

Validation of an instrument to measure registered dietitians'/nutritionists' knowledge, attitudes and practices of an intuitive eating approach

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Abstract

Objective: The purpose of the present study was to develop and assess the construct validity of a tool to measure knowledge, attitudes and practices of registered dietitians/nutritionists (RD/N) regarding an intuitive eating lifestyle.

Design: Cross-sectional study design that utilized a survey administered to a random sample and remaining full population of RD/N.

Setting: A national survey conducted via online survey software.

Subjects: A random sample of 10% of all RD/N in the USA (n 8834) was invited to participate. Survey completion rate was 22.2% (n 1897). After initial validation, the survey was distributed to the remaining 90% of RD/N to confirm validation.

Results: After removing items with insufficient factor loadings, results were consistent with a four-factor solution: (i) knowledge of intuitive eating; (ii) attitudes towards intuitive eating; (iii) traditional and restrictive practices; and (iv) non-restrictive and intuitive eating practices. Confirmatory factor analysis provided further evidence of the validity of the four factors and the factors had strong reliability.

Conclusions: Unlike the hypothesized three-factor solution (knowledge, attitudes and practices), validation analysis revealed that the survey measures knowledge of intuitive eating, attitudes towards intuitive eating, use of traditional and restrictive weight-management practices, and use of non-restrictive and intuitive eating practices. With the landscape of weight management and health promotion undergoing a shift towards a health centred, size acceptance approach, this instrument will provide valuable information regarding the current knowledge, attitudes and practices of RD/N and other health promotion professionals.

Keywords

Intuitive eating
Weight-management practices
Registered dietitian/nutritionist
Knowledge, attitudes and practices

Weight-related concerns, including eating disorders, disordered eating, and overweight and obesity, are prevalent in the adult population of the USA⁽¹⁾. The traditional approach to weight management has been characterized by restriction of energy, specific nutrients or food groups in order to induce weight loss, and generally results in little long-term success. Studies have shown that few participants maintained any weight loss and many participants gained back more weight than was lost during the dieting period^(2–6). Due to these negative outcomes, professionals have expressed ethical concern with the recommendation of restrictive practices for weight loss^(4,7) with some calling for a paradigm shift in the weight-management field.

One alternative, emerging approach is intuitive eating. Intuitive eating encourages individuals to focus on improving health rather than losing weight. A main focus is on use of internal cues of hunger and fullness to guide

eating, with emphasis on acceptance of the body regardless of size^(8–12). The approach was developed and endorsed by two registered dietitians/nutritionists (RD/N), Evelyn Tribole and Elyse Resch, in the late 1990s. They observed that overweight clients would lose weight by following a calorie-restricted diet but almost inevitably gain the weight back over time⁽⁸⁾. The weight gain was often accompanied by psychological distress and feelings of guilt and failure. Through experience, Tribole and Resch found that clients who were able to adopt an intuitive eating lifestyle were able to develop a healthier psychological relationship with food, accept and respect their bodies, and stop the endless cycle of dieting and weight cycling. Over the past two decades, several research studies have investigated this lifestyle.

The intuitive eating lifestyle is associated with lower BMI^(9,13–15) and greater psychological well-being^(9,15),

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and inversely associated with eating disorder symptomatology^(9,15). Participants in intuitive eating interventions have generally lost^(16–23) or maintained^(24–31) body weight, improved cardiovascular risk irrespective of weight loss^(25,32) and increased body satisfaction^(18,23,24,27,33–35). This evidence has been coupled with a divide in the literature on the best approach to weight management⁽³⁶⁾ and while intuitive eating research has been positive, additional studies are indicated^(10,12).

