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Research report

Dietary restraint: Intention versus behavior to restrict food intake

Junilla K. Larsen[a,b,*], Tatjana van Strien[a,b], Rob Eisinga[c], C. Peter Herman[d], Rutger C.M.E. Engels[b]

[a]Department of Clinical Psychology and the Institute for Gender Studies, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands
[b]Behavioural Science Institute, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands
[c]Department of Methodology and Statistics, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands
[d]Department of Psychology, University of Toronto at Mississauga, Ont., Canada L5L 1C6

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Abstract

The Dutch Eating Behavior Questionnaire Restraint Scale (DEBQ-R) assesses both intentions to restrict food intake (3 items) and actual behavioral restraint (7 items). Studies in general population's samples have shown that the DEBQ-R is a reliable instrument with all items loading highly on a single factor. The purpose of the present study was to examine the psychometric properties of a two-factor intention-versus-behavior structure of the DEBQ-R in 3 different weight-concerned samples with people from different (over)weight categories (total $N = 790$) using confirmatory factor analysis. A robust two-factor structure emerged in the various samples, generally supporting a distinction between DEBQ-R questions relating to intentions to restrict food intake and actual restrictive behavior. Results obtained in this study are important, because they suggest that a distinction between restrained intention and behavior could help to explain the relation between dietary restraint and external overeating tendencies. Future longitudinal research should examine whether the newly developed dietary restraint scales predict changes in overeating and Body Mass Index (BMI).

Keywords: Dietary restraint scales; Dieting intention; Dieting behavior; Factor analysis; Overeating; Disinhibition; Overweight; Obesity

Introduction

Obesity rates have risen dramatically in most Western societies (James, Leach, Kalamara, & Shayeghi, 2001). Because these increases have occurred over a relatively short time period, genetic factors are not seen as playing a predominant role in the current obesity epidemic. Instead, the combination of environmental and psychological factors promoting overeating, a sedentary lifestyle, and some genetic susceptibility, seems likely to provide the best explanation for the "obesity epidemic" (Wadden, Brownell, & Foster, 2002). At the same time that obesity rates have increased, dieting or dietary restraint, defined as intentional efforts to achieve or maintain a desired weight through reduced caloric intake, has also increased dramatically, particularly among women (Jeffery, Adlis, & Forster, 1991). Although the term dietary restraint originally referred to a tendency to oscillate between periods of caloric restriction and overeating (Heatherton, Herman, Polivy, King, & McGree, 1988), we use the term 'dietary restraint' as synonymous with 'dieting', avoiding assumptions about the association with overeating.

In modern societies, typified by easy access to abundant food, restrained eating may provide an adaptive behavior to reduce weight gain. Paradoxically, many prospective studies have shown that adolescent girls and adults with elevated scores on dieting scales are at increased risk for future onset of obesity and weight gain (Field et al., 2003; French et al., 1994; Klesges, Isbell, & Klesges, 1992; Stice, Cameron, Killen, Hayward, & Taylor, 1999; Stice, Presnell, Shaw, & Rohde, 2005). One interpretation of this paradoxical finding is that dieting may promote weight gain because it leads to increased metabolic efficiency (Klesges et al., 1992). An alternate interpretation is given by the

*Corresponding author. Behavioural Science Institute, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands.
E-mail address: j.larsen@pwo.ru.nl (J.K. Larsen).

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restraint theory, which suggests that an over-reliance on cognitive control over eating, rather than physiological cues, may leave dieters vulnerable to overeating when these cognitive controls are disrupted by emotions or the intake of forbidden food (Herman & Polivy, 1980). It is also possible that individuals with a chronic overeating tendency find themselves attempting to restrict their intake, but ultimately fail in these efforts and show weight gain (Stice, 2002; Van Strien, Engels, Van Staveren, & Herman, 2006). Finally, it may be that although restrained eaters eat less than desired, they eat more than is required and thereby gain weight (Van Strien et al., 2006). The latter three interpretations have in common their conclusion that most individuals in the general population scoring high on dieting scales fail to show true weight-loss dieting.

