

## ORIGINAL RESEARCH

# Applicability of the stages of change and Weight Efficacy Lifestyle Questionnaire with natives of Sarawak, Malaysia

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## ABSTRACT

**Introduction:** There is an increase in the prevalence of overweight and obesity in Malaysia. Besides prevalence studies, not much is known about either overweight or obese individuals. The objective of this study was to determine the stages of change in losing weight and the self-efficacy in eating control of three indigenous groups of overweight and obese adults in Sarawak, Malaysia.

**Methods:** A cross-sectional study was conducted in one rural region in Sarawak using a purposive sample. A structured questionnaire, which included two scales: (1) Weight: Stages of change (SOC) to assess readiness to change; and (2) Weight Efficacy Lifestyle Questionnaire (WEL) (both adopted from the transtheoretical model of change); and a set of pre-tested questionnaires on socio-demographic data, the presence of health problems and self-assessment of weight appropriateness, was used to interview respondents.

**Results:** The stage distribution for weight loss of these adults respondents ( $n = 271$ ) showed that 60.5% ( $n = 164$ ) were in the pre-contemplation stage, 20.7% ( $n = 56$ ) were in the contemplation stage, 8.5% ( $n = 23$ ) were in the preparation stage, and 8.9% ( $n = 24$ ) were in the action stage, while only 1.5% ( $n = 4$ ) were in the maintenance stage. Except for education, the stage differences were generally stable across age, sex, race, household income, presence or absence of health problem, self-perceived



weight and presence of overweight or obesity. Respondents were least able to control their eating under social pressure and food availability, according to their WEL score.

**Conclusion:** A large proportion of the overweight or obese adults was not intending to lose weight. The factor structure of the two WEL original subscales enabled partial differentiation between respondents who were able or unable to resist eating in situations where there were availability of food and experienced physical discomfort. The study results indicate the importance of assessing individuals' SOC score in order to implement stage-matched intervention strategies. More studies should be performed in order to validate the WEL questionnaire for use with a Malaysian sample.

**Key words:** cross-sectional study, overweight and obesity, Sarawak, self-efficacy in eating control, stages of change, transtheoretical model of change.

## Introduction

The problems of overweight and obesity have reached epidemic proportions in many developed countries<sup>1</sup>. In the USA, approximately 64.5% of adults are classified as overweight<sup>2</sup>. In Malaysia, approximately one in two adults aged 25 to 64 years were either overweight or obese, with the highest prevalence among Indians, followed by Malays and Chinese<sup>3</sup>. The Malaysian Health Minister noted in 2003 that Malaysia had 6 million adults who were either overweight or obese. He appealed for appropriate action because the prevalence of obesity and overweight climbed from 4.4% and 16.7% in 1996, to 12.3% and 26.7%, respectively, in 2003<sup>4</sup>.

The 1996, the Malaysian National Morbidity Survey in Sarawak ( $n = 4739$  adults) revealed that 3.4% were obese and 14.2% were overweight<sup>5</sup>. Another stratified cross-sectional study of 630 households with medium to low socio-economic level ( $n = 1379$ ) in four major towns revealed that 12.3% of the adults were obese and 32.5% were overweight<sup>6</sup>. The respondents were drawn from five indigenous groups and one Chinese population. Among the overweight indigenous respondents ( $n = 339$ ), the Iban had the largest percentage at 39.5% ( $n = 134$ ), followed by the Malay at 38.9% ( $n = 132$ ), Melanau at 11.6% ( $n = 8.7\%$ ), Bidayuh and other indigenous groups at 5% each ( $n = 17$ ). Among the obese indigenous respondents ( $n = 145$ ), the Malay group had the largest percentage at 46.9% ( $n = 68$ ),

Iban at 33.8% ( $n = 49$ ), Melanau at 8.2% ( $n = 12$ ), Bidayuh at 2.1% ( $n = 3$ ), and other indigenous groups at 9% ( $n = 13$ ). It is important to note that the Bidayuh only made up 5.3% ( $n = 59$ ) of the total indigenous sample ( $n = 1119$ ). Because the Bidayuh are mostly rural dwellers, it is not surprising such a small sample was recruited.

