



ORIGINAL ARTICLE

Prudence and weight control behaviour in obese patients and patients with selected eating disorders[☆]



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Abstract

Background and objectives: This study analyses the level of prudence exercised by obese women and women with eating disorders, such as anorexia, bulimia and binge eating, compared with women who do not demonstrate these disorders. It also analyses the relation between the level of prudence exercised by obese women and women with eating disorders and their weight control behaviour.

Methods: The study included 175 women aged 18–35: 105 patients with eating disorders, 35 obese patients and 35 healthy individuals. All women were assessed with the ED-1 and a questionnaire by the author concerning the frequency of weight control behaviour, such as self-induced vomiting, use of laxatives, slimming agents and diuretics, and increased exercising.

Results: MANOVA and ANOVA statistics revealed significant differences between the patient groups and the healthy controls with respect to both weight control behaviour and prudence exercised. Significant relations were found between the frequency of self-induced vomiting and the use of laxatives, slimming agents and diuretics, and the level of prudence exercised among women with anorexia and bulimia.

Conclusions: Mean prudence scores are significantly lower in women with eating disorders and obese women compared with healthy women.

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Introduction

Many reports of inadequate life style behaviours, including eating behaviours, can be found in the global literature. Bad eating habits may lead to eating disorders and diet-dependent diseases, including obesity.¹⁻³

Particularly prominent in the context of bad eating habits are anorexia, bulimia and binge eating disorder (BED), whose prevalence is rapidly increasing.^{1,4} The aetiology of eating disorders is unclear and researchers seek to identify the principal predisposing factors responsible for the persistence of symptoms. Researchers are currently discussing a multi-factor option. This is most comprehensively represented by the bio-psycho-social model.^{5,6}

As far as psychological factors are concerned, attention is focused on personality traits which could predispose individuals towards eating disorders.⁷ Of particular interest in this respect are impulsiveness, perfectionism and interactions among various constellations of personality traits.^{8,9}

Studies by Whiteside and Lynam¹⁰ suggest that prudence may be an important personality predictor of eating disorders, especially in individuals with bulimia. According to these researchers, low prudence may contribute to symptom persistence. There are few reports in the literature, however, dealing with the role of prudence in symptom initiation and persistence.^{10,11} Hariman¹² has defined prudence as the capacity to reflect upon one's behaviour before taking action. Therefore, prudence may affect people's attitudes towards eating.

Prudence is a character strength. It evolves during the developmental process in response to socialisation, which is a complex process based on modelling and emulation.^{13,14} Behavioural psychology posits that people learn various behaviours, including eating behaviours, by observing how other people behave. These behaviours may be accepted in the observer's environment or not. Prolonged and repeated exposure to stimuli – eating behaviours in our case – leads to the development of eating habits. In other words, eating habits develop as a result of a complex process of interaction with the environment over the long term.^{15,16} A similar process may be involved in the development of prudence. People learn to reflect upon their behaviour before taking action, analysing the pros and cons of a particular course of action. They do so indirectly through trial and error and by observing how other people behave. This may suggest a positive feedback loop between prudence and human eating behaviour. In other words, the more prudent a person is, the more likely it is that that person will engage in healthy eating behaviours. This relationship between prudence and eating behaviour may be particularly salient in patients with eating disorders. Such patients engage in many weight control behaviours including self-induced vomiting, the use of laxatives, slimming agents and diuretics, or intense exercising.^{17,18} Therefore, the relationship between the level of prudence manifested in the careful analysis of the pros and cons of a situation, and the frequency of weight control behaviours needs to be identified. Studies on the role of prudence in eating behaviours is limited.^{10,11} Based on current data, however, it may be assumed that high levels of prudence may contribute to healthy eating behaviours. In the case of eating

disorders, unhealthy eating behaviours were observed.^{17,18} For this reason, it can be assumed that these patients are characterised by low prudence. It should be noted, however, that it is not known whether prudence affects all unhealthy eating behaviours in eating disorders. It is important that prudence is associated with reflection on and analysis of the pros and cons of a particular course of action.^{13,14} For this reason, this characteristic may be related to the eating behaviours associated with impulse control (e.g. self-induced vomiting) and diet restrictions (e.g. food restriction).

