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The Body Weight Perception and Weight Control Behaviors among Undergraduate Students in National University of Malaysia (UKM)

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Abstract: This study was conducted to evaluate the associations between Body Mass Index (BMI), body weight perception and weight control behaviors among the undergraduate students in UKM and to identify gender differences in BMI, body weight perception and weight control behaviors between males and female students. A total of 200 subjects of UKM students have participated in (50% males and 50% females). Subjects involved were in the range of 20 to 25 years old. Information about socio-demographic, body image perception, body shape, weight control behaviors were obtained by questionnaire. Anthropometric measurements of body weight and height were also taken. The mean for age, weight, height and BMI were 22.2 ± 1.4 years, 69.1 ± 13.4 kg, 1.7 ± 0.1 m and 23.3 ± 4.1 kg/m² respectively for males while 22.5 ± 1.4 years, 56.8 ± 14.8 kg, 1.5 ± 0.1 m and 22.2 ± 4.7 kg/m² for females respectively. There were significant differences in weight, height and BMI between males and females ($p < 0.05$). Based on BMI categories (WHO, 2004), the results showed that 16.5% of the total subjects were classified as underweight, 57.0% normal weight, 17.0% overweight and 9.5% obese. Results showed that the actual weight (BMI) of subjects was significantly related to the body weight perception in overall ($p < 0.05$) and also for both sexes ($p < 0.05$). There were also a significant differences between actual body weight (BMI) ($p < 0.05$) and body weight perception ($p < 0.05$) with weight control behaviors in overall and in both sexes. Understanding the reasons for gender differences in actual weight and body weight perception can help health professionals in helping people to make strategic decisions to control body weight.

Key words: Body weight perception; body mass index (BMI); weight control behaviors

INTRODUCTION

Body image refer to one's perceptions, attitudes and experiences towards his/her body. Body image can be defined as the way people see or think about their body and how it is viewed by others (Khor *et al.*, 2009). Several previous studies have shown that Malaysian are very concern with their body image. However, there is still limited studies focus on body image in Malaysia. Body image perception is subjective and is based on how body size is viewed by others and it is heavily influenced by personal, family and culture factors. Body weight perception is one of the factors involving oneself in the weight control behaviors such as diet or exercise control (Cash *et al.*, 2004). Body weight perception is different from Body Mass Index (BMI). Body weight perception is more likely to be a motivation for engaging in weight control behaviors when compared with actual BMI. Understanding the perception of a person's weight is important to use an appropriate weight management strategies (Wong *et al.*, 2011). Assessment of body image perception with actual weight status is very important to ensure individuals to

maintain a healthy body weight (Poh *et al.*, 2006). Body weight perception is not accurate when compared with the actual BMI, thus, it is not suitable for use as a determinant for the control of weight management (Cash and Labarge, 1996; Kaplan *et al.*, 1988). Satisfaction with the body weight is associated with a person's perceptions rather than actual body weight (Wong *et al.*, 2011). The study by Cheung *et al.* (2007) had reported that girls are prefer to adopt a variety of weight control behavior by the body image perception, rather than based on their actual BMI. Discrepancy between actual weight and body weight perception can lead to dangerous weight loss that is not necessary as compared with those individuals who can estimate their body weight accurately (Pon *et al.*, 2004). Conversely, if the individual are not aware that they are actually overweight, they would not engage themselves in weight loss program. Body weight perception and BMI is closely related to weight control behaviors. Long term weight control behaviors is needed to achieve and maintain ideal body weight. The most important way to maintain a healthy and attractive body is to maintain an

appropriate body weight to the height that is has a normal BMI.

The university should give more focus on nutrition and physical activity and also promotes a positive body image (Harring *et al.*, 2011). Understand the reasons for gender differences in the body weight perception can help health professionals in helping people to make strategic decisions in maintaining a suitable body weight (Cheung *et al.*, 2007; Poh *et al.*, 2006). Body image has a significant influence on the weight control behaviors and body weight perception and BMI is closely related to weight control behaviors. The objectives of this study were to study the relationships between BMI, body weight perception and weight control behaviors among the undergraduate students in UKM and to identify gender differences in BMI, body weight perception and weight control behaviors between males and female students.

