

## Original Article

# Disturbed eating tendency and related factors in grade four to six elementary school students in Taiwan

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**OBJECTIVE:** This study investigated Taiwanese elementary school students' status in terms of body size, body satisfaction and disturbed eating tendencies. **METHODS:** In a cross-sectional survey, 1,261 elementary school children from grades four to six participated in this study. We used an anonymous self-reported questionnaire, which included: demographics and body satisfaction; Children's Eating Attitude Test -26 (ChEAT-26); Nowicki-Strickland Locus of Control Scale; and Influence of Significant Others Scale and Media Impact Scale. **RESULTS:** We found that 58.4% of the children were of normal weight, and 32.7% of the boys and 22.2% of the girls were over-weight or obese. Moreover, 39% of the children wanted to be thinner. The mean ChEAT-26 score was  $8.71 \pm 8.35$ , and 10.5% of the children were at high risk for disturbed eating tendencies (ChEAT-26 $\geq$ 20), including 8.4% of the boys and 12.6% of the girls. Scores on the ChEAT-26, Nowicki-Strickland Locus of Control Scale, Influence of Significant Others Scale and Media Impact Scale were positively correlated. The level of external control and the influence of significant others and the media were significantly higher in children with disturbed eating attitudes than in those without them. Multivariable logistic regressions showed that disturbed eating attitudes were associated with body satisfaction, locus of control, and the level of influence of significant others and the media. **Conclusions:** Disturbed eating behaviors exist among elementary school students in Taiwan. This survey highlights the need for education in acquiring healthy mental attitudes and eating behaviors by elementary school students.

**Key Words:** Children's Eating Attitude Test -26, locus of control, significant others, media, elementary school students

## INTRODUCTION

Eating disorders are prevalent in Western countries as the incidence of disordered eating has increased significantly since 1970 in Europe and the United States.<sup>1</sup> Along with an abundant life style and advanced information transmission, Asian countries have not only rapidly adopted the Western diet culture, but also their concept of "Slim is beautiful" as an aesthetic standard. Chisuwa and O'Dea pointed out that the incidence of problematic eating attitudes and behaviors pertaining to the fear of fatness in Japan had been increasing significantly for the past 20 years,<sup>2</sup> and a similar phenomenon has been found in studies from Taiwan,<sup>3</sup> China,<sup>4</sup> Hong Kong<sup>5</sup> and Korea.<sup>6</sup>

The development of disturbed eating is influenced mainly by internal and external factors such as personality, individual development, and locus of control. Early studies indicated that locus of control was associated with life adaptation.<sup>7</sup> Rotter advanced a theory of internal-external locus of control after integrated 10 years of studies.<sup>8</sup> Individuals with a high internal locus of control believe that events in their life derive primarily from their own action, while individuals with a high external locus of control believe that their decisions and life are controlled by environmental factors which they cannot influence.<sup>8</sup>

Studies have focused on how locus of control affects health behaviors. Strickland pointed out that an individual

with an internal locus of control was more willing to promote healthy habits and health related behaviors compared with those who tended to have an external locus of control.<sup>9</sup> A Taiwanese study also showed that adolescents with an external locus of control had poorer physical and mental health, and locus of control may be an important predictor for mental and physical health.<sup>10</sup> A cohort study of 7,500 British adults found that when children at the age of 10 showed a tendency towards an internal locus of control, they later had a lower risk of being obese and a better quality of life and health related behaviors, as well as higher self-esteem.<sup>11</sup>

Garner *et al* conducted a study on 18 anorexia nervosa sufferers, 16 obesity sufferers and 32 control individuals without eating disorders. Results showed that anorexia nervosa sufferers with body image disturbances had an external locus of control.<sup>12</sup> Hood *et al's* review paper noted that the feeling of ineffectiveness in anorexia ner-

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Manuscript received 11 March 2013. Initial review completed 17 May 2013. Revision accepted 20 August 2013.

doi: 10.6133/apjcn.2014.23.1.07

vosa sufferers was correlated with locus of control.<sup>13</sup> According to Fouts and Vaughan's research findings, adolescent girls who tended to have an external locus of control had significantly more disordered eating behaviors than did those who had a tendency towards an internal locus of control.<sup>14</sup>