Both studies<sup>5,6</sup> showed that overweight and obesity is a problem in Sarawak. Kiyu and Hashim's<sup>6</sup> study revealed that among the indigenous town dwellers, the Ibans and Malays had the largest percentage of overweight and obese respondents. There was no published study found regarding the prevalence among rural-dwelling natives of overweight and obesity (the National Morbidity Survey only reported the overall rate), thus this study aimed to fill the gap. For logistical reasons, it was decided that one geographic region would be used as the research site. Because the indigenous groups residing in this geographical region were predominantly Iban, Malay and Bidayuh, these three groups were studied. Although Kiyu and Hashim's<sup>6</sup> study revealed a very low percentage of Bidayuh to be overweight or obese (from a town sample), the present author's experience suggested this was an underestimate.

Existing studies of overweight and obese adults in Sarawak<sup>5,6</sup> were prevalence studies. To date, no published Malaysian study has examined overweight and obese adults in depth, for example their intention to lose weight, or their efficacy in controlling eating when feeling vulnerable.



Regarding individuals' intention to lose weight, the transtheoretical model of change (TTM) suggests how change occurs<sup>7</sup>. The TTM views change as a process with five progressive stages of change (SOC) before a change of behavior occurs. Many studies have demonstrated the applicability of SOC to weight loss<sup>2,8</sup>.

The five SOC stages<sup>7</sup> commence with *precontemplation*, preceding change by 6 months. Individuals in the precontemplation stage may be ignorant of the effects of their behavior, or unwilling to attempt change due to previous failed attempts. The second SOC stage is the *contemplation* stage, when an individual is considering change within the next 6 months due to awareness of a problem. The *preparation* stage is when an individual intends to take action in the next 30 days. Individuals in this stage may attempt to find out how to change a particular unhealthy behavior (eg overeating). In the *action* stage, there is overt modification of a behavior for less than 6 months. In the *maintenance* stage, individuals have taken action to change a behavior for more than 6 months.

Regarding weight loss efforts, it was decided that individuals at the action stage would consume less than 30% of their calories from fat, and also have to be vigilant for relapse. Individuals in the maintenance stage were expected to lose 5% or more of their baseline weight (based on a study of the benefits of 5% or more weight loss being sufficient to reduce the co-morbid risk factors of obesity, such as hyperlipidemia, hyperinsulinemia, hypertension and type 2 diabetes<sup>9</sup>. Studies have shown that determining individuals' intention to change facilitates the implementation of stage-matched interventions (crucial for the interventions to be effective)<sup>2</sup>.

Individuals' SOC may be affected by their confidence to cope with high-risk situations where they would relapse into unhealthy behavior<sup>10</sup>. Individuals' confidence in coping with high risk situations can be assessed using a self-efficacy scale. Self-efficacy, originally conceptualized by Bandura in his social learning theory, refers to how individuals perceive their confidence to perform a task in certain vulnerable

situations<sup>10</sup>. A change in the level of self-efficacy as a result of gaining skills to perform certain behavioral change can predict lasting success<sup>11</sup>.

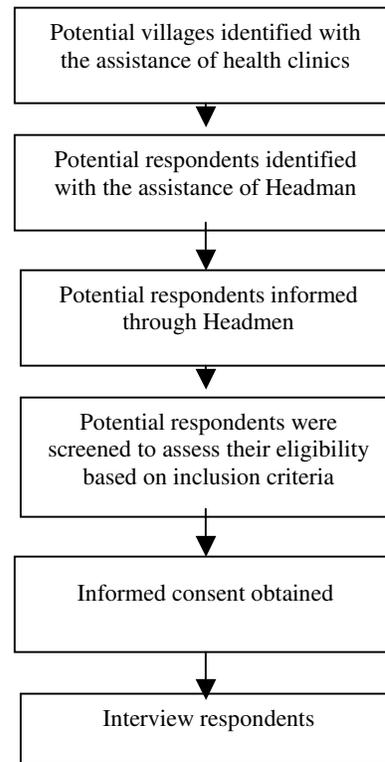
Concern about the increased prevalence of overweight and obesity among all Malaysian ethnic groups in both rural and urban communities<sup>12</sup> prompted the Malaysian Association for the Study of Obesity, in collaboration with Malaysian Ministry of Health, to formulate the *Guidelines for the Prevention of Obesity in Malaysia*<sup>12</sup>. While guidelines are helpful, it can be argued that before overweight and obesity can be addressed effectively, it is important to understand individuals' motivation and intention to lose weight. This aspect of weight loss is largely unknown for individuals in Malaysia and Sarawak. Thus, the objective of the present study was to determine the:

- Distribution of SOC among overweight and obese rural indigenous adults
- Stage distribution for weight loss and its relationship with socio-demographic characteristics
- Level of self-efficacy of the respondents
- Factor structure of the self-efficacy scale applied to this sample.