MATERIALS AND METHODS

Sampling and study location: Sample size required for the study was calculated based on the formula provided by Daniel (1999). This cross sectional study was conducted from January to February in 2012. This study was conducted at Universiti Kebangsaan Malaysia (UKM), Bangi campus, Selangor. Random sampling method was used in this study. The inclusion criteria was subjects aged 20 to 25 years old. Meanwhile the exclusion criteria were students who suffer from chronic diseases and not pregnant. A total of 200 UKM students with 100 males (50%) and 100 females (50%) aged 20 to 25 years involved in this study.

Data collection: Height without shoes was measured to the nearest 0.1 cm using the SECA body meter 208 (SECA, Germany). BMI was calculated using the weight and height (kg/m^2) data. Subjects were then categorized according to World Health Organization (WHO, 2004). Body weight was measured to the nearest 0.1 cm using the digital TANITA balance HD312 (Tanita Corp, Japan). The questionnaire includes information of demographic, body image perception, and weight control behaviors. This questionnaire will be completed by the students themselves. Students will be given instructions and guidance before answering questions. To ensure that the questions will be given to research subjects do not doubt, question its validity will be tested in advance. Before the data collection, pre-test was conducted on 10 subjects who randomly selected among students in UKM. This pre-test to identify whether respondents understood the questions contained in the questionnaires. Pre-testing is also essential for researchers to identify problems that may arise in the questionnaire and to estimate the time spent by the respondent to answer the questionnaires.

There were 3 sections in the questionnaire which consisted of demographic data, body image perception and weight control behaviors. Demographic data include sex, age, race, faculty, years of education and health status. Questionnaire on body image perception include body weight perception and body shape. Body image perception was assessed using a modified version of contour drawing rating scale which has 5 pictures designated with number 1 to 5 from left to right (Fig. 1 and 2). Based on the contour drawing, subjects

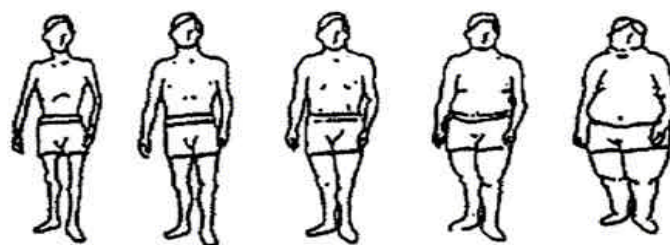


Fig. 1: Modified contour drawing rating scale for males

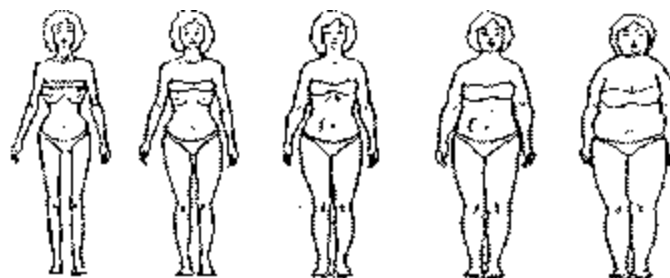


Fig. 2: Modified contour drawing rating scale for females

were required to choose the picture that represents their current and ideal body shape. Body dissatisfaction index was obtained by finding the absolute difference between the ideal body image and current body image. The magnitude of body dissatisfaction index value of 0 to 4. The larger the value, the more dissatisfaction with current body size. Negative value means that the subject desires to be thinner, while positive value indicates the current shape is smaller than the desired shape which means that the subject wants to be fatter than the current shape. This method is reliable and valid for assessment of body image perception (Thompson and Gray, 1995). Although this method is a global measurement but individuals can only identify the overall shape and not specific in terms of others body parameters. However, it can provide indication whether there is a difference between the current body shape and ideal body shape (Sabiston *et al.*, 2005). The questionnaire also include weight control behavior either to gain weight or lose weight as well as practices used in weight control such as diet control, physical activity, drug use, exercise, or a reduction in calorie intake, special diet, use of weight loss pill, vomiting and so on.

Data analysis: The data collected was analyzed by using Statistical Program Package for Social Sciences (SPSS) version 17.0. Descriptive statistical (mean, percentages, standard deviations and frequencies) were reported. In addition, the association between BMI and weight perception as well as between BMI, weight perception and weight control behaviors in overall and between the sexes were conducted by using Chi-squared test. The difference between men and female in weight, height and BMI conducted by using independent t-test. For all analyzes, significance level was set at $p < 0.05$.