In addition to individual beliefs and characteristics, the development of disordered eating behaviors is influenced by many other external environmental factors, including the advocacy of a thin body culture, parents' attitudes and behaviors towards weight, family relationships, and peer dieting behaviors.<sup>15-18</sup> Childhood eating habits and patterns are established in the family, as the impact of parental influence on children is greatest;<sup>19</sup> however, school-age peer experiences will also lead to disturbed eating behaviors in adults.<sup>20</sup> There is also a major influence by media on eating behaviors. The level of exposure to the media can directly affect female college students in the United States in developing eating disorders.<sup>21</sup> Their desire to become TV stars and regular dieting were important predictive factors for binge eating behavior.<sup>22</sup>

The age of development of eating disorders was the focus of several studies. Ambrosi-Randic *et al* investigated the eating behaviors of 1,396 female students from Croatian elementary schools, secondary schools and universities. They found that for 10.3% of primary school girls, 7.6% of female secondary school students and 11.3% of female university students, the Children's Eating Attitude Test -26 (EAT-26 or ChEAT-26) scores were greater than or equal to 20, showing disturbed eating attitudes and behaviors. They also demonstrated that in elementary school, girls had a higher prevalence rate of disordered eating behaviors than did those in secondary school.<sup>23</sup> Most studies have used female or male adolescents as the main subjects of research; however, a Polish research report pointed out that the prevention of disordered eating behaviors through educational intervention with female secondary school students was ineffective. This inferred that it might be too late to prevent disordered eating behaviors from occurring in adolescence.<sup>24</sup>

This study surveyed elementary school students in grades four to six as subjects, and investigated the status of body size, satisfaction with body weight and disturbed eating attitudes and behaviors in these children. We also explored the relationship between disturbed eating behaviors and locus of control, as well as environmental impacts in order to determine the predictive risk factors for disordered eating behaviors in children.

## METHODS

### *Participant and study design*

The study population consisted of students at elementary schools in Taichung City, Taiwan. Participants were selected by multiple-stage sampling with regard to districts, schools, grades, and classes. Ten elementary schools were selected, and two classes were randomly selected from each grade; a total of sixty classes took part in our study. We had determined that 1,600 students were the expected sample size, for a sampling ratio of 3.1%.

Written informed consent was obtained from students and their parents before participation in the survey. A total of 1,940 questionnaires were distributed and 1,355

were returned. Questionnaires that were not filled out completely or that contained unreliable information were excluded. Therefore, a total of 1,261 questionnaires were eligible for this study. The effective response rate was 93.1%. All participation was voluntary, and confidentiality was assured by not using names or student numbers. Each questionnaire was given a specific code number.

Data were collected anonymously. The questionnaires were completed by students in their classrooms under the standardized direction of well-trained research assistants. To protect the participants' privacy, students were led to a private area to measure height and weight after the completion of the questionnaires. All research assistants were trained in conducting the survey, answering questions, and measuring height and weight. The study protocol was approved by the Institutional Review Board of Chung Shan Medical University (Taichung City, Taiwan).

### *Instrument and collection*

The questionnaire contained five sets of measurements: 1) demographics and body satisfaction; 2) Children's Eating Attitude Test-26 (ChEAT-26); 3) Nowicki-Strickland Locus of Control Scale; 4) Influence of Significant Others Scale; and 5) Influence of Media Scale.

Body mass index (BMI) was computed from height (meters) and weight (kilograms) measurements in kg/m<sup>2</sup>. Participants were classified into 5 groups: severely underweight (BMI  $\leq$ 5th percentile), underweight (5th < BMI  $\leq$ 15th percentile), acceptable weight (15th < BMI  $\leq$ 85th percentile), overweight (85th < BMI  $\leq$ 95th percentile), and obese (BMI >95th percentile), in accordance with the gender- and age-specific BMI references determined in the study by Chen *et al*.<sup>25</sup> In 2003, the Taiwan Department of Health announced that this standard would be the standard indicator for obesity among Taiwanese children and adolescents. Body satisfaction was determined by the question: "How do you desire your weight to be?", and the possible responses were "thinner", "heavier", or "maintain current weight".