## Methods

This study was approved by the Ethics Committee of Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, and conformed to the requirements for ethical procedures for research in Malaysia. Informed consent was also obtained from each respondent.

This cross-sectional study was conducted from February 2006 to March 2007. Twenty-six villages in Kuching and Samarahan Division were included in the study. Due to the lack of an enumerated list of overweight and obese adults, and a failure to recruit sufficient numbers of respondents by randomly selecting the villages, a purposive sampling method was employed. The process of respondent recruitment is summarized in the flow chart (Fig1).



**Figure 1: Process of respondent recruitment.**

The inclusion criteria for recruitment were: adults of both sex; racial origin of Malay, Iban or Bidayuh; aged between 21 and 65 years; a body mass index of between 25 and 29.9 (overweight) or  $\geq 30$  (obese); those with no obvious chronic health conditions who were intellectually capable. A sample size of at least 200 people was required to ensure correlation and factor analysis on one of the scales. A ratio of at least 10 subjects for each variable is desirable for factor analysis<sup>13,14</sup>.

A pre-tested structured questionnaire was used to collect the study data. The questionnaire assessed socio-demographic details, perception of body weight, and the presence of health problem/s. Two scales were used: (i) Weight: SOC<sup>15</sup> to assess readiness for change; and (ii) Weight Efficacy Lifestyle Questionnaire (WEL)<sup>16</sup> to assess respondents' confidence regarding their ability to resist eating in certain

vulnerable situations. These scales were adapted using the TTM to form part of the data collection instrument.

The SOC questionnaire consisted of a 5 item algorithm to determine respondents' stage. The first item asked if respondents intended to lose weight in the next 6 months<sup>15</sup>. If the response was 'No', they were in the precontemplation stage. If they intended to lose weight in the next 6 months, they were in the contemplation stage. Respondents who reported that they were planning to lose weight in the next month were in the preparation stage. Respondents who had taken appropriate actions, such as reducing dietary fat, reducing portions and exercising, and had started to lose weight (less than 5% of the baseline weight) and had done so within the past 6 months were in the action stage. Respondents in the maintenance stage had lost more than 5% of their weight and had taken action for more than 6 months.



The WEL includes 20 items to be rated on a 10 point Likert scale ranging from 0 (not confident) to 9 (very confident)<sup>16</sup>. There are 5 subscales, each consisting of 4 items relating to negative emotions (eg eating when irritated); food availability (eg eating during a party); social pressure (eg eating when unable to refuse an invitation to eat); physical discomfort (eg eating when in pain or during a headache); and positive activities (eg eating when reading or watching television). The WEL yields 5 subscale scores and a global sum of the subscales. The internal consistency of the 5 subscales was found to be from .70 to .90<sup>16</sup>.

Respondents' anthropometric measurements were recorded, as well as an interview. It was necessary to conduct the interviews with structured questionnaires due the large percentage of rural dwellers who were illiterate. The interviews were conducted in the Malaysian national language, based on questionnaires (including the SOC and WEL questionnaires) that were translated from English into the Malaysian national language using the 'back translation' technique. Most of the interviews were conducted in the village community hall, with a small percentage in respondents' homes.

## **Data analysis**

The Statistical Package for Social Science v14 (SPSS Inc; Chicago, IL, USA) was used for analysis. Chi-squared tests were used to compare SOC by patient characteristics; *p*-values of <0.05 were considered statistically significant. Principal component analysis was used for factor analysis of the WEL scale.

## **Results**

### **Respondent characteristics**

A total of 271 respondents (male = 109, female = 162) participated. There were 32.8% (*n* = 89) Malays; 31% (*n* = 84) Ibans; and 36.2% (*n* = 98) Bidayuhs, ranging in age from 21 to 65 years (mean age = 42.5 years). Approximately

15% (*n* = 41) of the respondents had no schooling, 48.7% (*n* = 132) had a primary level of education while the remainder 36.2% (*n*=98) had a secondary or higher level of schooling. In all, 11.1% (*n* = 30) were not employed; 29.9% (*n* = 81) did not have family members who were overweight or obese; 59.8% (*n* = 162) had siblings and the remainder had either one or both parents with obesity. While 30.3% (*n* = 82) reported having health problems, the majority perceived themselves to be healthy. Only 2.2% (6) perceived themselves to be obese, 76.8% (*n* = 208) perceived that they were overweight, while the remainder perceived themselves to be either thin or of normal weight. Other aspects of the socio-demographic profile are reported (Table 1).