Health professionals have also been encouraging mindful eating, an approach similar to intuitive eating. Mindful eating has been described as the non-judgemental awareness of the physical and emotional sensations associated with eating or environment⁽³⁷⁾. Mindful eating encourages individuals to eat according to internal cues of hunger and satiety⁽³⁷⁾ and to eat slowly, taste every bite thoroughly and eat without distraction⁽³⁸⁾. The originators of intuitive eating have acknowledged that mindful eating is part of intuitive eating⁽⁸⁾. Regardless of the terminology and similarities or differences between the two approaches, evidence has suggested that many dietitians may be moving away from the weight-loss paradigm and towards a size acceptance, intuitive eating approach^(39,40).

In an attempt to characterize weight-management practices that Australian dietitians use with clients, Campbell and Crawford⁽⁴¹⁾ developed a questionnaire by compiling a list of practices from the literature that was then reviewed by dietitians with expertise in weight management. In this process, dietitians were asked how frequently they performed each weight-management strategy with their clients (e.g. specific advice to reduce total fat intake)⁽⁴¹⁾. Barr and colleagues⁽⁴⁰⁾ revised this questionnaire to include size acceptance philosophies (e.g. increasing self-acceptance of current weight) in their study to examine Canadian dietitians' weight-management attitudes and practices. While they have provided valuable insight into the attitudes and practices of dietitians, neither reliability nor validity of these questionnaires was established⁽⁴⁰⁾.

While two valid and reliable measures are available to capture individuals' intuitive eating behaviour, the more frequently used Tylka and Kroon van Diest's Intuitive Eating Scale-2^(9,15) and the less common, Hawks and colleagues' Intuitive Eating Scale⁽⁴²⁾, no such measure has been validated to gauge health professionals' knowledge, attitudes and practices regarding this approach. To date, only qualitative research has examined dietitians' knowledge of non-dieting and size acceptance approaches⁽⁴³⁾. As support for intuitive eating has grown, knowledge, attitudes and intuitive eating practices of RD/N have remained unknown. Surveys are often conducted to understand human behaviour; measuring the knowledge, attitudes and practices can increase insight into a given situation⁽⁴⁴⁾. Therefore, the purpose of the present study was to develop and validate a tool to measure knowledge, attitudes and practices of RD/N

regarding an intuitive eating lifestyle. Based on existing evidence, we hypothesized that this survey will reveal three valid and reliable constructs: (i) knowledge of intuitive eating; (ii) attitudes towards intuitive eating; and (iii) use of intuitive eating practices.

Methods

Participants

Contact information for all RD/N in the USA ($n = 88\,784$) was obtained from the Commission on Dietetic Registration. From this list, a 10% random sample ($n = 8834$) was selected. The survey was distributed by email with a survey link to 8549 individuals for the initial validity testing (excluded from the 10% sample were 285 RD/N who did not provide an email address or provided an invalid email address). The survey was open for two months, June through July 2014. During this time, 1897 RD/N completed the survey for a response rate of 22.2%. After initial validation analysis, the survey was distributed to the remaining 90% of RD/N ($n = 79\,950$) to confirm validity and reliability. Those in the 90% sample who indicated they worked in weight management were included in the present analysis study ($n = 9249$). This provided a response rate of 11.6% for the validity and reliability testing. There was no incentive given for completing the survey.

Procedures

The development of the survey instrument underwent several phases. Phase I entailed the development of the original instrument by the lead investigator who is an RD/N with training in survey methodology. Existing scales were identified and adapted and original questions were written to assess the knowledge, attitudes and practices of RD/N relevant to intuitive eating (see 'Survey measures' for detailed description of the items). In Phase II, two nutrition professionals, who had training in the intuitive eating approach, were consulted to ensure content validity. Based on feedback, three negatively worded practice items were reworded positively to enhance clarity; one item (recommend using a food journal/diary to monitor calories, portions, etc.) was divided into two items to reflect two practices (recommend using a food journal/diary to monitor exact calories, portions, etc. and recommend using a food journal/diary to monitor general calories, portions, etc.); and 'don't know' options were added to each of the three main sections. One of the RD/N consulted also noted that some RD/N may be familiar with the term 'mindful eating', but not 'intuitive eating', specifically. Thus, the question 'Have you ever heard of intuitive eating?' was changed to 'Have you ever heard of intuitive or mindful eating?' for those who may use these terms interchangeably; the remainder of the survey

referred only to intuitive eating to address the study's purpose of developing and validating a tool to measure RD/N knowledge, attitudes and practices regarding an intuitive eating lifestyle. After these edits, an online version of the survey was created.

