

Perceptions, Motives, and Psychological Flexibility Associated with Weight Management

Sairanen Essi Elina^{1*}, Lappalainen Raimo Ilmari¹, Lapveteläinen Anja Terttu² and Karhunen Leila Johanna²

¹Department of Psychology, University of Jyväskylä, P.O. Box 35, FI-40014 University of Jyväskylä, Finland

²Department of Clinical Nutrition/Food and Health Research Centre, Institute of Public Health and Clinical Nutrition, University of Eastern Finland, Kuopio Campus, P.O. Box 1627, FIN-70211, Kuopio, Finland

Introduction

Overweight people are often able to lose weight with the help of professionals, but majority (about 85 %) of the weight losers fail to maintain behavioural changes that would lead to favourable results in the long term [1-3]. Studies suggest that obesity treatment failures may reflect motivational and contextual impediments to weight loss, rather than limitations of the behaviour change strategies per se [4,5]. A stronger emphasis on motivational factors within a behavioral weight maintenance program offers promise for improving long-term outcomes. The motivation-focused approach has been shown to be as effective as the successful standard skill-based method in weight maintenance [5]. Specific attention on eliciting and supporting personally relevant motivation for weight management can be used to promote internalization and the sustaining of autonomous self-regulation [5].

Social situations can have an impact on compliance with dietary advice [6]. Interestingly, overweight cardiac patients more often reported cognitions and expectations as reasons for their difficulties to eat healthily in social situations than patients with normal weight [6]. This suggests that it would be useful to study weight losers' cognitions in order to better understand success and failures in the maintenance of weight loss.

It is known that rigid cognitive control may be harmful for weight control [7,8]. It has been shown that dietary restraint is not a homogeneous construct, but includes two distinct cognitive and behavioral styles: rigid control and flexible control of eating behavior [8]. Studies with various samples have shown that rigid control is consistently associated with higher Body Mass Index (BMI), while flexible control is consistently associated with lower BMI and better weight loss and weight maintenance [8]. Moreover, the results suggest that it is a general dichotomous thinking style, a form of cognitive rigidity, rather than dichotomous cognitions relating specifically to food, weight and eating, that is the key predictor of weight loss maintenance [7].

In contrast to cognitive rigidity, it is hypothesized by one of the recent empirical (experience-based) theories of psychopathology, the Acceptance and Commitment Therapy (ACT), that psychological flexibility is a primary determinant of mental health and behavioral effectiveness [9]. Psychological flexibility refers to an ability to focus on the present moment and, depending on what the situation affords, to persist with or change one's behavior in the pursuit of goals and values. Flexibility involves a reduced tendency to control internal experiences [9] when doing so would prevent goal attainment (e.g. when avoiding fear prevents people from taking goal-directed action). Instead, flexibility involves people deliberately observing their internal experiences on a moment-to-moment basis in an open, non elaborative, non controlling and non judgmental manner [10]. This mindful stance toward internal events frees people from the need to control such events

or to be overly guided by them. Instead, it allows people to redirect their limited attention resources to the present moment. As a result, psychologically flexible people are less emotionally disturbed [10], and they have more attentional resources for noticing and responding effectively to goal-associated opportunities that exist in the present situation [10].

In line with this conceptualization of psychological flexibility, there are now dozens of studies that show that this characteristic predicts outcomes such as mental health, physical health, and job performance [10]. Moreover, increased psychological flexibility led to stigma reduction, improvements in quality of life, and weight loss for obese weight losers [11].

In addition to flexibility, overweight people's own perceptions of factors affecting their weight and motivation may be an important aspect when aiming to change their behaviour. The success of the motivation-based approach [5] provides clinicians and researchers an attractive intervention alternative for use when addressing the challenge of sustaining weight loss. To maximize the clinical utility of this novel approach, further research is warranted to identify the personal motivating factors of weight losers.

The purpose of the present study was to find out how obese and overweight persons' perceptions of factors affecting their weight and motivation are related to weight loss and maintenance. Also, we were interested in how psychological flexibility (or cognitive rigidity) is related to those perceptions. The aim was to increase our understanding of how psychological flexibility is associated with weight maintenance, and find new hypotheses for future studies concerning weight management.