The theoretical model of such a relationship suggests that patients with eating disorders will be less prudent compared to healthy individuals without eating disorders and, hence, will engage more frequently in weight control behaviour. Thus, a link is postulated between the level of prudence exercised and weight control behaviour.

The present study is an attempt to test the foregoing observations empirically in patients with eating disorders. The study also looks at obesity attributed to excessive energy supply, a medical condition not classified as an eating disorder. The decision to include obesity was made following a review of the literature. A number of scientists (e.g. 4, 6, ¹⁹) have suggested that obesity ought to be viewed as an eating disorder.

The purpose of the present study was to analyse the level of prudence in obese women and women with eating disorders, i.e. anorexia, bulimia and binge eating disorder (research group), compared with women without these disorders (control group). Additionally, the study analysed the relationship between the level of prudence exercised by obese women and women with eating disorders, and their weight control activities. The following weight control activities were included: self-induced vomiting, use of laxatives, slimming agents and diuretics, and increased exercising.¹⁷

The following research questions were formulated in response to the main aim of the study:

1. Do obese women and women with eating disorders (anorexia, bulimia, BED) differ from each other and from healthy women with respect to level of prudence?
2. How frequently do obese women and women with eating disorders engage in weight control behaviours, such as self-induced vomiting, use of laxatives, slimming agents and diuretics, and intense exercising? Do they differ with respect to these behaviours from women in the control group?
3. Is the level of prudence in obese women and women with eating disorders (anorexia, bulimia, BED) related to the frequency of weight control behaviours, such as self-induced vomiting, use of laxatives, slimming agents and diuretics, and intense exercising? Can similar patterns of behaviour be identified in healthy controls?

Material and methods

In total, 175 women aged 18–35 years were studied; 105 women with eating disorders and 35 obese women constituted the research group, and 35 women who were neither obese nor had any eating-disorders constituted the control

group. The women with eating disorders were divided into three subgroups according to their diagnosis: anorexia ($n = 35$), bulimia ($n = 35$) and binge eating disorder ($n = 35$). Women with eating disorders were recruited from three psychiatric hospitals in Mazovia (Poland).

Due to the specific nature of the study and the need to control for numerous possible interfering variables, the following recruitment criteria were adopted:

1. All participants had to be at least 18 years old. This reduced the risk of interference with the assessment of individual differences in personality variables. This was also to prevent the recruitment of participants without completely symptomatic eating disorders and without a fully developed personality.
2. All participants had to have completed their primary education as a minimum. This was to avoid difficulties in comprehension of self-report items.
3. All participants had to be in medical or psychotherapeutic care at the time of study. Our study was carried out in a hospital. All women in ongoing medical or psychotherapeutic care were recruited. Therefore, we decided that 'being in medical or psychotherapeutic care' was a criterion for participation in this study.
4. All participants had to have a professionally diagnosed eating disorder according to ICD-10: F50.0 for anorexia, F50.2 for bulimia, E66.0 for obesity or had to comply with the DSM-5 criteria for BED.

Thirty-five women for whom a psychiatrist reported the absence of eating disorders and obesity (E66.0) according to the ICD-10 criteria served as healthy controls. The control group was recruited among students of the Medical University (Warsaw, Poland). Women who agreed to participate in the study had a psychiatric consultation to rule out eating and other psychiatric disorders.

Variables and assessment instruments

1. Prudence. This variable was defined as the capacity to reflect upon one's behaviour before taking action, analysing the action's pros and cons. Prudence was assessed with the Eating Disorder Prudence Scale (ED-U). This is an empirical instrument based on Oblimin rotation in the Eating Disorder group prior to participation in the present study. The scale has four items and is part of ED-1, a questionnaire developed by Jaworski. Reliability of this scale is .71.
2. Body Mass Index (BMI). Use of this index is recommended for worldwide epidemiological studies of overweight and obesity.²⁰ The BMI is calculated according to the following formula: $BMI = \text{body weight (kg)} / (\text{height [cm]})^2$. The unit is kg/m^2 . BMI is strongly correlated with total body fat. In adults (age >18), obesity is diagnosed when $BMI \geq 30 \text{ kg}/\text{m}^2$. Information concerning participants' current weight and height was gleaned from their medical records (following prior consent).
3. Ideal body weight. Participants were interviewed as to their ideal body weight.
4. Self-induced vomiting to control body weight. Respondents were asked the following question: 'Have you ever

used vomiting to control your body weight and shape?' Responses were given on a 6-point rating scale (never, once a month, 2–3 times a month, once a week, 2–6 times a week, once a day or more).

