



Published in final edited form as:

*Obesity (Silver Spring)*. 2018 October ; 26(10): 1566–1575. doi:10.1002/oby.22275.

## Changes in the Perceptions of Self-Weighing Across Time in a Behavioral Weight Loss Intervention

Margaret C. Fahey<sup>a</sup>, Robert C. Klesges<sup>b,c</sup>, Mehmet Kocak<sup>c</sup>, G. Wayne Talcot<sup>b,c</sup>, and Rebecca A. Krukowski<sup>c</sup>

<sup>a</sup>Department of Psychology, University of Memphis, Memphis, TN, USA

<sup>b</sup>Department of Public Health Sciences, University of Virginia, School of Medicine, Charlottesville, VA, USA

<sup>c</sup>Department of Preventive Medicine, University of Tennessee Health Science Center, Memphis, TN, USA

### Abstract

**Objective.**—Changes in beliefs about self-weighing were examined across time in a behavioral weight loss intervention.

**Methods.**—Active duty military personnel ( $n=248$ ) enrolled in a 12-month counselor-initiated or self-paced intervention based on the Look AHEAD intensive lifestyle intervention. Using an e-scale, participants were asked to self-weigh daily. Self-weighing perceptions were compared from baseline to four-months (*weight loss phase*), four-months to 12-months (*weight maintenance phase*), and from baseline to 12-months (*full intervention*), and compared across time by behavioral and demographic characteristics.

**Results.**—Overall, participants perceived self-weighing as more helpful and positive, less frustrating and making them less self-conscious after the *weight loss phase*. After *weight maintenance*, individuals believed self-weighing was less helpful and positive, more frustrating and anxiety provoking, and making them more self-conscious. Yet after the intervention, participants still viewed self-weighing as more helpful and positive and less frustrating than at baseline. Weight change, self-weighing behavior prior to the intervention, and intervention condition were associated with perception change. Controlling for these influencing factors, differences in gender, BMI, age, ethnicity and race were observed in how beliefs changed across time.

---

Users may view, print, copy, and download text and data-mine the content in such documents, for the purposes of academic research, subject always to the full Conditions of use:[http://www.nature.com/authors/editorial\\_policies/license.html#terms](http://www.nature.com/authors/editorial_policies/license.html#terms)

33 N Rembert Street #4 Memphis, TN 38104; mcfahey@memphis.edu.

The authors declare no conflict of interest.

The opinions expressed on this document are solely those of the authors and do not represent an endorsement by or the views of the United States Air Force, the Department of Defense, or the United States Government. The views or materials of BodyTrace™ are not necessarily the official views of, or endorsed by the United States Air Force, the Department of Defense, or the United States Government.

Dissemination of the Look Ahead Weight Management Treatment in the Military (NCT 02063178) The study was funded by the National Institute of Diabetes and Digestive and Kidney Diseases (RO1 DK097158) of the National Institutes of Health, with the title of “Dissemination of the Look Ahead Weight Management Treatment in the Military.”

**Conclusion.**—Results suggest engaging in a weight loss intervention promoting daily self-weighing increases positive and decreases negative beliefs about self-weighing.

### Keywords

self-weighing; perceptions; weight loss; e-scale

---

## Introduction

Frequent self-weighing is an effective tool for weight loss and weight gain prevention (1–7), and decreases in self-weighing are associated with subsequent weight gain (8). Extensive research refutes the common misperception that self-weighing increases long-term psychological distress and body dissatisfaction (5, 9). In fact, some studies suggest frequent self-weighing increases body satisfaction over time (10, 11).

Several studies measured perceptions of self-monitoring in adults after weight management interventions and found experiences were generally positive (3, 12–14). Steinberg and colleagues (3) measured beliefs about self-weighing in adults who completed a six-month weight loss intervention. On average, participants reported that daily self-weighing with e-scales was easy to do, easy to remember, positive, helpful, and that they would likely continue (3). Participants did not report that they found this behavior highly frustrating, anxiety provoking, or made them self-conscious. Using the same measure, consistently positive beliefs were found in African American female breast cancer survivors after a six-month weight gain prevention program (13). Additionally, Gokee Larose and colleagues (14) measured the belief that self-weighing is positive twice within a weight-gain prevention program and found scores remained positive and stable (14). However, these studies examined beliefs after engaging in an intervention (3, 12–14). Thus, potential changes in self-weighing perceptions before, during, and after a behavioral weight loss intervention are unknown.

The study purpose is to examine changes in perceptions of self-weighing during the weight loss and weight maintenance phases of a weight loss intervention in active duty military personnel using e-scales. Based on previous studies of self-weighing beliefs, in the overall sample, we hypothesize that positive perceptions will increase during weight loss (3, 12, 13). Further, based on research which suggested a stable and positive perception of self-weighing during weight gain prevention (14), we hypothesize perceptions will remain stable during weight maintenance. Given that individual experiences are embedded within a weight loss intervention, our study will examine how weight loss success, intervention condition, and self-weighing behavior prior to the intervention are associated with perception change. Additionally, due to a lack of research on demographic differences in self-weighing perceptions, our study aims to explore potential differences in gender, body mass index (BMI), age, ethnicity and race in how experiences of self-weighing differ across the intervention phases.

## Methods

### Participants

Active Duty Military Personnel ( $n=248$ ) were recruited from Joint Base San Antonio (Table 1). Participants (18 years of age, BMI  $\geq 25$ ) had phone and email access and at least one year left in their position in San Antonio. They were required to self-monitor diet and physical activity for a week and obtain written clearance from a healthcare provider. Exclusion criteria included failing more than one military fitness test in the past 12 months, as well as having a medical condition or taking medication affecting their weight or ability to change diet or physical activity.

### Procedure

This study was primarily approved by the Institutional Review Board (IRB) of the 59<sup>th</sup> Medical Wing in San Antonio, TX and secondarily acknowledged by the IRB at the University of Tennessee Health Science Center. After obtaining informed consent at screening, participants were randomized at the individual level using a computerized block design. Participants received either a counselor-initiated (CI) or self-paced (SP) weight-loss intervention. With both conditions, weight loss goals (10% of baseline weight), personalized calorie, and exercise goals were the same. All participants were also provided the Body Trace™ e-scale, in which measured weights were uploaded and graphed over time into a secure personalized website. Both conditions received a 12-month manualized behavioral weight loss program based on Look AHEAD intensive lifestyle intervention. Those randomized to the CI condition received 28 individual telephone sessions with a trained interventionist over the 12-month period. Participants received interventionist feedback via email on weight, diet, and exercise self-monitoring at the same frequency as telephone sessions. Individuals in the SP condition were given a handout of available resources (i.e., individual telephone sessions and self-monitoring feedback via email when requested, lesson materials). During telephone sessions, counselors encouraged daily self-weighing as one of the most effective tools for weight loss [1–7]. Further details on the sample, study procedures, and main outcomes are described elsewhere (15, 16).