Method and Procedures

Participants

The 49 participants (12 men, 37 women) of the present study were obese or overweight individuals who had taken part in a weight-loss and maintenance intervention (WLM intervention) 8-9 months earlier. The study design and the main results of the WLM intervention are described in detail by Karhunen et al. (In press). In brief, WLM

***Corresponding author:** Sairanen Essi Elina, Department of Psychology, University of Jyväskylä, P.O.Box 35, FI-40014 University of Jyväskylä, Finland, Tel: +358 407458215; E-mail: essi.sairanen@jyu.fi

Received April 11, 2012; Accepted May 15, 2012; Published May 20, 2012

Citation: Sairanen EE, Lappalainen RI, Lapveteläinen AT, Karhunen LJ (2012) Perceptions, Motives, and Psychological Flexibility Associated with Weight Management. J Obes Wt Loss Ther 2:135. doi:[10.4172/2165-7904.1000135](https://doi.org/10.4172/2165-7904.1000135)

Copyright: © 2012 Sairanen EE, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

intervention consisted of seven week weight loss period performed by using very-low-calorie-diet products, and a 24-week weight maintenance period. About 8–9 months after the end of the WLM intervention, the participants were asked to take part in the follow-up measurements of which they were not informed beforehand. The population of the present study was formed by the 60% of persons who completed the WLM intervention.

The mean age of the participants' of the present study was 50.8 ± 9.1 years (range 31–63) at the beginning of the intervention, and the mean Body Mass Index (BMI) at the time of follow-up was 31.2 ± 3.3 kg/m² (range 24.9–39.8). All participants were of Finnish origin. The majority were educated in vocational or upper secondary school (59.1%) and 24.5% had university or polytechnic degree. There were no significant differences in the background variables (gender, age, pre/post weight or BMI) between those individuals who participated in the follow-up and those who did not.

The study was performed in accordance with the standards of Helsinki Declaration. The Ethics Committee of the District Hospital Region of Northern Savo and Kuopio University Hospital approved the study plan, and all participants gave their written informed consent for participation in the study.

Procedure and measurements

The follow-up consisted of group sessions in which the participants were asked to describe the factors affecting their weight and factors motivating them to lose weight and change their lifestyle. Factors affecting weight were investigated using an open question. Participants were asked: "Which factors affect your weight? They can support or complicate weight management. Think about this question as extensively as possible. Factors affecting weight can be, for example, your habits and customs in specific situations, tendencies, desires, or they may concern your social relationships and life situation, thoughts and feelings." Participants were given a piece of paper with a radial diagram printed on it. A radial diagram was used to show the relationships of the core element: weight. The word "weight" was printed in the middle of the diagram and it was surrounded by eight equivalent circles scattered around the middle ("weight"). The subjects were asked to write whatever variables they thought have an effect on their own weight by writing it inside the circle (they were also permitted to write more or less than eight variables). An open weight analysis assessment using the radial diagram was chosen to allow the participants to produce the views regarding factors affecting their weight without limiting it. Positive and negative effects were not separated, because each factor can have both positive and negative effects for weight management. The general interest of the study was to clarify factors or classes of factors that are important in weight management. This assessment procedure is based on a clinical case formulation model [12]. This model has been used successfully in clinical practice over several years in order to collect hypotheses about factors affecting clients' behavior [13].

After naming the variables, participants were asked to evaluate how large impact or effect the stated factors have on their weight control, using a scale from 1 to 10 (1 = only a weak effect, 10 = a very strong effect). Similarly, they were asked to evaluate their willingness to make a change in those factors, using a scale from 1 to 10 (1 = little or no willingness to make a change in that particular factor; 10 = very

willing to make a change). The purpose of this question was to evaluate participants' motivation for action associated with different factors.