Randomized controlled trials indicate that low-calorie/fat diets produce significant weight losses for up to 36 months (Avenell et al., 2004). These findings suggest that true weight-loss dieting is possible. It will be vital to develop scales that validly assess true weight-loss dieting and perceived weight-loss dieting and that distinguish between these two important groups (Stice, Presnell, Lowe, & Burton, 2006). Some successful attempts to do so have already been made. For the Three Factor Eating Questionnaire Restraint Scale, TFEQ-R, (Stunkard & Messick, 1985), dieters with either low or high disinhibition (Westenhoefer, 1991), and for the Dutch Eating Behavior Questionnaire Restraint Scale, DEBQ-R, (Van Strien, Frijters, Bergers, & Defares, 1986), dieters with either low or high overeating tendencies (Van Strien, 1997b), have been distinguished. Only restrained eaters with high disinhibition scores showed overeating after an experimentally induced preload (Westenhoefer, Broeckmann, Munch, & Pudel, 1994). Similarly, restrained eating no longer significantly predicted food consumption when the variance attributable to overeating was removed (Van Strien, Cleven, & Schippers, 2000). Thus, the tendency toward overeating appears to be a crucial variable that may mask or even reverse the relation between dieting scales and weight loss (Van Strien et al., 2006).

A psychometric study on the TFEQ-R showed that dieters with either low or high disinhibition displayed different sets of restraint behaviors (flexible versus rigid) (Westenhoefer, 1991). In the current psychometric study we focus on the DEBQ-R, which assesses both intentions to restrict food intake (3 items) and actual behavioral restraint (7 items). The theory of planned behavior (Ajzen, 1991), a social cognition model that has been applied to many health-related behaviors, including healthy eating and dieting (Conner & Norman, 1996; Hagger, Chatzisarantis, & Harris, 2006), suggests that health intentions and behaviors are related but separate constructs. For the DEBQ-R, the distinction between intention and behavior may be crucial to validly assess true weight-loss dieting (high behavioral restraint) and perceived weight-loss dieting (high intentional restraint without high behavioral restraint). We hypothesize that more restrained behavior (RB) is associated with a lower Body Mass Index (BMI) and less overeating tendencies, while more restrained intention (RI) (without RB) is associated with a higher BMI and more overeating tendencies.

Previous studies on general adult and student samples have shown that the DEBQ-R is a reliable instrument with all items (intentions and behaviors) loading highly on a single factor (Allison, Kalinsky, & Gorman, 1992; Laessle, Tuschl, Kotthaus, & Prike, 1989; Ogden, 1993; Van Strien, 1997a; Van Strien, Frijters, Bergers et al., 1986). A substantial proportion of the adult population is not weight-concerned (Timperio, Cameron-Smith, Burns, & Crawford, 2000) and does not restrict eating (Jeffery et al., 1991). This may complicate a reliable distinction between RIs and RBs. We hypothesize that the DEBQ-R will show a two-factor structure with factors representing intention and behavior to restrict food intake among a predominantly weight-concerned population with people from different (over)weight categories.

The current investigation is the first factor-analytic study to examine psychometric characteristics of the DEBQ-R among a predominantly weight-concerned population with people from different (over)weight categories. Confirmatory factor analytic methods were used, which allowed for (1) a priori specification of alternative factor models (a two-factor structure versus the original one-dimensional structure), (2) statistical tests to evaluate the fit of the specified model, and (3) testing the equivalence of the DEBQ-R across three different sub-samples (each sub-sample was heterogeneous as regards weight). Convergent validity was examined to provide insight in the relation of the DEBQ-R with the BMI and overeating tendencies (emotional and external eating), as indicators of more or less successful dieting efforts.

Methods

Participants

Recruitment

People were recruited in three ways: through advertisements entitled "no more dieting?" in local newspapers, through advertisements in an obesity journal of the Dutch obese patients' association, and by intake screening in an obesity clinic. In the advertisements, people were offered a personal eating diagnosis in return for their participation. By this recruitment, we assembled a predominantly weight-concerned group with people from different (over)weight categories. After 14 respondents were excluded (due to incomplete questionnaires), the total group consisted of 790 individuals.

