

ORIGINAL PAPER

Exploring Mindfulness and Mindfulness with Self-Compassion centred interventions to assist weight loss – Theoretical considerations and preliminary results of a randomized pilot study.

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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 five-weeks. Participants lost weight in both experimental groups, while the control group gained weight during the initial five 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 one-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

Introduction

The positive effects of the mindfulness-based interventions for various eating disorders (e.g., Heffner, Sperry, Eifert, & Detweiler, 2002), as well as the ability to assist people who binge eat, through the Mindfulness-Based Eating Awareness Training (MB-EAT; Kristeller & 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 & Kabat-Zinn, 2008). There are many studies that have reported body weight as an outcome variable (Alberts, Thewissen, & Raes, 2012; Kearney, McDermott, Malte, Martinez, & Simpson, 2012; Kristeller, Wolever, & Sheets, 2013), but, to our knowledge, only four studies specifically aimed for participants to lose weight (see Dalen et al., 2010; Mantzios & Giannou, 2014; Miller, Kristeller, Headings, Nagaraja, & Miser, 2012; Timmerman & 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 towards the current obesity epidemic (see Cohen & Farley, 2008; Elfhag & Morey, 2008; Nederkoorn, Smulders, Havermans, Roefs, & Jansen, 2006), other research has shown that mindfulness relates negatively to automatic, emotional, and impulsive

reactions (Brown & Ryan, 2003; Goldin & Gross, 2010; Lattimore, Fisher, & Malinowski, 2011; Levesque & Brown, 2007; Sloan, 2004; Wenk-Sormaz, 2005) and positively to self-regulation (Lakey, Campbell, Brown, & Goodie, 2007; Levesque & 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, 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 multi-layered 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 & 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; 2003b) 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; 2003b 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 & 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, Wilson, Linnell, & Morris, 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, Pinto-Gouveia, & Duarte, 2013), while shame, body image dissatisfaction, and the drive for thinness are also observed and detrimental in dieting and overweight populations (e.g., Chernyak & Lowe, 2010; Conradt et al., 2008; Gavin, Simon, & Ludman, 2010). All in all, there are different goals and benefits observed between self-compassion and mindfulness theories and interventions (see Neff & Dahm, in press, 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, Speca, & Carlson, 2010). Further, research showed that self-compassion partially mediated the association between mindfulness and well-being (Hollis-Walker & Colosimo, 2011), as well as mindfulness practice and stress (Shapiro, Astin, Bishop, & Cordova, 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, Sheppard, Forsyth, & Earleywine, 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 towards 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, Greenwald & Golden, 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 (in press) suggested that loving-kindness meditation could also possibly assist in developing self-compassion (see also Hofmann, Grossman, & Hinton, 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 & 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 one-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 cut-off score (i.e., BMI > 40) and were thus excluded from any further analyses (see Figure 1). Sixty-three employees remained (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 non-significantly 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 five 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 non-combat 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.

INSERT FIGURE 1 HERE

Food Availability and meal plans

Breakfast always consisted of 2 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 5 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 non-separation 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 theatre 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 five 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 two or three 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 day 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 minutes 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 five 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 five weeks to record attendance.

After the weigh-in at week five, before participants left with a newly acquired way to aid them with their weight loss efforts, 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 six 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 six 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, socio-economic 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 post-measurements 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 one. Day two consisted of *Eating Meditation, desirable food meditation* and a *feeling of hunger mental scale* (see Levine, 2007). Day three 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 towards the self (see, Chödrön & Otro, 2001; see also Levine, 2007).

INSERT TABLE 1 HERE

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.

INSERT TABLE 2 HERE

The total amount of training was different for each group. For the dieting only/control group, participants received only 2 hours 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 3 additional hours of meditation training (2 hours on day one and 1 hour on day two). 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 hours for both groups covering mindfulness literature, and an additional 2 hours 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 one and weight again at five weeks, and at six and twelve months before breakfast. Height and weight were measured using a portable Harpenden stadiometer and a calibrated physician scale (rounded at 0.1kg) 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 non-significantly different (see Table 3).