Participants' answers of factors affecting their weight were classified into 18 categories using a data-driven content analysis (see e.g. [14]). First, the material was read through several times. Second, relevant categories emerging from the data were identified by putting similar responses into the same category. Third, the categories and responses were evaluated with another researcher, and all disagreements were discussed until a full agreement was achieved. Thus, the purpose of this approach was to generate hypotheses for future research by collecting participants' freely produced statements of possible weight affecting factors. A data-driven approach, often also referred to as inductive or bottom-up approach, is a widely used approach when the aim of research is to generate hypotheses in a new research area where there does not yet exist a well-developed theory [15]. Descriptions and examples of the categories are presented in Table 2.

After that, the participants were asked about factors that motivate them for weight management and lifestyle changes. In assessing motivating factors, predefined categories for the different areas of life (see Table 3, Value categories) were used. Value categories were those applied in Acceptance and Commitment Therapy (ACT) [16,17]. In ACT, values are used as motivational tools. The purpose is to help clients select directions in their lives that are congruent with what is deeply important to them and to establish goals that support movement in those directions [10,11,16,17]. The participants were asked: "Which factors in the various areas of your life motivate you to lose weight or to make changes in your lifestyle? What personal reasons do you have for losing weight or for making lifestyle changes? For example, which factors concerning intimate relationships motivate you in weight management or making lifestyle changes? Try to consider all domains in the questionnaire accordingly". In addition, the participants were asked to evaluate how important the reported factors are to them (how strong motivational effect those factors have), using a scale from 1 to 10 (1 = only slightly motivating, 10 = highly motivating). Moreover, to study how weight losers understand the effect of weight loss in their life, they were asked to evaluate how much impact weight loss, or attaining their desired weight would have on the different areas of their life using a scale from 1 to 10 (1 = very weak effect, 10 = very strong effect).

Psychological flexibility was assessed using the Acceptance and Action Questionnaire (AAQ-II) [18], which is a 10-item Likert-type questionnaire that assesses the ability to accept aversive internal experiences and to pursue goals in the presence of these experiences. The questions of the AAQ-II are based on the following statements like "I worry about not being able to control my worries and feelings" and "My thoughts and feelings do not get in the way of how I want to live my life". The Acceptance and Action Questionnaire has good reliability and validity [18,19]. Weight of the participants was measured pre-, post and follow-up of the WLM intervention.

Thus, qualitative and quantitative methods were used to study the participants' perceptions of factors affecting their weight, and the relations between weight changes/psychological flexibility and perceptions/motives, respectively.

Statistical Analysis

The participants' answers regarding factors affecting their weight were reported in terms of frequency. Means of the importance and

willingness to change were calculated for those participants who had mentioned that particular factor. With regard to motivational factors, means of the importance and impact on weight loss relating to motivation in different areas of life were calculated for those participants who had mentioned a particular life area. All results are presented as mean values (standard deviation). Weight changes during the WLM intervention and the follow-up period were predicted with different variables that were mentioned as factors affecting weight using a binary logistic regression. Correspondingly, correlations between weight changes and the importance of or willingness to change were calculated using a Spearman correlation analysis. Similar analyses were made concerning relations between weight changes and motivational factors. Psychological flexibility was predicted with different variables that were mentioned as factors affecting weight and motivating weight control using a binary logistic regression. Other relations of psychological flexibility with the factors affecting weight and motivating weight control (importance, willingness to change, and impact of weight loss) were calculated using the Spearman correlation analysis. All statistical analyses were performed using the PASW, version 18.0.

Results

Weight changes

The participants' weight and BMI pre-, post- and follow-up of the WLM intervention are described in Table 1. The average weight loss ($n = 49$) from the beginning of the WLM intervention to the follow-up was 8.1 (6.1) kg, that is 8.6 (6.2) %, ranging from 5.4% weight gain to 18.7% weight loss. The average weight loss during the intervention (32 weeks) was 11.3 (4.8) kg, which is 11.9 (4.6) % (range 1.1-22.4%). The

average weight change (increase) from post to follow-up was 3.2 (3.5) kg that is 3.3 (3.5) % ranging from 4.6% weight loss to 12.6% weight gain.

Perception of factors affecting weight and motivation

The participants' perceptions of factors affecting their weight are shown in Table 2. The most frequently named variables were exercise and eating habits. About half of the participants mentioned family, friends and other social relationships as factors affecting weight. One third reported mood and stress affecting their weight. Health and rest or tiredness was estimated as the most important variables that affect weight. The participants were most willing (or motivated) to change their life situation and to exercise habits (see Table 2).