### **Stage of change for weight loss**

Stage distribution for weight loss showed that 60.5% (*n* = 164) of the respondents were in the precontemplation stage; 20.7% (*n* = 56) in the contemplation stage; 8.5% (*n* = 23) in the preparation stage; 8.9% (*n* = 24) in the action stage; while only 1.5% (*n* = 4) were in the maintenance stage. The SOC data were analysed by respondents characteristics (Table 2). Because there were fewer respondents in the preparation, action and maintenance stages, the respondents were then subdivided into only 2 groups, pre-action group (precontemplation and contemplation), and action group (preparation, action and maintenance).

The stage of change differences were generally stable regarding age, sex, race, household income, presence or absence of health problem, self perceived weight and whether respondents were overweight or obese. Education affected the stage distribution with the proportion of respondents in the pre-action stage decreasing as education level increased ( $\chi^2 = 7.28$ , *df* = 2, *p* = .01). In all, 95.1% (*n* = 39) of respondents with no schooling were in the pre-action stage, compared with 81.1% (*n* = 107) who had primary education and 75.5% (*n* = 74) who had secondary or higher education (Table 2).



**Table 1: Respondent characteristics**

Demographic	Mean	SD	95% confidence interval	
			Lower	Upper
Age	42.5	9.7	41.4	43.7
Monthly household income (RM)	561.3	399.1	513.5	609.0
Weight (kg)	75.1	12.3	73.6	76.7
Waist (cm)	94.4	9.4	93.3	95.3
BMI (kg/m <sup>2</sup> )	30.7	3.6	30.2	31.1

SD, Standard deviation.

**Table 2: Association of respondent characteristics with stages of change**

Characteristics	Stage of change		P-value for $\chi^2$ *
	Pre-action n(%)	Action n(%)	
Sex			.52
Male	91 (83.5)	18 (16.5)	
Female	129 (79.6)	33 (20.4)	
Racial group			.38
Malay	76 (85.4)	13 (14.6)	
Iban	65 (77.4)	19 (22.6)	
Bidayuh	79 (80.6)	19 (19.3)	
Education level			.02*
No education	39 (95.1)	2 (4.9)	
Primary	107 (81.1)	25 (18.9)	
≥ Secondary	74 (75.5)	24 (25.5)	
Household income (monthly)			.16
Hardcore poor (<RM300.00)	82 (87.2)	12 (12.8)	
Poor (RM301-600)	69 (76.7)	21 (23.3)	
Not poor	69 (79.3)	18 (20.7)	
Age interval (years)			.94
< 30	28 (80)	7 (20)	
31-40	58 (80.6)	14 (19.4)	
41-50	83 (80.6)	20 (19.4)	
> 50	51 (83.6)	10 (16.4)	
Health problems			.76
Present	68 (82.9)	14 (17.1)	
Absent	152 (80.4)	37 (19.6)	
Self-perceived weight			.14
Obese	4 (66.7)	2 (33.3)	
Overweight	165 (79.3)	43 (20.7)	
Normal or underweight	51 (89.5)	6 (10.5)	
Weight			.48
Obese (> 30 kg/m <sup>2</sup> )	106 (79.1)	28 (20.9)	
Overweight (25-29.9 kg/m <sup>2</sup> )	114 (83.2)	23 (16.8)	

\*2-tailed.



## *Scale properties and factor analysis*

When analysing the WEL global and subscale scores, the item 'I can resist eating when I am reading' was excluded because approximately 30% of the respondents claimed that they never read. Based on Dutton and colleagues' approach to validating the WEL scale, the WEL subscale scores of the present study were compared with the scores obtained in Clark and colleagues' study<sup>16</sup> and Dutton and colleagues' study<sup>11</sup> (Table 3). The present sample scored lowest in the social pressure subscale, highest in the negative emotion subscale, and was comparable in other the subscales, except for positive activities (due to 3 items only) of the other two studies.