INSERT TABLE 3 HERE

Furthermore, a drop-out analysis was conducted to test significant differences in intervention settings, age, weight, and Body Mass Index (BMI) between participants and drop-outs. 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 drop-outs 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 five-week interventions would be excluded from the main analyses, but lost sessions were minimal and none exceeded this criterion for exclusion. The analyses showed that drop-outs 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 x 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 Figure 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 non-significantly 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 (p 's $< .05$), 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).

INSERT TABLE 4 HERE

INSERT FIGURE 2 HERE

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 non-cumulative 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 non-cumulative) 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 (p 's < .01), which latter groups did not significantly differ in weight change, $F(1, 72) = 2.99, p = .09$ (see Table 4). Both mindfulness and control groups gained weight, while the mindful loving kindness group continued losing weight (see Figure 3).

INSERT FIGURE 3 HERE

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

INSERT TABLE 5 HERE

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 non-cumulative weight change from 6-months to the 1-year follow-up revealed that there were significant differences between all groups, $F(1, 72) = 2.99, p = .09$ (all post hoc p 's < .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 group started failing at weight maintenance, while the mindfulness group marginally gained weight (see Figure 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 five 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 & Giannou, 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 six 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 one-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 six 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, Greenwald & Golden, 2004). Self-soothing, which is affiliated to the theory and practice of compassion and self-compassion, is enabling a less self-critical attitude towards 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 & Wilson, 2013), as well as in other everyday clinical and non-clinical difficulties (see Baer, 2010; Gilbert & Choden, 2013; Neff & 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, Speca, & Carlson, 2010). Also, research showed that self-compassion partially mediated the association between mindfulness and well-being (Hollis-Walker & Colosimo, 2011), as well as mindfulness practice and stress (Shapiro, Astin, Bishop, & Cordova, 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, Sheppard, Forsyth, & Earleywine, 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 life style 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, Smulders, Havermans, Roefs, & Jansen, 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 drop-out 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 towards 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 non-military 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, Butryn, Hoffman, Herbert, 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 drop-out rate. Nevertheless, these attitudes and reactions towards 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 non-meditators 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 drop-outs. Alternative methods to overcome such problems are required in future research if meditation is to be used as an intervention and not as a life-style change. Making meditation a life-style change, however, is a paradox, when a life-style 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 life-style 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 & 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, Williams, & Teasdale, 2002) or as specific as Mindfulness Based Eating Awareness Training (MB-EAT; Kristeller & 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, Kleinman, Hood, Nackers, & Corsica, 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 & 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 overridden 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, Lopez-Jimenez, Sierra-Johnson, & Somers, 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 & Choden, 2013; Neff & 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.

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Medicine, 21(3-4), 33-49.

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. 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</p> |

food. Also, observing shifts in hunger are also seen as a way of eating mindfully.

Troublesome Foods Meditation

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 towards slow, purposeful eating meditation). Since those foods would be otherwise forbidden, acceptance and non-judgment are more challenging.

Day 3 **Loving-Kindness Meditation**

Meditation taught only to the mindfulness with self-compassion group

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.

Table 2.

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

| All Groups | Experimental Groups <u>only</u> | Mindfulness with Self-Compassion Group <u>only</u> |
|---|---|--|
| Cohen, D. A., & Farley, T. A. (2008). Eating as an automatic behavior. <i>Preventing Chronic Disease</i> , 5(1), A23. | Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. <i>Clinical Psychology: Science and Practice</i> , 10(2), 125-143. | Neff, K. (2003). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. <i>Self and Identity</i> , 2(2), 85-101. |
| 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. <i>Journal of</i> | Kabat-Zinn, J., Massion, A. O., Kristeller, J., Peterson, L. G., Fletcher, K. E., et al. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. <i>American Journal of</i> | www.self-compassion.org/self-compassion-exercise.pdf Exercises were given to participants as tools to develop a more compassionate self. Some exercises were presented to participants to enhance the |

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- Experimental Social Psychology*, 43(3), 497-504.
- Psychiatry, 149(7), 936-947.
- understanding and usefulness of those exercises to restrictive and emotional eaters, as well as to people who fail in dieting (e.g., exercise 4, *The criticizer, the criticized, and the compassionate observer*).
- Wansink, B., & Sobal, J. (2007). Mindless Eating: The 200 Daily Food Decisions We Overlook. *Environment and Behaviour*, 39(1), 106-123.
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Note: 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

Table 3.

