Convergent Validity of the Larocque Obesity Questionnaire[1] and Self-reported Behavioral Observations during Obesity Treatment

S C Stotland[1,2], M Larocque[2]

[1]Department of Psychology, McGill University, Montreal, Canada

[2]MLA Nutrition Clinics, Montreal, Canada

Psychological Reports, 2004, 95, 1031-1042. © Psychological Reports 2004

Address correspondence to:

Dr. Stephen Stotland
1310 Greene Avenue, Suite 230
Westmount, Quebec H3Z 2B2
(514) 737-3360
sstot@qc.aibn.com

[1] The Larocque Obesity Questionnaire is administered online. For details, please contact the authors or visit our website at www.mla.ca.

Summary.- A validation study of the Larocque Obesity Questionnaire (LOQ), designed for use in obesity treatment was performed. Unlike other available obesity measures, the LOQ includes scales measuring general emotional state as well as eating behavior. LOQ subscales include uncontrolled eating, physical stress responses, depression and perfectionism. Subjects were 458 women and 79 men in treatment for obesity by general practitioners. The LOQ subscales demonstrated acceptable internal consistency and related in predictable ways to measures of eating behavior, depression, self-criticism, stress, physical complaints and weight-control motivation. Subjects in the heaviest weight category (body mass index ≥ 40) showed higher scores on stress response and depression subscales. There were no significant sex differences, after controlling for weight. All four LOQ subscales showed significant improvement after 5 weeks, demonstrating their sensitivity to changes brought about by treatment.

Obesity is a chronic condition that appears to necessitate continuous care over many months and years (World Health Organization, 1998). The treatment of obesity requires a commitment by patients and health care workers to a difficult and lengthy process (Wadden, Brownell, & Foster, 2002), although successful weight loss maintenance is by no means guaranteed by even the most consistent monitoring (Jeffery, Drewnowski, Epstein, Stunkard, Wilson, Wing, & Hill, 2000). The obese patient must traverse a number of difficult stages in behavior change, beginning with the initial weight loss and proceeding to long-term maintenance.

In order to effectively support these efforts, caregivers must provide long-term monitoring not only of weight shifts, but other physical changes, and changes in eating and exercise habits, in weight-control motivation, and in emotional state. Clearly, a large amount of biopsychosocial information is needed to treat obesity effectively (Wadden & Phelan, 2002).

Obesity practitioners have relied on an assortment of measures of psychological variables (e.g., eating restraint, emotional eating, motivation for weight loss, depression, stress), but these factors have not been included in a single, multidimensional scale, and using a combination of scales is cumbersome and time consuming. Clinicians are constrained by limited time and resources and therefore require measures able to balance the needs for comprehensiveness, brevity, and validity. The treatment of obesity is hampered by the lack of such a measure, one that would assess a patient's general emotional state as well as weight control behaviors and attitudes.

We designed the Larocque Obesity Questionnaire (LOQ, Larocque & Stotland, 2000; Stotland & Larocque, 2003) with the needs of clinical settings in mind. The LOQ is a relatively brief questionnaire with scales measuring eating behavior, stress responses, depression and perfectionist tendencies. Preliminary research suggested that the LOQ scales are reliable and have predictable relations with conceptually similar scales (Larocque & Stotland, 2000; Stotland & Larocque, 2003). In the current study, we present data from a large sample of women and men in obesity treatment on the reliability of LOQ subscales, their relations with a number of other variables (e.g., body mass index, age, sex, psychological variables), and their sensitivity to treatment change.

Method

Subjects

The study included a total of 458 female and 79 male subjects. Participants were between 18 and 70 years of age (women, 42.0 ± 6.1; men, 43.1 ± 6.6) and had a body mass index (BMI; kg/m^2) of at least 25 (women, 32.7 ± 11.4; men, 35.3 ± 13.4). All subjects were beginning treatment for obesity with a family doctor.

Procedure

Subjects were assessed with the LOQ at the start of treatment and were asked to repeat this assessment after about a month. The one-month treatment dropout rate was 26.1% for women and 21.5% for men. Seventy-one % of subjects ($\underline{N}$=278; $\underline{n}_{men}$= 40; $\underline{n}_{women}$=238) still in treatment after a month completed the second psychological assessment.