5. Use of laxatives, slimming agents and diuretics to control weight. Respondents were asked the following question: 'Have you ever used laxatives, slimming agents or diuretics to control your weight and shape?' Responses were given on a 6-point rating scale (never, once a month, 2–3 times a month, once a week, 2–6 times a week, once a day or more).
6. Exercising to control body weight. Respondents were asked the following question: 'Have you ever exercised for more than an hour a day to reduce or control your body weight?' Responses were given on a 6-point rating scale (never, once a month, 2–3 times a month, once a week, 2–6 times a week, once a day or more).

Each respondent was given the following forms:

- 1 ED-1, 1 questionnaire by the present author, 1 information concerning the study, and 2 informed consent forms (one for the interviewer and one for the participant).

The ethical statements

The authors sought approval from the Ethics Committee of the Medical University of Warsaw in order to conduct the presented study. In its response, the Ethics Committee stated that this study is 'non-interventional' and does not require the approval of the Ethics Committee. The response of the Ethics Committee was in accordance with Art. 37a1 of the Pharmaceutical Law Act (Journal of Laws, 2001, No. 126, item 1381). All patients provided informed consent to participate in this research. A clear, written statement of informed consent was obtained from all participants. They were also informed that the study is research only and that the findings were to be limited to research purposes. Information about the details of the study, data collection and analysis, as well as the names of the researchers and their contact information, were also presented.

Statistics

The data were entered into a previously prepared EXCEL 2007 database. This database was then submitted to STATISTICA 9 statistical analysis adopting the $\alpha = .05$ criterion. Distribution of the analysed variables was evaluated. Between-group differences were assessed using MANOVA multivariate analysis, ANOVA one-way analysis of variance and the Tukey contrast test. A Spearman correlation analysis and a linear regression analysis were also conducted. Eta square effect sizes were calculated to determine the proportion of the complete variance accounted for by the independent variable.

Results

Anthropometric group characteristics

MANOVA revealed significant anthropometric differences between the groups of women with eating disorders and obesity on the one hand, and the healthy controls on the other (Wilks' Lambda λ $F(5;170) = 13.36$; $p < .01$; $\text{Eta}^2 = .26$). This means that the compared groups differ with respect to conjoint anthropometric variables. After the MANOVA analysis, additional one-way ANOVA analyses were conducted separately for each anthropometric variable. Women with eating disorders, obese women, and the healthy control group differed with respect to age – $F(1;174) = 13.91$; $p < .05$; $\text{Eta}^2 = .23$, current weight – $F(1;174) = 61.96$; $p < .05$; $\text{Eta}^2 = .57$, BMI – $F(1;174) = 71.51$; $p < .05$; $\text{Eta}^2 = .60$ and reported ideal weight – $F(1;174) = 34.21$; $p < .05$; $\text{Eta}^2 = .42$. No differences were found for height – $F(1;174) = 2.38$; $p > .05$; $\text{Eta}^2 = .05$.

In order to conduct a more thorough analysis of the MANOVA findings, one-way ANOVA statistics were used. Significant differences were found for body weight ($F = 61.96$; $p < .01$; $\text{Eta}^2 = .57$). The Tukey contrast test revealed that women with anorexia had significantly lower ($p < .01$) body weight than women in each of the remaining groups (bulimia, BED, obese and control). The women with bulimia and women with BED had comparable body weights ($p > .05$). The largest, statistically significant parameters were found for obese women. The body weights of the women with anorexia, BED and obesity differed significantly ($p < .01$) from the body weights of the control group (Tukey test). The post hoc Tukey test revealed no significant differences between the body weights of women with bulimia and the control group ($p > .05$).