Baseline Characteristics of treatment and control participants.

| Variable | MM <i>M (SD)</i> | MLKM <i>M (SD)</i> | Control <i>M (SD)</i> | <i>F</i> | <i>p</i> -value |
|-----------------------|---------------------|-----------------------|--------------------------|----------|-----------------|
| Age | 22.4 (3.4) | 21.1 (2.8) | 22.2 (3.0) | .88 | .42 |
| Weight (kg) | 82.2 (12.6) | 83.3 (9.7) | 82.4 (17.9) | .02 | .97 |
| Body Mass Index (BMI) | 26.1 (3.3) | 26.3 (3.2) | 26.7 (4.9) | .13 | .88 |

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 | 6-months | 1-year | 6-months | 1-year | <i>F</i> | η^2 |
| | <i>M (SD)</i> | <i>M (SD)</i> | <i>M (SD)</i> | (from 5-weeks) <i>M (SD)</i> | (from 6-months) <i>M (SD)</i> | | |
| 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 |

*Note: MLKM = Mindful Loving Kindness Meditation, MM = Mindfulness Meditation
Negative values represent weight gain.*

Table 5.

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

| | INTERVENTION | | | Total |
|-----------------------------------|--------------|----|---------|-------|
| | MLKM | MM | Control | |
| No Result/No point to continue | 1 | 2 | 26 | 29 |
| No Need to continue (weight lost) | 9 | 2 | 1 | 12 |
| Too busy & no time | 2 | 15 | 2 | 19 |
| Need to lose more weight | 2 | 0 | 1 | 3 |
| Total | 14 | 19 | 30 | 63 |