Characteristics

Table 1 provides an overview of demographic and weight data of our participants. Most of our participants reported a desire to be thinner and to have dieted in the past year (Table 1). Although all weight categories were represented

Table 1
Demographic and weight characteristics of groups recruited through advertisements in local newspapers (sample 1), in an obesity journal (sample 2), and by intake screening in an obesity clinic (sample 3)

	Total sample $N=790$			Sample 1 $N=532$			Sample 2 $N=174$			Sample 3 $N=84$		
	N	*M*	SD	*N*	*M*	SD	*N*	*M*	SD	*N*	*M*	SD
Age (years)	785	44.9	11.8	531	45.5	12.4	172	44.5	10.6	82	41.9	10.4
BMI (kg/m^2)	775	34.0	8.2	523	30.2	5.2	172	43.1	7.5	80	39.3	7.7
		N	%		*N*	%		*N*	%		*N*	%
BMI category												
Normal weight (BMI: 18.5–24.9)		73	9.4		71	13.6		2	1.2		—	—
Pre-obese (BMI: 25.0–29.9)		209	27.0		201	38.4		3	1.7		5	6.3
Class 1 obesity (BMI: 30.0–34.9)		195	25.2		165	31.5		11	6.4		19	23.8
Class 2 obesity (BMI: 35.0–39.9)		128	16.5		60	11.5		46	26.7		22	27.5
Class 3 obesity (BMI ⩾40.0)		170	21.9		26	5.0		22	27.5		34	42.5
Educational level												
Primary education		66	8.6		43	8.2		18	10.5		5	6.7
Secondary education		359	46.6		243	46.5		82	47.6		34	45.3
Tertiary education		345	44.8		237	45.3		72	41.9		36	48.0
Gender												
Men		147	18.6		111	20.9		12	6.9		24	28.6
Women		643	81.4		421	79.1		162	93.1		60	71.4
Having dieted in the past year												
Yes		555	71.4		381	72.2		119	72.1		55	65.5
No		222	28.6		147	27.8		46	27.9		29	34.5
Thinking often about the desire to be thinner												
Yes		571	73.0		392	74.0		129	76.3		50	60.2
No		211	27.0		138	26.0		40	23.7		33	39.8

in our total sample, it should be noted that these classifications are based on self-report values of weight and height, and using self-reports to screen for overweight may fail to detect a significant proportion of morbid cases (Rowland, 1990). Thus, we suggest that maybe our sample includes even more individuals in the more severe obesity classes. People recruited through advertisements in local newspapers were older ($p<0.05$) and had a lower mean BMI ($p<0.01$) than people from the other two samples. People recruited through the obesity journal had a higher mean BMI than did people from the obesity clinic ($p<0.01$). There were significantly fewer men in the group recruited through the obesity journal ($p<0.01$).

Measures

The 33-item Dutch Eating Behavior Questionnaire (Van Strien, 2002; Van Strien, Frijters, Bergers et al., 1986) was used to measure restrained eating, emotional eating, and external eating. The restrained eating scale includes three items on RI and seven on RB (Table 2). The DEBQ-R total scale (10 items) has been found to be a reliable instrument among general populations (Allison et al., 1992; Van Strien, Frijters, Bergers et al., 1986). With regard to validity, studies assessing simple correlations between dietary restraint and food intake have shown conflicting results (Herman & Mack, 1975; Laessle et al., 1989; Stice, Fisher, & Lowe, 2004; Van Strien et al., 2000; Van Strien, Frijters, Van Staveren, Defares, & Deurenberg, 1986). Future studies on general adult or adolescent populations may take overeating into account when examining the relationship between dietary restraint and food intake (Van Strien et al., 2006). The reliable and valid emotional and external eating scales of the DEBQ (Van Strien, 2002; Van Strien, Frijters, Bergers et al., 1986) were used for evaluating emotional eating (e.g., "Do you have a desire to eat when you are irritated") and external eating (e.g., "If food smells and looks good, do you eat more than usual"). In the present study, Cronbach's α was 0.94 for emotional eating and 0.83 for external eating. Response categories of the DEBQ ranged from 1 'never' to 5 'very often'.

Self-report measurements of height and weight were obtained to calculate BMI (kg/m^2).