In Phase III, the instrument was sent to dietetic interns at Kent State University ($n = 13$) to pilot-test the survey. Most participants were female ($n = 11$), between 23 and 26 years of age, and all but one were non-Hispanic Caucasian. The interns completed the survey in its near final form. At the end of each section the interns were asked to provide feedback about the section they just completed and specifically to state if any items were unclear or if there were any errors. The interns indicated that all the items were clear. There was one spelling error and one error in the layout of the online survey. After these corrections, the development of the instrument was complete.

All RD/N in the sample described above were sent an email message requesting their participation in the survey. The email asked the RD/N to follow a link to the survey website where they were first prompted to read and agree to informed consent. The survey was open for two months during which the RD/N received the original email and two reminders to complete the survey. All procedures were reviewed and approved by the Kent State University Institutional Review Board.

Survey measures

Descriptive characteristics

Participants were asked to report their gender, age, race, highest level of education, main practice setting, state of practice, and if they had completed a certificate in paediatric or adult weight management. Participants were also asked if they had ever heard of intuitive or mindful eating and if they currently counsel overweight and/or obese clients for weight management; if they did, the number of years' experience in this practice was requested.

Practices

Participants completed this section if they reported that they do currently counsel overweight and/or obese clients for weight management. Participants were asked to report on a Likert scale (0 = 'never', 1 = 'rarely', 2 = 'sometimes', 3 = 'often', 4 = 'usually') how often they use various practices when counselling overweight and/or obese clients. This section of the survey was adapted from a tool used by Barr and colleagues⁽⁴⁰⁾ to describe how often Canadian dietitians utilize several specific practices with their weight-management clients.

Knowledge

All participants completed this section. The first ten questions were adapted from the Intuitive Eating Scale-2⁽¹⁵⁾ and described behaviours that are and are not consistent

with the intuitive eating lifestyle. Questions were chosen to represent the four factors of intuitive eating (unconditional permission to eat, eating based on internal cues, eating for physical rather than emotional reasons, body-food congruence) and were reworded to reflect general knowledge about the intuitive eating lifestyle as opposed to personal behaviour. Additionally, four questions were developed to assess knowledge on current research regarding intuitive eating. These questions were developed based on findings from a recent review paper⁽¹²⁾. Participants were asked to report if each statement was characteristic of an intuitive eater or if they did not know.

Attitudes

All participants completed this section. This section gauged the attitudes of RD/N towards various health behaviours and health attitudes. These items were developed by the researcher. Items assessed attitudes towards key aspects of intuitive eating (e.g. 'It is important for individuals to learn to eat based on internal cues of hunger, fullness and satisfaction') and towards the traditional weight-loss approach (e.g. 'Weight loss should be the primary focus to improve health in overweight and/or obese individuals'). The items favourable towards intuitive eating reflected the four factors of intuitive eating. Participants were asked to rate the degree to which they agreed or disagreed with each statement on a Likert scale (1 = 'strongly disagree', 2 = 'disagree', 3 = 'neutral', 4 = 'agree', 5 = 'strongly agree', and a 'don't know' option). Nine items were consistent with and four items were inconsistent with the intuitive eating lifestyle.

Data analysis

Since only RD/N who worked in weight-management counselling completed the whole survey, data from this sample were used to conduct initial validity analysis. Construct validity was examined first with exploratory factor analysis (EFA) using principal axis factoring to extract factors by estimating the shared variance between items and oblique rotation of factors with promax rotation in order to allow the factors to be correlated. The correlation matrix was explored to ensure there was no singularity or multicollinearity. The number of factors was determined by examining eigenvalues and the scree plot. Items with a factor loading of at least 0.35 and a cross-loading difference of at least 0.2 were retained to create the final instrument. This analysis was repeated using data from RD/N who did not work in weight management to ensure validity of the knowledge and attitudes factors of all RD/N.