Almost every participant mentioned intimate partnership and health as motivating factors for weight management (see Table 3). More than 80% of the participants also reported leisure activity, work and their social network. Health was perceived as the most important motivator for weight management or lifestyle changes. Weight loss was also evaluated to have the biggest impact on health.

	Pre*	Post**	Follow-up***
Weight (kg)	94.7 (12.3)	83.4 (11.3)	86.6 (12.7)
BMI	34.1 (2.7)	30.0 (2.8)	31.2 (3.3)

Mean averages with standard deviations shown in parentheses

*measured at the beginning of WLM intervention

** measured after completing the WLM intervention

*** measured at the follow-up

Table 1: Weights and body mass indexes (BMI) of the subjects ($n=49$) pre-, post- and follow-up of the WLM intervention. Mean (standard deviation).

Weight factor	Frequency % (n)	Importance	Willingness to change	Description (examples)
1. Exercise	90 % (44)	8.1 (2.1)	8.4 (4.6)	Exercise, leisure time activities, barriers to exercise
2. Eating habits	84 % (41)	8.4 (1.4)	7.8 (1.8)	Snacking, regularity of eating, meal size
3. Friends and other social relationships	51 % (25)	7.8 (1.9)	5.3 (3.3)	Friends, peer support
4. Family	43 % (21)	8.0 (2.0)	5.7 (3.4)	Family relations, support of the family
5. Work	35 % (17)	6.9 (2.0)	6.2 (2.6)	Working life quality, balance of work and spare time, way of work
6. Stress	33 % (16)	8.0 (2.5)	8.0 (1.9)	Stress, hurry, lack of time
7. Mood	33 % (16)	7.4 (2.3)	6.8 (2.9)	Melancholy, good mood, exhilaration, comfort
8. Dietary knowledge	29 % (14)	8.2 (1.8)	6.8 (3.7)	Nutritional knowledge, choices at grocery store
9. Life situation	25 % (12)	8.2 (1.6)	8.7 (1.1)	Menopause, age, loneliness, abode
10. Health	22 % (11)	9.1 (1.4)	7.8 (3.3)	Health, health problems, maladies, medicines
11. Holidays	20 % (10)	6.7 (2.3)	5.9 (3.1)	Holidays, social visits, parties
12. Self-control	18 % (9)	8.3 (2.1)	7.0 (3.2)	Self-control, self-esteem, motivation, personal willingness and decision-making
13. Rest and tiredness	16 % (8)	8.9 (0.8)	7.8 (2.3)	Sufficient rest, tiredness, paucity of sleep
14. Seasonal variables	14 % (7)	7.4 (1.4)	7.7 (2.1)	Season, darkness, weather
15. Alcohol	14 % (7)	6.6 (2.6)	8.0 (1.9)	
16. Life rhythm	12 % (6)	6.7 (2.8)	6.0 (2.0)	Regularity, active life rhythm, staying up late
17. Watching television	10 % (5)	7.0 (1.2)	6.4 (2.4)	Watching television, reading
18. Appearance	8 % (4)	8.6 (0.5)	8.0 (1.8)	

Note: The table shows the frequency of the variable, the mean (standard deviation) for the importance of the variable (scale 0–10), and the mean (standard deviation) for the willingness to change with regard to the variable (scale 0–10). Some examples of the kinds of descriptions included in the category are also given.

Table 2: Factors affecting weight as reported by obese and overweight participants.