No significant differences in height were found between the obese women, women with eating disorders and the healthy controls ($F = 2.38$; $p > .05$; $\text{Eta}^2 = .05$).

The women in the research groups and the healthy controls differed with respect to their BMIs ($F = 71.51$; $p < .01$; $\text{Eta}^2 = .60$). The Tukey contrast test revealed significant differences ($p < .01$). The women with anorexia had statistically lower BMIs than the BED women and the obese women ($p < .01$). The BMIs of the women with bulimia were comparable to the BMIs of women with anorexia and BED. The obese women had significantly ($p < .01$) higher BMIs than the women with eating disorders (anorexia, bulimia and BED) (Tukey test). The healthy controls had significantly lower BMIs ($p < .01$) than the obese women and the BED women. No significant differences were found for anorexia and bulimia ($p > .05$).

The women differed significantly with respect to declared ideal body weight ($F = 34.21$; $p < .01$; $\text{Eta}^2 = .42$). The Tukey contrast test further revealed significant differences ($p < .01$). The women with anorexia had the lowest declared ideal body weight compared with the remaining groups ($p < .01$). The declared ideal body weight was comparable in women with bulimia and BED ($p > .05$). Obese women had the highest declared ideal body weight ($p < .01$). The healthy controls had higher declared ideal body weight than women with anorexia ($p < .01$) and lower declared ideal body weight than the obese women ($p < .01$), as attested by the

significant Tukey test outcomes. No significant differences were found for bulimia and BED.

The precise anthropometric parameters, i.e. age, body weight, height, BMI and declared ideal body weight, are presented in Table 1.

Level of prudence by group

One-way ANOVA revealed significant differences in the level of prudence between obese women and women with eating disorders on the one hand, and healthy controls on the other ($F = 5.54$; $p < .01$; $\text{Eta}^2 = .11$). The Tukey test revealed no differences ($p > .05$) in the level of prudence between the obese women and women with eating disorders (anorexia, bulimia, BED). The healthy controls, i.e. women who were neither obese nor had any eating disorders, had higher average levels of prudence compared with the research groups ($p < .01$). The level of prudence was the lowest among women with bulimia and BED. In the case of anorexia, this level was very similar to that of obesity. The highest level was observed in the control group. Table 2 shows in detail the levels of prudence categorised by group.

Weight control behaviours by group

The MANOVA revealed significant differences in weight control behaviours between the obese women and women with eating disorders on the one hand, and the healthy controls on the other (Wilks' Lambda $\lambda = .39$; $F(4;171) = 17.69$; $p < .001$; $\text{Eta}^2 = .27$). The following behaviours were assessed: self-induced vomiting, use of laxatives, slimming agents and diuretics, and increased exercising. In other words, the women with different eating disorders, the obese women, and the healthy controls differed with respect to their engagement in weight control activities as a whole. Taking this MANOVA outcome as a point of departure, additional one-way ANOVAs were conducted separately for each weight control behaviour. The groups of women with eating disorders, obese women and the healthy controls differed with respect to the frequency of self-induced vomiting – $F(1;174) = 54.17$; $p < .01$; $\text{Eta}^2 = .54$, use of laxatives, slimming agents and diuretics – $F(1;174) = 17.92$; $p < .01$; $\text{Eta}^2 = .28$ and frequency of increased exercising – $F(1;174) = 10.59$; $p < .01$; $\text{Eta}^2 = .18$.

In order to obtain a more complete picture of the MANOVA effects, one-way ANOVAs were conducted. The research groups differed significantly from the healthy controls with respect to frequency of self-induced vomiting to control body weight ($F = 54.16$; $p < .01$; $\text{Eta}^2 = .54$). The Tukey test contrast further revealed that women with anorexia were less likely to report self-induced vomiting as a means of weight control than women with bulimia ($p < .01$) and more likely to do so than obese women and women with BED ($p < .01$). Women with bulimia were significantly ($p < .01$) more likely to report self-induced vomiting than women with anorexia, women with BED or obese women. Women in the healthy control group were less likely to report self-induced vomiting as a method of weight control than obese women and women in all eating disorder groups.