The treating physicians followed a fairly consistent approach, using reduced-calorie diets and a brief form of behavior therapy. Weekly counseling sessions were designed to be brief (15 – 20 minutes), and to include a medical evaluation, the selection of a diet plan, and behavior therapy. The behavioral component included the identification of behavior change targets, the setting of specific proximal goals, and the implementation of self-monitoring and self-reinforcement strategies.

Treatment was open-ended and patients were urged to continue well into the weight-loss maintenance phase. Patients were given the assurance that they could return to treatment at any time if they happened to stop for some reason. Thus, the treatment combined the use of reduced-calorie diets and brief behavior therapy, in a continuous-care format.

Measures

LOQ (Larocque & Stotland, 2000; Stotland & Larocque, 2003). The LOQ is an on-line assessment, currently in use in clinics in North America and Europe, with more than 30,000 patients having completed it since its introduction in the year 2000. The LOQ includes four subscales measuring Uncontrolled Eating (LOQ-UE), Stress Responses (LOQ-SR), Depression (LOQ-D) and Perfectionism (LOQ-P). These four dimensions were selected to provide a broad overview of both eating behavior and psychological states with potential relevance for weight control. Research suggests that obese patients seeking weight control treatment show heightened levels of depression and low self-esteem compared to control groups (Friedman & Brownell, 1995).

Emotional distress may have important implications for self-regulation in general (e.g. Maes & Gebhardt, 2000) and weight control in particular (Williams, Surwit, Babyak, & McCaskill, 1998; Wardle, Steptoe, Oliver, & Lipsey, 2000).

Uncontrolled Eating is an 11-item scale that includes items describing a range of eating behavior, including consumption of fats and sweets, emotional eating, urges to overeat, situational overeating, and eating style (e.g., "During the last month, have you had the urge to eat as if you had not eaten for years?"). Stress Responses is a 6-item scale measuring the occurrence of physical stress responses, in the last month (e.g., "Have you experienced any of the following symptoms: headache, backache, sore neck, that can not be attributed to any disease?"). Depression is a 7-item scale measuring currently experienced depressive symptoms (e.g., "I cry all the time."). Perfectionism includes 7 items measuring general tendencies towards perfectionism (e.g., "I demand a lot from myself and everything I do must be perfect"). All items were answered on 4-point rating scales.

Cronbach alphas for LOQ subscales at Time 1 were as follows: Uncontrolled Eating: .76 women, .76 men; Stress Responses: .69 women, .75 men; Depression: .81 women, .84 men; Perfectionism: .74 women, .75 men. These alphas appear very stable – we computed alphas for a much larger sample of more than 5000 patients, and found scores within a percentage point of those reported in the present study.

LOQ subscales showed moderate intercorrelations for both women and men (Table 1). An apparent sex difference was the stronger link between uncontrolled eating and stress responses in men, and between uncontrolled eating and depression and perfectionism in women (LOQ subscale intercorrelations in the 5000 subject sample are very similar, though slightly attenuated).

Convergent measures

In order to examine the convergent and discriminant validity of LOQ subscales, four subgroups of subjects were also administered one of four sets of additional questionnaires, selected to measure concepts similar to those of the LOQ:

Group 1 (N_1=123) completed the 33-item Dutch Eating Behavior Questionnaire (van Strein, Frijters, Bergers, & Defares, 1986; van Strein, 1999), which includes scales measuring Eating Restraint, Emotional Eating and External Eating; Cronbach alphas for the three scales in the present sample were .88, .94 and .83, respectively.

Group 2 (N_2=140) completed the 20-item Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), and the 35-item Self-Criticism scale of the McGill revision of the Depressive Experiences Questionnaire (Santor, Zuroff, & Fielding, 1997). Cronbach alphas were .91 and .80.

