Body Weight Misperception and Its Association with Unhealthy Eating Behaviors among Adolescents in China

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Abstract: This study aims to examine associations between body weight misperception and eating behaviors among Chinese adolescents. Students (N = 2641) from a middle school and a high school in Wuhan, China participated in a cross-sectional study in May 2016. A questionnaire based on the World Health Organization’s Global School-Based Student Health Survey was employed to assess responses. Self-reported data, including weight, height, body weight perception, and eating habits, were collected. Body Mass Index (BMI) for age z-score was calculated from self-reported height and weight using WHO AnthroPlus. We used descriptive, logistic regression analysis and a Kappa test to analyze the data using SPSS. Overall, 56.6% of participants did not correctly categorize their weight status; these were much more likely to be girls. Compared with the correctly-perceived group, those who underestimated their weight tended to report eating late at night, having dinners with family, and checking nutrition labels. In contrast, weight overestimating students were less likely to report eating late at night, having breakfasts with family, having dinners with family, and discussing nutrition topics over meals. Body weight misperception was associated with unhealthy eating behaviors among Chinese adolescents.

Keywords: body weight misperception; unhealthy eating behaviors; adolescents

1. Introduction

Adolescence is a critical period of both physical and mental development when lifestyle behaviors are cultivated. As 16.8% of Chinese youth are overweight or obese, and overweight/obese adolescents are more likely to become obese adults [1], it is important to identify factors contributing to weight status in Chinese adolescents. Furthermore, cultural beliefs and beauty ideals are changing, especially in China [2], and many young people are concerned about their body shape and size due to social pressures to conform to a thin ideal body [3–7]. Media representations may adversely affect self-perceptions of weight, thereby exacerbating the weight misperception [8].
Weight misperception is the over or under estimation of one’s weight. The research literature suggests that body dissatisfaction is a common concern for adolescents and young adults from Western countries [9,10], and some reports suggest that adolescents’ weight misperception is increasing [11–14]. In a recent study conducted in Korea, 49.3% of Korean youth misperceived their weight status, with similar prevalence of over- and under-estimation. It has been indicated that either overestimation or underestimation of body weight is correlated with health issues in adolescents, including depression and certain psychological conditions [15–17]. This may in turn affect adolescents’ weight management behaviors [18,19]. In particular, non-overweight adolescents who overestimate their body size may experience body dissatisfaction, leading to greater risk for disordered eating and eating disorders [20]. Conversely, overweight adolescents who underestimate their body size may be less motivated to lose weight, thus increasing chronic disease risk [21].

Like many Western youth, Chinese adolescents and young adults also have expressed dissatisfaction with body size and shape [22–24]. Moreover, research has demonstrated that body image concerns are associated with concerns about appearance, low self-esteem, depression, and stress in large samples of Chinese children and adolescents [12,23,25]. In extreme cases, such concerns can lead to eating disorders and even suicidal ideation [11,26]. Significant gender differences in body size misperception have been previously reported in a representative sample of adolescents from Hong Kong [27], with boys less likely to misperceive their body size than girls. Similarly, differences by gender in body size misperception have been reported among 9- to 10-year-old children in Beijing [25].

It is becoming increasingly important to understand the extent of body image misperception and the associations between it and unhealthy eating behaviors in the Chinese adolescent population. However, few previous studies have tested the relationship between weight misperception and eating behaviors in Chinese youth. This study was therefore designed to assess the associations between body weight misperception and unhealthy eating behaviors among a cohort of Chinese adolescents.

2. Materials and Methods

2.1. Study Population

A cross-sectional survey was conducted at two schools, a middle school and a high school, in Wuhan, Hubei, China, during the late spring/early summer of 2016. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Wuhan University (ethical approval code: 2016031269) and medical school district administrators. All adolescents (N = 3059) enrolled in grades 7–12 were invited to participate in the study via a recruitment letter and consent form sent home to parents; written informed consent was obtained from a parent or guardian. For those providing consent, a survey was sent home to be completed and returned to school. Of those who consented, 149 respondents did not return the questionnaire, and 258 respondents did not answer questions related to key independent or dependent variables (e.g., weight, grade, sex, eating behaviors, physical activity). Ten respondents older than 19 years of age and one respondent younger than 12 were excluded; this resulted in a final sample size of 2641 youth aged 13–18 years (91.5% of those eligible).

