

Exploring Mindfulness and Mindfulness with Self-Compassion-Centered Interventions to Assist Weight Loss: Theoretical Considerations and Preliminary Results of a Randomized Pilot Study

Michail Mantzios · Janet Clare Wilson

© Springer Science+Business Media New York 2014

Abstract This research explored whether developing mindfulness and self-compassion through meditation supports weight loss. The research addressed if (a) *mindfulness meditation* and (b) *mindfulness with self-compassion Meditation* (through loving kindness meditation and psycho-educational material to develop self-compassion) aid weight loss and maintenance. Sixty-three soldiers followed independent diet plans and were randomly assigned to a control group, or, one of the two meditation interventions for 5 weeks. Participants lost weight in both experimental groups, while the control group gained weight during the initial 5 weeks. Six months of subsequent, self-motivated and unguided meditative practice, revealed that only the mindfulness with self-compassion meditation group continued losing weight, while the mindfulness meditation group showed no significant weight differences. At a 1-year follow-up, both experimental groups regained some weight, while the control group paradoxically lost weight. Overall, however, the mindfulness with self-compassion meditation group lost significantly more weight than either of the two remaining groups (which did not significantly differ). The findings suggest that developing both mindfulness and self-compassion appears more promising for weight loss than developing mindfulness alone or simply dieting; nevertheless, weight maintenance requires more attention in future research.

Keywords Self-compassion · Mindfulness · Mindfulness meditation · Loving kindness meditation · Weight loss · Obesity

M. Mantzios (✉) · J. C. Wilson
Department of Psychology, University of Portsmouth,
Portsmouth PO1 2DY, UK
e-mail: michael.mantzios@port.ac.uk

Introduction

The positive effects of the mindfulness-based interventions for various eating disorders (e.g., Heffner et al. 2002), as well as the ability to assist people who binge eat, through the Mindfulness-Based Eating Awareness Training (MB-EAT; Kristeller and Hallett 1999) have been well documented in the past 15 years. More recently, researchers have turned to the possibility of mindfulness-based interventions combating the obesity epidemic, by aiding people who want to lose weight (e.g., Dalen et al. 2010; Daubenmier et al. 2011; see also Ludwig and Kabat-Zinn 2008). There are many studies that have reported body weight as an outcome variable (Alberts et al. 2012; Kearney et al. 2012; Kristeller et al. 2013), but, to our knowledge, only four studies specifically aimed for participants to lose weight (see Dalen et al. 2010; Mantzios and Giannou 2014; Miller et al. 2012; Timmerman and Brown 2012) and results suggest that there is some promise to mindfulness-based interventions. But why should mindfulness be of any help to people who want to lose weight?

Recent evidence has shown that personality characteristics which are responsible for the current obesity epidemic are better handled by being more mindful. For example, while automaticity (i.e., being unaware or inattentive), impulsivity, and emotional distress are noted in current literature to contribute toward the current obesity epidemic (see Cohen and Farley 2008; Elfhag and Morey 2008; Nederkoorn et al. 2006), other research has shown that mindfulness relates negatively to automatic, emotional, and impulsive reactions (Brown and Ryan 2003; Goldin and Gross 2010; Lattimore et al. 2011; Levesque and Brown 2007; Sloan 2004; Wenk-Sormaz 2005) and positively to self-regulation (Lakey et al. 2007; Levesque and Brown 2007). Furthermore, a systematic review and meta-analysis on attention and memory as potential determinants of eating behavior revealed that

incorporating attentive-eating principles into mainstream interventions are a novel way to aid weight loss (Robinson et al. 2013), which makes mindfulness training an even more relevant method of aiding people who are struggling to lose weight. But mindfulness is not only about attentional training.

A common and widely accepted definition of the practice of mindfulness is that it is an awareness that emerges through purposefully paying attention in the present moment, non-judgmentally (Kabat-Zinn 1990). In other words, mindfulness meditation is all about noticeable experiences (e.g., affective states and thoughts) that are observed without adding any meaning to them. In practical terms, the usual approach is a technique where people attend to their breath, moment-to-moment. This way, people observe the constant flow of information and systematically develop the ability to accept (as an alternative of judging themselves), and move on to more multilayered indirect benefits (e.g., develop compassion, equanimity, etc.). However, when mindfulness is being stripped from its Buddhist context, it regularly ignores or neglects qualities such as kindness and compassion, which have been and are parts of mindfulness practice (Kabat-Zinn 2006; Grossman and Van Dam 2011; Grossman 2013). In fact, returning to Buddhist psychology to look for answers to present-day problems may be a way to improve and develop current psychological knowledge and interventions.

Neff (2003a, b) described self-compassion as a kinder approach toward oneself, with a mindful awareness and understanding that one's experiences are part of what all people go through during personally challenging times (see Neff 2003a, b for review). Further, self-compassion consists of three main elements: self-kindness, common humanity, and mindfulness. These components mutually interact and combined create the construct of self-compassion (see Neff 2003b; see also Neff 2011). Self-compassion, however, is fairly new in the context of weight loss. Adams and Leary (2007) were the first scientists to test the effectiveness of self-compassion on restrictive eaters (or dieters). They investigated people who broke their diet, an event that usually triggers an increase in food intake afterwards (see Herman and Mack 1975). This finding, however, was not true for a group that received a short self-compassionate induction to cope after the experience of breaking the diet. Since then, other research emerged indicating that self-compassion plays a significant role in maintaining weight, when participants are working in a stressful environment (see Mantzios et al. 2014). Women with and without an eating disorder benefited from self-compassion by breaking the negative cycle of shame, body image dissatisfaction, and the drive for thinness (Ferreira et al. 2013), while shame, body image dissatisfaction, and the drive for thinness are also observed and detrimental in dieting and overweight populations (e.g., Chernyak and Lowe 2010; Conrard et al. 2008; Gavin et al. 2010). All in all, there are different goals and benefits observed between self-compassion and mindfulness theories and interventions (see Neff and Dahm (2014) for

review); but then again, self-compassion appears to complement mindfulness.

Indeed, recent research suggested self-compassion explaining the usefulness of mindfulness practice, where higher scores of self-compassion increased the effectiveness of mindfulness training (Birnie et al. 2010). Further, research showed that self-compassion partially mediated the association between mindfulness and well-being (Hollis-Walker and Colosimo 2011), as well as mindfulness practice and stress (Shapiro et al. 2005). Finally, recent research suggested that self-compassion (compared to mindfulness) was a more significant predictor of quality of life and psychological symptom severity in anxiety and depression (Van Dam et al. 2011). Indeed, developing self-compassion may be an improved method of dealing with a failing and inadequate self which causes further distress; but also with the distress of depriving oneself the comfort that could not be replaced otherwise—food. Combining self-compassion with mindfulness sensibly adds self-kindness and a sense of common humanity (the other two aspects that compromise the self-compassionate construct—see Neff 2003a, b), which may aid in calming oneself and coping effectively amid self-control in meditating dieters. Self-soothing is essential to this, and self-soothing does indeed require a less self-critical attitude toward oneself (see Gilbert 2009). This may be important as many people are stigmatized, socially isolated, and ashamed as a result of obesity, causing further emotional distress (e.g., Rogge et al. 2004). Therefore, having the ability to cultivate both self-compassion and mindfulness may support people who aim to regulate their weight more.