Motive	Frequency % (n)	Importance	Impact of weight loss	Description (examples)
1. Intimate relationships	92% (45)	7.9 (2.3)	7.2 (2.4)	Feeling more self-confident and attractive, partner's support and acceptance
2. Health	90% (44)	9.4 (0.9)	9.4 (0.9)	Improved health, feeling less pain
3. Leisure activity	84% (41)	8.0 (2.0)	8.2 (2.0)	More comfortable to exercise
4. Social network	82% (40)	7.5 (2.8)	6.9 (2.5)	More comfortable to be in others' company, others motivate to continue dieting
5. Work	82% (40)	7.0 (2.7)	7.4 (2.4)	Job well-being and performance, credibility
6. Caregiving	76% (37)	7.5 (2.8)	7.0 (2.7)	Being healthy because of children, transferring food habits
7. Family	76% (37)	6.8 (2.8)	6.8 (2.7)	Relatives' comments or cheer, to become accepted
8. Education and personal development	69% (34)	6.9 (2.8)	7.3 (2.6)	Improved self-esteem, dieting as a mental touchstone
9. Spirituality	41% (20)	4.0 (3.3)	4.2 (3.3)	Achieve mental and physical balance, ethical consuming
10. Community involvement	39% (19)	3.6 (2.8)	3.7 (2.9)	Being a good example, credibility

Note. The table shows the frequency of the variable, the mean (standard deviation) for the importance of the variable (scale 0–10), and the mean (standard deviation) for the impact of weight loss on that variable (scale 0–10). Some examples of the kinds of descriptions included in the category are also given.

Table 3: Factors motivating weight management and lifestyle changes as reported by obese and overweight participants.

Relationships between weight change and perceptions of factors affecting weight and motivation

Weight change that had occurred during the WLM intervention was related to the naming of nutritional knowledge (e.g., which foods are healthier than others) as a factor affecting weight ($B = 0.199, p = 0.019, \text{Exp}(B) = 1.220$), indicating that participants who had mentioned that knowledge (i.e., a lack thereof) affects their weight had lost less weight during the intervention. Similarly, weight change during the intervention was related to the naming of exercise as a factor affecting weight ($B = 0.265, p = 0.042, \text{Exp}(B) = 1.304$). Those few participants ($n = 5/49$) who had not mentioned exercise affecting their weight had lost more weight during the intervention (15.4 ± 6.7 kg) than those who had mentioned it (10.8 ± 4.4 kg). Thus, naming exercise as a factor affecting weight (during the follow-up phase) was associated with losing less weight during the treatment. However, all participants who did not mention exercise as a factor affecting weight ($n = 5/49$) had gained weight during the follow-up (3.3 ± 1.8 kg; range 1.2–6.1 kg).

Small weight loss during the intervention was related to willingness to make a change in alcohol consumption ($r = -0.76, p = 0.046, n = 7$) among those participants who had reported alcohol as a factor affecting their weight. In other words, the less weight participants had lost during the intervention period, the more they subsequently reported being motivated to change their level of alcohol consumption. Participants who had gained more weight during the follow-up more likely mentioned stress ($B = -0.223, p = 0.027, \text{Exp}(B) = 0.800$) as a factor affecting their weight and were more willing to change their eating habits ($r = 0.35, p = 0.03, n = 39$) and behavior associated with rest and tiredness ($r = 0.80, p = 0.02, n = 8$).

The weight change during the intervention was inversely related to reporting of intimate partnerships as a motivating factor for weight change ($B = 0.448, p = 0.016, \text{Exp}(B) = 1.566$). The participants who did not report intimate partnerships as a motivator for weight

management or lifestyle changes had lost more weight. The participants who reported education and personal development as motivators for weight management gained more weight during the follow-up period than those who did not mention those factors ($B = -0.282, p = 0.028, \text{Exp}(B) = 0.755$).

Relationships between psychological flexibility and perceptions of factors affecting weight and motivation

Psychological flexibility was related to the willingness to change one's life situation ($r = 0.89, p < 0.001, n = 11$) and life rhythm ($r = 0.88, p = 0.020, n = 6$). The more psychologically flexible the participants were, the more willing they were to change their life situation and life rhythm. There was also a nearly significant positive correlation between psychological flexibility and the willingness to change one's health ($r = 0.66, p = 0.053, n = 9$); more psychologically flexible participants were more willing to make a change in their health. Furthermore, psychological flexibility was related to importance of self-control as a factor affecting weight ($r = 0.75, p = 0.033, n = 8$); Individuals who had better psychological flexibility evaluated that self-control is more important factor concerning their weight.