The ChEAT-26 by Malony *et al*,<sup>26</sup> developed by amending the adult version of the eating attitudes test (EAT-26) of Garner *et al*,<sup>27</sup> is suitable for use among children aged 8 to 13. The test has a total of 26 questions and items are rated on a 6-point Likert-type scale. Selection of the extreme option of disturbed eating attitudes and behaviors, "Always" is scored with 3 points, followed by "Very often" with 2 points, "Often" with 1 point, and "Sometimes", "Little", or "Never" with 0 points. The 25th question is counted as a negative question. Total scores range from 0 to 78. A higher score indicated more abnormal eating attitudes and behaviors. A study by Malony *et al* suggested that a score on ChEAT-26 above a cut-off score of 20 indicated a high risk of having a tendency towards disturbed eating attitudes and behaviors.<sup>26</sup> In our study, all participants who scored  $\geq$ 20 were considered EAT (+), while those who scored <20 were considered EAT (-). Malony *et al* conducted a survey of 318 students from grades 3-6, and their results showed that students were good at reading and understanding the questionnaires, meaning that their readability was very high. The internal consistency of Cronbach's  $\alpha = 0.76$ , for test-retest reliability, effectively identified children with a

high tendency for disturbed eating, and showed the tool's accuracy.<sup>26</sup> The Chinese version of EAT-26 is suitable for use among Taiwanese adolescents and has been shown to be highly reliable and valid with a cut-off point of 20.<sup>28</sup> The Chinese version of ChEAT-26 was used and found to have good internal consistency in our study (Cronbach's  $\alpha = 0.75$ ).

The light edition of the Nowicki-Strickland Locus of Control Scale was used in this study.<sup>29</sup> It is suitable for use among adolescents aged 9 to 18 and the Chinese edition compiled by Wei and Lai was used in our study.<sup>30</sup> The scale has a total of 21 questions answered "yes" and "no", and scores external locus of control. An answer of "yes" scored 1 point and an answer of "no" 0 points. The 4th, 13th, and 20th questions were reverse scored. Total score ranged from 0 to 21 and the higher the score, the greater the tendency to have an external locus of control. In Wei and Lai's study of Taiwanese adolescents, the internal consistency among the participants was found to be acceptable (Cronbach's  $\alpha = 0.76$ ). In our study, the internal consistency of the Nowicki-Strickland Locus of Control Scale was 0.74.

The "Influence of Significant Others Scale", designed by Huang was used in our study.<sup>31</sup> This scale has a total of 14 questions, and scores from 1 to 4 were assigned: 4 indicating totally agree, 3 indicating mostly agree, 2 indicating mostly don't agree, and 1 indicating totally don't agree. Significant others included parents and peers. Total scores ranged from 14 to 56. The higher the scores on the "Influence of Significant Others Scale," the more that the children were concerned about their parents and peers' criticism and identification, and the greater the likelihood that they would pay more attention regarding weight control behaviors. Huang had carried out a survey of 530 higher grade elementary school students and found that the scale's Cronbach's  $\alpha$  of 0.77 showed good reliability for the questionnaire.<sup>31</sup> In this study, the internal consistency of the Influence of Significant Others Scale was 0.80.

The "Media Impact Scale" designed by Huang was used in our study.<sup>31</sup> This scale includes 7 questions. Questions number 1, 2, 3 and 6 are negative questions. Except for the 6th question scoring from 0 to 4, the rest score from 1 to 4. A high score on the Media Impact Scale indicated that a child's identification with media messages was high, as was the likelihood of changes in behaviors after exposure to media messages. The results of a survey of 530 higher grade elementary school students by Huang showed an internal consistency of Cronbach's  $\alpha = 0.60$  for the scale.<sup>31</sup> The internal consistency of the Media Impact Scale in our study was 0.68.

#### Data analysis

The SPSS (version 12.01, 2004, SPSS) was used for data compilation and statistical analysis. A  $p$ -value  $< 0.05$  indicated statistical significance. For the internal consistency of the questionnaire, a Cronbach's  $\alpha$  value was used to evaluate the ChEAT-26, the locus of control scale, the influence of significant others scale and the media impact scale. This study used independent sample  $t$ -tests for comparison of EAT (+) and EAT (-) children's scores on the "Nowicki-Strickland Locus of Control Scale", "Influ-

ence of Significant Others Scale" and "Media impact scale". The chi-square test was used to compare gender, grade, actual body size, and body satisfaction in the EAT (+) and EAT (-) groups.