Construct validity was further assessed through confirmatory factor analysis (CFA) with maximum likelihood estimation. Hu and Bentler⁽⁴⁵⁾ have recommended several two-index strategies to assess fit, including one recommended combination of the standardized root-mean-square

residual (SRMR) with recommended value ≤ 0.08 and the root-mean-square error of approximation (RMSEA) with recommended value ≤ 0.06 . Factor loadings were examined to ensure each had a loading of at least 0.35. Cronbach's α was reported to assess reliability.

Results

Participants

With regard to the initial survey distributed to the random 10% of RD/N, most participants were female (96.8%), non-Hispanic (96.2%) and Caucasian (91.0%; Table 1). Nearly 44% had a Bachelor's degree while an additional 50.2% had completed a Master's degree. Most worked in a clinical setting (40.9%) while others worked in the community (15.3%), research (6.0%), private practice (7.8%) or other settings (19.7%). Several were not practising in a dietetics-related field (10.2%). Roughly half of the respondents reported that they work in the weight management field (53.7%). With regard to the second distribution to the remaining 90% of RD/N, demographics were similar. Most participants were female (97.0%),

non-Hispanic (96.4%) and Caucasian (91.9%). About half of the RD/N had at least a Master's degree (49.2%). Less than half of all respondents reported they worked in a clinical setting while about half (50.3%) reported that they work in weight management.

Validity and reliability

The EFA with principal axis factoring and oblique rotation was conducted to assess construct validity. The correlation matrix was examined to ensure there was no singularity or multicollinearity. The sample size met the recommended 20:1 sample size to parameters ratio⁽⁴⁶⁾. The overall KMO (Kaiser–Meyer–Olkin) was 0.88; values ranged from 0.67 to 0.96, which indicated acceptable sampling adequacy. The communality values were assessed to assure there was shared variance between the items. The number of factors was determined by examining eigenvalues, the scree plot and the factor solution. There were five eigenvalues greater than 1. The scree plot inflection was between four and five factors (Fig. 1). The five-factor solution was examined first. Few items loaded on the fifth factor and of those that did, several cross-loaded with another factor. Thus, the four-factor solution was examined. The overall KMO value (0.88) and the communality values were still adequate.

Table 1 Sample characteristics of registered dietitians/nutritionists who completed the survey for exploratory factor analysis ($n = 1895$)

Variable	Mean or n	SD or %
Age (years)	44.40	13.09
Gender		
Male	61	3.22
Female	1834	96.78
Hispanic		
Yes	72	3.80
No	1823	96.20
Race		
Caucasian	1725	91.03
African American	45	2.37
Asian	64	3.38
American Indian or Alaskan Native	8	0.42
Native Hawaiian or Pacific Islander	5	0.26
Other	48	2.53
Education		
Bachelor's degree	826	43.59
Master's degree	951	50.18
Doctorate degree	83	4.38
Other	35	1.85
Practice setting		
Clinical	775	40.90
Community	290	15.30
Research or academia	114	6.02
Private practice	148	7.81
Industry		
Other	311	16.41
Not currently practising as a dietitian	194	10.24
Completed certificate of training in adult weight management		
Yes	280	14.78
No	1615	85.22
Completed certificate of training in paediatric weight management		
Yes	110	5.80
No	1785	94.20
Currently counsel overweight and/or obese clients for weight management		
Yes	1018	53.72
No	877	46.28