### Measures

**Sociodemographic characteristics.**—Participants reported gender (i.e., male, female), age (i.e., <30 years, 30–40 years, >40 years), ethnicity (i.e., non-Hispanic/Latino, Hispanic/Latino), and race (i.e., Caucasian, African American, and Other) at baseline. The category “Other” included individuals who identified as American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, multiple races, and unknown race given infrequency of responses.

**Body weight.**—Weight was measured on a calibrated scale (in kilograms) at the baseline, four-month, and 12-month assessments. Height (in centimeters) was measured using a wall-mounted stadiometer. BMI was calculated using the standard formula based on baseline measurements. Participant BMI was categorized as overweight: 25.0–29.9 kg/m<sup>2</sup> or obese: > 30 kg/m<sup>2</sup>. If clinic weight was missing for four or 12-month assessments, BodyTrace™ weights closest to targeted time points were used to maximize completeness of weight data,

based on high consistency between BodyTrace™ weights and in person weight assessments (17). To define four-month weight, weight not collected in-clinic ( $n=36$ ), BodyTrace™ weight that was available  $\pm 30$  days around 120 days from randomization was used (range: 90–142 days). For 12-month weight, weight not collected in-clinic ( $n=34$ ), BodyTrace™ weight that was available  $\pm 30$  days around 360 days from randomization was used (range: 335–385 days). After this imputation step, missing weights at 4-months ( $n=13$ ) and 12-months ( $n=42$ ) assumed no change from baseline, as the most conservative estimate.

**Weight change.**—To define weight change (i.e., gain, loss, stable), the difference in weight from baseline to both four-months and baseline to 12-months was used. Weight change was classified: weight gain ( $>2.3\%$  of baseline weight), weight loss ( $<2.3\%$  of baseline weight), and weight stable (within  $2.3\%$  of baseline weight). Criterion was based on a previous study on weight maintenance (18).

**Perceptions of self-weighing.**—Perceptions were assessed with a questionnaire on attitudes associated with self-weighing used in previous weight loss and weight gain prevention studies (3, 14). Using an 8-point scale, participants were asked whether they found daily self-weighing to be helpful (i.e., *not at all helpful* (1) to *very helpful* (8)) and positive (i.e., *not at all positive* (1) to *very positive* (8)). Additionally, using a reverse-scored 8-point scale, participants were asked whether they found self-weighing to be frustrating (i.e., *not at all frustrating* (1) to *very frustrating* (8)), anxiety provoking (i.e., *not at all anxiety provoking* (1) to *very anxiety provoking* (8)), or made them feel self-conscious (i.e., *not at all self-conscious* (1) to *very self-conscious* (8)). Thus, a higher score for these items indicates a more negative (i.e., frustrating, anxiety provoking, making self-conscious) perception of self-weighing.

**Previous self-weighing frequency.**—A question from the Look AHEAD weight control practices questionnaire was administered at baseline to assess previous self-weighing behavior (i.e., “How often do you weigh yourself?”) (3, 15). Answers were *never, about once a year or less, every couple of months, every month, every week, every day, and more than once per day*. This study categorized participants as those who weighed themselves *weekly or more frequently* versus *less than weekly*.

**Self-weighing frequency.**—Self-weighing was measured continuously by measurements from the BodyTrace™ scale. Frequency was computed by adding the number of days each participant weighed during each phase of the intervention.

## Analyses

Perceptions of self-weighing were compared from baseline to four-months (*weight loss*), four-months to 12-months (*weight maintenance*), and from baseline to 12-months (*full intervention*). This change was observed in the overall sample and compared by intervention condition, relevant weight change (i.e., four-month or 12-month outcome), and self-weighing frequency prior to the intervention using Wilcoxon Signed Rank and Kruskal-Wallis tests. To explore demographic differences, linear regression models examined change by gender, BMI category, age, ethnicity and race controlling for these influencing covariates

(i.e., weight change, intervention condition, previous self-weighing). In additional analyses, models examined demographic differences controlling for intervention condition, weight change, and frequency of e-scale self-weighing during relevant intervention phase (Table S1). To observe longitudinal profiles across the full intervention, random coefficient models predicted change over time controlling for baseline covariates (i.e., intervention, previous self-weighing frequency). Finally, a Spearman correlation coefficient was computed to assess the relationship between change in each belief and frequency of self-weighing during each intervention phase.

## Results

### Participants

Randomized participants were diverse in gender, BMI category, race, ethnicity and age (Table 1). Frequency of self-weighing behavior across behavioral and demographic characteristics are provided (Table 2).

### Change in Self-Weighing Perceptions in the Overall Sample

**Weight loss phase (0–4 months).**—Participants reported self-weighing as more *helpful* [Mean (M) = 1.56,  $p < .0001$ ] and more *positive* (M=1.66,  $p < .0001$ ), as well as less *frustrating* (M= -1.02,  $p < .0001$ ) and making them less *self-conscious* (M= -0.76,  $p < .0001$ ) after the weight loss phase (Table 3). Belief that self-weighing was *anxiety-provoking* did not significantly change (baseline score M=3.33).

**Weight maintenance phase (4–12 months).**—Compared to scores after the weight loss phase, participants reported self-weighing as less *helpful* and less *positive* after weight maintenance ( $p = .036$ ,  $p = .0024$ , respectively) (Table 3). Further, they found that self-weighing was more *frustrating* ( $p = .035$ ) and making them more *self-conscious* ( $p < .0001$ ). Belief that self-weighing was *anxiety-provoking* remained unchanged.

**Full intervention (0–12 months).**—Participants believed self-weighing was more *helpful* (M=1.31,  $p < .0001$ ) and more *positive* (M=1.18,  $p < .0001$ ), as well as less *frustrating* (M= -0.61,  $p = .0004$ ) after the full intervention (Table 3). Beliefs that self-weighing was *anxiety provoking* and makes you *self-conscious* remained unchanged.

### Perceptions by Behavioral Characteristics

**Weight change.**—At baseline, there were no differences in self-weighing perceptions by weight change outcomes at four-months (data not shown) or 12-months (Table 3).