Our study used Pearson's product-moment correlation to determine the correlation between children's eating attitudes, locus of control, and the degree of influence of significant others and the media. Logistic regression was used to analyze body satisfaction, locus of control, and degree of influence of significant others and the media in the prediction of children's disturbed eating attitudes and behaviors. In order to have the higher statistical power of an effective sample size, subjects with partially missing values on the questionnaire remained in the analysis if the part being analyzed was completed.

#### RESULTS

A total of 1,261 participants were involved in data collection. Among these, 617 were boys (48.9%) and 644 were girls (51.1%). There were 464 fourth grade students (36.8%), 404 fifth grade students (32.0%) and 393 sixth grade students (31.2%). Students' average BMI was  $19.3 \pm 3.71$  ( $\text{kg}/\text{m}^2$ ); boys and girls were  $19.7 \pm 4.06$  and  $18.8 \pm 3.31$  ( $\text{kg}/\text{m}^2$ ), respectively. The BMI of boys was significantly higher than that of girls ( $p < 0.001$ ). The overall results of this study showed that 6.1% were severely underweight, 7.9% were underweight, 58.4% were of acceptable weight, 13.1% were overweight, and 14.5% were obese. Most of the boys and girls were in the acceptable weight category, but the acceptable weight percentage of girls was higher than boys' (63.6% vs 53.3%); 32.7% of boys and 22.2% of girls were overweight or obese. About 14% of both boys and girls were severely underweight or underweight.

In terms of body satisfaction, 45.1% of all the school-children hoped to maintain their current weight, but 54.9% were not satisfied with their bodies as 39% hoped to be thinner. By gender, 47.2% of the boys wanted to keep their current weight, but 21.2% wanted to be fatter and 31.2% wanted to be thinner. Conversely, 46.7% of the girls wanted to be thinner. This was higher than the 43.0% who were satisfied with their present weight, and the 10.3% who wanted to be fatter.

In this study, the average overall score on the ChEAT-26 was  $8.17 \pm 8.35$  (0-62). For 10.5% of the students, their score was greater than or equal to 20, indicating a high risk of having a tendency to develop disturbed eating. As shown in Table 1, the ratio of boys to girls with disturbed eating attitudes and behaviors was significantly different ( $p < 0.05$ ; 8.4% and 12.6%). Different grades (from grades four to six) showed no significant difference. The tendency to develop disturbed eating attitudes and behaviors by differences in body size did show significant differences as 22% of obese students showed a tendency towards disturbed eating.

The overall average score on the Nowicki-Strickland Locus of Control Scale was  $7.45 \pm 3.92$ . With a score of 11 as a cut-off point, the students were divided into an internal locus of control group and an external locus of control group; 78.6% of the students tended towards an internal locus of control, which was more than 3 times the number with a tendency towards an external locus of control.

**Table 1.** Numbers and percentages of participants with and without disorder eating attitudes and behaviors across independent variables

Independent variable	Levels	EAT (+)	EAT (-)	Total
Gender *	Boy	54 (8.4)	590 (91.6)	644
	Girl	78 (12.6)	539 (87.4)	617
Grade	4	51 (11.0)	413 (89)	464
	5	40 (9.9)	364 (90.1)	404
	6	41 (10.4)	352 (89.6)	393
Actual body size ***	Severely underweight	3 (3.9)	74 (96.1)	77
	Underweight	3 (3.0)	97 (97.0)	100
	Normal	72 (9.8)	663 (90.2)	735
	Overweight	14 (8.5)	151 (91.5)	165
	Obese	40 (22.0)	142 (78.0)	182
Satisfaction with body weight ***	Keep current weight	35 (6.8)	480 (93.2)	515
	Hope to be heavier	5 (2.7)	177 (97.3)	182
	Hope to be thinner	71 (16.0)	374 (84.0)	445

The number in the table indicates the number of participants and the number in parentheses represents percentage.

Chi-square analysis is used to compare difference in the tendency of disturbed eating attitudes/ behaviors across independent variables.

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

ChEAT-26 scores  $\geq 20$ , which showed high risk of having tendency to develop th disturbed eating attitudes/behaviors and is shown as EAT (+); ChEAT-26 scores  $< 20$ , is shown as EAT (-).