Neff and Germer (2013) developed a mindful method to cultivate self-compassion; that is, the mindful self-compassionate program. More recently, Neff and Dahm (2014) suggested that loving kindness meditation could also possibly assist in developing self-compassion (see also Hofmann et al. 2011 for review). Loving kindness meditation involves using mental phrases that focus on the built-in collective desire to be happy and free from suffering. By following this practice, people develop attitudes, intentions, and feelings of love, kindness, and compassion, first for oneself and then for an expanding circle of others (e.g., Chödrön 1996). Although in Buddhist tradition loving kindness and compassion are two different *Brahmaviharas* (or two of the Four Immeasurables), the overlap and interaction appears to be of greater significance. In fact, some research showed that those trained in loving kindness meditation increased their levels of self-compassion (Davidson 2007; Mantzios and Wilson 2013; Weibel 2007). Such findings were not surprising considering the overlap of unselfishness, common humanity, kindness, and present moment awareness between loving kindness meditation and self-compassion. Therefore, this research used loving kindness meditation to enhance and develop self-compassion.

Therefore, this research aimed to investigate and compare the impact of developing mindfulness and self-compassion to support weight loss. Specifically, the study questioned through 5-week intense guided meditation programs: (a) whether mindfulness meditation-assisted weight loss, (b) whether mindfulness combined with self-compassion (hereafter referred to as *mindfulness with self-compassion*) aided weight loss further, and (c) if participants could continue meditation and weight loss efforts independently for a subsequent period of 6 months, and (d) if lost weight was maintained at a 1-year follow-up measurement.

Method

Participants

Eighty-eight military employees (45 females and 43 males) were invited to participate from a military base in Greece. Of those, some participants quit during the first week, some were transferred to other military bases and could not attend the guided meditation training and attend the follow-ups, while others exceeded the clinically obese cutoff score (i.e., body mass index (BMI) >40) and were thus excluded from any further analyses (see Fig. 1). Sixty-three employees remained

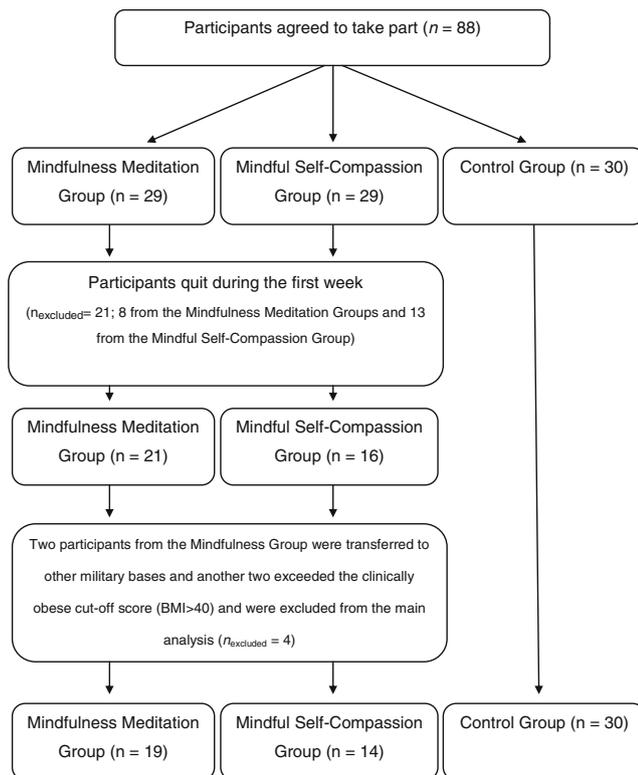


Fig. 1 Dropout and participant exclusion flowchart

(i.e., 22 females and 41 males with a BMI ($M=26.63$, $SD=4.35$) and age ($M=22.03$, $SD=3.10$)) and completed the intervention and follow-up measurements. Participants were randomly assigned to one of three groups at the beginning of the study, and age and BMI were nonsignificantly different (see results for further baseline comparisons). The final number of participants was 19 for the mindfulness meditation group, 14 for the mindfulness with self-compassion meditation group, and 30 for the control group.

Military employees were selected due to regular weigh-ins set by a military health scheme that facilitated the researchers in recording weight differences throughout. Moreover, the study benefited from the employer who allowed participants to attend meditation sessions on site three times a day during their shift for the 5-week interventions. All participants were professional soldiers who benefited from unrestricted access to a gym on site and three free daily meals. Due to their role in the army (i.e., subjected to daily tasks like foot patrol in military bases, heavy lifting, etc.) and their contracts restricting their progression to higher ranks (thus, not being able to get a desk job or a noncombat position within the military), their physical upkeep was of primary importance. Also, participants signed up for this study which was advertised as investigating meditation and other ways of assisting weight loss, and thus, all participants had the intention and motivation to lose weight.

Food Availability and Meal Plans

Breakfast always consisted of two slices of bread, milk or tea, and margarine, honey and/or jam. Meals were served at set times for all personnel and the typical drink for lunch and dinner provided from the military was water (nevertheless, there were vending machines on site selling beverages). Lunch and dinner were served in stainless steel food trays with five separate compartments for the main meal, the salad, fruit, and bread, which allowed for similarly equal portions for all personnel. In Greece, due to the nonseparation between state and church, the military was serving every Wednesday and Friday vegetarian meals that consisted of vegetable casseroles, beans, or lentils, all served with bread and feta cheese. Potatoes and pasta, as well as soups were quite often served as a main meal. Also, the weekly meal plan was closely linked to the Mediterranean diet, where beef and pork was served only once a week, and chicken was served twice a week. It should be noted that soldiers had the choice of eating outside the army base, or to bring their own food, but it was not the preferred option.

Procedure

Soldiers gathered in a theater after responding to an announcement which informed them that there will be a study on-site exploring weight loss and meditation. Participants were told

that all would receive information that would aid them with weight loss. However, to enable us to explore and compare different methods, they were told that some would not participate in meditations, while the rest of participants may be assigned to different types of meditation techniques. All participants were given a broad introduction of the practices, which would be used by some participants (i.e., mindfulness meditation), and were informed that the first 5 weeks would require the participants assigned to the meditation groups to gather and practice meditation while they were at work. They were also informed that their weight measurements would be shared with the researchers for the next year, while their active participation would last 7 months. Participants who agreed to take part (and signed the informed consent) were measured in weight and height by a general practitioner who remained blind to the conditions throughout the 5-week interventions and follow-ups. Afterwards, they completed a short page on demographic information and were randomly assigned to one of the two experimental groups or the control group. Subsequently, all participants received a presentation of psycho-educational material relating to eating behaviors and weight loss, with some time allocated for questions. Control participants were asked to watch their weight and food consumption with the help of the psycho-educational material that was given to them in a written form, whereas participants in the experimental groups received the same type of information and were asked to return the next day.