Statistical analyses

The data complied with the suggested guidelines for normality, linearity, and homoscedasticity. Means and standard deviations of the DEBQ-R were computed per item and for the sum scores of the RI and RB items (Table 2). One-way analysis of variance with post-hoc Bonferroni comparison was used to compare sum scores in the different samples. To compare sum scores on the RI

Table 2
Scores on items in the DEBQ-R from the groups studied

Abbreviated item	Total sample		Sample 1		Sample 2		Sample 3	
	M	SD	*M*	SD	*M*	SD	*M*	SD
DEBQ-R								
Restrained behavior (RB)								
4. Eat less after putting on weight	2.9	0.9	2.9	0.9	2.7	1.0	2.8	1.0
7. Refuse food offered	2.9	0.9	2.8	0.9	2.9	1.0	2.9	1.0
14. Watch what you eat	2.9	1.1	2.9	1.0	2.9	1.1	2.8	1.1
17. Eat slimming foods	3.3	1.0	3.3	1.0	3.2	1.0	3.2	1.0
19. Eat less after eating too much	2.6	1.0	2.7	1.0	2.5	0.9	2.6	1.0
22. Eat deliberately less	3.1	0.9	3.1	0.9	3.0	1.1	3.1	1.0
31. Eat while allowing for weight	3.3	1.0	3.4	1.0	3.2	1.1	3.1	1.10
Total score RB	3.0	0.7	3.0	0.7	2.9	0.8	2.9	0.8
Restrained intention (RI)								
11. Try to eat less than you would like	2.9	0.9	2.9	0.9	3.0	0.9	2.9	1.0
26. Try not to eat between meals	3.3	1.1	3.4	1.0	3.3	1.1	3.0	1.1
29. Try not to eat in the evenings	3.3	1.1	3.3	1.1	3.1	1.2	3.2	1.2
Total score RI	3.2	0.9	3.2	0.8	3.1	1.0	3.0	0.8

and RB items, paired samples of *t*-tests were used. Cronbach's αs were computed to test the internal consistency of the factors. These analyses were performed by using the Statistical Package for the Social Sciences (SPSS Version 14.0).

Model development

To study the structure of the DEBQ-R, we specified and estimated a series of confirmatory factor models using AMOS (Arbuckle & Wothke, 1999). The first model specified a single-factor model, one latent variable containing all 10 DEBQ-R manifest variables, with the measurement error terms uncorrelated. Model 2 specified two correlated factors with the items relating to actual RB loading exclusively on the first factor ('RB') and the items relating to intention to restrict eating loading exclusively on the second factor ('RI'), and with the measurement error terms uncorrelated (Fig. 1).

On the basis of the highest modification index, a statistically significant and theoretically interpretable path was added that significantly improved the model, after which the model was tested again (MacCallum, 1986). Because our aim was to examine separate subscales for dieting intention and dieting behavior, we also tested potential improvement of the model by removing ambiguous items. Models were tested for the total sample ($N = 790$). As there was enough variance in BMI within the three subgroups, the best-fitting model for the total sample was also tested for the three samples separately. Multiple-group analyses were conducted to investigate whether the adequately fitting model is equivalent across the three samples.

Model validation

To test equivalence of structure across the three samples, we carried out a multiple-group analysis. A restrictive model

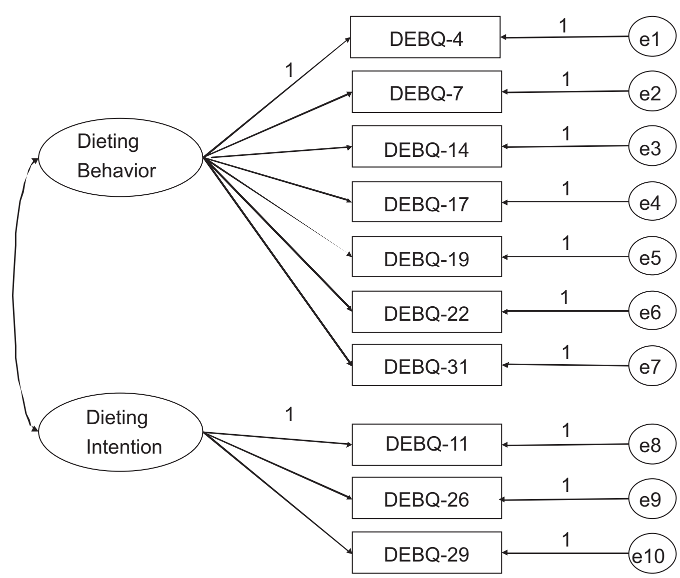

Fig. 1. Hypothesized model of factorial structure of the DEBQ-R. e1-e10 = measurement error for the 10 DEBQ-R items.