2.2. Measures

The school and grade of each student were recorded by study staff; date of birth, sex, height, and weight were self-reported. Age, body mass index (BMI: weight in kg/height in m^2), and sex- and age-standardized BMI (BMI z-score, or BAZ) were calculated [28]. Weight status was divided into three categories: underweight (BAZ ≤ −2), normal weight (−2 < BAZ < 1), and overweight (BAZ ≥ 1).

The questions, answer options, and the categories of information collected are shown in the Appendix A. The questions about behaviors were grouped by the answer options but not relevant to its negative or positive association.
Misperception of Body Weight

The outcome of self-perceived weight status was classified as: underestimation, correct estimation, and overestimation. For example, normal-weight participants were classified in the overestimation category if their self-evaluated weight status was overweight/obese. Overweight and obese participants were placed in the underestimation category if they reported themselves as being normal weight or underweight.

2.3. Statistical Analysis

The Kappa statistic was used to account the consistency between objective and self-perceived weight status. Binary logistic regression was used to analyze the associations between misperception of body weight and eating behaviors, and attitudes of losing or gaining weight. Multiple logistic regression was used to analyze the associations between misperception of body weight and the frequency of every kind of food. Separate analyses were conducted for males and female participants. Models were adjusted for age, sex, physical activity, and whether the person reported eating less food or lower-fat food to lose weight. Distributions and frequencies for each category of variables were examined. Kappa, odds ratios (OR), and \( p \)-values were calculated where appropriate to assess the relationships between weight misperception and the dependent variables. All analyses were conducted using a combination of SPSS v22.0 (IBM Corporation, Armonk, NY, USA) [29] and JMP v13.0 (SAS Institute Inc., Cary, NC, USA) [30].

3. Results

3.1. Characteristics of the Study Population

Characteristics of the study population are summarized in Table 1. Based on BAZ, about 80% of respondents were of normal weight status. However, based on self-evaluation, about 23% of participants consider themselves underweight and 45% considered themselves either overweight or obese.

| Characteristics                          | Whole Sample (\( N = 2641 \)) | Male (\( n = 1399 \)) | Female (\( n = 1242 \)) |
|------------------------------------------|-------------------------------|-----------------------|------------------------|
| Gender                                   |                               |                       |                        |
| Male                                     | 1399                          | 53.0                  |                        |
| Female                                   | 1242                          | 47.0                  |                        |
| Grade                                    |                               |                       |                        |
| Middle school                            | 1121                          | 42.4                  | 615                    |
| High school                              | 1520                          | 57.6                  | 784                    |
| Sleeping time                            |                               |                       |                        |
| Short (<8 h/day)                         | 2143                          | 81.1                  | 1082                   |
| Long (\( \geq 8 \) h/day)                | 498                           | 18.9                  | 310                    |
| Physical Activity                        |                               |                       |                        |
| Active                                   | 1025                          | 38.8                  | 640                    |
| Not Active                               | 1616                          | 61.2                  | 799                    |
| Objective weight status (BAZ)            |                               |                       |                        |
| Underweight (\( \leq -2 \))             | 103                           | 3.9                   | 64                     |
| Normal (\(-2 \leq 1\))                  | 2156                          | 81.6                  | 1051                   |
| Overweight/obese (\( \geq 1 \))         | 382                           | 14.5                  | 284                    |
| Self-perceived weight status             |                               |                       |                        |
| Underweight                              | 604                           | 22.9                  | 422                    |
| Normal                                   | 854                           | 32.3                  | 469                    |
| Overweight/obese                         | 1183                          | 44.8                  | 508                    |
| Having food late at night                |                               |                       |                        |
| Usually (\( \geq 2 \) times/week)       | 1190                          | 45.1                  | 725                    |
| Rarely (\(<2 \) times/week)             | 1451                          | 54.9                  | 674                    |
### Table 1. Cont.