The following days were 2- or 3-day introductions corresponding to mindfulness and loving kindness meditation training, and participants were informally debriefed and informed that a full debriefing would occur at the end of the intervention, and after each follow-up. Both experimental groups attended days 1 and 2, where they received an introduction and practiced mindfulness meditation. The third day was set for mindfulness with self-compassion meditation participants where they received additional training in loving kindness meditation and literature on self-compassion (see Table 1). Participants were asked to practice three times a day with the meditation teacher at set times and venues for the next 5 weeks. Members of those groups were seen in group formats for 20–30 min at a time (loving kindness meditation was usually a bit longer explaining the range of meditation time), but could also practice on their own with informal meditation sessions (i.e., walking and eating meditation). The counselor used only the sitting practice during those 5 weeks, which focused on the attention on the breath, while sitting on a chair or on a meditation cushion on the floor. For the mindfulness with self-compassion meditation group, one session (of the three during the day) and two sessions every second day was loving kindness meditation. A daily log form was used during the 5 weeks to record attendance.

After the weigh-in at week 5, before participants left with a newly acquired way to aid them with their weight loss efforts,

Table 1 Meditation taught for experimental groups

Meditation taught to both experimental groups	
Day 1	<p>Mindfulness meditation practice</p> <p>Siting breath awareness practice set to cultivate attention, non-reactivity and non-judgment.</p> <p>Used 3 times a day for the mindfulness meditation group, and once or twice per day interchangeably with loving kindness meditation for the duration of 5 weeks.</p> <p>Mindfulness walking meditation</p> <p>A walking practice quite similar to the siting practice above. It enhances body awareness and serves well in comprehending how mindfulness can be applied to daily tasks. This practice was suggested for use during foot patrols, which was an everyday requirement.</p>
Day 2	<p>Mindful hunger awareness</p> <p>Participants were asked to imagine a mental hunger scale from 1–10. This scale helped with the main question that was suggested to participants, which was to ask themselves how hungry they really are. Similar to walking, eating is many times used by people as a time to take to analyze, plan, think and interpret their lives. Again, cultivating attention, non-reactivity and non-judgment become relevant in accepting that there is a need to eat, but not in response to the hunger felt by participants.</p> <p>Mindful eating meditation</p> <p>Before eating, and starting with the observation of the breath, participants are acknowledging hunger levels, emotions, thoughts, motivations, and the environment that are driving them to eat, with acceptance and non-judgment. When eating, the emphasis is on fully acknowledging the experience and slowly embracing the taste and texture of the food. Also, observing shifts in hunger are also seen as a way of eating mindfully.</p> <p>Troublesome foods meditation</p> <p>The next step related to treat oneself in moderation. Allowing for all foods to be part of participants' lives, by mindfully choosing (e.g., observing hunger levels) and mindfully consuming those foods (e.g., attempts toward slow, purposeful eating meditation). Since those foods would be otherwise forbidden, acceptance and non-judgment are more challenging.</p>
Day 3	<p>Loving kindness meditation</p> <p>Meditation taught only to the mindfulness with self-compassion group</p> <p>A meditation that involves the repetition of phrases invoking goodwill and benevolence for oneself and others. In this study, the meditation started and ended with a focus on oneself to emphasize self-kindness. Used once or twice per day interchangeably with mindfulness meditation for the duration of 5 weeks.</p>

they were asked to carry-on practicing meditation for another 6 months on a daily basis (and the control group was asked to continue in a similar fashion with their dieting). This was to explore how well participants would perform with their attempts to lose weight and without the guidance and set meditation schedules.

During the 6 month weigh-in, participants received a short questionnaire that questioned (a) if they kept up with practicing meditation (and for control participants if they continued on regulating their eating), (b) if they would continue what they learned after this point, and (c) the reason why they would maintain or quit whatever they learned. Following the 6 month weigh-in, participants were not asked to do (or not do) anything.

Twelve months post-intervention, participants were weighed by a physician and received the final debriefing form. Please note that the informed consent, confidentiality, freedom from coercion and deception, and debriefing ensured participants' rights, and established adherence to the guidelines of the British Psychological Society.

Measures and Data Analyses

Participant Information Form This form asked for the participants' age, gender, ethnicity, socioeconomic status, height, and weight. These forms also included an arbitrary number slip (sized to a credit card to keep it safe in their wallet), which they used at the follow-up measurements to put together the pre- and postmeasurements and ensure anonymity.

Instruction Manual and Meditation Schedule

A protocol was created for the counselor to introduce mindfulness and loving kindness meditation (see Table 1). *Mindfulness meditation* and *mindfulness of walking* were introduced in day 1. Day 2 consisted of *eating meditation*, *desirable food meditation*, and a *feeling of hunger mental scale* (see Levine 2007). Day 3 was designed for the mindfulness with self-compassion group only, introducing a slightly modified meditation (i.e., for loving kindness meditation) that integrated self-compassion into the meditative practice they already learnt by emphasizing the kindness more toward the self (see, Chödrön and Otro 2001; see also Levine 2007).

The control group received literature on problems dieters usually face, how the environment affects eating behavior, and how to diet more effectively. Experimental groups also received information given to the control group, a copy of the corresponding meditation protocol, as well as literature about mindfulness or mindfulness and self-compassion (see Table 2 for more information; all information is also available by contacting the first author). All information was also presented orally to the groups during the initial training days.

The total amount of training was different for each group. For the dieting only/control group, participants received only 2 h of training in total covering material that would be helpful in losing weight (e.g., the automaticity of eating, having smaller plates helping in eating less, etc.). This bulk of information was also given to the experimental groups. For the mindfulness meditation group, there were three additional hours of meditation training (2 h on day 1 and 1 h on day

2). The mindfulness with self-compassion group received the same meditation training as the mindfulness group, but there was an additional hour of meditation training covering loving kindness meditation on the third day. The psycho-educational material that was presented to participants in the experimental groups was set to be around 2.5 h for both groups covering mindfulness literature, and an additional 2 h for the loving kindness meditation group. In reality, however, questions and prolonged breaks made those presentations longer than initially intended. Also, participants had questions during the initial 5 weeks that were addressed by the meditation teacher by addressing the whole group, to make sure that all participants in each experimental group received similar additional information.

Weight and height were measured on day 1 and weight again at 5 weeks, and at 6 and 12 months before breakfast. Height and weight were measured using a portable Harpenden stadiometer and a calibrated physician scale (rounded at 0.1 kg) respectively. Also, when weighed, participants were dressed in light military clothing (i.e., pants, socks, underwear, and t-shirt) and without footwear at all measurements. Standard military outfit sizes were measured in weight and were used by the researchers to correct the weight to nude before the analyses.

Results

Initially, we examined whether there were any significant differences in weight, body mass index, and age between the mindfulness, mindful loving kindness, and control groups. Analyses of variance revealed that all baseline variables were nonsignificantly different (see Table 3).