Group 3 (N_3=144) completed the 15-item Treatment Self-Regulation Questionnaire (Williams, Grow, Freedman, Ryan, & Deci, 1996), measuring Autonomous and Controlled Motivation for weight control, indicating whether the individual's reasons for pursuing weight control were a reflection of internalized values

(autonomous motivation) vs. external pressure (controlled motivation). Cronbach alphas were .77 and .76. This group also completed a series of scales related to preventive nutrition developed by Schwarzer and Renner (2000), measuring health Risk Perception (3 items), Outcome Expectancies (3 items), Action Self-Efficacy (2 items) and Coping Self-Efficacy (3 items) and Intentions (4 items); Cronbach alphas were .91, .82, .75, .76 and .79.

Group 4 (N_4=140) completed the 10-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), and the 33-item Cohen-Hoberman Inventory of Physical Symptoms (Cohen, & Hoberman, 1983); Cronbach alphas were .90 and .89.

Results

Sex and BMI effects on LOQ scores

Table 2 presents descriptive data for women and men at the first and second assessments (Time 1 and Time 2). Analysis of variance was used to evaluate the influences on LOQ scores of sex, BMI, and their interaction. Subjects were categorized into three BMI groups for this analysis (group 1: 25 ≤ BMI < 30; group 2: 30 ≤ BMI < 40; group 3: BMI ≥ 40). No significant main effects were found for sex. This means that with BMI controlled, sex had no influence on self-ratings of eating behavior or emotional states. Significant main effects for BMI group were found on Stress Responses ($F_{2, 534}$ = 10.23, p < .0001) and Depression ($F_{2, 534}$ = 6.37, p < .0001). Planned comparisons of BMI groups using the Tukey test indicated that the highest BMI group scored higher than the other two groups on both variables. Thus, the effect of the severity of the weight problem is observed in the group with BMI greater than 40. This group would be categorized as “severely obese.”

Construct validity

Correlations between LOQ scores and age, BMI, and other psychological variables were examined, separately for women and men. Given the large number of comparisons, correlations at the $p < .05$ level should be interpreted with caution.

Older women scored significantly lower on Uncontrolled Eating, Depression and Perfectionism (Table 3). None of the LOQ scales were related to BMI for women. Older men had lower scores on Uncontrolled Eating and Stress Responses. Heavier men had more Stress Responses and scored higher on Depression.

As in our previous research (Larocque & Stotland, 2000), we found Uncontrolled Eating to correlate weakly with Eating Restraint, and strongly with Emotional Eating and External Eating (Table 3), in the female sample. To rule out potential mediating effects of age and BMI, we conducted stepwise regression analysis, including these variables and the four LOQ subscales as predictors of each of the Dutch Eating Behavior Questionnaire scales. Due to the limited size of the male sample, the regression analyses were conducted for women only. We found that Uncontrolled Eating was the only significant predictor of Eating Restraint ($\underline{df} = 1, 103$, $\underline{R}^2 = .06$, $\underline{p} < .02$), indicating a statistically significant but weak relationship between those scores. Both Emotional Eating and External Eating were strongly associated with Uncontrolled Eating ($\underline{df} = 1, 103$, $\underline{R}^2 = .43$ and .42, $\underline{p}$'s $< .0001$), with Perfectionism accounting for a very small amount of additional variance in Emotional Eating scores ($\underline{df} = 2, 102$, $\underline{R}^2 = .03$, $\underline{p} < .02$). The pattern of correlations was strikingly different in the male sample. Uncontrolled Eating was associated strongly with lower Restraint and higher External Eating, but was not significantly related to Emotional Eating (Table 3).

Emotional Eating was significantly related to higher Stress Responses. Thus, it seems that for men, Uncontrolled Eating was primarily a function of lack of restraint and heightened responsiveness to eating stimuli, rather than to emotional eating, as it was in women.

Scores on both the Center for Epidemiological Studies Depression scale (CES-D) and the Depressive Experiences Questionnaire-Self-Criticism scale were significantly related to scores on all of the LOQ subscales for women, with the strongest relations for Depression (Table 3). Stepwise regression indicated that much of the variance in CES-D (df = 1, 121, R^2 = .43, p< .0001) and Self-Criticism (df = 1, 121, R^2 = .44, p< .0001) was explained by Depression. In males, CES-D and Self-Criticism scores were both significantly related to Stress Responses, Depression and Perfectionism (p's <.05). The strongest relations were with Depression (both r's = .84, p's < .0001).

