-5.00	1.00-5.00

Eating behavior: Mean total score of eating behavior was 2.49 (SD = 0.39). Details of each subscale were presented in Table 2.

Table 2 Mean, standard deviation, and range of eating behavior for total and subscale scores (n = 225)

Eating behavior	M	SD	Range	Possible range
Total	2.49	0.39	1.72-3.76	1.00-5.00
Subscale				
Food responsiveness	2.18	0.84	1.00-5.00	1.00-5.00
Emotional over-eating	2.42	0.94	1.00-5.00	1.00-5.00
Enjoyment of food	2.94	0.91	1.00-5.00	1.00-5.00
Desire to drink	2.18	0.98	1.00-5.00	1.00-5.00
Satiety responsiveness	2.66	0.71	1.00-4.80	1.00-5.00
Slowness in eating	2.32	0.85	1.00-5.00	1.00-5.00
Emotional under-eating	3.17	0.97	1.00-5.00	1.00-5.00
Food fussiness	2.05	0.61	1.00-4.33	1.00-5.00

Relationships between temperament and eating behaviors

Assumptions of Pearson's correlation coefficients analysis were tested before running the test, including, normal distribution of variables, all data in interval or ratio and random sampling. Data were met these assumption. Then, Pearson correlation coefficients were carried out to determine relationships between temperament and eating behaviors. Results showed that there were significantly negative relationship between task persistence and eating behaviors ($r = -0.268$, $p < 0.01$), and positive relationship between motor activity and eating behaviors ($r = 0.187$, $p < 0.01$). However, there was no significant between negative reactivity and eating behaviors ($r = 0.102$, $p > 0.05$), and no significant between withdrawal and eating behaviors ($r = -0.052$, $p > 0.05$). Details were presented in Table 3.

Table 3 Pearson's correlation coefficients between temperament and eating behaviors (n = 225)

Temperament	Eating behaviors (r)
Negative reactivity	0.102
Task persistence	-0.268**
Withdrawal	-0.052
Motor activity	0.187**

**p < 0.01

Discussion

Temperament of Vietnamese school-age children

Result showed that Vietnamese school-age children had mean score of temperament of negative reactivity was 2.25 (SD = 0.57). It was a moderate to low score when comparing with its possible range score of 1-5 rating (lowest score = 1.00, low = 2.00, median = 3.00, high = 4.00 and highest score = 5.00). Negative reactivity described the intensity and frequency with which the child expresses negative affection. A child who was high in negative reactivity would have an intense, immediate reaction to a minor inconvenience. A child who was low in negative reactivity was generally pleasant and mild in his or her reactions to situational changes[25]. The previous study also showed that mean score of temperament of negative reactivity was 2.62 (SD = 0.99)[11], which was similar score to this study finding.

Vietnamese school-age children had mean score of temperament of task persistence was 3.82 (SD = 0.81). It was a moderate to high score when comparing with its possible range score of 1-5 rating (lowest score = 1.00, low = 2.00, median = 3.00, high = 4.00 and highest score = 5.00). Task persistence depicted the degree of self-direction that a child exhibited in fulfilling tasks and other responsibilities. Task persistence in children is primarily descriptive of attentive behavior shown in learning or mental skill performance. Children who were high in task persistence

could complete their schoolwork or other activities with ease. Children who were low in task persistence had difficulty finishing homework[25]. The previous study also showed that mean score of temperament of task persistence was 3.42 (SD = 0.98)[11]. High task persistence was associated with teacher reports of academic performance[26].

The result of this study also showed that Vietnamese school-age children had mean score of temperament of withdrawal was 3.12 (SD = 0.60), which was a moderate to high score comparing with possible range score of 1-5 rating (lowest score = 1.00, low = 2.00, median = 3.00, high = 4.00 and highest score = 5.00). Withdrawal portrayed the child's initial response to new people and situations. Children who were low in withdrawal were usually excited about meeting new people or having an opportunity to experience a novel situation. Children who were high in withdrawal appear to be shy[25]. The previous study showed that mean score of temperament of withdrawal was 2.80 (SD = 0.83)[11], which was somewhat different from this study. It is possible that Vietnamese school-age children were born in an Asian culture. Children with shyness, keeping quiet and less extrovert have been seen as a norm and usual way of lifestyle.

Result of this study also showed that Vietnamese school-age children had mean score of temperament of motor activity was 2.35 (SD = 0.91), which was a moderate score comparing with possible range score of 1-5 rating (lowest score = 1.00, low = 2.00, median = 3.00, high = 4.00 and highest score = 5.00). Motor activity described the amount of large motor activity of the child. Children who were high in activity were constantly in motion, even when they were supposed to be still. Children who were low in activity could sit quietly for long periods of time[25]. The previous study also showed that mean score of temperament of motor activity was 2.42 (SD = 1.05)[11], which was similar to this study and normal for school-age children.