RESULTS AND DISCUSSION

Profile of subjects: A total of 200 subjects which consisted of 50% males and 50% females were involved in this study. The subjects involved were randomly selected from eight different faculties. The subjects involved were in the range of aged 20 to 25 years old with a mean age of 22.4 years old. Mean age for male subjects was 22.2 ± 1.4 years old while for the female subjects was 22.5 ± 1.4 years. The majority of subjects (59.0%) were Malay, followed by 34.5% Chinese, 3.5% Indian and 3.0% of others ethnic.

Anthropometric characteristics: Anthropometric characteristics of subjects are shown in Table 1. The mean body weight of male and female subjects were 69.1 ± 13.4 and 56.8 ± 14.8 kg, respectively, while the mean height of male and female subjects were 1.7 ± 0.1 and 1.5 ± 0.1 m, respectively. These results had indicated that male subjects had a mean height and weight higher than female subjects ($p < 0.05$). Mean BMI for male subjects was 23.3 ± 4.1 kg/m², while for female subjects was 22.2 ± 4.7 kg/m². There was also a significant difference in BMI between male and female subjects ($p < 0.05$).

According to the BMI classification, most of the UKM students 57.0% (55% males and 59% females) were in the normal category followed by 17.0% (10.0% females and 24.0% males) as overweight. In addition, 16.5% (22.0% females and 11.0% males) were categorized as in the underweight category and 9.5% (9.0% females and 10.0% males) were obese.

Previous study that conducted by Nurul Huda and Ruzita (2010) on 264 male and 360 female students at Universiti Sains Malaysia, reported that 27.4% subjects (32.8% females and 20.1% males) were underweight, 61.22% subjects as normal weight (60.56% females and 62.12% males), 9.6% (6.1% females and 14.4% males) in the overweight category and 1.8% (0.6% females and 3.4% of males) were obese. Results showed that the prevalence of underweight and normal weight in present study were lower, while the prevalence of overweight and obese were higher if compared with this previous study.

In this study, there were more male subjects in the category of overweight (24%) and obese (10%) than those who were underweight (11%). While for female subjects, subjects that were classified in the category of underweight (22%) more than those who were overweight (10%) and obese (9%). This finding was

Table 1: Anthropometric characteristics of subjects by gender

Anthropometric characteristics	Mean \pm SD		
	Male (n = 100)	Female (n = 100)	Total (n = 200)
Body weight (kg)	69.1 ± 13.4	$56.8 \pm 14.8^*$	62.9 ± 15.4
Height (m)	1.7 ± 0.1	$1.5 \pm 0.1^*$	1.6 ± 0.1
BMI (kg/m ²)	23.3 ± 4.1	$22.2 \pm 4.7^*$	22.8 ± 4.5

*There are significant differences between the two gender groups ($p < 0.05$)

Table 2: The association between BMI with body weight perception

BMI	Body weight perception			
	Underweight n (%)	Normal weight n (%)	Overweight n (%)	Obese n (%)
Underweight	24 (72.7)	8 (24.3)	1 (3.0)	0 (0.0)
Normal weight	21 (18.4)	67 (58.8)	24 (21.0)	2 (1.8)
Overweight	0 (0.0)	12 (35.3)	15 (44.1)	7 (20.6)
Obese	0 (0.0)	1 (5.3)	5 (26.3)	13 (68.4)

consistent with other studies conducted in Asia who found that the prevalence of underweight was higher among female university students compared to those of male students (Sakamaki *et al.*, 2005).

The relationship between BMI and body weight perception:

The relationship between BMI with body weight perception are shown in Table 2. Results shows that among subjects who were categorized as underweight, majority (72.7%) perceived themselves as underweight, 24.2% subjects perceived themselves having a normal weight, 3.0% as overweight, while no one perceived themselves as being obese.