Furthermore, a dropout analysis was conducted to test significant differences in intervention settings, age, weight, and BMI between participants and dropouts. Generally, the attrition rate was at 28.4 %, but this percentage related only to the experimental groups, where the mindfulness with self-compassion group lost nearly half of participants (51.7 %), and the mindfulness group around one third (34.5 %) during the first week. After the first week, there were no further dropouts recorded. Participation was further measured through daily logs which were at the entrance of the hall where meditation sessions took place, and participants were ticking next to their arbitrary number to indicate that they attended. There were no differences between experimental groups in sessions lost (mindfulness group— $M=1.95$, $SD=1.68$; loving kindness group— $M=1.86$, $SD=1.83$, $t(31)=0.15$, *ns*), and follow-up analyses as a covariate showed that the lost sessions had no impact to the findings presented in the main analyses. Also, it should be mentioned that participants that would lose more than 15 sessions (i.e., 5 days) out of the 5-week

Table 2 Psycho-educational material presented at the induction and was subsequently given to participants in hand-outs

All groups	Experimental groups only	Mindfulness with self-compassion group only
Cohen and Farley (2008)	Baer (2003)	Neff (2003a, b)
Hofmann et al. (2007)	Kabat-Zinn et al. (1992)	www.self-compassion.org/self-compassion-exercise.pdf
Wansink and Sobal (2007)	Kabat Zinn (2003)	Adams and Leary (2007)
Blair et al. (1990)	Kristeller and Hallett (1999)	
Greeno and Wing (1994)		

Selected segments that were useful for people who wanted to lose weight from the articles above, as well as insights and exercises relevant to mindfulness and self-compassion were translated and rewritten in lay terms for the presentation given by the researchers and for the hand-outs

All groups control group, mindfulness meditation group, and mindful loving kindness meditation group; *Experimental groups only* mindfulness meditation group and mindful loving kindness meditation group

interventions would be excluded from the main analyses, but lost sessions were minimal and none exceeded this criterion for exclusion. The analyses showed that dropouts and those who participated did not differ in baseline measurements: age $t(86)=-1.13$, *ns*; BMI, $t(86)=-0.39$, *ns*; and weight, $t(86)=0.45$, *ns*. However, there was a difference in gender, $\chi^2(1)=23.33$, $p<0.001$, with more females dropping-out than males (23 out of 45 vs. 2 out of 43, correspondingly).

A repeated-measures ANOVA for cumulative changes in weight with groups (mindfulness vs. mindful loving kindness vs. control) as a between-participants factor and time (5 weeks vs. 6 months vs. 1 year follow-up) as a within-participants factor showed a significant effect of time, $F(2, 60)=16.7$, $p<0.001$, $\eta^2=0.13$, and group, $F(2, 60)=6.5$, $p=0.003$, $\eta^2=0.18$, as well as a significant group \times time interaction, $F(4, 60)=20.2$, $p<0.001$, $\eta^2=0.50$, suggesting that significant changes in weight occurred at least once during the year of observations, as well as between groups (see Fig. 2). It should be noted that findings throughout remained significant when we used the Huynh-Feldt correction for sphericity. Subsequent between-participants analyses and Bonferroni post hoc tests showed that the mindful loving kindness group did not significantly differ from the mindfulness group, but both experimental groups were significantly different from the control group at the 5-week measurements, $F(2, 60)=57.13$, $p<0.001$. At the 6-month measurements, the mindful loving kindness group lost significantly more weight than both the mindfulness and control groups, while the latter groups were also significantly different from each other, $F(2, 60)=44.28$, $p<0.001$. At the 1-year follow-up measurements, the results yielded all group being nonsignificantly different from each

other, $F(2, 60)=6.39$, *ns*. Overall, the mindful loving kindness group lost more weight, although the difference did not reach statistical significance (see Table 4 for means and SDs). Also, within-participants analyses showed that the mindful loving kindness and control groups significantly differed in all measurements of weight change ($ps<0.05$), while the mindfulness group showed no significant weight differences at the 6-month and 1-year marks (see Table 4 for F values and partial eta square). Please note that cumulative weight changes are presented as cumulative weight loss (i.e., weight gain is seen as negative values).

However, the success of the mindful loving kindness group was more a result of the initial 5 weeks and the subsequent 6 months, rather than the weight change observed from the 6 months to the 1-year follow-up. To look at these differences, we investigated noncumulative weight change from the 5-week measurement to the 6-month mark, as well as from the 6-month measurement to the 1-year follow-up.

From the 5-week measurement to the 6-month mark, the independent (or noncumulative) weight change between groups was investigated through a one-way analysis of variance. Results indicated that the mindfulness with self-compassion group performed better than both mindfulness and control groups ($ps<0.01$), which latter groups did not significantly differ in weight change, $F(1, 72)=2.99$, $p=0.09$ (see Table 4). Both mindfulness and control groups gained weight, while the mindful loving kindness group continued losing weight (see Fig. 3).

The brief questionnaire administered at the 6 month weigh-in indicated that all participants reported that they had continued with their diet management and meditation program.

Table 3 Baseline characteristics of treatment and control participants

Variable	MM <i>M</i> (SD)	MLKM <i>M</i> (SD)	Control <i>M</i> (SD)	F	p value
Age	22.4 (3.4)	21.1 (2.8)	22.2 (3.0)	0.88	0.42
Weight (kg)	82.2 (12.6)	83.3 (9.7)	82.4 (17.9)	0.02	0.97
Body mass index (BMI)	26.1 (3.3)	26.3 (3.2)	26.7 (4.9)	0.13	0.88

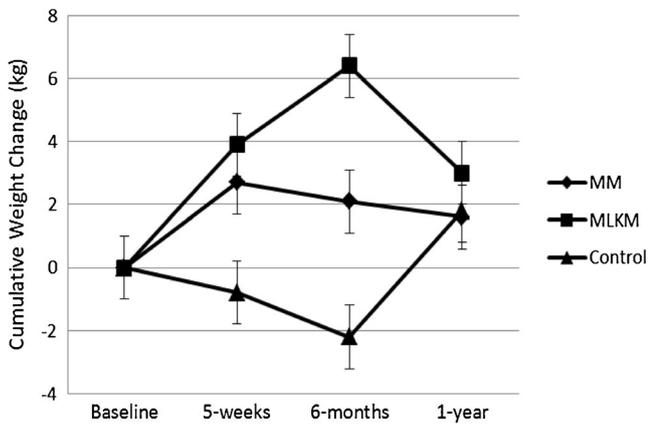


Fig. 2 Cumulative weight change of experimental and control groups from baseline throughout the intervention periods to the 1 year follow-up. Error bars indicate ± 1 SE. Negative values represent weight gain

Participant responses to the question “why will you continue (or discontinue) practicing meditation” revealed mixed findings. The majority of participants in the mindfulness with self-compassion meditation group reported that there was no need to continue meditation, since they lost all the weight they needed to lose. The mindfulness group participants reported that they do not have enough time to commit to a meditation program. Last, the majority of control participants reported that there were no positive results from dieting (see Table 5).