**Table 2.** The correlation analysis of ChEAT-26 scores between the locus of control scale scores, influences of significant others scale scores and media impact scale scores

	ChEAT-26
Score of locus of control scale	0.200***
Score of influences of significant others scale	0.328***
Score of media impact scale	0.253***

Expressed by Pearson product-moment correlation coefficient: r. Pearson product-moment correlation analysis, \*\*\*  $p < 0.001$

Results on the Influence of Significant Others Scale and the Media Impact Scale were  $25.6 \pm 7.07$  and  $12.1 \pm 2.74$ , respectively. As shown in Table 2, the score on the ChEAT-26 had a significant and positive correlation with the locus of control scores, and influence of significant others and media scores (all  $p < 0.001$ ). This indicated that school children's disturbed eating attitudes/behaviors had significant correlations with locus of control and the degrees of influence of significant others and the media.

EAT (+) and EAT (-) groups were compared in terms of the differences in their locus of control, and influence of significant others and the media. As shown in Table 3, the scores on the Locus of Control Scale, Influence of Significant Others Scale and Media Scale in the EAT (+) group were significantly higher than those in the EAT (-) group. This indicated that, for children with a tendency towards disturbed eating patterns, their locus of control tended to be external, and they were more susceptible to the influence of significant others and media in changing behaviors.

Table 4 shows how disturbed eating attitudes/ behaviors were related to body satisfaction, locus of control, influence of significant others and the media. For example, the tendency to develop disturbed eating behaviors in participants who wanted to be thinner was 3.17 times higher than that in participants who wanted to keep their current weight ( $p < 0.01$ ). With each additional point on the "locus of control" variable, the chance of having a tendency to develop disturbed eating attitudes/behaviors

was greater (odds ratio (OR) = 1.13, 95% CI: 1.06-1.19). For each additional point on the "influence of significant others" variable, the chance of having a tendency to develop disturbed eating attitudes/behaviors was greater (OR = 1.05, 95% CI: 1.02-1.09). For each additional point on the "media impact" variable, the chance of having a tendency to develop disturbed eating attitudes/behaviors was greater (OR = 1.14, 95% CI: 1.07-1.22). After adjustment for gender, grade, and actual body size, the "body satisfaction", "locus of control", "influence of significant others" and "media impact" variables were still the important factors for effectively predicting the schoolchildren with a tendency to develop disturbed eating attitudes/behaviors.

## DISCUSSION

Overall, 13.1% of students were overweight, and 14.5% were obese. These percentages were quite similar to those in the 2001-2002 Taiwan elementary schoolchildren's nutrition and health status survey where 15% were overweight and 12% were obese.<sup>32</sup> In terms of gender, the rate of overweight and obesity in boys was 32.7%, compared to 22.2% in girls. The boys' obesity rate has increased, but the girls' slightly decreased when compared with 2001-2002.

Nearly 40% of students were dissatisfied with their body size and hoped to be thinner. In terms of gender, regardless of their actual body size, 46.7% of girls wanted to become thinner, while only 31.2% of boys did. This rate of girls' body dissatisfaction was higher than that in Liu's findings.<sup>33</sup> Girls do have a greater desire to become thin, and are very concerned about their body weight and size.<sup>34,35</sup>

The overall percentage of elementary schoolchildren with a tendency towards disturbed eating attitudes/ behaviors was 10.5%. This was lower than the 25% in Taipei City, Taiwan reported by Chang,<sup>3</sup> but was close to the results of 10.9% found by Liu<sup>33</sup> and 11.4% reported by Dong in Taichung, Taiwan.<sup>36</sup> This may be because of multi-culturalism in the northern region and advanced information transmission; however, further study is nec-

**Table 3.** Comparison of scores of locus of control scale, influences of significant others scale and media impact scales between participants with and without disturbed eating attitudes/behaviors (N=1261)

	EAT (+)	EAT (-)
Scores of locus of control scale***	9.27 (4.06)	7.24 (3.85)
Scores of influences of significant others scale***	30.0 (8.31)	25.0 (6.72)
Scores of media impact scale***	13.7 (3.30)	11.9 (2.61)

Expressed by Mean (SD).