| Characteristics                          | Whole Sample (N = 2641) | Male (n = 1399) | Female (n = 1242) |
|------------------------------------------|-------------------------|-----------------|-------------------|
|                                          | n           | %     | n       | %     | n       | %     |
| Having taken-out food                    | 1174        | 44.5  | 606     | 43.3  | 568     | 45.7  |
| Usually (≥6 times/month)                 | 1467        | 55.5  | 793     | 56.7  | 674     | 54.3  |
| Having breakfast                         | 2018        | 76.4  | 1081    | 77.3  | 937     | 75.4  |
| Usually (≥5 times/week)                  | 623         | 23.6  | 318     | 22.7  | 305     | 24.6  |
| Having breakfast with family             | 1128        | 42.7  | 641     | 45.8  | 487     | 39.2  |
| Usually (≥2 times/week)                  | 1513        | 57.3  | 758     | 54.2  | 755     | 60.8  |
| Having dinner with family                | 1539        | 58.3  | 892     | 63.8  | 647     | 52.1  |
| Usually (≥2 times/week)                  | 1102        | 41.7  | 507     | 36.2  | 595     | 47.9  |
| Checking the nutrition labels            | 885         | 33.5  | 474     | 33.9  | 411     | 33.1  |
| Usually                                 | 1756        | 66.5  | 925     | 66.1  | 831     | 66.9  |
| Discussing nutrition topics over meals   | 531         | 20.1  | 295     | 21.1  | 236     | 19.0  |
| Usually                                 | 2110        | 79.9  | 1104    | 78.9  | 1006    | 81.0  |
| Watching TV or videos on their phone over meals | 525      | 19.9  | 296     | 21.2  | 229     | 18.4  |
| Usually                                 | 2116        | 80.1  | 1103    | 78.8  | 1013    | 81.6  |
| Taking nutritional supplements           | 962         | 36.4  | 510     | 36.5  | 452     | 36.4  |
| Yes                                     | 1679        | 63.6  | 889     | 63.5  | 790     | 63.6  |
| Eating less food or lower-fat food to lose weight | 767       | 29.0  | 342     | 24.4  | 425     | 34.2  |
| Yes                                     | 1874        | 71.0  | 1057    | 75.6  | 817     | 65.8  |

Note: Data were collected from a middle school and a high school, in Wuhan, China, during the late spring/early summer of 2016.

### 3.2. Proportions of Weight Status Misperception

Table 2 is a cross-tabulation of self-reported weight status and self-perceived weight status. The agreement between objective weight status and self-perceived weight status was very low. The descriptive statistics and proportions of each weight status misperception pattern are shown in Table 3. Nearly half of female participants overestimated their weight. Thin and overweight or obese adolescents were more likely to correctly perceive their weight. On the other hand, participants of normal weight are more likely to incorrectly estimate their weight, especially overestimate.

#### Table 2. Relationships between objective and self-perceived weight status (N = 2641).

| Objective Weight Status | Self-Perceived Weight Status | Total |
|-------------------------|------------------------------|-------|
|                         | Thin | Normal | Overweight/Obesity |       |
| Thin                    | 71   | 25     | 7                 | 103   |
| Normal                  | 489  | 783    | 884               | 2156  |
| Overweight/obesity      | 44   | 46     | 292               | 382   |
| Total                   | 604  | 854    | 1183              | 2641  |

Note: Kappa = 0.145, p < 0.001. Data were collected from a middle school and a high school, in Wuhan, China, during the late spring/early summer of 2016.

#### Table 3. Proportions of weight status misperception (N = 2641).

| Characteristics | Underestimate | Correctly Estimate | Overestimate |
|-----------------|---------------|--------------------|--------------|
|                 | n    | %    | n    | %    | n    | %    |
| All (N = 2641)  | 579  | 21.9 | 1146 | 43.4 | 916  | 34.7 |
| Gender          |      |      |      |      |      |      |
| Male            | 410  | 29.3 | 680  | 48.6 | 309  | 22.1 |
| Female          | 169  | 13.6 | 466  | 37.5 | 607  | 48.9 |
| Grade           |      |      |      |      |      |      |
| Middle school   | 262  | 23.4 | 523  | 46.6 | 336  | 30.0 |
Table 3. Cont.

| Characteristics | Underestimate | Correctly Estimate | Overestimate |
|-----------------|---------------|-------------------|--------------|
|                 | n  | % | n  | % | n  | % |
| Grade 7         | 81 | 23.5 | 158 | 45.8 | 106 | 30.7 |
| Grade 8         | 94 | 25.7 | 169 | 46.2 | 103 | 28.1 |
| Grade 9         | 87 | 21.2 | 196 | 47.8 | 127 | 31.0 |
| Senior high school | 317 | 20.9 | 623 | 41.0 | 580 | 38.1 |
| Grade 10        | 70 | 18.6 | 167 | 44.4 | 139 | 37.0 |
| Grade 11        | 152 | 32.6 | 265 | 39.4 | 256 | 38.0 |
| Grade 12        | 95 | 40.2 | 191 | 40.6 | 185 | 39.2 |
| BAZ ≤ −2        | 0 | 0.0 | 71 | 68.9 | 32 | 31.1 |
| BAZ −2~1        | 489 | 22.7 | 783 | 36.3 | 884 | 41.0 |
| BAZ ≥1          | 90 | 23.6 | 292 | 40.6 | 0 | 0.0 |

Notes: Data were collected from a middle school and a high school, in Wuhan, China, during the late spring/early summer of 2016. BAZ: BMI z-score.