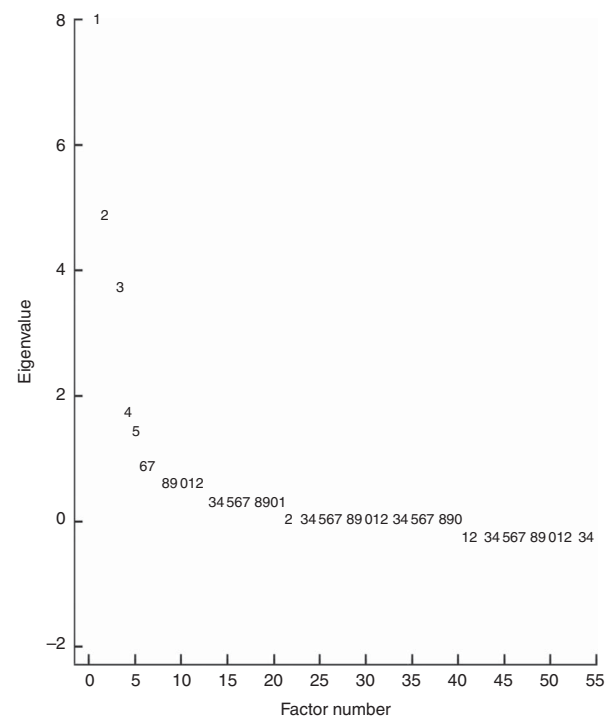


Fig. 1 Scree plot of eigenvalues obtained from exploratory factor analysis among dietitians/nutritionists ($n = 1895$). The numbers on the figure represent the number of factors proposed. The inflection point of the graph is between four and five, suggesting that either a four- or five-factor solution would be recommended based on the results of the scree plot

In this four-factor solution, all of the knowledge items loaded strongly with each other and were retained. Five attitude items (items 1, 6, 8, 9 and 11) that did not load on any factor (factor loading <0.35) and three attitude items (items 2, 5 and 7) that loaded with the practice items were removed. After examination of these three items, it was apparent that the wording of these items assessed preference of a particular practice (i.e. 'To lose weight, overweight and/or obese individuals should consciously restrict calories, fat and/or carbohydrates'); thus, these items were assessed in the practices section.

The practice items loaded on to two distinct factors. Six practice items (items 4, 11, 12, 23, 24 and 25) were removed that did not load at a value of at least 0.35 on any factor. When the EFA was conducted again without these items, only two items were problematic. One practice item (item 10) did not load on the factor (factor loading <0.35) and one practice item (item 16) was cross-loading with two factors. Seven items loaded on one factor that included traditional and restrictive weight-management practices that recommend limiting calories, nutrients or eating in general, or monitoring intake and/or weight. The ten remaining practices included strategies that did not directly imply restriction (i.e. 'Work with clients using behaviour modification techniques') and strategies that promoted intuitive eating (i.e. 'Recommend keeping a hunger awareness journal/diary'). The practice items that were removed were either not specifically about eating (e.g. 'How often do you give general advice about exercise?') or were not related to one of the two approaches (non-restrictive/intuitive eating or restrictive/traditional); for example, 'How often do you recommend herbs or botanicals for weight loss?' or 'How often do you recommend a commercial or community-based weight-loss programme?' These items could have been consistent with a non-restrictive/intuitive eating approach, a traditional/restrictive approach, or not consistent with either depending how these strategies were implemented.

After removal of these two items, the results indicated four distinct factors with strong factor loadings (≥ 0.35 ; Table 2) and no cross-loading (difference >0.20). The first factor consisted of fourteen items that represent knowledge of intuitive eating. The second factor consisted of seven items that represent attitudes towards intuitive eating. The third factor consisted of ten items that represent practices consistent with a non-restrictive, intuitive eating approach, while the fourth factor consisted of seven items that represented practices consistent with a restrictive, traditional approach to weight management.

To further explore the validation of factors, the EFA was re-run in the complete sample (all RD/N, not just those who work in weight management), without the practices section of the survey, to ensure that the knowledge and attitudes factors were valid in all RD/N, not just those who work in weight management. The factor structure for knowledge and attitudes was upheld.