Independent sample *t*-test for EAT (+)/EAT (-), \*\*\*  $p < 0.001$

ChEAT-26 scores  $\geq 20$ , which showed high risk of having tendency to develop disturbed eating attitudes/behaviors and is shown as EAT (+); ChEAT-26 scores  $< 20$ , is shown as EAT (-).

**Table 4.** The predictive analysis of the tendency to develop disordered eating behaviors in elementary schoolchildren (N=976)

	$\beta$	SE	Odds ratio	95% CI
Body satisfaction				
Maintain current weight			1.00	
Hope to be fatter	-0.477	0.679	0.620	0.164-2.35
Hope to be thinner	1.152	0.407	3.17**	1.43-7.03
Locus of control	0.118	0.029	1.13***	1.06-1.19
Degree of influences of significant others	0.051	0.016	1.05***	1.02-1.09
Degree of media impact	0.130	0.033	1.14***	1.07-1.22
Constant	-6.429	0.618	0.002***	

Logistic regression, \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

essary to determine if the prevalence rate in northern Taiwan is higher than that in other regions. The results of this study were similar to those of Ambrosi-Randic *et al* in Croatia (10.3%),<sup>23</sup> but lower than those in Canada (13%),<sup>37</sup> Brazil (16.5%)<sup>38</sup> and Spain (20%).<sup>39</sup> Western cultures may have a higher prevalence rate of factors which favor the development of disordered eating behaviors.

This study showed that the percentage of girls with a tendency to develop disordered eating behaviors was 12.6%, which was significantly higher than the boys' 8.4%. In other studies such as those in Hong Kong (6.5% female and 3.9% male adolescents),<sup>5</sup> Israel (20% female and 5% male adolescents),<sup>40</sup> and the United States (20% female college students and 10% male college students),<sup>41</sup> the female prevalence rate for a tendency to develop abnormal eating behaviors was higher. In domestic research, Liu,<sup>33</sup> Gu,<sup>42</sup> Lai<sup>43</sup> and Chen<sup>25</sup> pointed out that the prevalence rate for a female tendency towards abnormal eating behaviors was higher than that for the males. Gender is one of the key factors affecting abnormal eating behaviors, as females have a tendency towards disordered eating behaviors.

During adolescence, females with a BMI indicating overweight tend to be more at risk for developing an eating disorder.<sup>15,44,45</sup> BMI was independently associated with disturbed eating attitudes and behaviors, as had previously been found in Western studies.<sup>46</sup> Our study focused on school children and showed a similar phenomenon. Different body sizes showed a statistically significant difference in the tendency towards disordered eating behaviors. The percentage of obese children with disturbed eating patterns was significantly higher than those with other body sizes. Studies carried out by Tam *et al*,<sup>5</sup> Le Grange *et al*<sup>47</sup> and Liu<sup>33</sup> indicated that the larger the body size, the greater the tendency towards abnormal eating attitudes/behaviors in children. However, this as-

sociation disappeared after the multivariate analysis was performed. In previous adolescent and adult studies, Alves *et al* found that participants with disturbed eating (based on EAT-26  $\geq 21$ ) tended to have large body sizes.<sup>48</sup> However, studies in adolescents from Taiwan and Korea reported that there were no significant associations between elevated EAT-26 scores and actual body size.<sup>43,49</sup> Actual body size may therefore be due to other relevant factors and more longitudinal studies are needed.

Our results also showed that dissatisfaction with the body served as an important risk factor in assessing whether children suffered from disturbed eating attitudes/behaviors. This was similar to the findings of Rukavina *et al* in that the higher the EAT score, the greater the gap between current and ideal body image.<sup>50</sup> Studies by Makino *et al*<sup>51</sup> and Grogan<sup>52</sup> also pointed out that body dissatisfaction in adolescent girls was associated with a tendency towards disturbed eating. We perceive this gap as an individual's dissatisfaction with his or her body. Similar results reported in other longitudinal studies showed that dissatisfaction with body weight was an important predictive factor for disordered eating behaviors.<sup>53-55</sup> Research by Polivy and Herman also indicated that there was a lower risk of having abnormal eating behaviors when young girls were satisfied with their own body size.<sup>56</sup>

Scores for locus of control in children with disturbed eating were significantly higher than those in children without disturbed eating. The score on ChEAT-26 was significantly correlated with the score on the Nowicki-Strickland Locus of Control Scale. This finding was similar to that in a study by Fouts and Vaughan where adolescent girls with a tendency for external locus of control had significantly more disturbed eating patterns than those with an internal locus of control.<sup>14</sup> A Taiwanese study also pointed out that a tendency for an external locus of control was positively related to adolescents with

abnormal eating behaviors.<sup>43</sup> Skinner found that 9-10 year olds had a perception of being divided into internal and external control groups.<sup>57</sup> This supports our hypothesis that locus of control could influence the development of disturbed eating, and that this begins in childhood.