Therefore, the majority of participants in both experimental groups reported that they would discontinue meditation or start again if there was a need to lose weight again in the future. Results from a one-way analysis of variance of noncumulative weight change from 6-months to the 1-year follow-up revealed that there were significant differences between all groups, $F(1, 72)=2.99$, $p=0.09$ (all post hoc p 's < 0.01). However, not practicing meditation might have had an impact on experimental participants. Results indicated that the mindful loving kindness group gained significantly more weight than both groups, while the control group lost the weight that was gained during the intervention periods. Indeed, the control group performed well from the 6-month mark to the 1-year follow-up, right about when the mindful loving kindness

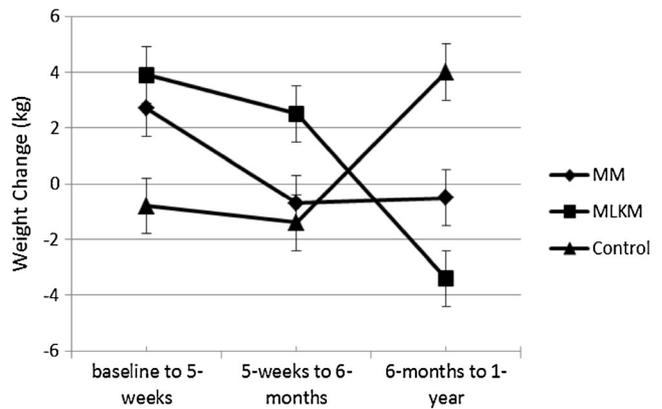


Fig. 3 Independent weight change of experimental and control groups from baseline to 5 weeks, from 5 weeks to 6 months, and from 6 months to 1 year. Error bars indicate ± 1 SE. Negative values represent weight gain

group started failing at weight maintenance, while the mindfulness group marginally gained weight (see Fig. 3). Overall, however, the results are mixed and the mindful loving kindness group did significantly better when we investigated the cumulative weight loss, compared to both mindfulness and control groups.

Discussion

This research explored and compared whether mindfulness meditation and mindfulness with self-compassion meditation support weight loss. The findings were mixed. Specifically, the 5-week intervention revealed that mindfulness with self-compassion meditation assisted participants more in their weight loss efforts than the mindfulness meditation participants. Further, both experimental groups improved significantly compared to the control group, which gained weight during those weeks. Considering the extensive support, the two experimental groups received over those 5 weeks, this is not surprising. Findings are consistent with past research that reported weight loss for participants in mindfulness-based interventions (Dalen et al. 2010; Mantzios and Giannou

Table 4 Mean cumulative weight change by group and time, with supplementary between- and within-subject analyses of variance and effect sizes. Also, mean weight change of 6 months (from 5 weeks), and of 1-year (from 6 months) are also reported

Groups	Cumulative weight change (kg)			Weight change (kg)		Cumulative within-participants	
	5 Weeks <i>M</i> (SD)	6 Months <i>M</i> (SD)	1 Year <i>M</i> (SD)	6 Months (from 5 weeks) <i>M</i> (SD)	1 Year (from 6 months) <i>M</i> (SD)	<i>F</i>	η^2
MM	2.7 (2.0)	2.1 (2.6)	1.6 (1.1)	-0.7 (3.4)	-0.5 (2.3)	6.68	0.27
MLKM	3.9 (0.8)	6.4 (2.8)	3.0 (1.0)	2.5 (2.6)	-3.4 (2.5)	31.66	0.71
Control	-0.8 (1.4)	-2.2 (3.0)	1.8 (1.3)	-1.4 (2.6)	4.0 (2.7)	34.43	0.54

Negative values represent weight gain

MLKM mindful loving kindness meditation, MM mindfulness meditation

Table 5 Reasons for continuing or discontinuing learnt interventions in the future after the 6-month measurement

Intervention	MLKM	MM	Control	Total
No result/no point to continue	1	2	26	29
No need to continue (weight lost)	9	2	1	12
Too busy and no time	2	15	2	19
Need to lose more weight	2	0	1	3
Total	14	19	30	63

MLKM mindful loving kindness meditation, *MM* mindfulness meditation

2014; Miller et al. 2012). However, the finding that mindfulness with self-compassion meditation did so well compared to mindfulness meditation is significant and adds to the current knowledge of mindfulness based interventions and weight loss. This notable difference was prolonged in the following 6 months of independent efforts to meditate and lose weight, where the mindfulness with self-compassion meditation group almost doubled their weight loss, whereas the mindfulness meditation group started to gain weight (with the control group continuing gaining weight). This is particularly interesting as all participants in the experimental groups reported that they had continued meditation; nevertheless, the frequency of the practice is unknown and is an important limitation discussed later. Finally, the 1-year follow-up revealed that both experimental groups regained weight they had lost, which was not unexpected, since most participants reported that they would stop meditating. Further, control participants paradoxically lost weight during the same period. In fact, the control group lost all of what was gained during the 5-week intervention and the following 6 months of independent efforts to lose weight. Overall, however, the cumulative weight loss observed showed that the mindfulness with self-compassion meditation group did lose more weight than either of the two other groups at all three weight change measurements.

The two main issues raised by these results were that self-compassion training adds more to weight loss than mindfulness meditation alone; and maintenance, rather than weight loss, was where this intervention failed. First, the mindfulness with self-compassion intervention may have aided in increasing tolerance and acceptance of self-critical thoughts and feelings that are evident in dieters. Dieters usually fail to find compassion when they think of past mistakes (e.g., “It is my fault that I cannot have a cookie now”) or when they fail (e.g., “Of course I failed, this is why I gained weight in the first place, this is why I am a loser”). Such thoughts are better embarked upon when one recognizes that everyone makes mistakes and everyone struggles with weight loss. Also, many people are stigmatized, socially isolated, and ashamed as a

result of obesity (or of being marginally overweight), causing further emotional distress (e.g., Friedman et al. 2005; Rogge et al. 2004). Self-soothing, which is affiliated to the theory and practice of compassion and self-compassion, is enabling a less self-critical attitude toward oneself, overall easing the emotional distress felt (see Gilbert 2009). In fact, this may well result in blocking out the critical, uncompassionate, and intolerable self-talk and self-perception, which usually comes with dieting. Indeed, self-compassion offers more resources to dieters than mindfulness alone, while together they pose a superior model in weight loss (see also Mantzios et al. 2014; Mantzios and Wilson 2013), as well as in other everyday clinical and nonclinical difficulties (see Baer 2010; Gilbert and Choden 2013; Neff and Germer 2013). Further, past research suggested that self-compassion explained the usefulness of mindfulness practice, where higher scores of self-compassion increased the effectiveness of mindfulness training (Birnie et al. 2010). Also, research showed that self-compassion partially mediated the association between mindfulness and well-being (Hollis-Walker and Colosimo 2011), as well as mindfulness practice and stress (Shapiro et al. 2005). Finally, recent research suggested that self-compassion (compared to mindfulness) was a more significant predictor of quality of life and psychological symptom severity in anxiety and depression (Van Dam et al. 2011). Therefore, combining those two constructs may well be the next step for future research in mindfulness-based interventions, whether it is for weight loss, or any other health concern.