For BMI categories of overweight and obese, there was no one who perceive themselves as underweight. There were 44.1% subjects classified as overweight perceived themselves as overweight, 35.3% perceived themselves having normal weight and 20.6% as obese. For subjects within the normal BMI range, the majority (58.8%) accurately perceived themselves, followed by 21.1% perceived themselves overweight, 18.4% had the perception that they were underweight and only a small percentage (1.8%) perceived themselves as obese. Chi-squared test showed that the actual weight (BMI) had significant association with body weight perception ($p < 0.05$). Results of this study also consistent with those of other studies who found that the actual weight differed significantly with weight perception among adolescents (Cheung *et al.*, 2007; Khor *et al.*, 2009; Pon *et al.*, 2004). Results of several studies in the United States also consistent with the results of this study that the perception of body weight tends to be inaccurate when compared with BMI (Cash and Labarge, 1996; Kaplan *et al.*, 1988).

Gender differences in weight perception: The association between BMI with body weight perception by gender was summarized in Table 3. Almost half of the male subjects (47) considered themselves as normal body weight, followed by 28 subjects perceived themselves as underweight, 15 subjects perceived themselves as overweight and 10 subjects as obese. All the males who were in BMI category of underweight had

correct perception. For those who were classified as normal weight, 63.6% accurately perceived their weight, 30.9% subjects perceived themselves as underweight, 5.5% perceived themselves as overweight and no one perceived themselves as obese. For the category of overweight and obese, there was no one perceived themselves as underweight and majority of the subjects (60%) in obese category were correct estimator.

For females, 41 subjects had normal body weight perception, followed by 30 subjects perceived themselves as overweight, 17 subjects as underweight and 12 subjects as obese. For female subjects who were classified as underweight, there were 59.1% accurately perceived their weight, while 36.4% perceived themselves as normal weight. For the normal weight category, 54.2% subjects accurately perceived their weight, 39% subjects over estimated their weight which consisted of 35.6% who perceived themselves as overweight and 3.4% subjects perceived themselves as obese.

The results showed that there were more female subjects who perceived themselves as overweight and obese than those of male subjects. This finding is similar to the previous studies conducted by Harring *et al.* (2011) and Cheung *et al.* (2007) that more women than men were more likely to perceived themselves having excessive body weight while more men than women perceived themselves as underweight. The results obtained are consistent with a study conducted by Jaworowska and Bazylak (2009) on pharmacy students who found that more females perceived themselves as overweight or obese but in fact having normal weight or underweight. In contrast, among male students, they were more often underestimated their weight. Chi-squared test showed that there was a significant association between actual body weight (BMI) with the body weight perception for both sexes ($p < 0.05$). In general, the accuracy of the estimated body weight for male and female subjects are shown in Fig. 3. The present study showed that more than half the subjects accurately estimate their weight in which male and female subjects reported 61 and 58%, respectively. If the comparison is made between the sexes, female

Table 3: The association between BMI with body weight perception by gender

BMI	Body weight perception			
	Underweight n (%)	Normal weight n (%)	Overweight n (%)	Obese n (%)
Male (n = 100)				
Underweight	11 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Normal weight	17 (30.9)	35 (63.6)	3 (5.5)	0 (0.0)
Overweight	0 (0.0)	11 (45.8)	9 (37.5)	4 (16.7)
Obese	0 (0.0)	1 (10.0)	3 (30.0)	6 (60.0)
Female (n = 100)				
Underweight	13 (59.1)	8 (36.4)	1 (4.5)	0 (0.0)
Normal weight	4 (6.8)	32 (54.2)	21 (35.6)	2 (3.4)
Overweight	0 (0.0)	1 (10.0)	6 (60.0)	3 (30.0)
Obese	0 (0.0)	0 (0.0)	2 (22.2)	7 (77.8)

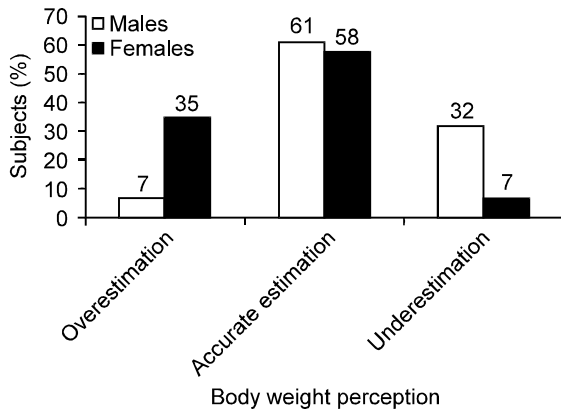


Fig. 3: Comparison between the gender in the estimation of body weight

subjects reported a higher number of overestimation of weight compared with male subjects and male subjects showed a higher tendency in underestimation of weight compared with females.