With regard to associations between psychological flexibility and perceptions of factors motivating weight control, psychological flexibility was related to the impact of weight loss on health ($r = 0.34, p = 0.022, n = 45$). The participants who had better psychological flexibility evaluated weight loss as having a considerable impact on their health. There was also a nearly significant correlation between psychological flexibility and the reported importance of one's social network as a perceived motivating factor ($r = -0.31, p = 0.054, n = 39$). The individuals who had lower psychological flexibility were more motivated to weight management by their social network.

Discussion

The overall purpose of the present study was to examine perceptions of factors affecting weight and motivation for health

management in persons with excess weight. The associations between those perceptions and weight changes during and after controlled weight loss intervention were studied. The perceptions were also related to psychological flexibility in order to clarify its role in weight management. Particularly, the study aimed to increase the knowledge of how psychological flexibility (or cognitive rigidity) is related to the perceptions of factors affecting weight and motivation for weight management.

About half of the participants reported that social relationships have an influence on their weight, and intimate relationships were reported as frequently as health a motivating factor for weight management or lifestyle changes. In some previous studies, relationships with family, friends, and intimate partners have been found to have positive influences on weight loss and maintenance [2,4,20]. However, in the present study, participants who saw intimate partnerships as a reason for weight management or lifestyle changes had lost less weight during the weight loss program than those who did not report intimate partnership as a motivator. Thus, intimate relationships as a motivator may complicate weight management. Moreover, this observation supports the results showing that seeking help from others may be an ineffective way of coping with a dietary lapse, and suggests a possible dearth of self-sufficiency or self-efficacy [21]. Compared to regainers, maintainers of weight are more likely to use direct coping, such as increasing exercise or watching their food intake more carefully and less likely to seek help.

In short, the preceding and present results suggest that leaning on others may not be a good motivator or way of coping when aiming to lose weight. Rather, earlier results have indicated that an autonomous or intrinsic motivation to participate in a weight loss program [22] and exercise [4,23,24] is especially critical for weight loss maintenance. Hence, it was unexpected that participants who reported education and personal development as motivators for weight management had gained more weight during the follow-up period. The retrospective nature of study design may explain these results.

The participants who had not mentioned exercise affecting weight had lost more weight during the active weight loss phase. A corresponding connection between exercise as a factor affecting weight and weight change was not perceived during the follow-up period. Actually, all subjects who did not mention exercise, gained weight during the follow-up. In other words, the data suggest that perceiving exercise as a factor affecting weight may not be important in losing weight during a supervised weight loss program and can even moderate weight loss. However, as preceding results suggest, exercise may be especially critical for weight loss maintenance over time [2,4,21,23-25]. Furthermore, the studies suggest that an initial focus on diet is associated with short-term weight loss, while a change in exercise-related motivational factors-with a special emphasis on intrinsic sources of motivation (e.g., interest and enjoyment in exercise)-plays a more important role in longer-term weight management [25].

The participants who had gained more weight during the 8-month follow-up had more likely mentioned stress as a factor affecting their weight. Stress, when mentioned as a factor affecting weight, was usually seen as impeding weight management. Also, previous studies have found an association between experiencing stressful life events and weight regain [26]. However, some studies have shown that it is not the absence of stress, but rather the ability to cope with stress, that appears to be associated with successful weight maintenance [26].

The results of the present study may explain previous findings showing that increased psychological flexibility supports weight loss [11]. The more psychologically flexible the participants were, the more willing they were to change their life situation, life rhythm and health. In clinical application, this may mean that working with psychological flexibility (including values) may increase the willingness to make lifestyle changes. In addition, more psychologically flexible participants evaluated self-control to be affecting their weight more. The category of self-control consisted of motivational factors and factors concerning self-appreciation, these factors being personal and internal. Thus, the results suggest that individuals who have better psychological flexibility may feel more able to affect their weight autonomously. This is also called internal weight locus of control, which means that the person believes that his or her own behavior and attributes determine his/her weight. The belief that one's weight is due to factors outside one's own control, such as luck, genes, fate, or social support, is contrastingly labeled as perceived external weight locus of control [27]. Internal weight locus of control has been proposed as a predictor of success in weight loss [27]. The present and earlier results are in line with the notion that psychologically flexible people are less emotionally disturbed [10], and that they have more attentional resources for noticing and responding effectively to goal-associated opportunities that exist in the present situation [10]. The present results may reflect the mechanisms of psychological flexibility in weight maintenance.