Across the weight loss phase, those who lost weight (i.e., at four-months) viewed self-weighing as more *helpful* ( $p = .013$ ), more *positive* ( $p < .00001$ ), and making them less *self-conscious* ( $p = .008$ ) compared to those who gained or remained weight stable (Table 3). Across weight maintenance, individuals who lost weight (i.e., at 12-months) perceived self-weighing as more *helpful* ( $p < .0001$ ), more *positive* ( $p < .0001$ ), less *frustrating* ( $p = .0004$ ), less *anxiety-provoking* ( $p = .007$ ) and making them less *self-conscious* ( $p = .0006$ ) than those who gained or remained weight stable. Over the full intervention, those who lost weight

(i.e., 12-months) developed views that self-weighing was more *helpful* ( $p < .0001$ ) and *positive* ( $p < .0001$ ), as well as less *frustrating* ( $p = .0004$ ), *anxiety-provoking* ( $p = .007$ ), and making them less *self-conscious* ( $p = .0006$ ). No other differences were observed.

**Intervention group.**—Participants in both interventions had similar baseline perceptions (Table 3). Across the weight loss phase, the CI group believed self-weighing was more *helpful* ( $p = .0001$ ) and more *positive* ( $p = .0004$ ) than the SP group (Table 3). Over the full intervention, the CI group perceived self-weighing as more *helpful* ( $p = .0003$ ) and *positive* ( $p < .0001$ ), and making them less *self-conscious* ( $p = .004$ ) than the SP group. No other differences in beliefs were observed.

**Previous self-weighing.**—At baseline, individuals who weighed weekly or more frequently prior to the intervention indicated that self-weighing was more *helpful* ( $p = .002$ ) and *positive* ( $p = .03$ ) than those who weighed less often (Table 3). Across weight loss phase, those who weighed less than weekly prior to the intervention believed self-weighing was more *helpful* ( $p = .046$ ) and more *positive* ( $p = .004$ ) than those who weighed more frequently (Table 3). Across weight maintenance, those who weighed less than weekly prior to the intervention believed self-weighing was more *helpful* ( $p = .014$ ) than those who weighed more frequently (Table 3). Across the full intervention, those who weighed less than weekly prior to the intervention developed views of self-weighing as more *helpful* ( $p = .0003$ ) and *positive* ( $p = .033$ ) than those who weighed more frequently.

### Perceptions by Demographic Characteristics

**BMI.**—At baseline, participants with overweight believed self-weighing was more *positive* ( $p = .027$ ) and less *frustrating* ( $p = .029$ ) than participants with obesity (Table 4). Controlling for covariates, across the weight loss phase, individuals with obesity believed self-weighing was more *helpful* ( $p = .027$ ) and more *positive* ( $p = .006$ ) than those with overweight (Table 4). Across weight maintenance, however, those with obesity believed self-weighing was less *positive* ( $p = .02$ ) and more *anxiety provoking* ( $p = .022$ ). There were no BMI differences for other beliefs at baseline or across time (Table 4).

**Gender.**—At baseline, men reported self-weighing was more *positive* ( $p = .001$ ), less *frustrating* ( $p = .002$ ), less *anxiety provoking* ( $p = .005$ ), and made them less *self-conscious* ( $p < .0001$ ) than women (Table 4). There were no other differences at baseline or across weight loss or maintenance phases (Table 4). Adjusting for covariates, across the full intervention, women developed the view of self-weighing as more *positive* ( $p = .03$ ). No other differences were found across the full intervention.

**Age.**—Baseline scores showed similar beliefs of self-weighing across age groups, and no differences were observed for beliefs over time (Table 4).

**Ethnicity.**—At baseline, scores showed similar perceptions regardless of ethnicity (Table 4). Adjusting for covariates, individuals who identified as Hispanic/Latino believed self-weighing was more *anxiety-provoking* ( $p = .013$ ) than those non-Hispanic/Latino after the full intervention (Table 4). No other differences were found.



**Race.**—At baseline, participants who identified as Caucasian reported self-weighing was less *positive* ( $p<.0001$ ) compared to other racial identities (Table 4). Further, participants classified as Other race perceived self-weighing as less *frustrating* ( $p=.009$ ) and less *anxiety provoking* ( $p=.017$ ) at baseline than other racial identities. There were no other baseline differences. Adjusting for covariates, those classified as Other race believed self-weighing was less *helpful* across weight maintenance ( $p=.03$ ) and the full intervention ( $p=.022$ ) compared to those with other racial identities. Across the full intervention, those identified as Caucasian developed self-weighing beliefs of being more *positive* ( $p=.044$ ) than those with other racial identities.

### Longitudinal Profiles

In random coefficient models, interactions of time and behavioral characteristics were consistent with linear regression models (Figure 1). To differentiate between intervention and weight loss success, models explored effects of intervention group and time, controlling for weight change (i.e., 12-months), for all beliefs. Interactions of time and intervention condition remained for beliefs that self-weighing is *helpful* ( $p=.0041$ ) and *positive* ( $p=.0054$ ), such that those in the CI group exhibited a steeper increase in the beliefs that self-weighing is *helpful* and *positive* compared to the SP group over the full intervention. No significant interactions were found for other beliefs.

Adjusting for baseline covariates, coefficient models predicted profile differences by BMI, gender, ethnicity, and race similar to differences found in linear regression models (Figure 1). However, inconsistent with null findings in regression models, time and age interacted in the belief that self-weighing is *anxiety provoking* ( $p=.027$ ) (Figure 1). Specifically, those between the ages of 30 and 40 years of age exhibited a steeper increase in the belief that self-weighing is *anxiety provoking* compared to other ages over the full intervention.

### Self-Weighing Perceptions and Self-Weighing Behavior

**Weight loss phase.**—There was a positive relationship between increased belief that self-weighing is *helpful* and number of days participants self-weighed during the weight loss phase ( $r=0.35$ ,  $p<.0001$ ) (Table 5), such that developing stronger beliefs that self-weighing is *helpful* correlated with more frequent self-weighing. There was a negative relationship between increased belief that self-weighing is *positive* and days weighed ( $r=-0.19$ ,  $p=.007$ ), such that developing stronger beliefs that self-weighing is *positive* correlated with less frequent self-weighing. Further, there was a negative relationship between increased belief that self-weighing is *frustrating* and days participants weighed ( $r=-.15$ ,  $p=.020$ ), such that developing stronger views that self-weighing is *frustrating* correlated with less frequent weighing. There were no correlations between change in other beliefs and self-weighing frequency.

**Weight maintenance phase.**—There were no associations between change in perceptions and self-weighing frequency during weight maintenance (Table 5).