Perceived Stress Scale scores were significantly related to all four LOQ subscales (p's < .0001) (see Table 3) for women. Stepwise regression indicated that Depression accounted for the majority of the explained variance in Perceived Stress (df = 1, 107, R^2 = .45, p < .0001), with Stress Responses (df = 2, 106, R^2 = .13, p< .0001) and Perfectionism (df = 3, 105, R^2 = .02, p< .03) explaining small amounts of additional variance. Scores on the Cohen-Hoberman Inventory of Physical Symptoms were also significantly related to all four LOQ subscales (p's < .01). Stepwise regression indicated that Stress Responses accounted for most of this (df = 1, 107, R^2 = .67, p< .0001). Thus, it appears that perceived stress is associated with elevations on all the LOQ subscales, while physical complaints are primarily associated with Stress Responses.

The pattern of correlations for men was very similar to that described for women, except that Perfectionism scores were unrelated to physical complaints.

Women's scores on Uncontrolled Eating were related to both Autonomous and Controlled Motivation, Health Risk Perception, Outcome Expectancies, and Action Self-Efficacy (Table 3). Subjects with higher Uncontrolled Eating reported greater motivation, but particularly of the external (Controlled) type, and also reported greater Perceived Health Risk, had higher Outcome Expectancies for eating behavior change, yet had less confidence (Action Self-Efficacy) in achieving this aim. Stress Responses was related to higher scores on Controlled Motivation, Perceived Health Risk, and lower Action Self-Efficacy. Depression and Perfectionism were both associated with higher scores on Controlled Motivation. None of the LOQ scores were related to scores on Intentions to make behavior changes. For males, Uncontrolled Eating and Perfectionism were associated with higher scores on Controlled Motivation.

Changes during weight control treatment

An important validity criterion for an obesity outcome measure is its sensitivity to treatment effects. We examined changes in LOQ scores from Time 1 to Time 2. In order to minimize the effects of varying time intervals, we selected a subsample whose second assessment occurred between 1 and 3 months from the beginning of treatment (average interval was 37.9 ± 15.6 days). Paired t tests indicated significant changes on the four LOQ scores (Table 4). Thus, it appeared that LOQ scores showed rapid change during the initial phase of weight control treatment.

Discussion

The LOQ was designed to address the critical need for repeated monitoring of several important psychological dimensions during long-term obesity treatment. The four LOQ scales have acceptable reliability (Cronbach alphas ranging from .69 to .84) and correlate in predictable ways with age, BMI and related psychological measures. Scores on all four LOQ subscales showed marked improvement at the second assessment, suggesting they are sensitive to the psychological changes brought about by treatment. Future research should include a no-treatment control group to evaluate the possibility that these observed changes are merely due to practice effects or the passage of time.

Uncontrolled Eating may be considered an index of controlled vs. uncontrolled eating patterns. This includes a number of overlapping behavioral tendencies, including emotional eating, impulsive/external eating, and unhealthy eating habits (i.e., eating too much fat and sweets). In women, this scale showed strong relations with the Emotional Eating and External Eating scales from the Dutch Eating Behavior Questionnaire, as well as with higher scores on external (controlled) motivation for weight control, higher Outcome Expectancies, CES-D, Self-Criticism and Perceived Stress, and lower Action Self-Efficacy (confidence in making behavior changes). Thus, women reporting more uncontrolled eating showed a complex and problematic combination of emotions, thoughts and feelings about weight control. This pattern is consistent with research on the correlates of emotional eating and binge eating in women (Dingemans, Bruna, & van Furth, 2002; Stice, 2002). The pattern of correlations with uncontrolled eating was somewhat different in men –Uncontrolled Eating was not significantly related to Emotional Eating, but was strongly related to lower Eating Restraint and higher External

Eating (i.e. eating in response to the sight, smell or taste of food, or the presence of other people eating), as well as to Controlled Motivation, Perceived Health Risk and Perceived Stress. It appears that Uncontrolled Eating is more closely related to depression and emotional eating in women, and to unrestrained eating and perceived stress in men. This finding of a sex difference in the correlates of uncontrolled eating should be explored further in future research. For both men and women, there was a rapid reduction in Uncontrolled Eating scores after a month of treatment.