Body shape dissatisfaction: Index of body shape dissatisfaction was assessed by calculating the absolute difference between the ideal body image and current body image. The magnitude of index of body dissatisfaction was value from 0 to 4. The larger the value, there was rising dissatisfaction with body shape. Negative value means that the subject desires to be thinner, while positive value indicates the current shape was smaller than the desired shape which means that the subject wants to be fatter than the current shape. This method is reliable and valid for assessment of body image perception (Thompson and Gray, 1995). Table 4 showed 38% male subjects and 38% female subjects were satisfied with their body shape and did not intend to change their current body shape. These results obtained was almost similar to a study conducted by Jaworowska and Bazylak (2009) on pharmacy students that there were 34.4% of female and 37.1% male students were satisfied with their current weight.

However, the majority of the subjects (62%) were dissatisfied with their body shape. Subjects who had dissatisfaction on their body shape and intended to become thinner (82) were higher than subjects dissatisfied with their body shape and desired to be fatter (42). Female subjects were found to have higher dissatisfaction and desired to become thinner (48%) than male subjects (34%). Previous study by Khor *et al.* (2009) showed that females who have a sense of dissatisfaction with body shape were higher than males and they want a slim Figure.

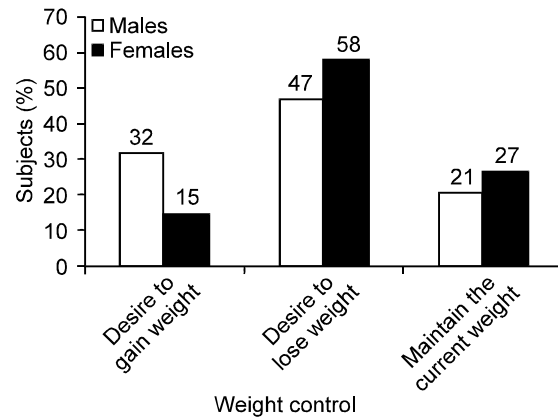


Fig. 4: Weight control by gender

Weight control behaviors: The desire to control their weight for men and women are presented in Fig. 4. Results showed that approximately half (52.5%) of both sexes want to lose weight. More females (58%) than males (47%) want to lose weight. In addition, there were more males (32%) want to gain weight than females. There were 27% males and 21% of females intended to maintain that current body weight. This finding is similar to previous studies conducted in Western countries and Asia, who also found that there were more women than men in engaging for weight loss management because of the socio-cultural pressure is greater among women than men to achieve an ideal body shape (Mellor *et al.*, 2009). Furthermore, another study by Harring *et al.* (2011) also stated that female university students were more concerned with their weight and tried to lose weight. The results obtained was quite similar to previous studies by Lowry *et al.* (2002) on high school students in the United States that 42.7% subjects trying to lose weight and 19.1% of the subjects tried to maintain their weight.

Weight control behaviors based on BMI by gender:

Weight control behaviors for males and females were analyzed based on BMI. Based on Table 5, for male subjects in the underweight category, 90.9% of subjects tried to gain weight and 9.1% wanted to lose weight. For male subjects with normal body weight, 38.2% wanted to increase their weight, 34.5% tried to lose weight and 27.3% subjects wanted to maintain their body weight. In addition, for males who were overweight, the majority wanted to lose weight (69.2%), followed by 16.7% subjects who wish to maintain body weight and 4.2% who wanted to gain weight.