**Full intervention.**—Across both phases, there was a positive relationship between increased belief that self-weighing is *helpful* and days participants self-weighed ( $r=0.29$ ,

$p=.0005$ ), such that developing stronger beliefs that self-weighing is *helpful* correlated with more frequent self-weighing (Table 5). There was a negative relationship between increased belief that self-weighing is *positive* and days participants self-weighed ( $r = -0.22$ ,  $p=.0086$ ), such that developing stronger beliefs that self-weighing is *positive* correlated with less frequent self-weighing. There were no associations between change in other beliefs and self-weighing frequency.

## Discussion

Current findings are the first, to our knowledge, to track the progress of beliefs specifically about self-weighing behavior across different phases of a weight loss intervention. Consistent with our hypothesis, overall, positive perceptions of self-weighing increased and negative perceptions decreased during the weight loss phase. However, positive perceptions decreased and negative perceptions increased both slightly, albeit significantly, during the weight maintenance phase. Yet, after intervention completion, active duty personnel still perceived self-weighing as more positive and less negative than they did at baseline. Results indicate that when observing the sample as a whole, participation in a weight loss intervention, especially the weight loss phase, increased positive beliefs and decreased negative beliefs about weight self-monitoring behavior, although this effect was stronger in the more intensive version of the intervention. Consistent with previous qualitative findings, results suggest that participants find that self-weighing is not as frustrating as expected and that it can be helpful and positive in achieving goals after engaging in an intervention promoting daily self-weighing (19).

Ratings after the weight loss phase (i.e., four-months) were similar to a previous study which measured these perceptions at six-months; specifically, overall mean scores in the beliefs that self-weighing is helpful, positive, anxiety provoking, and makes you self-conscious, were similar to those reported by Steinberg and colleagues (3). However, the slight decrease over the maintenance period in the belief that self-weighing is positive was inconsistent with previous findings (14), in which this perception remained stable in a weight gain prevention program. Further, compared to African American breast cancer survivors in a weight management program (13), this study sample's perceptions about self-weighing were less positive and more negative. Perhaps, current ratings were specific to those experienced in an intervention that included both weight loss and weight maintenance phases, as well as within a primarily (66%) Caucasian sample.

Given the potential for different experiences of self-weighing throughout the intervention, our study aimed to disentangle behavioral characteristics associated with change in beliefs. Weight change, self-weighing behavior prior to the intervention, and the intensity of the intervention were associated with how self-weighing perceptions changed. Specifically, those who weighed less frequently at baseline perceived self-weighing as more helpful and positive over time than those who previously weighed more often. Participants who weighed infrequently prior to the intervention might have been unfamiliar with self-weighing as a weight loss tool, and perhaps, these participants were more positively influenced by exposure to this behavior. Not surprisingly, those who lost weight perceived self-weighing as more positive and less negative across the intervention. Additionally, those in the more



intensive CI intervention group believed self-weighing was more positive and helpful than the SP group, regardless of weight loss success. Counselor encouragement and feedback about self-weighing might have facilitated a more positive experience when engaging in this behavior even within individuals who were unsuccessful with weight loss.

Adjusting for all covariates, no age differences were found in beliefs across intervention phases. Yet, longitudinal profiles, adjusting for baseline covariates, suggested that those between the ages of 30 and 40 experienced self-weighing as more anxiety provoking compared to other ages. Findings might be unique to the military population, in which individuals between the ages of 30 and 40 are closer to retirement than in other professions (20). Failure to pass annual fitness tests increases an individual's risk of being discharged from their job and losing medical and pension benefits (21). Thus, perhaps these active duty personnel between 30 and 40 years experienced increased anxiety with self-weighing as the weight loss intervention neared completion in anticipation of a fitness test.

Participants with obesity, despite perceiving self-weighing as more helpful and positive during the weight loss phase, experienced this behavior as less positive and more anxiety provoking over weight maintenance compared to those with overweight. These findings indicate that participants with obesity might benefit from increased support in regard to self-weighing during weight maintenance periods. This BMI difference might explain why the mean rating of self-weighing as frustrating in the present study (i.e.,  $M=3.48$ ) was higher compared to the mean reported by Steinberg and colleagues (3) (i.e.,  $M=2.4$ ). Steinberg and colleagues (3) measured perceptions in only adults with overweight. Perhaps, those with obesity, although believing self-weighing is helpful, might perceive more negative experiences with this behavior. Further, women developed a more positive view of self-weighing across the intervention compared to men. Women initially believed self-weighing was less positive and more negative prior to the intervention, thus, they experienced a greater change in their perception of this behavior over time.

Despite similar beliefs at baseline, those identified as Hispanic/Latino perceived self-weighing as more anxiety provoking compared to those non-Hispanic/Latino. Additionally, individuals classified as Other race believed self-weighing was less helpful across intervention phases compared to other racial identities. Although participants identified as Caucasian reported less positive beliefs prior to the intervention, they were more likely to report a positive experience of self-weighing over time compared to other racial identities. Findings suggest adults identified as ethnic or racial minorities experience self-weighing more negatively across a behavioral trial. Future interventions might provide additional support and resources, specifically in regard to self-weighing, for individuals identifying as racial or ethnic minorities. However, due to the combined different racial identities, interpretation of results related to the Other race is difficult. Future research should utilize larger samples of individuals who identify as American Indian/Alaska Native, Asian, Native Hawaiian/Pacific Islander, multiple races, and unknown race in order to draw conclusions.

With regard to the correlations between perception change and actual self-weighing behavior, perhaps, participants who weighed more frequently during the intervention were more likely to perceive self-weighing as helpful, yet also felt that this behavior was less

positive and more frustrating. Interestingly, other perceptions were not associated with self-weighing behavior. Although these correlations were weak, results suggest that an increased belief that self-weighing is helpful might facilitate more frequent self-weighing behaviors more so than other beliefs.

The current study was conducted in a military population which might limit generalizability to the civilian sector. Personnel are generally younger and have access to additional resources to assist in weight loss that are not accessible to the general public (e.g., free fitness centers, healthcare). Further, results might not be representative of adults with severe health and mental health conditions who are excluded from enlistment. In the military, fitness is perceived as a critical factor for employment and is assessed regularly in annual evaluations. Despite these unique characteristics of the military, the prevalence of overweight and obesity in the U.S. military is similar to the civilian population. Approximately 60% of active duty personnel are affected by overweight and obesity, which is a critical concern for the U.S. military (22). This diverse population of military personnel provided a unique opportunity to examine race differences, as well as gender differences, dissimilarly from previous studies which examined primarily female samples (3, 13–14, 19).