3.3. Associations between Attitudes about Losing Weight and Weight Misperception among Normal-Weight Participants

Associations between attitudes of losing weight and weight misperception among normal weight participants are presented in Table 4. Normal-weight participants who perceived themselves as overweight or obese were significantly more likely to eat less food or lower-fat food to lose weight compared to those who underestimated or correctly estimated their weight; these were more likely to be male respondents. Normal-weight participants who perceived themselves as thin were significantly less likely to eat less food or lower-fat food to lose weight, especially female participants.

Table 4. Eating less food or lower-fat food lower to lose weight: normal-weight participants (Logistic regressions, N = 2641).

| Eating Less Food or Lower-Fat Food to Lose Weight | All | Male | Female |
|--------------------------------------------------|-----|------|--------|
|                                                  | OR (95% CI) | p-Value | OR (95% CI) | p-Value | OR (95% CI) | p-Value |
| Correctly estimate                                | 1 [Ref] | 1 [Ref] | 1 [Ref] |
| Underestimate                                     | 0.57 (0.42–0.78) | <0.001 ** | 0.71 (0.46–1.10) | 0.126 | 0.50 (0.31–0.80) | 0.004 ** |
| Overestimate                                      | 2.27 (1.82–2.83) | <0.001 ** | 3.71 (2.58–5.34) | <0.001 ** | 1.67 (1.27–2.11) | <0.001 ** |

Notes: Adjusted for gender, grade, and physical activity. Correctly perceived weight was used as the control group. Boldface indicates statistical significance (** p < 0.01). Data were collected from a middle school and a high school, in Wuhan, China, during the late spring/early summer of 2016.

3.4. Associations between Eating Behaviors and Weight Misperception

Associations between eating behaviors and weight misperceptions are shown in Table 5. Compared with the correctly-perceived group, weight-overestimating respondents were less likely to report usually having food late at night, having breakfast or dinner with family, and discussing nutrition topics over meals; they also were more likely to have takeout food. Compared with the correctly-perceived group, weight-underestimating students were more likely to eat food late at night, have dinners with family, check nutrition labels, and discuss nutrition topics over meals.

3.5. Associations between Eating Behaviors and Weight Status Misperception by Sex

Among males, compared with the correctly-perceived group, weight-overestimating respondents were less likely to have breakfast every day and have dinners with family. Weight-underestimating male respondents were more likely to report eating late at night, checking nutrition labels, discussing nutrition topics over meals, and taking nutritional supplements (Table 6). Among females, compared with the correctly-perceived group, weight-overestimating respondents were less likely to eat food late at night, discuss nutrition topics over meals, and more likely to have takeout food. Weight-underestimating female respondents were more likely to consume food late at night, have dinners with family, and discuss nutrition topics over meals (Table 6).
Table 5. Eating behaviors associated with weight misperception among participants (Logistic regressions, N = 2641).

| Eating Behaviors | Usually having food late at night | Usually having takeout food | Having breakfast everyday |
|------------------|----------------------------------|----------------------------|--------------------------|
|                  | OR (95% CI)                      | p-Value                    | OR (95% CI)              | p-Value                    | OR (95% CI) | p-Value | OR (95% CI) | p-Value |
| Correctly estimate | 1 [Ref]                          | 0.97                      | 1.07                      | 0.93                      | 0.80        | 0.067   | 0.88        | 0.255   |
| Underestimate    | 1.32 (1.07–1.62)                 | 0.008 **                  | 0.93 (0.76–1.14)         | 0.479                     | 0.80        | 0.067   | 0.88        | 0.255   |
| Overestimate     | 0.78 (0.65–0.94)                 | 0.009 **                  | 1.28 (1.07–1.54)         | 0.007 **                  | 0.88        | 0.067   | 0.88        | 0.255   |
| Correctly estimate | 1 [Ref]                          | 0.93                      | 1.07                      | 0.93                      | 0.80        | 0.067   | 0.88        | 0.255   |
| Underestimate    | 1.17 (0.94–1.45)                 | 0.013 *                   | 1.49 (1.18–1.88)         | 0.001 **                  | 1.34        | 0.075   | 0.88        | 0.255   |
| Overestimate     | 0.78 (0.64–0.95)                 | 0.013 *                   | 0.73 (0.60–0.89)         | 0.002 **                  | 0.88        | 0.067   | 0.88        | 0.255   |