Note: MLKM = Mindful Loving Kindness Meditation, MM = Mindfulness Meditation

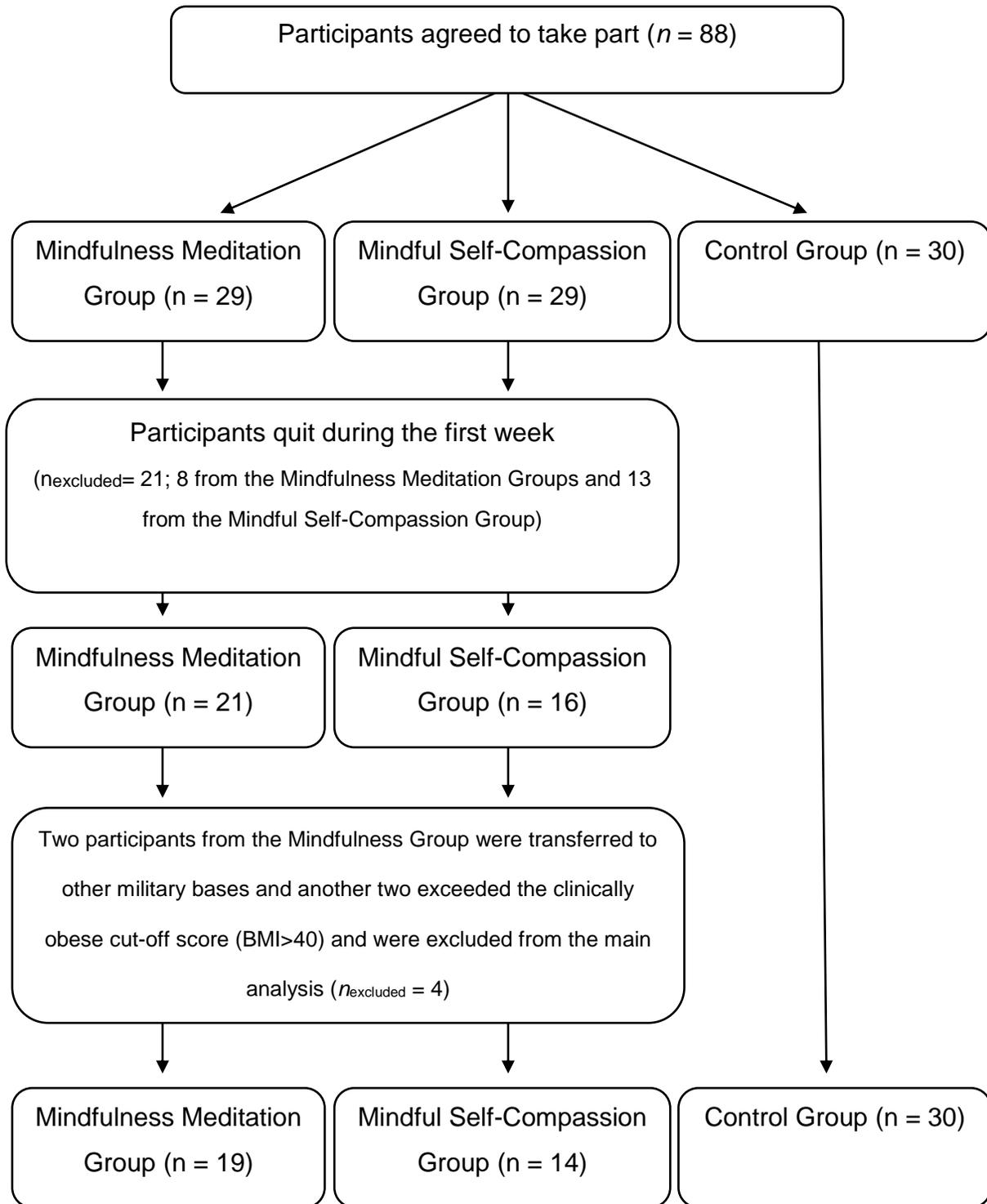


Figure 1. Drop-out and participant exclusion flow-chart

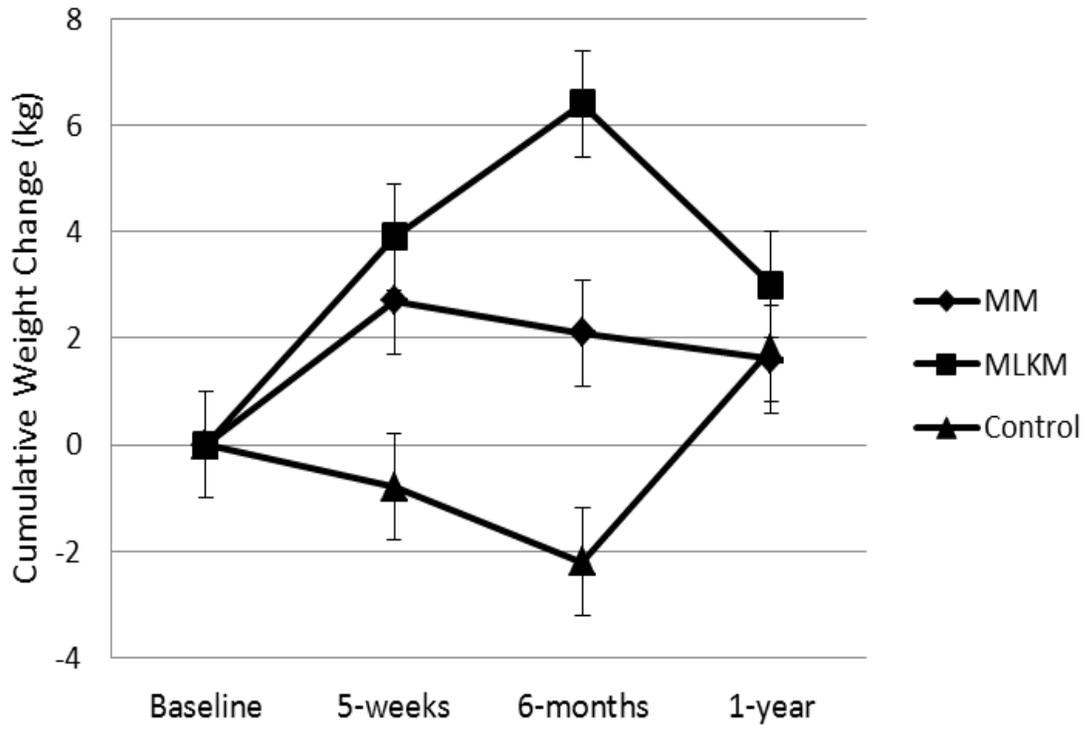


Figure 2. Cumulative weight change of experimental and control groups from baseline throughout the intervention periods to the 1 year follow-up. Error bars indicate ± 1 SE.