Missing in-clinic weight for some participants was a limitation. Although minimized by utilizing BodyTrace™ weight, there were cases in which weights were not available. The current study used a criterion of 2.3% to define weight change based on previous research (18). However, other studies suggest alternative definitions (e.g., 3%) (23). Importantly, although the protocol clearly encouraged daily weighing, information on how frequently self-weighing was discussed during the telephone sessions was not collected. In addition, those in the CI condition more frequently received encouragement to self-weigh. Finally, although the questionnaire of self-weighing perceptions has been used in previous research, it was not previously validated. Future research should assess reliability and validity of this measure.

## Conclusions

Despite the weight loss benefits of self-monitoring, there is often a reluctance to engage in self-weighing behaviors. Current results suggest completing a weight loss intervention, which promoted daily self-weighing, overall increased positive perceptions and decreased negative perceptions of self-weighing. Importantly, weight loss success, prior lack of experience with self-weighing, and increased intervention intensity were associated with a more positive experience of self-weighing over time. Controlling for these influencing factors, differences in BMI, gender, age, ethnicity, and race were also observed in how these experiences changed across the intervention.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## References

1. Burke LE, Choo J, Music E, Warziski M, Styn MA, Kim Y, Sevick MA. PREFER study: A randomized clinical trial testing treatment preference and two dietary options in behavioral weight management — rationale, design and baseline characteristics. *Contemp Clin Trials* 2006; 27: 34–4. [PubMed: 16233990]
2. Linde JA, Jeffery RW, French SA, Pronk NP, Boyle RG Self-Weighing in Weight Gain Prevention and Weight Loss. *Trials Ann Behav Med* 2005; 3 (3): 210–216.
3. Steinberg DM, Tate DF, Bennett GG, Ennett S, Samuel-Hodge C, Ward DS. The efficacy of a daily self-weighing weight loss intervention using smart scales and email. *Obesity (Silver Spring)* 2013; 21 (9), 1789–1797. [PubMed: 23512320]
4. VanWormer JJ, French SA, Pereira MA, Welsh EM. The impact of regular self-weighing on weight management: A systematic literature review. *Int J of Behav Nutr and Phys Act* 2008; 5 (54): 1–10. [PubMed: 18182102]
5. Shieh C, Knisley MR, Clark D., Carpenter JS Self-Weighing in Weight Management Interventions: A Systematic Review of Literature. *Obes Res & Clin Pract* 2016; 10 (5): 493–519. [PubMed: 26896865]
6. Zheng Y, Klem ML, Sereika SM, Danford CA, Ewing LJ, Burke LE. Self-weighing in weight management: A systematic literature review. *Obesity (Silver Spring)* 2015; 23 (2): 256–265. [PubMed: 25521523]
7. Pacanowski CR, Levitsky DA. Frequent Self-Weighing and Visual Feedback for Weight Loss in Overweight Adults. *J Obes* 2015; 2015: 1–9.
8. Helander EE, Vuorinen AL, Wansink B, Korhonen IKJ. Are Breaks in Daily Self-Weighing Associated with Weight Gain? *PLoS One* 2014; 9 (11): e113164. [PubMed: 25397613]
9. Benn Y, Webb TL, Chang BPI, Harkin B. What is the psychological impact of self-weighing? A meta-analysis. *Health Psychol Review* 2016; 10 (2), 187–203.
10. Welsh EM, Sherwood NE, VanWormer JJ, Hotop AM, Jeffery RW. Is frequent self-weighing associated with poorer body satisfaction? Findings from phone-based weight loss trial. *J Nutr Educ Behav* 2009; 41 (6): 425–428. [PubMed: 19879499]
11. Steinberg DM, Tate DF, Bennett GG, Ennett S, Samuel-Hodge C, Ward DS. Daily self-weighing and adverse psychological outcomes: A randomized controlled trial. *Am J of Prev Med* 2014; 4 (46): 24–29.
12. Linde JA, Jeffery RW. Testing a brief self-directed behavioral weight control program. *Behav Med* 2011; 37 (2): 47–53. [PubMed: 21660772]
13. Valle CG, Deal AM, Tate DF. Preventing weight gain in African American breast cancer survivors using smart scales and activity trackers: a randomized controlled pilot study. *J Cancer Surviv* 2017; 11, 133–148. [PubMed: 27631874]
14. Gokee LaRose J, Tate DF, Gorin AM, Wing RR. Preventing weight gain in young adults: A randomized controlled pilot study. *Am J of Prev Med* 2010; 39 (1), 63–68. [PubMed: 20537843]
15. Krukowski RA, Hare ME, Talcott GW, Johnson KC, Richey PA, Kocak M, et al. Dissemination of the Look AHEAD intensive lifestyle intervention in the United States Air Force: Study rationale, design, and methods. *Contemp Clin Trials* 2015; 40:232–239. [PubMed: 25545025]
16. Krukowski RA, Hare ME, Talcott GW, Gladney LA, Johnson KC, Richey PA, Kocak M, Keller PL, Hryshko-Mullen A, Klesges RC. Dissemination of the Look AHEAD Intensive Lifestyle Intervention in the United States Military: A Randomized Controlled Trial. In press.
17. Ross KM, Wing RR. Concordance of in-home ‘smart’ scale measurement with body weight measured in-person. *Obesity Science & Practice* 2016: 224–2248. [PubMed: 27499884]
18. Wing RR, Tate DF, Gorin AA, Raynor HA, Fava JL. A self-regulation program for maintenance of weight loss. *N Engl J Med* 2006; 355 (15): 1563–1571. [PubMed: 17035649]
19. Zheng Y, Terry MA, Danford CA, Ewing LJ, Sereika SM, Goode RW, Mori A, Burke LE. Experiences of daily weighing among successful weight loss individuals during a 12-month weight loss study. *West J Nurs Res* 2018; 40 (4):462–480. [PubMed: 28322640]
20. Quester George H. Demographic trends and military recruitment: Surprising possibilities. *Parameters* 2005; 35 (1): 27–40.