The internal consistency of the WEL subscales was assessed for this sample. Cronbach's coefficients were .47 for positive activities, .60 for negative emotions, .77 for physical discomfort, .78 for availability and .86 for social pressure. These findings were lower than those obtained by Clark and colleagues<sup>16</sup>, who found coefficients ranging from .70 to .90, and those obtained by Dutton and colleagues, where Cronbach's coefficient ranged from .69 to .84.

An exploratory factor analysis was then performed to validate the factor structure of the WEL for this study sample. A principal component analysis with Varimax rotation was performed and factors with eigenvalues of greater than 1<sup>17</sup>, and items with loadings of .40<sup>17</sup> or more were retained. When 19 items of the WEL were included in the initial analysis, the determinant value was 0, indicating at least one linear dependency in the matrix<sup>14</sup>. Pett and colleagues<sup>14</sup> advocate removing items that have a high correlation with each other from the analysis. Subsequently 3 items were excluded from the analysis, which included: 'I can resist eating even when others are pressuring me to eat' ( $r = .713$ ), 'I can resist eating even when high-calorie foods are available' ( $r = .659$ ) and 'I can resist eating even when I think others will be upset if I don't eat' ( $r = .638$ ). The

16 items were then analyzed and the determinant value was 0.04.

To assess the strength of the linear association among items in the correlation matrix, Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy should be examined<sup>14</sup>. Bartlett's test of sphericity in this study was significant ( $\chi^2 = 1447.351$ ,  $p = .000$ ), which indicated that the correlation matrix was not an identity matrix. The KMO statistic (.86), met Kaiser's<sup>18</sup> 'meritorious' criteria. The item-to-total scales correlation ranged from .793 to .921. The KMO value and Bartlett's test of sphericity formed the basis for further factor analysis. Cronbach's  $\alpha$  for the total 16 item scale was .85.

Table 4 show the total variance explained by three extracted factors of WEL for this study sample, and the model accounted for 53.8% of the variance (Table 4). Six items were loaded on factor 1 and six items on factor 2, and four items were loaded on factor 3 in the final solution (Table 5).

In reliability analysis test for factor 1, Cronbach's  $\alpha$  coefficient was .83, the inter-item correlation ranged from .26 to .63 with the mean inter-item correlation of .46, and a variance of .0096. For factor 2, the Cronbach's  $\alpha$  coefficient was .82, the inter-item correlation ranged from .21 to .48 with the mean inter-item correlation of .42, and a variance of .0082. The Cronbach's  $\alpha$  coefficient for factor 3 was .63, the inter-item correlation ranged from .21 to .40 with the mean inter-item correlation of .30, and a variance of .0039. All interitem correlations of the three factors were less than .80, suggesting that none of the items were duplicates<sup>14</sup>. There were also no negative correlations within items. These findings showed that interpretation of the reliability analyses was possible<sup>14</sup>. The variance values of nearing 0 for all factors indicated that there was high consistency among the interitem correlations<sup>14</sup>.



**Table 3: Comparison of the present baseline Weight Efficacy Lifestyle questionnaire subscale scores with two other studies**

Subscale	Clark et al [11] sample (n = 162)		Dutton et al [12] sample (n = 144)		Present sample (n = 271)	
	Mean	SD	Mean	SD	Mean	SD
Negative emotion	18.8	9.5	23.3	9.8	28.9	5.7
Availability	17.7	7.2	21.1	8.2	17.7	8.2
Social pressure	24.1	7.8	25.8	7.8	16.9	9.1
Physical discomfort	26.1	7.2	28.4	7.4	29.7	5.8
Positive activities	25.9	6.4	24.8	7.8	18.1 <sup>†</sup>	5.4 <sup>†</sup>

SD, Standard deviation.

<sup>†</sup>Only three items.

**Table 4: Total variance explained by the three extracted factors of the Weight Efficacy Lifestyle Questionnaire scale**

Factor	Initial eigen values			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.131	32.066	32.066	5.131	32.066	32.066
2	2.423	15.143	47.209	2.423	15.143	47.209
3	1.054	6.590	53.799	1.054	6.590	53.799

Extraction method: principal component analysis.