Notes: Adjusted for gender, grade, physical activity, and whether eating less food or lower-fat foods to lose weight. Correctly perceived weight was used as the control group. Boldface indicates statistical significance (*p < 0.05; **p < 0.01). Data were collected from a middle school and a high school, in Wuhan, China, during the late spring/early summer of 2016.

Table 6. Association between eating behaviors and weight status misperception among male and female respondents (Logistic regressions, N = 2641).

| Characteristics | Male | Female |
|-----------------|------|--------|
|                 | Underestimated Weight | Overestimated Weight | Underestimated Weight | Overestimated Weight |
|                 | p-Value | OR (95% CI) | p-Value | OR (95% CI) | p-Value | OR (95% CI) | p-Value |
| Usually having food late at night | 0.85 (0.63–1.14) | 0.301 | 0.127 | 0.70 (0.52–0.95) | 0.020 * | 0.73 (0.60–0.89) | 0.013 * |
| Having breakfast everyday | 0.79 (0.58–0.92) | 0.205 | 0.79 (0.58–0.92) | 0.246 | 0.78 (0.58–0.92) | 0.250 | 0.78 (0.58–0.92) | 0.250 |
| Usually checking nutrition labels | 1.51 (1.52–1.61) | 0.010 ** | 0.75 (0.52–0.98) | 0.001 ** | 0.74 (0.52–0.98) | 0.001 ** | 0.74 (0.52–0.98) | 0.001 ** |
| Usually discussing nutrition topics over meal | 0.70 (0.61–0.79) | 0.153 | 0.70 (0.52–0.95) | 0.020 * | 0.69 (0.52–0.95) | 0.019 ** | 0.69 (0.52–0.95) | 0.019 ** |
| Usually watching TV or phones over meal | 0.75 (0.56–0.95) | 0.025 | 0.75 (0.56–0.95) | 0.025 | 0.75 (0.56–0.95) | 0.025 | 0.75 (0.56–0.95) | 0.025 |

Notes: Correctly perceived weight was used as the control group. Boldface indicates statistical significance (*p < 0.05; **p < 0.01). Data were collected from a middle school and a high school, in Wuhan, China, during the late spring/early summer of 2016.
4. Discussion

Nearly 57% of our respondents showed weight misperception, and consistency between objective weight and self-perceived weight status was very low in this group. A considerable number of normal-weight individuals erroneously reported their weight status (22.7% underestimated and 41.0% overestimated). Several studies have suggested that sociocultural factors may explain body dissatisfaction among young men and women in China. For example, Chen et al. [23] found that teasing and social pressure to be thin directly predicted body dissatisfaction in a large sample of Chinese adolescents and young adults. Jackson et al. found that media pressure about appearance predicted body dissatisfaction among Chinese female and male college students [22]. In that study, over one-third of participants overestimated their weight status. What’s more, students who overestimated their status in senior high school were more likely to overestimate their weight as they grew older. These trends may be due to changing cultural beliefs and beauty ideals, as many young people are concerned about their body shape and size due to social pressures to conform to a thin body ideal [3–7]. There is evidence that pressure about appearance from the media, friends, and family deliver unrealistic societal standards of physical beauty [2].

In our study, a quarter of overweight or obese participants underestimated their weight. This is troubling, as correct perception of one’s weight is associated with maintenance of a healthy lifestyle. As reported by Skinner et al. [31] and Jones and colleagues [32], individuals who misperceived their weight report fewer weight concerns, less control over emotional distress, and related overeating. In a separate study, overweight youngsters who perceived their weight accurately consumed fewer calories, reported more physical activity, and recorded more weight loss [33]. In the current study, overweight or obese participants were also more likely to report indulging in unhealthy food choices such as fast food and/or sugar sweetened beverages, snacking at inappropriate times, and engaging in more sedentary behaviors. This has important clinical ramifications, as the current findings provide several behaviors that could be targeted through behavioral counselling by clinicians or dieticians, such as having food late at night, having dinners with families, and having takeout food.