The participants who had better psychological flexibility also estimated that weight loss would have a greater impact on their health. This may reflect the notion that persons with better psychological flexibility perceive their healthiness to rest in their own hands and feel that they can affect it by losing weight. This result also points out the possibility that increased psychological flexibility may influence how a person perceives the relationship between weight loss and health. In contrast, the persons who had lower psychological flexibility were motivated more by their social network, indicating that people who have lower psychological flexibility may be more dependent on other people's acceptance and support. As already mentioned, leaning on others may be ineffective with regard to weight management, suggesting a possible dearth of self-sufficiency or self-efficacy [21].

When drawing conclusions from this study, we must keep in mind that how people explain their own behaviour is not always in accordance with the true causes of that behaviour. The participants were asked about factors and motivators affecting their weight after having participated in a weight loss intervention. This retrospective nature of design implies that the perceptions of the subjects are not necessarily the a priori factors and motivations influencing weight change and maintenance, but could be subjective post hoc explanations (causal attributions) of the course of weight development. These perceptions were probably based on the participants' successful and unsuccessful experiences about weight loss and maintenance. It would be also useful to study whether weight losers' a priori perceptions and motives would predict weight loss outcomes.

Another limitation of the present study is that part of the correlation results are based on only a very small number of subjects. This is due to the qualitative nature of the assessment of factors affecting weight and of the factors motivating for weight loss and maintenance with the possibility to choose answers freely. The subjects gave ratings of importance, willingness, and impact for those factors or categories only

which they mentioned themselves. In spite of small number of subjects, there were significant correlations concerning psychological flexibility, which encourages studying these issues further with greater samples.

Moreover, the persons not taking part in the follow-up may have experienced a different pattern of weight change after the intervention compared with the participants of the present study, even though there was no difference in weight loss during the intervention between the subjects taking part in the follow-up and the 40% not doing so. Despite of these limitations, the present study gives plausible hypotheses which should be evaluated in future studies in more detail.

In conclusion, specific attention on eliciting and supporting personally relevant motivators for weight management could be used to promote internalization and the sustaining of autonomous self-regulation. The data of the present study suggest that increasing psychological flexibility could make weight losers more autonomous, and improve their internal weight locus of control. Moreover, increase in psychological flexibility could influence how a person understands the relationship between weight loss and health. It would also be useful to pay attention to intimate relationships and coping with stress. Teaching more flexible coping strategies for lifestyle changes in relationships and handling stress could be useful in weight control programs.

Acknowledgements

The study was supported by Department of Psychology, University of Jyväskylä, and Tekes – the Finnish Funding Agency for Technology and Innovation.