**Table 5: Factor loadings from the rotated factor structure matrix for the Weight Efficacy Lifestyle Questionnaire scale (rotation converged in 4 iterations)**

WEL items	Factor		
	1	2	3
I can resist eating even when I feel it is impolite to refuse	.800		
I can resist eating even when I am at a party	.786		
I can resist eating when I am happy	.762		
I can resist eating when I have to say 'no' to others	.746		
I can resist eating even when there are different kinds of food available	.736		
I can control my eating on weekends	.490		
I can resist eating when I feel uncomfortable		.770	
I can resist eating when I am angry (or irritable)		.760	
I can resist eating even when I have a headache		.743	
I can resist eating when I am in pain		.732	
I can resist eating when I am depressed (or down)		.529	
I can resist eating when I feel physically run down		.502	
I can resist eating just before going to bed			.698
I can resist eating when I am anxious (nervous)			.660
I can resist eating when I am watching TV			.598
I can resist eating when I have experienced failure			.570

WEL, Weight Efficacy Lifestyle Questionnaire.

Extraction method: principal component analysis. Rotation Method: varimax with Kaiser normalization.



## Discussion

Although the Malaysian Ministry of Health has implemented a range of health promotion activities targeting the increased prevalence of overweight and obesity<sup>19</sup>, success is yet to be seen<sup>12</sup>. As obesity is a comorbid risk factor for many cardiovascular diseases, diabetes mellitus and certain types of cancer<sup>1</sup>, this lifestyle problem must be further researched. Most of the Malaysian studies were epidemiological, focused on assessment of the prevalence of obesity and overweight<sup>3,5,6</sup>. No previous published research has examined the SOC among or used the WEL for overweight and obese individuals in Malaysia and Sarawak. Assessment of SOC provides information about the proportion of population that is ready for change. This information is imperative in order to develop stage-matched strategies to overcome a problem<sup>2</sup>. For example, for those people identified as being in the preparation or action stages, strategies that impart skill and techniques to enhance behavioral change may be most effective. Similarly, individuals in the precontemplation and contemplation stages need strategies to motivate them to change, rather than other unmatched SOC approaches<sup>2</sup>.

This study showed that over 80% of the respondents had not taken action to lose weight (65% precontemplation; 20.7% contemplation) although 76.8% perceived themselves to be either overweight or obese. The proportion of respondents in the precontemplation SOC in this study was higher than other studies (eg Larforge and colleagues<sup>2</sup>, (45%); Hawkinand colleagues<sup>15</sup>, 49%). When the respondents were randomly interviewed to discover their reason/s for not taking action to lose weight, many claimed they did not know how to do so. Some respondents reported drinking sour cordial juice which they admitted was ineffective. One woman said, 'I drink lime juice, lime water, twice a day. But my body weight still maintains. Not increase, not decrease, maintain only'.

Povey and colleagues<sup>20</sup> claimed that SOC might wrongly classify individuals into the action or maintenance stages of change in a self-administered questionnaire, especially if the respondents wrongly perceived they had made a healthy change. In order to avoid over-representation of people in the action stage of change, respondents who claimed that they had 'taken action' such as applying 'sliming cream', used a corset or drank 'sliming tea' for extended periods of time without any effect were classified into the preparation stage of the present study. Approximately 5% of women were in this category.

Except for educational level, the stage differences were generally stable regarding age, sex, race, household income, presence or absence of health problem, self-perceived weight and whether they were overweight or obese. Education appears to have an impact on overweight and obese individuals' SOC, probably reflecting that a better understanding of the ill-effects of being overweight or obese motivates action to modify behavior. That there were no significant differences between other demographic characteristics and SOC suggests that similar stage-matched strategies might be suitable for this sample. The high proportion of respondents in the pre-action stage may explain why the Malaysian Ministry of Health's ready-for-action strategies (eg health campaigns on 'healthy eating', 'exercise' and 'healthy lifestyle') failed to curb the increased incidence of overweight and obesity<sup>4</sup>.

For self-efficacy in eating control, when compared with the original WEL validation sample<sup>11,14</sup> (Table 3) the current study sample seemed less able to resist eating with social pressure. This finding is not surprising because social eating is a norm among Sarawak indigenous people, and refusing to join others in eating may be considered rude behavior. This study sample had a higher level of self-efficacy in situations when they experienced negative emotions, compared with African-American females<sup>11</sup> and predominantly Caucasian samples<sup>14</sup>. They were also able to resist eating when experiencing physical discomfort. These findings showed



that the current sample did not use eating to ease their physical and emotional problems.