Next, CFA was conducted to ensure validity of the factors. Data consisted of the responses from the 9249 RD/N who completed the instrument distributed after the EFA was complete. The CFA model was specified with four factors. The RMSEA value was 0.07, close to the recommended value around 0.06 and less than the critical value of 0.10 that would have suggested poor fit. The SRMSR value was 0.07, indicating acceptable fit. All items loaded on their respective factor with a factor loading of at least 0.35 except for two attitude items: 'How strongly do you support the use of intuitive eating to promote a healthy lifestyle?' and 'Intuitive eating is more effective than calorie-restricted dieting for long-term weight loss and/or maintenance'. With regard to the former item, it is possible that support does not necessarily align with attitude; the latter item is a matter of evidence rather than attitude. After these two items were removed, all items loaded on their respective factors with a loading for at least 0.35 (Table 3). The correlations between constructs were low (Table 3), indicating little overlap between factors.

Finally, Cronbach's α was calculated to assess reliability of each factor (Table 3). The Cronbach's α value for the traditional/restrictive practices factor was 0.74. The Cronbach's α value for the non-restrictive/intuitive eating practices factor was 0.84. The Cronbach's α value for the knowledge factor was 0.88 for those who work in weight management and 0.91 for the complete sample. The Cronbach's α value for the attitudes factor was 0.75 for those who work in weight management and 0.79 for the complete sample. While reliability was on the lower end for the traditional/restrictive practices and attitudes factors, all values indicated adequate internal reliability of the factors⁽⁴⁷⁾.

Discussion

The results indicated that, contrary to the hypothesized three factors (knowledge, attitudes and practices), the proposed instrument actually measured four distinct factors: (i) knowledge of intuitive eating; (ii) attitudes towards intuitive eating; (iii) use of restrictive and traditional weight-management practices; and (iv) use of non-restrictive and intuitive eating practices. All fourteen proposed knowledge items loaded strongly together. This factor measured RD/N knowledge of intuitive eating and the research regarding intuitive eating. These items were expected to load strongly together since most were adapted from a validated measure of intuitive eating behaviour^(9,15).

Originally, the authors expected the two practice factors to load on one factor in opposite directions. However, the items represented two distinct factors. One potential explanation is that RD/N do not distinctly use one approach or the other, which would have caused the two groups of questions to load on one factor in opposite directions. RD/N could use both approaches depending

Table 2 Exploratory factor analysis factor loadings among registered dietitians/nutritionists who work in weight management (*n* 1018)