in which all the three samples were expected to have identical population covariance matrices (i.e., all loadings were constrained equal) was compared to a non-restrictive model. We also performed an internal cross-validation procedure. Each of the three samples were randomly split into two halves and subsequently merged to form two split-half samples. One half ($N = 395$) was used to develop the model and the other half ($N = 395$) for confirmatory factor analysis: confirmatory testing was performed by a multiple group analysis on the two random half samples. To determine convergent validity, a model was proposed in which both (a) high dieting behavior and (b) high dieting intention in the absence of high dieting behavior were related to BMI and emotional and external eating tendencies.

Fit indices

To examine how closely the competing models fit the data, several fit indices were obtained. The first was the traditional chi-square goodness-of-fit index (χ^2). However, when the sample size is large (as in the present study) χ^2 can be significant even if the model fits the data. Therefore, inspection of other fit indices was warranted. We calculated the root mean square error of approximation (RMSEA) and the Tucker-Lewis Index (TLI). A RMSEA value <0.06 and a TLI value $\geqslant 0.95$ indicate that the model fits well (Hu & Bentler, 1999).

The AMOS program does not provide model modification indices when data are missing. In the current study, fewer than 5% of the scores were missing. Incidental missing values were imputed using expectation-maximization estimation. This method is considered the most effective method to impute missing data, because it uses all the information in the available data (Hox, 1999). After estimating the models using the imputed data file, the original dataset with incomplete data was reanalyzed using the best fitting models employing direct likelihood in AMOS.

Results

Means and standard deviations

The three samples significantly differed on the total mean score of the RI items, $F(2, 783) = 3.4$, $p<0.05$ (Table 2). Post-hoc tests indicated that sample 1 scored significantly higher than sample 3. The total score on the RI items was significantly higher than the total score on the RB items for sample 1, $t(1, 528) = 6.9$, $p<0.01$, and sample 2, $t(1, 156) = 3.3$, $p<0.01$. Effect sizes of these differences were small (between 0.2 and 0.3).

Confirmatory factor analysis

Model development

The two-factor model of RB and RI (Fig. 1) was a better fit to the data than the original one-factor solution (Table 3), $\Delta\chi^2$ (1, 790) = 108, $p<0.01$.

Model 2a in which DEBQ item 11 was allowed to load on both factors fitted the data better than did the original two-factor model, $\Delta\chi^2$ (1, 790) = 49, $p<0.01$. Model 2b that also allowed error terms of items 4 and 19, referring to eating less after putting on weight and having eaten too much, to correlate was a significant improvement over model 2a, $\Delta\chi^2$ (1, 790) = 57, $p<0.01$. In model 2c DEBQ item 11 was removed, in model 2d DEBQ items 11 and 19 were removed and in model 2e DEBQ items 4, 11, and 19 were removed. Model 2d showed a significant improvement over model 2c, $\Delta\chi^2$ (7, 790) = 94, $p<0.01$, and model 2e showed a significant improvement over model 2d, $\Delta\chi^2$ (6, 790) = 26, $p<0.01$. Model 2e fit the data well and also was a better fit to the data than model 2b, $\Delta\chi^2$ (19, 790) = 89, $p<0.01$. We decided to accept model 2e as our final model not only because this model was the best fit to our data, but also because DEBQ items 4, 11, and 19 did not improve the proposed two-factor structure concerning the content: item 11 did not refer to dieting practices but to eating less than desired and items 4 and 19 reflected RB after gaining weight or eating too much, which has a direct connotation of unhealthy eating practices. Model development on a random half of our total sample ($N = 395$) also led to model 2e as the best fitting model (Table with fit indices is available on request). Re-analyzing the original dataset with incomplete data using the best-fitting model 2e revealed equivalent results. The product-moment correlation coefficient between scores on the final scales was 0.62, $N = 770$, $p<0.01$.