Second, while weight loss as such in the mindfulness with self-compassion group was superior, the maintenance was not. However, this is not an uncommon problem in dieting literature (e.g., see Rogge et al. 2004). In fact, long-term maintenance of lost weight appears to be a greater challenge than losing weight (e.g., Jeffery et al. 2000). Most participants in the mindfulness with self-compassion group reported that they would stop meditating when asked at the 6-month questionnaire. Thus, part of the problem may be seeing an intervention as only needed while one wants to achieve the weight loss goal (which was already low for most participants in this study due to the low baseline weight recorded), rather than as an advancing lifestyle change. We are inclined to speculate that the mindfulness with self-compassion intervention was seen by participants as a weight loss technique that was abandoned once people reached their weight loss goal, which might have been an indirect effect of the intervention that was explicit about weight loss. Future research needs to explore this issue more extensively and the possibility of promoting such research as a lifestyle change instead of an intervention.

The sample for the present study was from the Greek military and there were some benefits and some limitations. The first benefit was having a relatively controlled food environment to examine and focus on the psychological intervention. All participants were eating mostly the same food (i.e.,

all meals were free of charge and were the preferred choice for participants). Also, all were moderately fit (as they were on active duty) and none had sedentary jobs. Also, all participants had free access to the military gym which most used regularly. Thus, they were all generally living in an environment where energy intake and expenditure was fairly controlled, allowing for a tighter exploration of the influence of interventions. However, this is a lifestyle only a minority of people will experience; hence, limiting the generalization of results.

The second benefit was that they were motivated to lose weight. For example, as part of their employment contract they were required to perform physical tasks, which meant that being overweight would not assist them in performing their duties. In other words, putting on too much weight may have resulted in extreme cases to being discharged or suspended from the military.

The third potential benefit was that most of the sample was male. Much research into obesity (and meditation) is conducted with female participants (e.g., Nederkoorn et al. 2006; Tapper et al. 2009), as males appear less willing to take part. Using a predominantly male profession to access participants allowed this research to follow male and female weight loss attempts. However, accessing such a macho cultural group as male soldiers also meant that it was not easy to encourage participants to meditate. This, in part, may account for a major limitation in this study, which was the high early dropout rate, especially of female participants that had to demonstrate their “tough guy *persona*” to a greater extent than the males that took part. It would be interesting to explore female attitudes toward dieting in such predominantly male environments further in future studies. For example, future research could explore whether female participants that are employed in the military differ from nonmilitary females in dieting, as well as in self-compassion and self-criticism.

The fourth benefit was that as the sample was accessed at work, they were given time off work to meditate daily in the first 5 weeks, which allowed all participants to practice regularly. The added benefit was that they saw their colleagues regularly attending meditation practice, which may have encouraged them further to maintain their meditating and dieting efforts. However, the limitation here is that most employers may not allow participants to meditate as part of their job. That said, future research might explore what would happen to the health and well-being of employees if they are allowed and encouraged to practice within their working hours. All in all, the adherence after the first week was remarkable and could pose a topic of future research by itself in occupational research.

Another three limitations require consideration before interpreting the results. First, the sample size was small. Previous studies did find that the commitment required in learning meditation means that some people drop out (e.g., Forman et al. 2009; Tapper et al. 2009), which was also

obvious in the present study. This is mainly true for two suspected reasons. First, meditation is often associated with religious practice—especially mindfulness and Buddhism—and appeal to some and repulses others. This is specifically true in Greece, where meditation is usually a motive to mock and ridicule people who practice it. In fact, participants in this study were mocked and criticized at times from fellow soldiers, which may have also added to the early dropout rate. Nevertheless, these attitudes and reactions toward meditation is not something new, and similar attitudes of mockery have been observed in other studies that we conducted with Greek university students. Future research should explore how disapproval from significant others may influence the maintenance of meditative practices, which might have been in this study another reason that led most participants to quit meditation after the 6-month mark. Second, meditation was seen as a mean to lose weight, which success or failure meant there was no further need to practice. The way this study tried to encourage nonmeditators was by practicing during work hours. This meant it was more of a pleasant break from work than a chore to be remembered. Although this may have worked also as a confounding element in this study (i.e., skipping work), this strategy ensured that after the first week, all participants completed the follow-up measurements and practiced individually the first 6 months without any further dropouts. Alternative methods to overcome such problems are required in future research if meditation is to be used as an intervention and not as a lifestyle change. Making meditation a lifestyle change, however, is a paradox, when a lifestyle change that is more required should be about losing and maintaining weight, rather than meditation. On the other hand, meditation and being more compassionate to oneself may be a deeper lifestyle change and easier to manage than the suffering and distress that comes with dieting.

Second, this research used loving kindness meditation instead of an intervention that is designed to target the self and the suffering aligned with dieting. Loving kindness meditation is not specifically aiming to cultivate self-compassion, but focuses more on developing benevolence and kindness. As already mentioned, the practice involves the self and a circle of others (i.e., a benefactor, a neutral person, an antagonistic person, and all beings), while the mindful self-compassion program primarily aims to address the self's suffering (see Neff and Germer 2013). When this research was designed and conducted, no mindful self-compassionate interventions were available. Neff and Germer (2013) recently created a mindful self-compassion program that may be more beneficial to future weight loss research and to the anguish dieters feel when they diet or when they try to maintain the weight that they lost. Aligned with this limitation, the mindfulness meditation program used was intensive during the first 5 weeks; however, it is far-off from the intensity and consistency experienced during mindfulness-based stress reduction

(MBSR; Kabat-Zinn 1982) or mindfulness-based cognitive therapy (MBCT; Segal et al. 2002) or as specific as mindfulness-based eating awareness training (MB-EAT; Kristeller and Wolever 2010). Such programs might prove more beneficial in future research, since these are long-standing, reliable, and validated interventions. Indeed, present results form a good underpinning to explore the mindful self-compassion program (but also MBSR or MB-EAT with active elements of compassion) in a more clinical setting with people who need to lose more weight (i.e., obese or clinically obese patients). Also, making future interventions more specific to dieting (e.g., nutritional advice, individual dieting plan, etc.) or healthy eating may add another small piece to the puzzle of weight management in mindfulness-based interventions (see Katterman et al. 2014 for discussion).