	Knowledge of intuitive eating	Attitudes toward intuitive eating	Non-restrictive/intuitive eating practices	Traditional/restrictive practices
An intuitive eater tries to avoid certain foods high in fat, carbohydrates or calories	0.6272			
An intuitive eater eats when feeling emotional (e.g. anxious, depressed, sad), even when not physically hungry	0.7545			
If craving a certain food, an intuitive eater allows his/herself to have it	0.7077			
An intuitive eater gets mad at his/herself for eating something unhealthy	0.7814			
An intuitive eater is able to cope with negative emotions (e.g. anxiety, sadness) without turning to food for comfort	0.7800			
An intuitive eater allows his/herself to eat what food is desired at the moment	0.6220			
Most of the time, an intuitive eater desires to eat nutritious foods	0.5766			
An intuitive eater mostly eats foods that make his/her body perform efficiently (well)	0.6446			
An intuitive eater relies on his/her hunger signals to tell him/her when to eat	0.8848			
An intuitive eater relies on his/her fullness (satiety) signals to tell him/her when to stop eating	0.8778			
Research has shown that intuitive eating is positively associated with a normal BMI	0.6373			
Research has shown that weight loss is necessary for overweight and/or obese individuals to improve their health	0.4361			
Research has shown that intuitive eating is positively associated with psychological well-being (i.e. self-esteem, overall life satisfaction and proactive coping skills)	0.7406			
Research has shown that intuitive eating is inversely (negatively) associated with disordered eating, body dissatisfaction and internalization of the thin ideal	0.6081			
How strongly do you support the use of intuitive eating to promote a healthy lifestyle?		0.4792		
Intuitive eating is more effective than calorie-restricted dieting for long-term weight loss and/or maintenance		0.3904		
It is important for individuals to learn to eat based on internal cues of hunger, fullness and satisfaction		0.4588		
It is important for individuals to choose foods that honour health and body function that also taste good		0.4380		
Intuitive eating is an adaptive style of eating		0.4399		
Students studying to become registered dietitians should be educated about intuitive eating		0.7825		
Registered dietitians should be trained to use intuitive eating for weight management		0.8107		
Give specific advice regarding opportunities for increasing incidental physical activity			0.5458	
Help clients find ways to be physically active that are enjoyable, rather than following a strict exercise regimen			0.6738	
Give advice regarding distribution of meals and snacks throughout the day			0.3671	
Give practical advice regarding shopping and cooking to achieve dietary goals			0.4907	
Help clients identify and eat foods that they enjoy and are nutritious			0.5765	
Work with clients using behaviour modification techniques			0.5900	
Help clients learn to recognize and eat based on their internal signals of hunger, fullness and satiety			0.5460	
Recommend keeping a hunger awareness journal/diary			0.5190	
Work with clients to increase self-esteem			0.7831	
Work with clients to increase self-acceptance of weight			0.7207	
Give specific advice to eat fewer calories				0.6842
Give specific advice to reduce total fat intake				0.5650
Advise clients to follow specific dieting plans that dictate what, when and/or how much to eat				0.3860
Encourage clients to avoid foods high in fat, carbohydrates or calories				0.4497
Recommend using a food journal/diary to monitor exact calories, portions, etc.				0.5423
Recommend keeping a weight journal/diary				0.5400
Suggest that clients weigh themselves				0.4964

Items with factor loadings ≥ 0.35 are shown.

Table 3 Results of confirmatory factor analysis factor loadings, correlation between factors and reliability coefficients among registered dietitians/nutritionists who completed the instrument distributed after the exploratory factor analysis was complete (*n* 9249)

Item	Estimate	SE	<i>t</i> value	Inter-construct correlations	Reliability*
1. Traditional/restrictive practices	1	2	3	4	0.74
e1	0.5372	0.0091	58.9090	1	
e2	0.4689	0.0097	48.1311		
e3	0.3952	0.0103	38.2261		
e4	0.3854	0.0104	37.0180		
e5	0.6381	0.0081	78.4890		
e6	0.6828	0.0077	88.7121		
e7	0.6009	0.0085	70.7143		
2. Non-restrictive/intuitive eating practices	1	1			0.83
e8	0.4833	0.0088	54.8177		
e9	0.6266	0.0072	86.6892		
e10	0.4258	0.0093	45.5618		
e11	0.5590	0.0080	69.6836		
e12	0.5990	0.0076	79.2048		
e13	0.6751	0.0066	102.1000		
e14	0.6736	0.0066	101.6000		
e15	0.5753	0.0078	73.3805		
e16	0.6925	0.0064	108.5000		
e17	0.6703	0.0067	100.4000		
3. Knowledge	0.0955	-0.1517	1		0.92
e18	0.6261	0.0066	94.3466		
e19	0.7618	0.0047	162.2000		
e20	0.6631	0.0061	107.9000		
e21	0.7877	0.0043	183.7000		
e22	0.7831	0.0044	179.6000		
e23	0.5871	0.0071	82.3844		
e24	0.5103	0.0080	63.8065		
e25	0.6121	0.0068	89.8135		
e26	0.8901	0.0026	345.7000		
e27	0.8919	0.0025	350.6000		
e28	0.5598	0.0075	75.1526		
e29	0.4128	0.0089	46.2270		
e30	0.6810	0.0059	115.5000		
e31	0.5298	0.0078	68.0328		
4. Attitudes	0.0963	-0.1491	-0.0545	1	0.75
e32	0.5453	0.0090	60.6524		
e33	0.5678	0.0088	64.7045		
e34	0.4465	0.0099	45.2337		
e35	0.7730	0.0071	109.3000		
e36	0.6731	0.0078	86.1723		