Table 3
Fit indices for confirmatory factor models of the DEBQ-R

Sample and model	χ^2	df	RMSEA	TLI
Total sample ($N = 790$)				
Model 1	342**	35	0.11	0.89
Model 2	234**	34	0.09	0.92
Model 2a	184**	33	0.08	0.94
Model 2b	127**	32	0.06	0.96
Model 2c	157**	26	0.08	0.94
Model 2d	64**	19	0.06	0.97
Model 2e	38**	13	0.05	0.98
Sample 1 ($N = 532$)				
Model 2e	31*	13	0.05	0.98
Sample 2 ($N = 174$)				
Model 2e	18	13	0.05	0.99
Sample 3 ($N = 84$)				
Model 2e	10	13	<0.01	1.02
Multiple group (three samples)				
Model 2e non-restricted	59*	39	0.03	0.99
Model 2e restricted	70*	51	0.02	0.99
Multiple group (random halves of total sample)				
Model 2e non-restricted	49**	26	0.03	0.99
Model 2e restricted	58**	32	0.03	0.99

Model 1 = model with one latent variable; Model 2 = model with two latent variables; Model 2a = DEBQ item 11 loads on restrained behavior and restrained intention; Model 2b = model 2a and error terms of DEBQ items 4 and 19 are intercorrelated; Model 2c = without DEBQ item 11; Model 2d = without DEBQ items 11 and 19; Model 2e = without DEBQ items 4, 11, and 19; * $p<0.05$; ** $p<0.01$

Model validation

The final model (2e) fitted the data well for all three samples separately (Table 3). All factor loadings exceeded 0.64 (Table 4).

Multiple group analysis on the three samples showed that the restrictive model revealed an adequate fit (Table 3), and was not significantly worse compared to a non-restricted model, $\Delta\chi^2$ (12, 790) = 12, $p>0.10$. This indicates that the structure of model 2e is similar for the three subsamples. Similarly, multiple group analysis on the two random split halves showed that the restrictive model revealed an adequate fit (Table 3) and was not significantly worse compared to a non-restricted model, $\Delta\chi^2$ (6, 395) = 9, $p>0.10$. This indicates that the structure of model 2e is similar for the two random samples.

Reliability

The reliability (α) coefficients ranged from 0.85 to 0.89 for the RB subscale (5 items), from 0.75 to 0.81 for the RI subscale (2 items), and from 0.87 to 0.89 for the total scale (7 items; see Table 4).

In all samples, the internal consistency of the subscales and the total score of the items in the final model was good. Note that the alphas for the total scale are all higher than the alphas for the subscales, except for one. This may seem to be counterintuitive if the subscales are truly distinct, as it would appear to show a higher internal consistency when the subscales are combined than when they are separated.

Table 4
Factors in the final measurement model and their factor loadings and αs

Subscale and item	Factor loading			
	Total sample	Sample 1	Sample 2	Sample 3
	($N = 790$)	($N = 532$)	($N = 174$)	($N = 84$)
Restrained behavior (RB)				
DEBQ-7	0.68	0.64	0.76	0.69
DEBQ-14	0.74	0.72	0.78	0.76
DEBQ-17	0.70	0.70	0.68	0.80
DEBQ-22	0.77	0.76	0.78	0.85
DEBQ-31	0.81	0.80	0.84	0.81
Alpha	0.86	0.85	0.87	0.89
Restrained intention (RI)				
DEBQ-26	0.80	0.81	0.78	0.77
DEBQ-29	0.80	0.77	0.87	0.79
Alpha	0.78	0.77	0.81	0.75
α total scale (7 items)	0.88	0.87	0.89	0.88

However, α is a function not only of the internal consistency but also of the number of items of the scale. According to the Spearman–Brown prediction formula (Guilford, 1936), for all samples the αs for the subscales would exceed the α for the total scale if the subscales hypothetically had had the same number of items as the total scale (i.e., 7).

Convergent validity

A path model was proposed in which both (a) high dieting behavior and (b) high dieting intention in the absence of high dieting behavior were related to BMI and emotional and external eating tendencies. One path with a non-significant regression weight ($p>0.10$) connecting RI and BMI was removed from the model. The model was a good fit to the data, χ^2 (1, 790) = 0.1, $p = 0.73$; RMSEA < 0.01, and TLI = 1.01 (see Fig. 2). All regression paths were significant at the 1% level, except for the path from RB to emotional eating, which was only marginally significant ($p = 0.08$).