Third, this study would have benefited if there were more measures to monitor the levels of mindfulness, self-compassion and eating behaviors throughout the intervention and follow-up measurements. Although another study identified that this loving kindness meditation program increased levels of self-compassion (see Mantzios and Wilson 2013), this study would have allowed us to observe whether self-compassion was maintained at follow ups. In retrospect, being judged by others when practicing meditation may have over-ridden the mindful and self-compassionate attempts of participants in the experimental conditions. Further research is needed in respect to the antagonistic environment and the possible effect it might have had on participants. Also, tighter explorations of behaviors such as eating may have helped in drawing stronger conclusions. Above all, recordings of exercise levels was a key limitation, as some may have exercised more than others, and closely associated to this limitation is the absence of other materials to measure weight change. Looking simply at weight measurements is an imprecise way, as it fails to separate adipose tissue from lean mass and skeletal frame size (see Romero-Corral et al. 2008). This might also explain the weight that was gained by the control group during the intervention and the subsequent 6 months, but again, there is a need in future research to use more specific measurements that will separate adipose from lean body mass to draw stronger conclusions.

All in all, pioneers in the fields of compassion and mindfulness have recently highlighted the significance of combining those two constructs (Baer 2010; Gilbert and Choden 2013; Neff and Germer 2013), which was the attempt in this research project. Despite the limitations observed, the effectiveness of mindfulness with self-compassion can be of clinical importance if the maintenance is improved by prolonging the effects of the intervention. Present findings support the notion that mindfulness with self-compassion offer a way of losing more weight—during and after receiving guided training—compared to simply practicing mindfulness meditation. This promising finding can be extended to assist people who

need ways to tolerate and deal with the distress and suffering of each and every moment of behavior adaptation and change.

References

- Adams, C. E., & Leary, M. R. (2007). Promoting self-compassionate attitudes toward eating among restrictive and guilty eaters. *Journal of Social and Clinical Psychology, 26*(10), 1120–1144.
- Alberts, H. J. E. M., Thewissen, R., & Raes, L. (2012). Dealing with problematic eating behavior. The effects of a mindfulness-based intervention on eating behavior, food cravings, dichotomous thinking and body image concern. *Appetite, 58*(3), 847–851.
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: a conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*(2), 125–143.
- Baer, R. A. (2010). Self-compassion as a mechanism of change in mindfulness- and acceptance-based treatments. In R. A. Baer (Ed.), *Assessing mindfulness & acceptance processes in clients* (pp. 135–154). Oakland: New Harbinger.
- Birnie, K., Speca, M., & Carlson, L. E. (2010). Exploring self-compassion and empathy in the context of mindfulness-based stress reduction (MBSR). *Stress and Health, 26*(5), 359–371.
- Blair, A. J., Lewis, V. J., & Booth, D. A. (1990). Does emotional eating interfere with success in attempts at weight control? *Appetite, 15*(2), 151–157.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822–848.
- Chernyak, Y., & Lowe, M. R. (2010). Motivations for dieting: drive for thinness is different from drive for objective thinness. *Journal of Abnormal Psychology, 119*(2), 276–281.
- Chödrön, P. (1996). *Awakening loving-kindness*. Boston: Shambhala.
- Chödrön, P., & Otto, T. (2001). *Tonglen: the path of transformation*. Halifax: Vajradhatu.
- Cohen, D. A., & Farley, T. A. (2008). Eating as an automatic behavior. *Preventing Chronic Disease, 5*(1), A23.
- Conradt, M., Dierk, J. M., Schlumberger, P., Rauh, E., Hebebrand, J., & Rief, W. (2008). Who copes well? Obesity-related coping and its associations with shame, guilt, and weight loss. *Journal of Clinical Psychology, 64*(10), 1129–1144.
- Dalen, J., Smith, B. W., Shelley, B. M., Lee Sloan, A., Leahigh, L., & Begay, D. (2010). Pilot study: mindful eating and living (MEAL): weight, eating behavior, and psychological outcomes associated with a mindfulness-based intervention for people with obesity. *Complementary Therapies in Medicine, 18*, 260–264.
- Daubenmier, J., Kristeller, J., Hecht, F. M., Maninger, N., Kuwata, M., Jhaveri, K., & Epel, E. (2011). Mindfulness intervention for stress eating to reduce cortisol and abdominal fat among overweight and obese women: an exploratory randomized controlled study. *Journal of Obesity, 2011*, 1–13.
- Davidson, R. (2007). Changing the brain by transforming the mind. The impact of compassion training on the neural systems of emotion. Paper presented at the 13th Annual Mind and Life Institute Conference, Atlanta, GA.
- Elfhag, K., & Morey, L. C. (2008). Personality traits and eating behavior in the obese: poor self-control in emotional and external eating but personality assets in restrained eating. *Eating Behaviors, 9*(3), 285–293.
- Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013). Self-compassion in the face of shame and body image dissatisfaction: implications for eating disorders. *Eating Behaviors, 14*(2), 207–210.