In previous studies, rates of weight misperception ranged from 46.0% among US adolescents [34], 40.0% in young Dutch adolescents [35], and approximately 45.0% (47.4% of boys and 44.2% of girls) in 6 different central-eastern European countries (Hungary, Slovakia, Czech Republic, Romania, Ukraine, and Poland) [36]. For example, a study of African-American adolescents in the U.S. [37] showed that 67.2% correctly judged their weight status, 27.2% underestimated it, and only 5.6% overestimated their weight status [38]. The difference between findings in this study and others might be due to ethnic differences or the higher prevalence of overweight adolescents, which was 39.8% in the study by Wang et al. [37] versus 14.5% in the present study. However, in another study among normal-weight adolescents in the U.S., only 16.2% overestimated their weight [20], much lower than the 32.3% we report here.

In this study, adolescents who overestimated their weight were more likely to have takeout food, not have breakfast and dinner with family, not discuss nutrition topics over meals, and not have snacks at night; those who underestimated their weight had the opposite results. Among those who overestimated their weight, male respondents were less likely to have breakfast every day and have dinners with family, while female respondents were less likely to eat food late at night or discuss nutrition topics over meals, and more likely to have takeout food. Among weight-underestimating respondents, participants were more likely to discuss nutrition topics over meals and have food late at night regardless of gender. However, female participants were more likely to have dinners with family, while male participants were more likely to take nutritional supplements and check nutrition labels. Research regarding eating behaviors according to weight-perception status is limited. A few related studies have been reported for Chinese [14] and African-American [38] adolescents. For example, it was found that unhealthy eating habits, such as drinking less milk and consuming less fruit, were prevalent in weight-underestimating African-American girls. However, African-American boys who underestimated their weight were less likely to eat snacks [38]. In a previous study based on US
nationally representative data, accurate weight perception was associated with healthy weight-related behaviors, including more dietary intake of fruit and vegetables and more physical activity, in both boys and girls [33]. Therefore, the formation of healthy dietary habits can be at least partially attributed to an accurate body weight perception.

The two important findings in our study were the high prevalence of overestimation amongst female respondents and underestimation among male respondents. This was in accordance with previous studies [13,14,33,36]. Among normal-weight participants, both those who underestimated and overestimated their weight reported trying to lose weight through eating less food or eating lower-fat food, especially girls. The differences observed by gender may reflect social norms that accept a larger range of weight statuses in boys while simultaneously enforcing a ‘ideal thin’ physique for girls. This might be affected by mass media and reflect a growing social issue in China. Also, exposure to media from either USA or Asian countries/regions (Japan, Korea, Taiwan, and Hong Kong) led to perceive or misperceive overweight in girls and underweight in boys [14]. The ideal body image has been for men to be muscular and women to be thin with the rise and influence of mass media throughout past decades. Consistently, we found that weight underestimating males seemed to be more likely to exercise to develop muscles, whereas weight overestimating females were more likely to be involved in vigorous physical activity to lose weight.

To help adolescents to keep healthy both mentally and physically, the following aspects should be considered. Firstly, general education about weight perception is essential. A correct self-perception of weight status is a necessary prerequisite to good health, as suggested by Cai et al. [39] and Fan et al. [40]. Moreover, the government should require schools to provide abundant healthy food with the introduction of healthy food options in the school café to make sure students eat well. Furthermore, appropriate education about physical activity is also needed, so that students do not hurt themselves. Finally, further large-scale prospective studies are needed for the government to assess adolescents’ dietary structure. For parents, it is important to promote a healthy family lifestyle.

There are several limitations in this study. First, the cross-sectional design of our study limits the ability to determine causal relationships. Most of these data were self-reported, and therefore the validity of the BMI categorization is unknown. Moreover, the sample is limited to Wuhan and may not be representative of all Chinese adolescents. Finally, the self-designed questionnaire may raise potential issues related to reliability and validity. A cohort study using a previously validated questionnaire could improve the quality of data.

5. Conclusions

In this cohort of Chinese middle- and high-school students, more than half did not correctly perceive their own body weight. Those who were inaccurate about their weight were much more likely to be girls. Both underestimation and overestimation could result in inappropriate weight-control behaviors and unhealthy eating behaviors. Thus, programs and comprehensive interventions aiming to correct adolescents’ weight misperception are important for their healthy growth and development.