One-way ANOVA yielded significant between-group differences in the frequency of use of weight control agents as

Table 1 Anthropometric parameters by group.

Variable	Group	Mean	SD	SE	95% confidence interval for mean		Minimum	Maximum	Eta ²
					Lower bound	Upper bound			
Age	Anorexia	23.28	5.112	.949	21.33	25.22	16	35	.23
	Bulimia	22.97	5.648	.983	20.97	24.97	17	35	
	BED	28.90	8.654	1.554	25.73	32.08	16	54	
	Obesity	30.77	10.497	1.681	27.37	34.17	17	56	
	Healthy control	22.03	2.302	.295	21.44	22.62	18	33	
Height	Anorexia	163.38	6.489	1.205	160.91	165.85	148	179	.05
	Bulimia	167.82	6.971	1.213	165.35	170.29	155	180	
	BED	166.74	6.170	1.108	164.48	169.00	158	182	
	Obesity	167.59	7.755	1.242	165.08	170.10	152	189	
	Healthy control	166.97	5.260	.673	165.62	168.31	154	179	
Current body weight	Anorexia	49.28	7.166	1.321	46.57	51.98	34	70	.57
	Bulimia	61.07	11.389	1.983	57.03	65.11	46	95	
	BED	68.69	11.456	2.058	64.49	72.90	51	103	
	Obesity	96.07	25.023	4.007	87.96	104.18	52	166	
	Healthy control	57.95	7.442	.953	56.04	59.86	44	83	
BMI	Anorexia	18.45	2.26	.42	17.58	19.31	13.28	24.22	.60
	Bulimia	21.55	2.75	.48	20.57	22.52	17.26	29.38	
	BED	24.68	3.72	.67	23.32	26.05	19.68	33.46	
	Obesity	34.15	8.30	1.33	31.46	36.84	19.27	56.77	
	Healthy control	20.78	2.47	.32	20.15	21.41	16.97	30.12	
Ideal body weight	Anorexia	44.69	5.299	.984	42.67	46.71	37	60	.42
	Bulimia	53.33	8.432	1.468	50.34	56.32	38	76	
	BED	57.19	7.574	1.360	54.42	59.97	45	78	
	Obesity	66.64	11.695	1.873	62.85	70.43	40	100	
	Healthy control	54.82	5.284	.677	53.47	56.17	45	70	

Table 2 Levels of prudence in obese women, women with eating disorders and healthy controls.

	Mean	SD	SE	95% confidence interval for mean		Minimum	Maximum	Eta ²
				Lower bound	Upper bound			
Anorexia	11.28	1.91	.35	10.55	12.00	8.00	15.00	.11
Bulimia	10.06	2.14	.38	9.29	10.83	6.00	13.00	
BED	10.90	2.06	.37	10.15	11.66	6.00	15.00	
Obesity	11.05	1.86	.30	10.45	11.66	6.00	15.00	
Healthy controls	12.08	2.15	.28	11.53	12.63	5.00	16.00	

laxatives, slimming agents and diuretics ($F=17.92$; $p<.01$; $\text{Eta}^2=.28$). The Tukey contrast test further revealed that women with anorexia, BED and bulimia did not differ significantly regarding how frequently they used laxatives, slimming agents and diuretics to control their weight ($p>.05$). Women with bulimia used laxatives, slimming agents and diuretics to control their weight significantly more frequently than obese women and women with BED. Obese women were significantly less likely to use laxatives, slimming agents and diuretics for the purpose of weight control than women with anorexia and bulimia ($p<.01$). Women from the control group were significantly less likely to report use of laxatives, slimming agents and diuretics for the purpose of weight control than women in all the eating disorder groups and obese women ($p<.01$).

The women in the research groups also differed significantly from the healthy controls regarding the frequency of increased exercising to control their weight ($F=30.63$; $p<.01$; $\text{Eta}^2=.18$). The Tukey contrast test additionally revealed that women with anorexia were more likely to report increased exercising for the purpose of weight control compared with women with BED and obese women ($p<.01$). Similar observations were made for women with bulimia, who were more likely to report increased exercising compared with women with BED and obese women ($p<.01$). No significant differences were found between women with BED and obese women regarding increased exercising to control their weight ($p>.05$). The healthy controls were significantly less likely to report increased exercising to control their weight than women with anorexia and bulimia, and obese women ($p<.01$).