References

- Cooper Z, Doll HA, Hawker DM, Byrne S, Bonner G, et al. (2010) Testing a New Cognitive Behavioural Treatment for Obesity: A Randomized Controlled Trial with Three-Year Follow-Up. *Behav Res Ther* 48: 706-713.
- Jeffery RW, Drewnowski A, Epstein LH, Stunkard AJ, Wilson GT, et al. (2000) Long-Term Maintenance of Weight Loss: Current Status. *Health Psychol* 19: 5-16.
- Ayyad C, Andersen T (2000) Long-term efficacy of dietary treatment of obesity: a systematic review of studies published between 1931 and 1999. *Obes Rev* 1: 113-119.
- Tinker, Jane E, Tucker, Jalie A (1997) Motivations for weight loss and behavior change strategies associated with natural recovery from obesity. *Psychology of Addictive Behaviors* 11: 98-106.
- West DS, Gorin AA, Subak LL, Foster G, Bragg C, et al. (2011) A motivation-focused weight loss maintenance program is an effective alternative to a skill-based approach. *Int J Obes (Lond)* 35: 259-269.
- Koikkalainen M (2001) "Ruokailutottumusten muuttamisen esteet sydänpotilailla," Kuopion yliopiston julkaisuja D. lääketiede. 2001; No. 262.
- Byrne SM, Cooper Z, Fairburn CG (2004) Psychological predictors of weight regain in obesity. *Behav Res Ther* 42: 1341-1356.
- Westenhoefer J (2001) The Therapeutic Challenge: Behavioral Changes for Long-Term Weight Maintenance. *Int J Obes* 25: S85-S88.
- Bond FW, Flaxman PE, Bunce D (2008) The Influence of Psychological Flexibility on Work Redesign: Mediated Moderation of a Work Reorganization Intervention. *J Appl Psychol* 93: 645-654.
- Hayes SC, Luoma JB, Bond FW, Akhiko M, Jason L (2006) Acceptance and Commitment Therapy: Model, Processes and Outcomes. *Behav Res Ther* 44: 1-25.
- Lillis J, Hayes SC, Bunting K, Akihiko M (2009) Teaching Acceptance and Mindfulness to Improve the Lives of Obese: A Preliminary Test of a Theoretical Model. *Ann Behav Med* 37: 58-69.
- Haynes SN, O'Brien WH (2000) Principles and Practice of Behavioral Assessment. Plenum/ Kluwer Press.
- Lappalainen R, Lappalainen P (2010) Painon ja mielen psykologiaa. Bookwell, Jyväskylä, Tuomisto M., ed. SKT:n julkaisusarja: Hoitomenetelmien julkaisuja 9.1
- Hsieh H, Shannon S (2005) Three Approaches to Qualitative Content Analysis. *Qual Health Res* 15: 1277-1288.
- Breakwell GM, Hammond S, Fife Schaw C (2000) Research Methods in Psychology, Second Edition, Sage, London, England.
- Dahl J, Lundren T, Plumb J, Stewart I (2009) The Art and Science of Valuing in Psychotherapy: Helping Clients Discover, Explore, and Commit to Valued Action using Acceptance and Commitment Therapy. US: New Harbinger Publications, US.
- Hayes SC, Smith S (2005) Get out of your mind and into your life: The new acceptance and commitment therapy. New Harbinger, Oakland.
- Boelen PA, Reijntjes A (2008) Measuring Experiential Avoidance: Reliability and Validity of the Dutch 9-Item Acceptance and Action Questionnaire (AAQ). *J Psychopathol Behav Assess* 30: 241-251.
- Bond FW, Hayes SC, Baer RA, Carpenter KC, Guenole, et al. (2011) Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological flexibility and acceptance. *Behav Ther* 676-688.
- Rigsby A, Gropper DM, Gropper SS (2009) Success of Women in a Worksite Weight Loss Program: Does being Part of a Group Help? *Eat Behav* 10: 128-130.
- Dohm FA, Beattie JA, Aibel C, Striegel-Moore RH (2001) Factors differentiating women and men who successfully maintain weight loss from women and men who do not. *J Clin Psychol* 57: 105-117.
- Williams GC, Grow VM, Freedman ZR, Ryan RM, Deci EL (1996) Motivational predictors of weight loss and weight-loss maintenance. *J Pers Soc Psychol* 70: 115-126.
- Wadden TA, Vogt RA, Foster GD, Anderson DA (1998) Exercise and the maintenance of weight loss: 1-year follow-up of a controlled clinical trial. *J Consult Clin Psychol* 66: 429-433.
- Wing RR, Papandonatos G, Fava JL, Gorin AA, Phelan S, et al. (2008) Maintaining large weight losses: the role of behavioral and psychological factors. *J Consult Clin Psychol* 76: 1015-1021.
- Teixeira PJ, Going SB, Houtkooper LB, Cussler EC, Metcalfe LL, et al. (2006) Exercise motivation, eating, and body image variables as predictors of weight control. *Med Sci Sports Exerc* 38: 179-188.
- Byrne SM (2002) Psychological aspects of weight maintenance and relapse in obesity. *J Psychosom Res* 53: 1029-1036.
- Stotland S, Zuroff DC (1990) A new measure of weight locus of control: the Dieting Beliefs Scale. *J Pers Assess* 54 : 191-203.