The three LOQ emotion subscales were all strongly related to other emotion scales. Stress Responses was related to Perceived Stress and CES-D, but showed its strongest link with the Cohen-Hoberman Inventory of Physical Symptoms, supporting our belief that it represents a measure of physical stress responses. Depression and Perfectionism were strongly related to CES-D and Self-Criticism, as well as Perceived Stress, but less so to the Cohen-Hoberman Inventory of Physical Symptoms. Given the moderate degree of intercorrelation of the three LOQ subscales, it is not surprising that they showed significant overlap in their patterns of correlation with other measures. This is consistent with other reports that various measures of negative affect are strongly related (Jolly, Dyck, Kramer, & Wherry, 1996; Santor, Zuroff, Mongrain, & Fielding, 1997). Scores on all three of the LOQ subscales showed marked improvement in the first month of treatment (see Table 4).

Previous research would also predict a link between the degree of Uncontrolled Eating and the other three factors. Obese people would be expected to show more uncontrolled eating patterns when stressed or depressed, or showing more self-criticism (Wadden et al., 2002; Womble, Williamson, Martin, Zucker, Thaw, Netemeyer, Lovejoy,

& Greenway, 2001). Our finding that the four LOQ subscales had a moderate degree of intercorrelation is consistent with those predictions. However, there remain many questions about how these four overlapping dimensions interact to predict behavior and weight changes in the context of obesity treatment.

The present study offers additional evidence of the construct validity of the LOQ and its usefulness as an obesity outcome measure. This scale is offered as a practical measure for the purposes of monitoring psychological factors in long-term obesity treatment and research. It is relatively brief, includes a number of clinically relevant scales, and appears to be both reliable and valid.

The LOQ is still in development, the intent of which is to provide a comprehensive assessment and data management system for obesity treatment. The LOQ includes a number of additional items that were not evaluated in the present study. These include items measuring exercise habits, smoking, alcohol and caffeine intake, purging, and weight control motivation. Our ongoing research aims to validate these additional behavioral and cognitive-motivational factors and to integrate them into the LOQ.

References

Cohen, S., & Hoberman, H. (1983). Positive events and social supports as buffers of life change stress. Journal of Applied Social Psychology, 13, 99-125.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. Journal of Health and Social Behavior, 24, 385-396.

Dingemans, A., Bruna, M., & van Furth, E. (2002). Binge eating disorder: a review. International Journal of Obesity, 26, 299-307.

Friedman, M., & Brownell, K. (1995). Psychological correlates of obesity: Moving to the next research generation. Psychological Bulletin, 117, 3-20.

Jeffery, R., Drewnowski, A., Epstein, L., Stunkard, A., Wilson, G., Wing, R., & Hill, D. (2000). Long-term maintenance of weight loss: Current status. Health Psychology, 19, 5-16.

Jolly, D., Dyck, M., Kramer, T., & Wherry, J. (1996). The relations between sociotropy and autonomy, positive and negative affect and two proposed depression subtypes. British Journal of Clinical Psychology, 35, 91-101.

Larocque, M., & Stotland, S. (2000). The Larocque Obesity Questionnaire: A new measure of the psychological factors in weight control. American Journal of Bariatric Medicine, 15, 12-14.

Maes, S., & Gebhardt, W. (2000). Self-regulation and health behavior: The health behavior goal model. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation*. San Diego, CA: Academic Press, Pp.343-368.

Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1, 385-401.

Santor, D., Zuroff, D., & Fielding, A. (1997). Analysis and revision of the Depressive Experiences Questionnaire: Examining scale performance as a function of scale length. Journal of Personality Assessment, 69, 145-163.

Santor, D., Zuroff, D., Mongrain, M., & Fielding, A. (1997). Validating the McGill revision of the Depressive Experiences Questionnaire. Journal of Personality Assessment, 69, 163-182.