Table 3 Group comparison of selected weight control behaviours.

Weight control behaviour	Group	Mean	SD	SE	95% confidence interval for mean		Minimum	Maximum	Eta ²
					Lower bound	Upper bound			
Self-induced vomiting	Anorexia	1.97	1.99	.37	1.21	2.72	0	5	.54
	Bulimia	3.88	1.11	.19	3.48	4.27	1	5	
	BED	.87	1.45	.26	.34	1.40	0	5	
	Obesity	.59	1.29	.21	.17	1.01	0	4	
	Healthy controls	.11	.58	.07	-.03	.26	0	4	
Use of laxatives, slimming agents and diuretics	Anorexia	2.38	2.01	.37	1.62	3.14	0	5	.28
	Bulimia	2.76	2.02	.35	2.04	3.47	0	5	
	BED	1.58	1.61	.29	.99	2.17	0	5	
	Obesity	1.56	1.87	.30	.96	2.17	0	5	
	Healthy controls	.20	.48	.06	.07	.32	0	2	
Increased exercising	Anorexia	3.34	1.65	.31	2.72	3.97	0	5	.18
	Bulimia	3.27	1.61	.28	2.70	3.84	0	5	
	BED	1.90	1.85	.33	1.22	2.58	0	5	
	Obesity	2.05	1.89	.30	1.44	2.66	0	5	
	Healthy controls	1.36	1.56	.20	.96	1.76	0	5	

A detailed comparison between healthy controls, and women with eating disorders (anorexia, bulimia, BED) and obese women with respect to the frequency of various weight control behaviours is presented in Table 3.

Prudence indicators and engagement in selected weight control behaviours

Correlation analysis between levels of prudence and engagement in selected weight control behaviours has been conducted separately for each group. Self-induced vomiting to control weight was positively related to prudence in women with anorexia ($\rho = .39$; $p < .05$). No significant relations were found in women with bulimia and BED or in obese women ($\rho = .01$, $p > .05$).

Linear regression analysis was conducted to unpack the relation between self-induced vomiting and prudence in women with anorexia. In this analysis, self-induced vomiting was the dependent variable and prudence was the predictor. The model accounted for 38.8% of the variance of the dependent variable (corrected $R^2 = .115$). The model had satisfactory goodness of fit and was a better predictor of the dependent variable than the mean: $F(1,34) = 4.80$; $p < .01$. The regression coefficients are presented in Table 4.

The linear regression analysis failed to find any significant relation between the frequency of using laxatives, slimming agents and diuretics to control body weight and the level of prudence in anorexia ($\rho = .12$; $p > .05$), bulimia ($\rho = .10$; $p > .05$), BED ($\rho = .28$; $p > .05$) and obesity ($\rho = .18$; $p > .05$).

Conversely, the combination of prudence and self-induced vomiting was positively related to the frequency of using laxatives, slimming agents and diuretics ($\rho = .445$; $p < .05$) in women with bulimia. No significant relations, however, were found for BED ($\rho = -.13$; $p > .05$) or obesity ($\rho = .21$; $p > .05$).

Intense exercising to control body weight also failed to correlate with the level of prudence in anorexia ($\rho = .18$;

$p > .05$), bulimia ($\rho = .09$; $p > .05$), BED ($\rho = .05$; $p > .05$) or obesity ($\rho = .18$; $p > .05$).

The combination of prudence and self-induced vomiting was unrelated to intense exercising to control body weight in bulimia ($\rho = .22$; $p > .05$), BED ($\rho = .12$; $p > .05$) and obesity ($\rho = .01$; $p > .05$).

No significant correlation was found between the level of prudence and self-induced vomiting ($\rho = -.23$; $p > .05$), the use of laxatives, slimming agents and diuretics ($\rho = .09$; $p > .05$), or the frequency of intense exercising ($\rho = -.03$; $p > .05$) in healthy controls.