For female subjects with normal weight, 64.4% wanted to lose weight, followed by 25.4% did not want to add or reduce their weight. For female subjects who were

Table 4: Indices of body shape dissatisfaction by gender

	Dissatisfaction index								
	-4	-3	-2	-1	0	1	2	3	4
Subjects									
Male (%)	0	1	5	28	38	23	5	0	0
Female (%)	0	1	13	34	38	13	1	0	0

Table 5: Weight control based on BMI by gender

BMI	Weight control behaviors		
	Desire to gain weight n (%)	Desire to lose weight n (%)	Maintain the current weight n (%)
Male (n = 100)			
Underweight	10 (90.9)	1 (9.1)	0 (0.0)
Normal weight	21 (38.2)	19 (34.5)	15 (27.3)
Overweight	1 (4.2)	19 (69.2)	4 (16.7)
Obese	0 (0.0)	8 (80.0)	2 (20.0)
Female (n = 100)			
Underweight	9 (40.9)	4 (18.2)	9 (40.9)
Normal weight	6 (10.2)	38 (64.4)	15 (25.4)
Overweight	0 (0.0)	8 (80.0)	2 (20.0)
Obese	0 (0.0)	8 (88.9)	1 (11.1)

Table 6: Weight control based on body weight perception by gender

Body weight perception	Weight control behaviors		
	Desire to gain weight n (%)	Desire to lose weight n (%)	Maintain the current weight n (%)
Male (n = 100)			
Underweight	24 (85.7)	1 (3.6)	3 (10.7)
Normal weight	8 (17.0)	21 (44.7)	18 (38.3)
Overweight	0 (0.0)	15 (100.0)	0 (0.0)
Obese	0 (0.0)	10 (100.0)	0 (0.0)
Female (n = 100)			
Underweight	12 (70.6)	1 (5.9)	4 (23.5)
Normal weight	3 (7.3)	20 (48.8)	18 (43.9)
Overweight	0 (0.0)	27 (90.0)	3 (10.0)
Obese	0 (0.0)	10 (83.3)	2 (16.7)

overweight, majority (80.0%) tried to lose weight and 20.0% did not want to change their weight. While for the category of obese, 88.9% female subjects wanted to reduce their weight. Results of the present study is similar with the study by Lin *et al.* (2002) who found that boys and girls with higher BMI status tried to take action to control weight gain. In addition, the study by Lowry *et al.* (2002) showed that less girls were overweight than boys but more likely to try to lose weight. However, this result is in conflict with the results obtained from study of Cheung *et al.* (2007), who showed no evidence of a relationship between BMI and weight control behavior of females. Statistical analysis showed that there is a significant association between BMI with weight control behaviors in overall and also for both sexes ($p < 0.05$).

Weight control behaviors based on body weight perception by gender: Weight control behaviors based on the perception of body weight for males and females

are shown in Table 6. Weight control behaviors were influenced by body weight perception, especially among females. Results showed that of 28 male subjects who perceived themselves as underweight, 85.7% of them wanted to gain weight, 10.7% subjects who wished to maintain their weight and only 3.6% who wanted to reduce their weight. As expected, for subjects who perceived themselves as overweight (15) and obese (10), all of them wanted to reduce their weight.

Results showed that female subjects who perceived themselves as overweight, 90.0% wanted to reduce weight and 10.0% did not want to gain or reduce their weight. For female subjects who perceived themselves as obese, the majority (83.3%) desired to reduce their weight and 16.7% did not want to change their weight. However, female subjects who perceived themselves as normal weight, half of them (48.8%) also wanted to lose weight. The study by Lowry *et al.* (2002) among United

State high school students found that 36.3% female students who were categorized as overweight according to BMI perceived themselves as obese, most of them (59.4%) were trying to lose weight.

Chi-squared test showed that there was a significant association between perception of body weight with weight control behaviors in overall and also for both sexes ($p < 0.05$). These findings were reinforced by a study conducted by Cheung *et al.* (2007) who shows an association between weight perception and weight control behaviors in which females perceived themselves as overweight were more likely to lose weight. For males, there was evidence of the relationship between body weight perception and weight control behaviors in which males perceived themselves as overweight or actually overweight, more likely to lose weight.

Conclusion: The mean weight, height and BMI for male were higher than that of female ($p < 0.05$). The actual weight (BMI) of subjects had significant association with body weight perception in overall and also for both sexes ($p < 0.05$). There were a significant relationship between actual body weight (BMI) as well as body weight perception with weight control behaviors in overall and also for both sexes ($p < 0.05$). Issues related to BMI, weight perceptions and weight management practices showed significant differences between male and female students in UKM. Further researches should be conducted to identify socio-cultural factors that can influence the perception of body weight among young adults. Motivational factors such as body weight perception should be included in the intervention programs to prevent and overcome obesity.

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