Schwarzer, R., & Renner, B. (2000). Social-cognitive predictors of health behavior: Action self-efficacy and coping self-efficacy. Health Psychology, 19, 487-495.

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. Psychological Bulletin, 128, 824-848.

Stotland, S., & Larocque, M. (2003). Web-based psychological assessment in obesity treatment: Association with treatment continuation vs. dropout. American Journal of Bariatric Medicine, 18, 11-14.

van Strein, T. (1999). Success and failure in the measurement of restraint. International Journal of Eating Disorders, 25, 441-449

van Strein, T., Frijters, J.E.R., Bergers, G.P.A., & Defares, P.B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional eating and external eating behavior. International Journal of Eating Disorders, 5, 295-315.

Wadden, T., Brownell, K., & Foster, G. (2002). Obesity: responding to the global epidemic. Journal of Consulting and Clinical Psychology, 70, 510-525.

Wadden, T.A., & Phelan, S. (2002). Behavioral assessment of the obese patient. In T. Wadden & A. Stunkard (Eds.), *Handbook of obesity treatment*. New York, Guilford, Pp.186-228.

Wardle, J., Steptoe, A., Oliver, G., & Lipsey, Z. (2000). Stress, dietary restraint and food intake. Journal of Psychosomatic Research, 48, 195-202.

Williams, G., Grow, V., Freedman, Z., Ryan, R., & Deci, E. (1996). Motivational predictors of weight loss and weight-loss maintenance. Journal of Personality and Social Psychology, 70, 115-126.

Williams, P., Surwit, R., Babyak, M., & McCaskill, C. (1998). Personality predictors of mood related to dieting. Journal of Consulting and Clinical Psychology, 66, 994-1004.

Womble, L., Williamson, D., Martin, C., Zucker, N., Thaw, J., Netemeyer, R., Lovejoy, J., & Greenway, F. (2001). Psychosocial variables associated with binge eating in obese males and females. International Journal of Eating Disorders, 30, 217-221.

World Health Organization. (1998). Obesity: preventing and managing the global epidemic. Geneva, Switzerland: World Health Organization.

Table 1 – Intercorrelations between LOQ scales

	LOQ-UE	LOQ-SR	LOQ-D	LOQ-P
LOQ-UE	----	.51****	.14	.25*
LOQ-SR	.29****	----	.46****	.41***
LOQ-D	.39****	.41****	----	.42***
LOQ-P	.40****	.31****	.48****	----

Note – Correlations for males are above the diagonal, for females below the diagonal.

N= 458 for females, N=79 for males

* $p < .05$ **** $p < .0001$

Table 2 – Age, BMI and LOQ scores at Time 1 and Time 2

Time 1	FEMALES									MALES								
Variable	25 ≤ BMI < 30			30 ≤ BMI < 40			BMI ≥ 40			25 ≤ BMI < 30			30 ≤ BMI < 40			BMI ≥ 40		
	N	mean	std	n	mean	std	n	mean	std	n	mean	std	n	mean	std	n	mean	std
AGE	190	40.7	11.7	218	43.3	11.5	50	41.0	8.8	19	41.3	13.1	48	45.5	13.0	12	36.6	13.8
BMI	190	27.7	1.4	218	34.2	2.7	50	45.6	5.9	19	28.5	1.1	48	34.9	2.8	12	47.8	4.7
LOQ-UE	190	32.1	5.5	218	32.3	5.3	50	33.2	4.7	19	30.2	3.9	48	31.9	5.0	12	32.9	6.8
LOQ-SR	190	10.7	3.2	218	11.1	3.3	50	12.2	3.9	19	9.3	2.5	48	10.9	3.8	12	13.8	3.7
LOQ-D	190	11.2	3.2	218	11.4	3.4	50	12.9	3.7	19	9.7	2.5	48	10.4	3.2	12	12.7	4.0
LOQ-P	190	17.0	3.6	218	17.2	3.8	50	17.1	4.0	19	17.3	3.5	48	16.5	3.8	12	19.3	1.9
Time 2	FEMALES									MALES								
Variable	25 ≤ BMI < 30			30 ≤ BMI < 40			BMI ≥ 40			25 ≤ BMI < 30			30 ≤ BMI < 40			BMI ≥ 40		
	n	mean	std	n	mean	std	n	mean	std	N	mean	std	n	mean	std	n	mean	std
BMI	93	26.6	2.7	118	32.5	2.8	26	44.3	6.9	11	27.3	0.9	20	33.0	2.6	9	46.1	5.3
LOQ-UE	93	26.8	4.1	118	26.5	4.1	26	26.5	4.0	11	26.3	5.0	20	26.0	3.9	9	25.8	4.5
LOQ-SR	93	8.4	1.9	118	8.9	2.4	26	9.8	3.2	11	8.5	1.9	20	8.5	3.4	9	9.8	2.9
LOQ-D	93	9.5	2.2	118	10.0	2.5	26	10.8	2.7	11	9.6	1.8	20	10.1	2.9	9	9.3	1.6
LOQ-P	93	15.3	3.4	118	16.0	3.5	26	15.3	4.2	11	15.9	4.8	20	14.9	4.0	9	16.4	2.3