- Forman, E. M., Butryn, M. L., Hoffman, K. L., & Herbert, J. D. (2009). An open trial of an acceptance-based behavioural intervention for weight loss. *Cognitive and Behavioral Practice, 16*(2), 223–235.
- Friedman, K. E., Reichmann, S. K., Costanzo, P. R., Zelli, A., Ashmore, J. A., & Musante, G. J. (2005). Weight stigmatization and ideological beliefs: relation to psychological functioning in obese adults. *Obesity, 13*(5), 907–916.
- Gavin, A. R., Simon, G. E., & Ludman, E. J. (2010). The association between obesity, depression, and educational attainment in women: the mediating role of body image dissatisfaction. *Journal of Psychosomatic Research, 69*(6), 573–581.
- Gilbert, P. (2009). *The compassionate mind*. London: Constable.
- Gilbert, P., & Choden. (2013). *Mindful compassion*. London: Constable & Robinson.
- Goldin, P. R., & Gross, J. J. (2010). Effects of mindfulness-based stress reduction (MBSR) on emotion regulation in social anxiety disorder. *Emotion, 10*(1), 83–91.
- Greeno, C. G., & Wing, R. R. (1994). Stress-induced eating. *Psychological Bulletin, 115*(3), 444–464.
- Grossman, P. (2013). Kindness and compassion as integral to mindfulness—experiencing the knowable in a special way. In T. Singer & M. Bolz (Eds.), *Compassion: bridging practice and science* (pp. 192–207). Munich: Max Planck Society.
- Grossman, P., & Van Dam, N. T. (2011). Mindfulness, by any other name...: trials and tribulations of sati in western psychology and science. *Contemporary Buddhism, 12*(01), 219–239.
- Heffner, M., Sperry, J., Eifert, G. H., & Detweiler, M. (2002). Acceptance and commitment therapy in the treatment of an adolescent female with anorexia nervosa: a case example. *Cognitive and Behavioral Practice, 9*(3), 232–236.
- Herman, C. P., & Mack, D. (1975). Restrained and unrestrained eating. *Journal of Personality, 43*(4), 647–660.
- Hofmann, S. G., Grossman, P., & Hinton, D. E. (2011). Loving-kindness and compassion meditation: potential for psychological interventions. *Clinical Psychology Review, 31*(7), 1126–1132.
- Hofmann, W., Rauch, W., & Gawronski, B. (2007). And deplete us not into temptation: automatic attitudes, dietary restraint, and self-regulatory resources as determinants of eating behavior. *Journal of Experimental Social Psychology, 43*(3), 497–504.
- Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: a theoretical and empirical examination. *Personality and Individual Differences, 50*(2), 222–227.
- Jeffery, R. W., Epstein, L. H., Wilson, G. T., Drenowski, A., Stunkard, A. J., & Wing, R. R. (2000). Long-term maintenance of weight loss: current status. *Health Psychology, 19*(1), 5–16.
- Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*(1), 33–47.
- Kabat-Zinn, J. (1990). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness*. New York: Delacourt.
- Kabat Zinn, J. (2003). Mindfulness based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice, 10*(2), 144–156.
- Kabat-Zinn, J. (2006). *Coming to our senses: healing ourselves and the world through mindfulness*. New York: Hyperion.
- Kabat-Zinn, J. et al. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry, 149*(7), 936–943.
- Katterman, S. N., Kleinman, B. M., Hood, M. M., Nackers, L. M., & Corsica, J. (2014). Mindfulness meditation as an intervention for binge eating, emotional eating, and weight loss: a systematic review. *Eating Behaviors, 15*(2), 197–204.
- Kearney, D. J., Milton, M. L., Malte, C. A., McDermott, K. A., Martinez, M., & Simpson, T. L. (2012). Participation in mindfulness-based stress reduction is not associated with reductions in emotional eating or uncontrolled eating. *Nutrition Research, 32*(6), 413–420.
- Kristeller, J. L., & Hallett, C. B. (1999). An exploratory study of a meditation-based intervention for binge eating disorder. *Journal of Health Psychology, 4*(3), 357–363.
- Kristeller, J. L., & Wolever, R. Q. (2010). Mindfulness-based eating awareness training for treating binge eating disorder: the conceptual foundation. *Eating Disorders, 19*(1), 49–61.
- Kristeller, J., Wolever, R. Q., & Sheets, V. (2013). Mindfulness-based eating awareness training (MB-EAT) for binge eating: a randomized clinical trial. *Mindfulness, 5*(3), 282–297.
- Lakey, C. E., Campbell, W. K., Brown, K. W., & Goodie, A. S. (2007). Dispositional mindfulness as a predictor of the severity of gambling outcomes. *Personality and Individual Differences, 43*(7), 1698–1710.
- Lattimore, P., Fisher, N., & Malinowski, P. (2011). A cross-sectional investigation of trait disinhibition and its association with mindfulness and impulsivity. *Appetite, 56*(2), 241–248.
- Levesque, C., & Brown, K. W. (2007). Mindfulness as a moderator of the effect of implicit motivational self-concept on day-to-day behavioral motivation. *Motivation and Emotion, 31*(4), 284–299.
- Ludwig, D. S., & Kabat-Zinn, J. (2008). Mindfulness in Medicine. *Journal of the American Medical Association, 300*(11), 1350–1352.
- Levine, N. (2007). *Against the stream: a Buddhist manual for spiritual revolutionaries*. New York: HarperOne.
- Mantzios, M., & Giannou, K. (2014). Group vs. single mindfulness meditation: exploring avoidance, impulsivity and weight management in two separate mindfulness meditation settings. *Applied Psychology: Health and Well-Being, 1*–19.
- Mantzios, M., & Wilson, C. J. (2013). How concrete construals can become mindful: a novel approach of developing mindfulness and self-compassion to assist weight loss. *Psychology & Health, 1*–21.
- Mantzios, M., Wilson, J. C., Linnell, M., & Morris, P. (2014). The role of negative cognitions, intolerance of uncertainty, mindfulness, and self-compassion in weight regulation among male army recruits. *Mindfulness, 1*–8.
- Miller, C. K., Kristeller, J. L., Headings, A., Nagaraja, H., & Miser, F. (2012). Comparative effectiveness of a mindful eating intervention to a diabetes self-management intervention among adults with type 2 diabetes: a pilot study. *Journal of the Academy of Nutrition and Dietetics, 112*, 1835–1842.
- Nederkorn, C., Smulders, F. T. Y., Havermans, R. C., Roefs, A., & Jansen, A. (2006). Impulsivity in obese women. *Appetite, 47*(2), 253–256.
- Neff, K. D. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250.
- Neff, K. D. (2003b). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–101.
- Neff, K. D., & Dahm, K. A. (2014). Self-compassion: what it is, what it does, and how it relates to mindfulness. In M. Robinson, B. Meier, & B. Ostafin (Eds.), *Mindfulness and self-regulation*. New York: Springer.
- Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology, 69*(1), 28–44.
- Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass, 5*(1), 1–12.
- Robinson, E., Aveyard, P., Daley, A., Jolly, K., Lewis, A., Lycett, D., & Higgs, S. (2013). Eating attentively: a systematic review and meta-analysis of the effect of food intake memory and awareness on eating. *The American Journal of Clinical Nutrition, 97*(4), 728–742.
- Rogge, M., Greenwald, M., & Golden, A. (2004). Obesity, stigma and civilized oppression. *Advances in Nursing Science, 27*(4), 301–315.

- Romero-Corral, A., Lopez-Jimenez, F., Sierra-Johnson, J., & Somers, V. K. (2008). Differentiating between body fat and lean mass—how should we measure obesity? *Nature Clinical Practice Endocrinology & Metabolism*, 4(6), 322–323.
- Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-based stress reduction for health care professionals: results from a randomized trial. *International Journal of Stress Management*, 12(2), 164–176.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: a new approach to preventing relapse*. New York: Guilford Press.
- Sloan, D. M. (2004). Emotion regulation in action: emotional reactivity in experiential avoidance. *Behaviour Research and Therapy*, 42(11), 1257–1270.
- Tapper, K., Shaw, C., Ilsley, J., Hill, A. J., Bond, F. W., & Moore, L. (2009). Exploratory randomised controlled trial of a mindfulness-based weight loss intervention for women. *Appetite*, 52(2), 396–404.
- Timmerman, G. M., & Brown, A. (2012). The effect of a mindful restaurant eating intervention on weight management in women. *Journal of Nutrition Education and Behavior*, 44, 22–28.
- Van Dam, N. T., Sheppard, S. C., Forsyth, J. P., & Earleywine, M. (2011). Self-compassion is a better predictor than mindfulness of symptom severity and quality of life in mixed anxiety and depression. *Journal of Anxiety Disorders*, 25(1), 123–130.
- Wansink, B., & Sobal, J. (2007). Mindless eating: the 200 daily food decisions we overlook. *Environment and Behaviour*, 39(1), 106–123.
- Weibel, D. T. (2007). A loving-kindness intervention: boosting compassion for self and others. Retrieved from the Ohio University Theses database (Document number: ohio1190652251): http://etd.ohiolink.edu/view.cgi?acc_num=ohiou1190652251
- Wenk-Sormaz, H. (2005). Meditation can reduce habitual responding. *Advances in Mind-Body Medicine*, 21(3–4), 33–49.