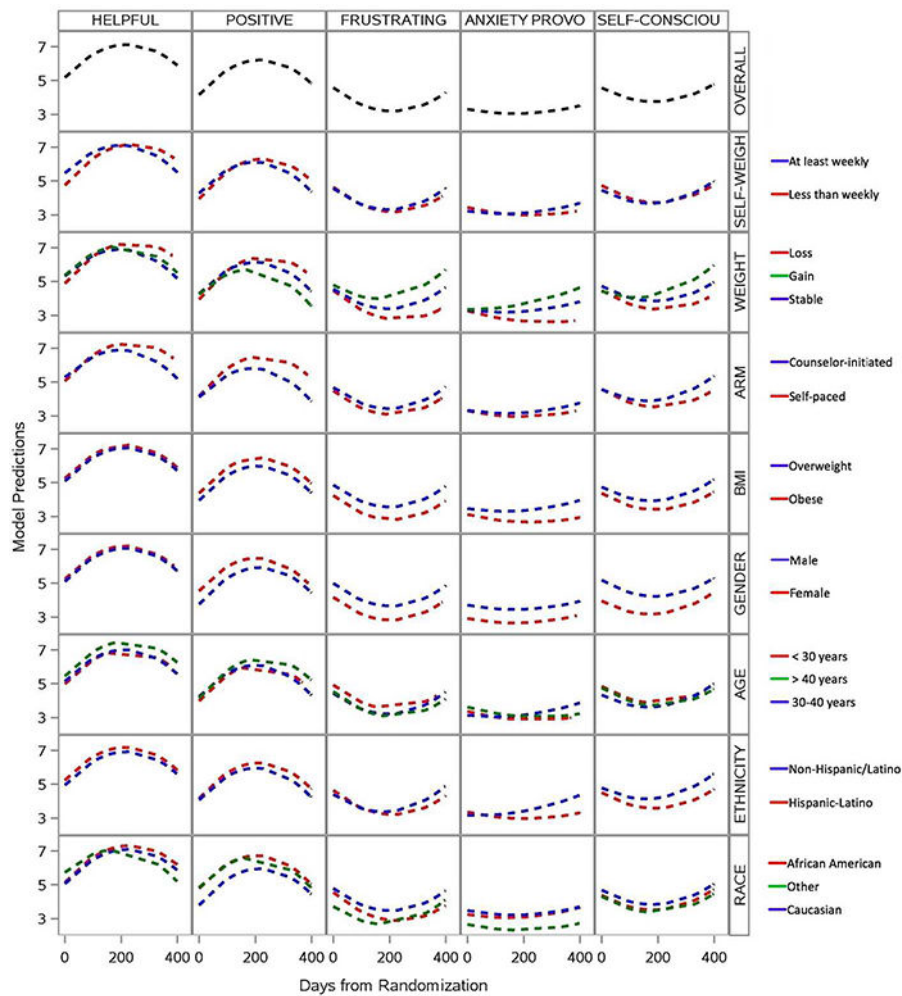
21. Dall TM, Zhang Y, Chen YJ, Askarinam Wagner RC, Hogan PF, Fagan NK, et al. Cost associated with being overweight and with obesity, high alcohol consumption, and tobacco use within the military health system's TRICARE prime-enrolled population. *Am J Health Promot* 2007; 22: 120–139. [PubMed: 18019889]
22. Tanofsky-Kraff M, Sbrocco T, Theim KR, Cohen LA, Mackey ER, Stice E, Henderson JL, McCreight SJ, Bryant EJ, Stephens MB. Obesity and the US military family. *Obesity* 2013; 21: 2205–2220. [PubMed: 23836452]
23. Stevens J, Truesdale KP, McClain JE, Cai J. The definition of weight maintenance. *Int J Obes* 2006; 30 (3): 391–399.

**Study Importance Questions****What is already known about this subject?**

- Daily self-weighing is an effective tool for weight loss.
- There is a common misconception that frequent self-weighing increases body dissatisfaction over time.
- After completing weight management interventions individuals commonly report positive experiences associated with self-weighing.

**What does your study add?**

- The current study uniquely measures self-weighing perceptions before, during, and after a behavioral weight loss intervention.
- This study explores differences in the overall sample and by behavioral characteristics (i.e., weight change, previous self-weighing behavior, intervention intensity) in how self-weighing perceptions change during a weight-loss intervention.
- Further, this study examines demographic differences (i.e., gender, BMI category, age, race, ethnicity) in how beliefs about self-weighing change over time after controlling for influencing covariates.



**Figure 1. Modeling Change in Self-Weighing Perceptions across the Intervention**  
 Random Coefficient models observed change in self-weighing perceptions by behavioral and demographic factors. Self-weighing perceptions (x-axis) in order: *Helpful, Positive, Frustrating, Anxiety-Provoking, Makes You Self-Conscious*. Factors of interest (y-axis) in order: overall sample, previous self-weighing frequency (i.e., < weekly, weekly), weight change (i.e., gain, loss, stable), intervention condition (i.e., counselor-initiated, self-paced), BMI category (i.e., overweight, obese), gender, age (i.e., <30, 30–40, >40), ethnicity (i.e., non-Hispanic/Latino, Hispanic/Latino), race (i.e., Caucasian, African American, Other). Models of demographic differences (i.e., BMI, gender, age, ethnicity, and race) adjusted for baseline covariates (i.e., intervention condition, previous self-weighing frequency). A higher score indicates a more positive (i.e., helpful, positive) perception of self-weighing. Scores for negative beliefs were reverse scored, such that, a higher score indicates a more negative (i.e., frustrating, anxiety provoking, making self-conscious) perception of self-weighing.



**Table 1.***Participant Characteristics (n=248)*

<b>Demographic Characteristics</b>	<b>Randomized (%)</b>
<u>Gender</u>	
Male	122 (49%)
Female	126 (51%)
<u>Age</u>	
< 30 years	66 (27%)
30–40 years	123 (50%)
>40 years	59 (24%)
<u>Race</u>	
African American	49 (20%)
Caucasian	163 (66%)
Other	36 (15%)
<u>Ethnicity</u>	
Non-Hispanic/Latino	192 (77%)
Hispanic/Latino	56 (23%)
<u>BMI Category</u>	
Normal	1
Overweight	139 (55%)
Obese	107 (43%)