The model shows that high RB was associated with less external eating ($\beta = -0.38$), less emotional eating ($\beta = -0.08$) and a lower BMI ($\beta = -0.12$), whereas high RI without high RB was associated with more emotional eating ($\beta = 0.14$) and more external eating ($\beta = 0.27$), but was not directly associated with BMI ($p>0.10$). The model explained 1% of the variance of emotional eating, 1% of BMI, and 9% of external eating.

Discussion

The present study examined the psychometric properties of the DEBQ-R in a predominantly weight-concerned sample with people from different (over)weight categories. Virtues of our study were that it included a relatively large sample and applied confirmatory methodology, which has unique advantages over exploratory analyses because measurement models are developed on an a priori basis

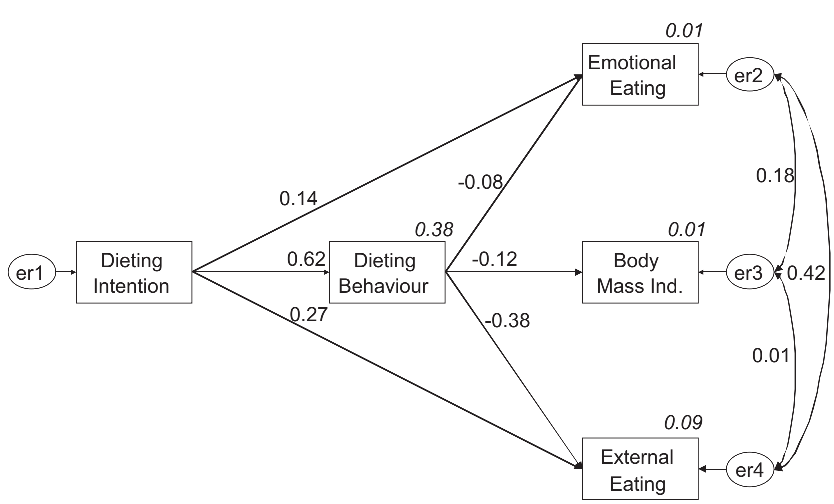

Fig. 2. A structural equation model of DEBQ-R newly formed subscales RI and RB and BMI and emotional and external eating. The values of the arrows reflect (marginally) significant standardized regression weights. The values above the outcome variables reflect the amount of explained variance.

and specific factor structures can be tested and compared to see whether they fit the data. The main finding of our study was that a two-factor model of RIs and RBs described the DEBQ-R data adequately. This finding is relevant because the DEBQ-R is one out of three widely used measures of restraint.

People in our study scored in general higher on the dieting intention items than on the dieting behavior items. This finding does suggest a difference between these two kinds of dieting items. However, in general adult, adolescent, or student samples, the DEBQ-R was found to be best described by one single factor containing both RIs and RBs (Allison et al., 1992; Laessle et al., 1989; Ogden, 1993; Van Strien, 1997a; Van Strien, Frijters, Bergers et al., 1986). Also two studies that specifically examined a two-factor DEBQ-R intention–behavior model did not find support for a two-factor model (Ogden, 1993; Van Strien, 1997a). Using a median split of the scores on each scale (intention versus behavior), it was found that only 16% of the individuals were categorized differently with respect to DEBQ-R dietary intention and behavior (Van Strien, 1997a). A reliable distinction between RIs and RBs among general populations may have been complicated by the fact that a substantial proportion of the adult population is not weight-concerned (Timperio et al., 2000) and does not restrict eating (Jeffery et al., 1991). In this study, we found that among a predominantly weight-concerned and heterogeneous (over)weight sample, the DEBQ-R is best described by the two factors of RI and RB. The structure of the two-factor intention-and-behavior model was robust across three different samples. Our findings suggest that a reliable distinction between dietary intentions and behaviors exists among individuals who participate in a clinical weight-loss program or who try to lose weight on their own.