Note: Negative values represent weight gain.

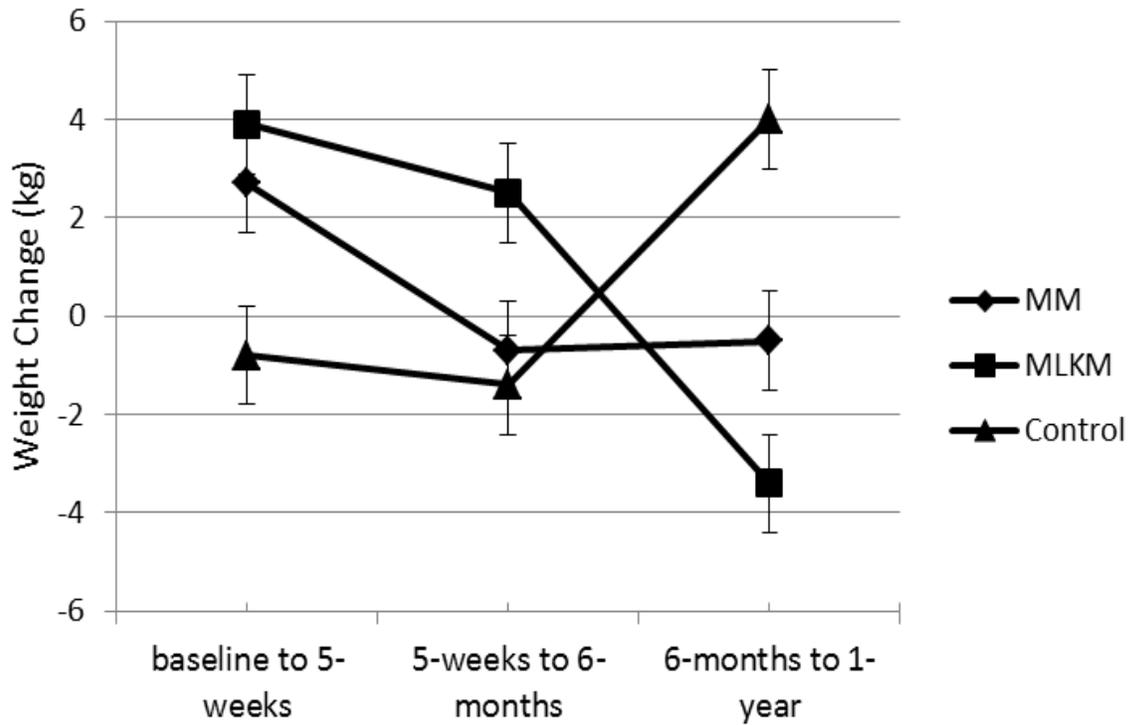


Figure 3. Independent weight change of experimental and control groups from baseline to 5-weeks, from 5-weeks to 6-months, and from 6-months to 1-year. Error bars indicate ± 1 SE.

Note: Negative values represent weight gain.