*Note.* Numbers represent n values

**Table 2.**

## Frequency of Self-Weighing

	Weight Loss Phase		Weight Maintenance Phase		Full Intervention	
	<u>N</u>	<u>M (SD)</u>	<u>N</u>	<u>M (SD)</u>	<u>N</u>	<u>M (SD)</u>
Overall Sample	246	71.95 (34.47)	246	78.03 (66.96)	246	149.98 (94.31)
<b>Gender</b>						
Male	121	72.36 (36.52)	121	77.55 (67.02)	121	149.92 (95.64)
Female	132	71.54 (32.52)	125	78.49 (67.17)	125	150.03 (93.39)
<b>Age</b>						
<30 years	66	62.73 (35.34)	66	62.17 (62.53)	66	124.89 (90.24)
30–40 years	122	74.29 (34.03)	122	80.11 (66.52)	122	154.40 (92.99)
>40 years	58	77.52 (32.92)	58	91.69 (70.20)	58	169.21 (97.18)
<b>Race</b>						
Caucasian	161	70.01 (34.41)	161	77.20 (64.71)	161	147.22 (92.20)
African American	49	77.61 (31.25)	49	77.90 (65.08)	49	155.51 (88.35)
Other	36	72.89 (38.80)	36	81.89 (80.10)	36	154.78 (112.22)
<b>Ethnicity</b>						
Non-Hispanic/Latino	191	73.27 (34.84)	191	81.1 (65.65)	191	154.37 (93.57)
Hispanic-Latino	55	67.36 (33.08)	55	67.35 (70.89)	55	134.71 (96.16)
<b>BMI Category</b>						
Overweight	114	72.24 (33.76)	114	78.30 (69.87)	114	150.54 (95.95)
Obese	132	71.70 (35.21)	132	77.80 (64.61)	132	149.49 (93.24)
<b>Weight Change</b>						
Weight Loss	90	85.71 (29.43)	90	113.11 (67.43)	90	198.82 (90.60)
Weight Stable	100	66.47 (34.98)	100	57.12 (59.79)	100	123.59 (85.66)
Weight Gain	56	59.61 (34.21)	56	58.98 (54.78)	56	118.59 (83.42)
<b>Intervention</b>						
Counselor-Initiated	114	88.15 (27.97)	114	97.11 (68.13)	114	185.27 (89.31)
Self-Paced	132	55.74 (32.78)	132	58.94 (60.23)	132	114.68 (85.88)
<b>Previous Self-Weighing</b>						
At least weekly	143	73.67 (33.3)	143	82.2 (69.92)	143	155.87 (96.1)
Less than weekly	102	69.25 (36.12)	102	72.15 (62.79)	102	141.4 (91.98)

Note. Mean (M); Standard deviation (SD)

**Table 3.** Description of Self-Weighing Perception Scores Across Intervention Phases by Behavioral Characteristics

Perception Change <i>M (SD)</i>	Overall Sample			Weight Change			Intervention Group			Previous Self-Weighing		
	Loss	Stable	Gain	Counselor	Self-Paced	<Weekly	Weekly					
<b>Helpful</b>												
Baseline	5.15 (1.93)	4.82 (1.93)	5.32 (1.94)	5.31 (1.88)	4.91 (2.04)	5.39 (1.79)	4.68 (2.01)**	5.49 (1.81)**				
Weight Loss	1.56 (2.09)***	1.94 (2.05)*** <sup>†</sup>	1.17 (2.09)*** <sup>†</sup>	1.13 (2.00)*** <sup>†</sup>	2.07 (2.05)***	.93 (1.98)***	1.97 (2.02)*	1.28 (2.10)*				
Weight Maintenance	-.28 (1.52)*	.15 (1.19)**	-.72 (1.60)**	-.55 (1.84)**	-.26 (1.47)	-.30 (1.61)	0.00 (1.30)*	-.50 (1.66)*				
Full Intervention	1.31 (2.27)***	2.15 (1.94)***	.49 (1.97)***	.85 (2.67)***	1.85 (2.17)***	.62 (2.21)***	2.03 (2.24)***	.81 (2.16)***				
<b>Positive</b>												
Baseline	4.12 (1.98)	3.77 (1.96)	4.23 (2.00)	4.44 (1.92)	4.00 (2.06)	4.24 (1.89)	3.80 (1.99)*	4.35 (1.94)*				
Weight Loss	1.66 (2.20)***	2.44 (1.84)*** <sup>†</sup>	1.03 (2.15)*** <sup>†</sup>	-.13 (2.53)*** <sup>†</sup>	2.17 (2.12)***	1.03 (2.13)***	2.23 (2.15)**	1.27 (2.15)**				
Weight Maintenance	-.38 (1.47)**	-.12 (1.38)	-.66 (1.37)	-.55 (1.76)	-.38 (1.30)	-.39 (1.72)	-.33 (1.49)	-.41 (1.47)				
Full Intervention	1.18 (2.13)***	2.01 (2.02)***	.92 (2.02)***	.03 (1.86)***	1.78 (2.26)***	.41 (1.68)***	1.69 (2.30)*	.83 (1.94)*				
<b>Frustrating</b>												
Baseline	4.62 (2.12)	4.51 (2.10)	4.59 (2.05)	4.58 (2.13)	4.55 (2.10)	4.68 (2.14)	4.63 (2.18)	4.60 (2.08)				
Weight Loss	-1.02 (2.26)***	-1.38 (2.26) <sup>†</sup>	-.68 (2.07) <sup>†</sup>	-.44 (2.87) <sup>†</sup>	-1.11 (2.43)	-.91 (2.05)	-1.04 (2.03)	-1.01 (2.42)				
Weight Maintenance	.36 (2.01)*	-.21 (1.67)**	.83 (1.91)**	.93 (2.55)**	.32 (1.97)	.42 (2.09)	.11 (1.84)	.56 (2.14)				
Full Intervention	-.61 (2.25)**	-1.36 (2.02)***	-.35 (2.09)***	.40 (2.39)***	-.83 (2.45)	-.34 (1.93)	-.82 (2.19)	-.47 (2.28)				
<b>Anxiety Provoking</b>												
Baseline	3.33 (2.10)	3.47 (2.04)	3.22 (2.15)	3.33 (2.08)	3.32 (2.09)	3.34 (2.11)	3.41 (2.20)	3.27 (2.03)				
Weight Loss	-.22 (1.99)	-.43 (1.90) <sup>†</sup>	-.04 (1.96) <sup>†</sup>	.19 (2.61) <sup>†</sup>	-.30 (1.92)	-.13 (2.09)	-.24 (1.94)	-.21 (2.04)				
Weight Maintenance	.31 (1.99)	-.16 (1.91)*	.89 (1.97)*	.48 (1.99)*	.21 (1.84)	.47 (2.20)	.06 (2.16)	.50 (1.84)				
Full Intervention	-.06 (2.28)	-.74 (2.06)**	.25 (2.46)**	.75 (2.13)**	-.18 (2.22)	.10 (2.36)	-.34 (2.46)	.14 (2.14)				
<b>Self-Conscious</b>												
Baseline	4.58 (2.36)	4.71 (2.19)	4.58 (2.51)	4.37 (2.31)	4.62 (2.41)	4.54 (2.32)	4.72 (2.31)	4.48 (2.40)				
Weight Loss	-.76 (2.22)***	-1.20 (2.25)** <sup>†</sup>	-.39 (1.87)** <sup>†</sup>	.25 (3.02)** <sup>†</sup>	-.90 (2.24)	-.58 (2.20)	-.84 (2.10)	-.70 (2.31)				
Weight Maintenance	.62 (1.80)***	.26 (1.57)	.77 (2.06)	1.21 (1.72)	.53 (1.93)	.75 (1.58)	.37 (1.84)	.85 (1.73)				
Full Intervention	-.15 (2.24)	-.72 (1.76)***	-.20 (2.65)***	0.95 (2.06)***	-.51 (2.30)**	.32 (2.07)**	-.43 (2.22)	.05 (2.24)				

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Note.