The findings of the factor analysis resulted in a 16 item, three-factor solution, rather than the 5 factors reported by Clark and colleagues<sup>14</sup>. None of Clark and colleagues' 5 original factors were retained unchanged in the current exploratory factor analysis. In the current study, 2 items from the social pressure subscale, 3 items from the availability subscale and one item from positive activities were loaded on to factor 1 (Table 5). The combination of items from different subscales is still considered appropriate if one considers that 'a second helping' may indicate food availability in low-income group<sup>12</sup> and 'having to say 'no' to others' may also mean that food is available, thus one is invited to share the food. The item 'eat when happy' may also link to the availability of food, otherwise one would engage in other activities rather than eating when one is happy. A Cronbach's  $\alpha$  of .83 demonstrates that 83% of the variance of the total scores on this subscale can be attributed to reliable variance, and a variance value of .0096 indicates that there is consistency in the inter-item correlation<sup>14</sup>.

The original 4 items in Clark and colleagues'<sup>14</sup> physical discomforts were retained in the second factor of this study. In addition, two other items from negative emotions, 'eat when angry', and 'eat and depressed' were also loaded on to the same factor. An examination of the Cronbach's  $\alpha$  (.82) of this factor shows internal consistency, and a variance of .0082 supports the consistency of the inter-item correlation. However, discrimination between physical discomfort and negative emotions is less clear. Because negative emotions and physical discomfort affect individuals psychologically, it makes sense to load these items on to the same factor.

Factor 3 of this study is a combination of 2 items for the original positive activities subscale ([5] I can resist eating when I am watching TV; and [15] I can resist eating just before going to bed), and 2 items from the negative emotions subscale ([1] I can resist eating when I am nervous; and [16] I can resist eating when I experienced failure). Cronbach's  $\alpha$  was .63, which is considered questionable<sup>13</sup>. The inter-item

correlation was low (range .21 to .40) and the variance of .0039 showed consistency of low inter-item correlations, reflecting that the items were relatively heterogenous. This suggests that this component is less salient as a subscale to differentiate positive activities and negative emotion for this sample.

Although 4 items of the original scale ([10] I can resist eating when I am reading; [13] I can resist eating even when others are pressuring me to eat; [17] I can resist eating even when high-calorie foods are available; and [18] I can resist eating even when I think others will be upset if I don't eat) were removed, these items are important and should be included in future studies in Malaysia. The high correlation coefficient of 3 items ('eat when pressured by others', 'eat when high-calorie foods are available' and 'eat to avoid upsetting people') may 'occur when one person's answers are the exact replica or are a linear combination of another person's answer'<sup>14, p 67</sup>, but may not recur in another sample. The reason for dropping 'eat when reading' was due to approximately 30% of the respondents reporting that they did not read. Not reading is common in a sample of individuals who are not educated or who have little education.

## *Limitations*

This study has potential limitations due to the sampling and data collection methods. The purposive sample used may limit generalizability of the findings. However, this study has yielded the important insight that a large portion of overweight or obese adults were not contemplating to lose weight. The study also identified the importance of assessing individuals' SOC before implementing strategies for modifying behavior. Although self-reported data may be contaminated by self-presentation bias, in this case inflating the percentage of respondents in the action SOC, the findings suggested the opposite. However, if face-to-face interviews had been used to collect data, respondents' actual SOC could have been ascertained, using such additional questions as, 'How did you do it?' and 'Have you lost any weight'.



## Conclusion

The current study demonstrated that a high proportion of respondents who were not ready to lose weight required appropriate strategies to motivate them to change. It also reflected the need to assess individuals' SOC before implementing treatment strategies. Also apparent was that the factor structure of the two WEL subscales was only partially able to differentiate between availability and physical discomfort in this sample. The respondents appeared less able to resist eating when foods were available (eg when invited to eat or happy). Any situation that affected the respondents psychologically would affect their urge to eat, indicating that they did not eat for comfort. Combining items in factor 3 and dropping 4 items from the WEL scale, suggested differences in the correlations of eating self-efficacy in this sample from those hypothesized among Caucasian and African-American women. Further studies are recommended to examine SOC and WEL among different groups, for example in those of higher income and better education. Further factor analysis studies are also required to validate the WEL, especially in the Malaysian population.

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