Eating behavior of Vietnamese school-age children

The result of this study showed that Vietnamese school-age children had mean total score of eating behavior was 2.49 (SD = 0.39). It was a moderate score when comparing with its possible range score of 1-5 rating (lowest score = 1.00, low = 2.00, median = 3.00, high = 4.00 and highest score = 5.00). These findings support and extend previous research implicating emotionality not just in feeding difficulties such as fussy and slow eating[19], but also in more generic eating behavior constructs such as enjoyment of food and responding to fullness. Besides, with school-age, the approval and esteem of those outside the family, especially peers was important role for developing emotional eating of children. Most relationships come from school associations[27]. In addition, the school-age children usually eat foods from their home, but they sometimes eat foods at school. Besides, their eating behavior had influenced from peer, friends, teacher, media, television, so school-age children often taste new foods based on introducing them. However, school-age children can decide to their food based on their own, self-confidence, and self-regulatory. So, the children's eating behavior can be affected from their environment

and relationships. The previous studies also showed that mean score of eating behavior was 2.70 (SD = 0.41)[28], and mean score of eating behavior was 2.45 (SD = 0.53)[22], which were moderate and similar to this study.

Relationships between temperament and eating behaviors in Vietnamese school-age children

The result presented that there was a significant and negative relationship between task persistence and eating behaviors ($r = -0.268$, $p < 0.01$). Since higher scores reflected inappropriate eating behavior, and lower score indicated appropriate eating behaviors[23], it could be implied that school-age children who had the higher task persistence had less inappropriate eating behaviors. In other words, school-age children who had the higher task persistence had more appropriate eating behaviors. The previous study also showed that higher task persistence related to healthier behaviors in school-age children ($r = 0.08$, $p < 0.001$)[29]. When the school-age children had the higher task persistence, they had more healthy behaviors. It could understand that when children have high responsible they usually have appropriate eating behavior. It was explained that task persistence is the child's tendency to remain focused on a task until it is done and this was found to be more related to child health behaviors. The children had high task persistence was a strength when it would mean that a child completes things without multiple reminders. Moreover, school-age children with high task persistence implied that the children would complete things without multiple reminders[24]. The school-age children who had high task persistence usually completed their home works and assignments on time with high responsibility. These could make them have better understanding what to eat and that they would have more appropriate eating behaviors. So, they usually focused on healthy behaviors that protected them. In addition, they are in a stage of developing to be young adolescents, which may be more carefully on eating behaviors related to healthy, fatty and beauty. It could be a reason that makes these children with high task persistence had more appropriate eating behavior.

The result also showed that there was a significantly positive relationship between motor activity and eating behaviors ($r = 0.187$, $p < 0.01$). It could be implied that school-age children who had high motor activity linked to less appropriate or inappropriate eating behavior. It would be explained that vigorous physical activity such as running outdoors is generally considered using and burning more energy and that their body system need more food as a generally logical concept. Henniger[30] reminded us that children acquire self-confidence and self-esteem in part through successful physical activities. They would see themselves as more competent and capable. So, children could have inappropriate eating behaviors when they had more motor activity.

Based on these results, there were two dimensions of temperament, including task persistence and motor activity, significantly related to eating behavior. According to Pender[20], she said that

individual characteristics and experience, including personal factor, had affected health promoting behavior. Temperament of children also affected on eating behavior. Based on this relationship, nurse can support and promote eating behavior of children based on characteristic of temperament. The results of this study were similar to previous studies presented that there were important associations between children's temperament and their eating behaviors[28]. Another study said that children's eating behavior was given by their early temperament that had been linked to later eating behaviors[13].

However, there was no significant relationship between negative reactivity and eating behaviors, and withdrawal and eating behaviors ($p > 0.05$). Negative reactivity described as intensity and frequency with which the child expresses negative affection. A child who was high in negative reactivity would have an intense and immediate reaction to a minor inconvenience[31]. It could be explained that negative reactivity may not about eating, but rather it is about feeding. This result was similar to a previous study presented that there was no relationship between negative reactivity and food intake ($r = 0.24$, $p = 0.13$)[32]. In addition, this result was also consistent with a previous study presented that there was no significant correlation between eating behavior and withdrawal ($p > 0.05$) in preschool children[17].

Implications

Pediatric nurses and healthcare professionals should understand the temperament's characteristics and eating behavior of school-age children. Besides, nurses can develop a plan or an intervention focusing on increasing task and assignment responsibility of school-children. That could have the children with high task persistence. Moreover, the school-age children should be suggested to have lower motor activity. Later, temperament of high task persistence and low motor activity can lead to help the children have more appropriate eating behaviors. Consequently, eating problem overweight in school-age children would be less.

In the future, an intervention study should be carried out to improve eating behaviors of school-age children through enhance, strengthening and promote temperament of high task persistence and low motor activity. In the addition, a longitudinal study should be conducted to examine each dimension of eating behaviors of children overtime, as well as with different dimensions of the school-age temperament. However, the SATI Vietnamese version should be reexamined its reliability in the next study since there was low.

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