We hypothesized that more RB would be associated with a lower BMI and less overeating tendencies, while more RI (without RB) would be associated with a higher BMI and more overeating tendencies. In line with our hypotheses, our results show differential associations of the newly formed DEBQ-R scales with overeating tendencies. More RB was related to *less* external and emotional eating, whereas more RI (without RB) was related to *more* external and emotional eating. Although more RB was associated with a lower BMI, our model did, in contrast to our hypothesis, not indicate direct effects from RI to BMI. These results suggest adequate convergent validity of the newly formed DEBQ-R subscales with regard to overeating tendencies, but not with regard to BMI. Because only 1% of the variance of emotional eating was explained by our model, we suggest that a division into DEBQ-R intention and behavior is not very useful in explaining whether someone will exhibit emotional eating tendencies. However, nearly 10% of the variance in external eating was explained by our model, suggesting that a distinction between dietary intention and behavior may be a valid indicator of which restrained eaters are likely to have a low or high tendency toward external eating.

For the TFEQ restraint scale, a division between more rigid and flexible dietary restraint has been found for individuals who participated in a computer-aided training program for weight reduction (Westenhoefer, 1991). Rigid control was associated with a higher BMI and more overeating, while flexible control was associated with a lower BMI and less overeating (Westenhoefer, 1991; Westenhoefer, Stunkard, & Pudel, 1999). Research has provided partial support for the findings of Westenhoefer (McGuire, Jeffery, French, & Hannan, 2001; Shearin, Russ, Hull, Clarkin, & et al., 1994; Smith, Williamson, Bray, & Ryan, 1999; Stewart, Williamson, & White, 2002; Williamson et al., 1995). Notably, studies on specific clinical eating disorder samples or studies that recruited participants as a part of a clinical weight-loss program appear to provide more support for the findings of Westenhoefer than do studies that have been conducted on general community samples. Only 23% of a community sample could be classified as predominantly rigid or flexible dieters (Stewart et al., 2002). These results suggest that, as with the DEBQ-R findings, a reliable distinction between more or less successful dieting efforts (dieting intention versus behavior for the DEBQ-R, and flexible versus rigid dieting for the TFEQ-R) will not be found among general population samples.

Our study indicates that although some people may develop an intention to restrict their food intake, this intention is not always translated into action. The discrepancy between health intention and behavior has been labeled the 'intention–behavior gap'. Planning, maintenance self-efficacy and action control are suggested to be important variables that may explain this intention–behavior gap (Sniehotta, Scholz, & Schwarzer, 2005). Thus, translated to our study, this may imply that individuals with high dieting intention but low dieting behavior have poor planning skills and lack self-efficacy and action control. Realization that current behavior does not measure up to the self-imposed standards or intentions may trigger negative affect (Neal & Carey, 2004). Possibly, this increased negative affect may subsequently trigger eating disturbances (Stice, 2002) and weight gain (Stice et al., 2005) over time. Thus, our data may imply that individuals who only show high dieting intention are more vulnerable to future eating disturbances and weight gain.

Our study has some limitations. (1) It used an internal cross-validation design. Although this procedure increases the confidence that can be placed in our findings, future studies should further cross-validate our RI and RB subscales among other samples of individuals who participate in a clinical weight-loss program or who try to lose weight on their own. As RI has only two items in our research, the studies may also want to incorporate additional items intended to be alternative indicators of the DEBQ-R intention construct (e.g., try not to eat sweets; try not to eat unhealthy food). (2) Our study used self-reported height and weight values to determine BMI. Studies have shown that, although self-reports may fail to detect a significant proportion of overweight cases (Rowland, 1990), the correlation between self-reported and measured height and weight is very strong (Spencer, Appleby, Davey, & Key, 2002). We therefore suggest that we would have arrived at qualitatively similar results had BMI been measured objectively. (3) Because our study population predominantly consisted of weight-concerned and overweight adult women, our findings are suggested to generalize to weight-concerned and overweight adult women who are motivated to change their weight status. Future factor analytic studies on the DEBQ-R among weight-concerned samples may benefit by addition of more normal weight participants (i.e., weight-concerned individuals who have already successfully lost weight) besides overweight participants. (4) Our cross-sectional design prohibits causal inferences. Thus, evidence of real criterion validity is lacking. Future longitudinal research should examine whether the newly developed dietary restraint scales predict changes in overeating and BMI.

In conclusion, our results suggest that a two-factor classification of the DEBQ-R (RI and RB) provides a better fit for individuals who participate in a clinical weight-loss program or who try to lose weight on their own than does the original single-factor solution. Results obtained in this study are important, because they suggest that the distinction between restrained intention and behavior could help to explain the relation between dietary restraint and external overeating tendencies.

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