*Reliability values presented are Cronbach's α values for registered dietitians/nutritionists who work in weight management.

on the client. Further investigation into RD/N practices would be needed to investigate this finding. These two factors could be used to gauge how frequently RD/N who work in weight management use practices from the traditional weight-loss paradigm as well as practices that are non-restrictive and consistent with the intuitive eating approach. Measuring the two factors separately could prove to be more valuable in studying weight-management practices among health professionals than clustering all practices together.

According to the Academy of Nutrition and Dietetics, RD/N are nutrition experts who translate the science of nutrition into practical solutions to help individuals make positive lifestyle changes. While support for the intuitive eating approach has grown, our understanding of RD/N knowledge and use of this approach has not been explored until now. The present study is the first to validate a measure to assess the concept of intuitive eating. Given the current divide in the weight-management

philosophies (traditional *v.* intuitive eating), it has also been unknown how favourably RD/N view the intuitive eating lifestyle. With the validation of this survey, these gaps in the literature can now be examined.

Qualitative evidence has demonstrated that while some RD/N maintain a focus on weight loss, many have moved towards the new paradigm that promotes concepts consistent with intuitive eating^(39,40). Other studies have assessed dietitians' attitudes towards overweight and obesity^(39-41,48-50). The present research is the first to develop a validated measure of attitudes towards intuitive eating. Similarly, researchers have investigated dietitians' use of different weight-management practices with clients using qualitative⁽³⁹⁾ and quantitative^(40,41,48) methods. These previous studies have been limited in that reliability and validity were not established⁽⁴⁰⁾.

One strength of the present study is the large sample size as this is required for accuracy in EFA⁽⁴⁶⁾. The provision of contact information by the Commission on

Dietetic Registration enabled the researchers to collect adequate data to be able to conduct this analysis. One limitation of the study is the potential for selection bias. Participants self-selected into the study. Those who chose to participate may differ from those who chose not to participate. Since there are no population statistics on RD/N in the USA, the degree of potential selection bias was unknown.

There are several important next steps that should follow the present study. Future research should measure convergent and discriminant validity to ensure validity of this measure. In addition, as eating- and weight-related issues continue to challenge health professionals and individuals, and as research continues to grow in favour of the intuitive eating approach, future research could use this tool to assess the knowledge, attitudes and practices regarding intuitive eating in RD/N and other health professionals both in the USA and globally. Conducting this survey with RD/N and other health professionals could lend insight into the current state of practice in the weight-management field. A link between research and practice is important to advance this challenging field. Further, evidence suggests that nutrition practitioners should use theoretical frameworks to enhance the effectiveness of programmes designed to address weight concerns^(51,52). This survey could be expanded to assess RD/N application of theoretical constructs to both non-restrictive/intuitive eating and restrictive/traditional weight-management practices with clients.

Conclusion

In conclusion, the present study developed and validated an instrument to measure RD/N knowledge of and attitudes towards intuitive eating, as well as use of traditional/restrictive and non-restrictive/intuitive eating practices. As it has become apparent that the traditional, restrictive approach to promote weight loss is ineffective and as the support for an intuitive eating approach has grown, researchers have begun to discuss ethical issues associated with continuing to promote the use of traditional, restrictive practices for weight management^(4,7,11). In particular, Aphramor⁽¹¹⁾ has asserted that the ineffectiveness of the traditional energy-deficit approach to weight management has not only failed to meet standards of evidence-based practice, but has also failed to ignite a conversation about the ethical implications of continuing to use these practices and yet it continues to dominate research in the field. The tool developed and validated in the present study could help spark such a debate, by examining the current state of practice, in the hope of moving the field forward.

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