Discussion

This study has yielded empirical support for the theoretically derived prediction that patients with eating disorders would be less prudent than individuals without such disorders. Women in the healthy control group, i.e. non-obese women and women without diagnosed eating disorders, had higher prudence scores than obese women and women with anorexia, bulimia or BED. This suggests that obese women and women with anorexia, bulimia or BED are less capable of reflecting upon their behaviour prior to taking action, i.e. of analysing the pros and cons of their behaviour. The present findings corroborate those of Whiteside and Lynam,¹⁰ who observed that patients with eating disorders, particularly bulimia, are less capable of careful deliberation of a problem and the possible consequences of chosen solutions prior to taking action. Also, Miller et al.,²¹ who studied 481 adults aged 20–21, found that high urgency scores correlated with predispositions to eating disorders. Peñas-Lledó et al.,²² however, found that lack of planning does not correlate with bulimia. According to Whiteside and Lynam,¹⁰ urgency, lack of planning and impulsivity are risk factors for bulimia.

One must emphasise the lack of any mention in the literature of attempts to analyse the role of the intensity of prudence in patients with anorexia, BED or obesity. The present study is, therefore, pioneering in this field and

Table 4 Regression analysis for women with anorexia.

	Model	Unstandardised coefficients		Standardised coefficients	<i>t</i>	<i>p</i>
		<i>B</i>	<i>SE</i>			
1	(Constant)	−2.61	2.12		−1.23	.23
	Prudence	.41	.19	.39	2.19	.04

forecasts new trends in the study of eating disorders. Our findings suggest the need for further research in this area.

The present findings propose that prudence may regulate eating behaviour. In accordance with the definition of prudence, eating behaviours should be submitted to greater reflection and should have a positive effect on health. The fact, however, that women with eating disorders and obese women were less prudent than healthy women suggests the existence of several factors which may reduce the role of prudence in eating decisions. The ability to think through one's decisions relating to food consumption before actually beginning to eat, i.e. to analyse the pros and cons of this activity, may play an important role when one is not hungry, i.e. when one's nutritional needs are satisfied, and one is not experiencing intense emotions. In such cases, individuals may decide to consume healthy foods and avoid eating potentially unhealthy products. The case, however, may be rather different when one is hungry. The individual may then decide to prioritise the satisfaction of the hunger drive. The hungrier he or she is, the less attention the individual will pay to the quantity and quality of the ingested food. In affect-laden situations, the level of prudence may be less important. The health aspect is no longer salient. All that counts is to supply the organism with energy as quickly as possible. The individual may now eat foods not previously considered attractive. Prudence may now be gradually switched off, giving way to defence mechanisms whose role is to reduce negative affective states. The importance of defence mechanisms in the psychopathology of eating disorders has been emphasised, *inter alia*, by Lawson et al.,²³ Waller et al.²⁴ and Vidović et al.²⁵ Only when hunger has been alleviated can guilt set in, as the individual becomes aware of what he or she has done. This may explain the lower levels of prudence in obese women and women with eating disorders compared with healthy controls. It is important to note that patients with eating disorders are focused on controlling the signs of hunger and limiting the amount of ingested food. Therefore, they try not to react to the biological signs of mounting hunger and do their best to maintain their dieting restrictions.¹⁸ The longer patients fail to respond to signs of hunger and the hungrier they become, the quicker the role of prudence in eating behaviour is reduced. This is why patients with eating disorders may have spells of binge eating followed by severe guilt and the need to engage in weight control activities.¹⁷ These weight control activities may take various forms depending on the disorder.^{17,18} The present study revealed that women with eating disorders and obese women differ with respect to their weight control behaviours both when these are viewed together and separately. Self-induced vomiting significantly differed between women with anorexia and bulimia on the one hand, and women with BED on the other. Women

with anorexia, bulimia and BED were equally likely to use laxatives, slimming agents and diuretics to control their weight. Women with bulimia were significantly more likely to use laxatives, slimming agents and diuretics than obese women. Women with anorexia reported increased exercising to reduce body weight more frequently than women with BED and obese women. A similar pattern was found for women with bulimia, who were significantly more likely to report increased exercising than women with BED and obese women. The patterns observed in the present study have been corroborated by other writers, e.g. APA,¹⁷ Kelly et al.²⁶ and Maine et al.²⁷