Table 3 – Correlations between LOQ scales and age, BMI, and other psychological measures

	FEMALES					MALES				
Variable	N	LOQ-UE	LOQ-SR	LOQ-D	LOQ-P	N	LOQ-UE	LOQ-SR	LOQ-D	LOQ-P
Age	458	-.22****	.00	-.18****	-.19****	79	-.22	-.24*	-.07	-.10
Body Mass Index	458	.08	.15	.14	.02	79	.19	.36**	.25*	.18
Eating Restraint[1]	105	-.25*	-.04	-.13	.00	18	-.69**	-.54*	-.20	.02
Emotional Eating[1]	105	.66****	.19	.40****	.47****	18	.17	.50*	.44	.23
External Eating[1]	105	.65****	.17	.26**	.42****	18	.51*	.41	.26	.19
Autonomous Motives[2]	121	.18*	-.05	.04	.15	19	.22	-.30	-.36	-.06
Controlled Motives[2]	121	-.36****	-.25**	-.28**	-.38****	19	-.46*	-.23	-.39	-.54*
Perceived Health Threat[3]	121	.27**	.23*	.07	.12	19	.45	.26	.20	-.28
Outcome Expectancy[3]	121	.42****	.06	.04	.18	19	.30	.03	-.04	.06
Action Self-Efficacy[3]	121	-.27**	-.23*	-.15	-.19*	19	-.19	-.21	-.22	.24
Coping Self-Efficacy[3]	121	-.05	.01	.04	.01	19	-.29	-.19	-.22	-.09
Intentions[3]	121	.02	.01	.02	.06	19	.40	-.06	-.29	.01
CES-D[4]	123	.39****	.52****	.65****	.41****	21	.19	.55*	.84****	.48*
Self Criticism[5]	123	.45****	.42****	.67****	.51****	21	.32	.68***	.84****	.63**
Perceived Stress[6]	109	.43****	.61****	.67****	.52****	21	.52*	.57**	.45*	.35
Physical Complaints[7]	109	.27**	.82****	.33***	.32***	21	.27	.70***	.53*	.11

* p <.05 ** p<.01 *** p<.001 **** p<.0001

Table 3 – Footnotes, continued

[1] Dutch Eating Behavior Scale

[2] Treatment Self-Regulation Scale

[3] Social-cognitive scales from Schwarzer and Renner (2000)

[4] Center for Epidemiological Studies Depression Scale

[5] McGill Revision of the Depressive Experiences Questionnaire – Self-Criticism Scale

[6] Perceived Stress Scale

[7] Cohen-Hoberman Inventory of Physical Symptoms

Table 4 – Changes in BMI and LOQ scales from time 1 to time 2

Variable	Change from time 1	T value
BMI	1.7 ± 1.1	23.9****
LOQ-UE	6.2 ± 5.2	18.0****
LOQ-SR	2.2 ± 2.9	11.0****
LOQ-D	1.7 ± 2.5	10.0****
LOQ-P	1.7 ± 2.9	8.9****

df = 220 **** $p < .0001$

Note – Change = time 1 – time 2