Author Contributions: H.Y. designed the study, made the literature search, and drafted the manuscript; Y.Wu. designed the study and performed the statistical analysis; T.O. contributed to the intellectual content and provided a critical review of the manuscript; J.B. contributed to the intellectual content of the manuscript and provided a critical review of the manuscript; R.Z. contributed to the intellectual content and provided a critical review of the manuscript; X.Z. contributed to the intellectual content of the manuscript and collected data; Y.Wa. selected studies and contributed to the statistical analysis; G.C. contributed to the intellectual content of the manuscript and provided a critical review of the manuscript; R.L. designed the study, contributed to the intellectual content of the manuscript, and provided a critical review of the manuscript; J.B.M. contributed to the analyses of the data, intellectual content of the manuscript, and provided a critical review of the manuscript.

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Conflicts of Interest: The authors declare no conflicts of interest.
Appendix A

Body Weight Misperception Questionnaire for Adolescents in Wuhan, China.

| Questions                                                                 | Answer Options                          | Answer Categories                                                                 |
|--------------------------------------------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------|
| **Self-Perceived Weight Status**                                         | very underweight;                      | underweight (slightly underweight or very underweight);                          |
| How do you describe your weight?                                         | slightly underweight;                  | normal (about right weight);                                                      |
|                                                                          | about the right weight;                | overweight/obese (slightly overweight or very overweight) [41]                   |
|                                                                          | slightly overweight;                  |                                                                                   |
|                                                                          | very overweight [41,42]                |                                                                                   |
| **Eating Behaviors**                                                     |                                         |                                                                                   |
| (1) How many times a month do you eat takeaway food?                     | no more than 1 time/month;             | Forms and categories may vary depending on dietary habits, such as occasional   |
|                                                                          | 2–5 times/month;                      | consumption or more frequent purchases.                                          |
|                                                                          | 6–10 times/month;                     |                                                                                   |
|                                                                          | 11–15 times/month;                    |                                                                                   |
|                                                                          | almost every day                      |                                                                                   |
| (2) How many days did you buy snacks from supermarkets, street vendors,  | 0, 1 day;                              | Usually and always.                                                              |
| or restaurants during the past week?                                    | 2 days;                                |                                                                                   |
|                                                                          | 3 days;                               |                                                                                   |
|                                                                          | 4 days;                               |                                                                                   |
|                                                                          | no less than 5 days                   | Rarely                                                                           |
| (3) How many times did you have (a) breakfast; (b) food late at night;   | once a week;                           | Forms and categories may vary depending on dietary habits, such as occasional   |
| (c) breakfast with parents; (d) dinner with parents in a week?          | 2–3 times a week;                     | consumption or more frequent purchases.                                          |
|                                                                          | 4–5 times a week and every day         |                                                                                   |
| (4) Did you (a) look at the nutritional information on food packaging;   | never;                                 | Forms and categories may vary depending on dietary habits, such as occasional   |
| (b) discuss the topic of diet nutrition at mealtime; (c) watch a        | once in a while;                      | consumption or more frequent purchases.                                          |
| TV/phone/computer over a meal; (d) take nutritional supplements?         | usually and always                    |                                                                                   |

**Attitudes to Losing or Gaining Weight**

| During the past 30 days, did you take measures (eat less/more food, food | yes;                                   | yes;                                                                                   |
|                                                                          | with fewer/more calories, foods low/high in fat or take any pills,   |                                                                                       |
|                                                                          | powders, or liquids without a doctor’s advice) to lose/gain weight?  |                                                                                       |
|                                                                          | no;                                    | Forms and categories may vary depending on dietary habits, such as occasional       |
|                                                                          | no                                     | consumption or more frequent purchases.                                              |
| Physical activity: Since strenuous PA is strongly [43] and independently | Forms and categories may vary depending on dietary habits, such as occasional   |
| associated with markers of cardiometabolic health [44], and can be more  | consumption or more frequent purchases.                                          |
| reliably assessed than light or moderate PA [45], we assessed only      |                                                                                       |
| strenuous PA [45]. Strenuous activity was defined as sports, games, or  |                                                                                       |
| dance that make respondents breathe hard, make their legs feel tired, or  |                                                                                       |
| made them sweat [46].                                                   |                                                                                       |

| Are you usually engaged in strenuous activity, equal to or more than    | yes;                                   | yes;                                                                                   |
| three days a week?                                                     | no                                     |                                                                                       |

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