The present study found that the level of prudence is related to the frequency of self-induced vomiting to control weight in women with anorexia. This pattern was not found in women with bulimia, women with BED or obese women. It was also absent in healthy controls. The combination of prudence and self-induced vomiting, however, was significantly and positively related to the frequency of use of laxatives, slimming agents and diuretics in bulimia. The lack of relationships can be explained in the context of emotion control^{28,29} and cognitive impairment in patients with eating disorders.^{26,27} The obtained results may suggest that the theoretical model of the relationship between prudence and unhealthy eating behaviours should be supplemented with emotional control, especially the control of fear.²⁵ The high level of anxiety in patients with eating disorders may reduce the effect of prudence. Further studies should take into account the mutual interaction between prudence and fear in the context of the analysed behaviours.

Cognitive disorders may be another important explanation of the obtained results in patients with ED. In particular, cognitive impairment in eating disorders is emphasised in the literature.^{26,27} Prudence is associated with the reflection and analysis of a given course of action.^{13,14} Cognitive disorders can negatively affect the regulation of prudence. This theory, however, requires empirical research. In future studies, the interaction between cognitive impairment and prudence should be analysed in relation to behaviours.

The present study shows that prudence is not the main characteristic associated with eating behaviours in eating disorders. It is reasonable, however, to check other variables that reduce the activity of prudence in patients with eating disorders. The results obtained indicate that the problem may be more complex.

It should be noted that all women with eating disorders were in treatment. This may be one of the explanations why significant relationships had not been found. Behaviours are the first aspects to be modified in therapy, while attitudes and personal traits change more slowly. It may be that patients are not showing behaviours while they are still having lower levels of prudence because they are in treatment.

The study, however, was carried out in hospitals, and the participation of patients with eating disorders in therapy was obligatory.

The present findings suggest the need for further research on the role of prudence in weight control behaviour in anorexia and bulimia. Future studies on eating disorders need to consider the following variables: personality, i.e. the interaction of prudence and other personality traits; diet, i.e. the eating behaviours of patients with eating disorders; and biological hunger-satiation dynamics, which may affect the contribution of prudence to eating behaviours. The opposite of prudence is intense affect. It is, therefore, necessary to take affect control into consideration when studying prudence. Affective temperament^{28,29} may prove to be a very helpful dimension in this context.

The research trend proposed here points to a new direction of research on eating disorders. The need to highlight one's entire personality profile rather than isolated personality variables, as postulated for example by Whiteside and Lynam,¹⁰ is particularly noteworthy.

Problems with healthy weight maintenance are related to bad eating habits. These habits are very stable and hard to modify because they are determined by stable personality structures, including lack of prudence. Psychologists define attitudes as a set of relatively stable dispositions to behave in particular ways towards particular objects. Attitudes have three basic dimensions: cognitive, behavioural and affective.³⁰ Taking these basic tenets of social psychology into consideration, we may presume that prudence affects three different aspects of human attitudes towards eating: (1) cognition, i.e. nutritional knowledge; (2) behaviour, i.e. eating behaviour; and (3) affect, i.e. the emotions accompanying eating.

The findings presented in this article indicate the need to develop new therapeutic approaches for patients with eating disorders, which would foster healthy prudence. Prudence ought to be the object of increased concern in therapy. Arguments need to be carefully developed and methods need to be appropriately selected to modify patients' awareness. Further intensive research is necessary to achieve this end.

Conclusions

Mean prudence scores are significantly lower in women with eating disorders and obese women compared with healthy women. Prudence is an important personality disposition, which significantly contributes to the analysed eating disorders. The present study found a significant effect of prudence on readiness to initiate weight control behaviours, such as self-induced vomiting, the use of laxatives, slimming agents and diuretics in women with anorexia and bulimia, and the frequency of such behaviours.

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Conflict of interest

The authors have no conflict of interest to declare.

Uncited reference

Ref. 19.

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