We also found that students with a tendency towards disturbed eating attitudes/behaviors showed a significant positive correlation with the degree of influence by their environment. EAT (+) elementary schoolchildren were significantly more susceptible to the influence of significant others and the media than were those in the EAT (-) group. Many other studies have shown that media impact had a direct influence on female students with symptoms of disturbed eating.<sup>21,58</sup> Studies in Taiwan also showed that adolescents with a higher degree of influence by media, peer and family, had stronger negative thoughts about body image and disturbed eating behaviors.<sup>59,60</sup> Environmental effects have a significant influence on adolescents and children in the development of disturbed eating attitudes and behaviors.

After adjustment for the factors of gender, grade, and actual body size, we found that elementary school students' body satisfaction, personality traits (locus of control) and environmental factors (influence of significant others and media impact) were the most important factors in validly predicting children's tendencies towards disordered eating behaviors. Previous studies about body satisfaction and the influence of significant others and the media on the tendency to develop disturbed eating attitudes and behaviors were similar to our findings. For example, fasting, media impact, body dissatisfaction, and history of being teased were important factors in the development of eating disorders.<sup>61</sup> The desire to become a TV star and negative parental evaluations of weight were predictive risk factors for adolescent girls and boys, respectively, to develop bulimia nervosa.<sup>22</sup> This study proposed that elementary schoolchildren's locus of control could predict a tendency to develop disturbed eating attitudes and behaviors, and further related studies are needed.

This study was conducted on children in Taichung city, so the results might be skewed towards the behavior and mentality of urban life in Taiwan. We suggest that future studies should include an extended sampling range for a better understanding about body image, eating behavior and body size in children throughout Taiwan.

#### ACKNOWLEDGMENTS

The authors thank Xiangling Chen and Wei Huang for their help in the preparation of the article.

#### AUTHOR DISCLOSURES

The authors declare no conflict of interest in this study.

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## Original Article

## Disturbed eating tendency and related factors in grade four to six elementary school students in Taiwan

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### 台灣國小四到六年級學童病態飲食行為傾向及相關影響因子探討

本研究主要目的在瞭解台灣國小四到六年級的學童的體型狀態、體型滿意度及病態飲食行為傾向。本研究為橫斷式調查，共有 1261 位四到六年級的國小學童參與本研究。以匿名自填式問卷為研究工具，內容包括：基本資料、體型滿意度、兒童版飲食態度測驗(ChEAT-26)、內外控信念量表 (Nowicki-Strickland Locus of Control Scale)、重要他人影響量表及媒體影響量表。結果發現：58.4%的學童體型正常，分別有 32.7%的男童及 22.2%女童體型為過重或肥胖，然而卻有 39.0%的學童希望自己能再瘦一點。學童之 ChEAT-26 平均分數為  $8.71 \pm 8.35$  分，10.5%的學童為病態飲食行為傾向高危險群(ChEAT-26  $\geq 20$ )，男童及女童分別為 8.4%及 12.6%。學童之 ChEAT-26 得分與內外控信念量表、重要他人影響量表及媒體影響量表得分皆呈現顯著正相關。具病態飲食行為傾向的高危險群學童其外控信念、受重要他人及媒體影響程度皆顯著高於低危險群。多元邏輯迴歸顯示，「體型滿意度」、「內外控信念」、「重要他人影響程度」及「媒體影響程度」與學童病態飲食行為傾向有顯著相關性。病態飲食行為相關問題確實存在於台灣國小學童，本研究結果突顯出國小學童需要有健康心理與飲食行為的教育。

**關鍵詞：**兒童飲食態度測驗、內外控信念、重要他人、媒體、國小學童