\*\*\*  
p<.001,

\*\*  
p<.01,

\*  
p<.05;

Mean (M); Standard deviation (SD); Wilcoxon Signed Rank and Kruskal-Wallis tests measured mean change differences overall and between behavioral factors;

<sup>†</sup>Weight change based on 4-month outcome

**Table 4.**

**Perception of Self-Weighing Perception Scores Across Intervention Phases by Demographic Characteristics**

Intervention Change <i>M (SD)</i>	BMI			Gender		Age			Ethnicity			Race		
	> 25	Male	Female	<30 years	30–40 years	>40 years	Hispanic/Latino	Non-Hispanic/Latino	African American	Caucasian	Other			
<b>Helpful</b>														
Gain	5.00 (1.93)	5.20 (1.93)	5.10 (1.94)	4.97 (1.86)	5.17 (2.01)	5.31 (1.86)	4.89 (1.96)	5.08 (1.96)	5.02 (1.87)	5.81 (2.07)				
Loss	1.84 (.84) <sup>*</sup>	1.56 (.24) <sup>†</sup>	1.53 (.25) <sup>†</sup>	1.49 (.33) <sup>†</sup>	1.46 (.25) <sup>†</sup>	1.76 (.32) <sup>†</sup>	1.71 (.34) <sup>†</sup>	1.79 (.36) <sup>†</sup>	1.62 (.23) <sup>†</sup>	.87 (.39) <sup>†</sup>				
Indifference	-.38 (.88) <sup>†</sup>	-.31 (.18) <sup>†</sup>	-.35 (.19) <sup>†</sup>	-.39 (.28) <sup>†</sup>	-.26 (.18) <sup>†</sup>	-.41 (.25) <sup>†</sup>	-.63 (.28) <sup>†</sup>	-.20 (.30) <sup>*</sup>	-.17 (.16) <sup>*</sup>	-1.08 (.30) <sup>*</sup>				
Intervention	1.44 (.23) <sup>†</sup>	1.02 (.23) <sup>†</sup>	1.48 (.24) <sup>†</sup>	1.04 (.36) <sup>†</sup>	1.39 (.24) <sup>†</sup>	1.13 (.33) <sup>†</sup>	1.39 (.36) <sup>†</sup>	1.54 (.38) <sup>*</sup>	1.39 (.20) <sup>*</sup>	.27 (.40) <sup>*</sup>				
<b>Positive</b>														
Gain	3.87 (.96) <sup>*</sup>	4.52 (1.80) <sup>***</sup>	3.74 (2.07) <sup>***</sup>	3.97 (1.95)	4.29 (1.99)	3.95 (2.00)	4.07 (2.09)	4.80 (2.04) <sup>***</sup>	3.71 (1.79) <sup>***</sup>	5.06 (2.18) <sup>***</sup>				
Loss	1.61 (.24) <sup>***</sup>	1.08 (.24) <sup>†</sup>	1.41 (.25) <sup>†</sup>	1.33 (.32) <sup>†</sup>	.93 (.25) <sup>†</sup>	1.74 (.32) <sup>†</sup>	1.25 (.34) <sup>†</sup>	1.15 (.35) <sup>***</sup>	1.49 (.22) <sup>***</sup>	.26 (.38) <sup>***</sup>				
Indifference	-.69 (.87) <sup>*</sup>	-.48 (.18) <sup>†</sup>	-.37 (.19) <sup>†</sup>	-.38 (.28) <sup>†</sup>	-.43 (.18) <sup>†</sup>	-.46 (.25) <sup>†</sup>	-.51 (.29) <sup>†</sup>	-.39 (.31) <sup>†</sup>	-.50 (.16) <sup>†</sup>	-.20 (.31) <sup>†</sup>				
Intervention	1.11 (.21) <sup>†</sup>	.70 (.21) <sup>*</sup>	1.35 (.22) <sup>*</sup>	1.13 (.33) <sup>†</sup>	.71 (.22) <sup>†</sup>	1.53 (.30) <sup>†</sup>	.82 (.34) <sup>†</sup>	.44 (.36) <sup>*</sup>	1.28 (.19) <sup>*</sup>	.54 (.38) <sup>*</sup>				
<b>Strategic</b>														
Gain	4.89 (.17) <sup>*</sup>	4.20 (2.03) <sup>**</sup>	5.02 (2.13) <sup>**</sup>	5.00 (2.03)	4.43 (2.09)	4.58 (2.25)	4.36 (2.18)	4.55 (2.35) <sup>**</sup>	4.85 (1.99) <sup>**</sup>	3.64 (2.13) <sup>**</sup>				
Loss	-.93 (.67) <sup>†</sup>	-.81 (.27) <sup>†</sup>	-.82 (.28) <sup>†</sup>	-.109 (.37) <sup>†</sup>	-.67 (.28) <sup>†</sup>	-.82 (.36) <sup>†</sup>	-.59 (.38) <sup>†</sup>	-.83 (.40) <sup>†</sup>	-.91 (.26) <sup>†</sup>	-.38 (.44) <sup>†</sup>				
Indifference	.54 (.33) <sup>†</sup>	.41 (.24) <sup>†</sup>	.55 (.25) <sup>†</sup>	.55 (.38) <sup>†</sup>	.50 (.24) <sup>†</sup>	.38 (.33) <sup>†</sup>	.54 (.38) <sup>†</sup>	-.11 (.41) <sup>†</sup>	.63 (.21) <sup>†</sup>	.43 (.41) <sup>†</sup>				
Intervention	-.48 (.24) <sup>†</sup>	-.44 (.24) <sup>†</sup>	-.46 (.25) <sup>†</sup>	-.55 (.37) <sup>†</sup>	-.52 (.25) <sup>†</sup>	-.61 (.34) <sup>†</sup>	.10 (.37) <sup>†</sup>	-.83 (.41) <sup>†</sup>	-.44 (.21) <sup>†</sup>	-.04 (.43) <sup>†</sup>				
<b>Unprovoking</b>														
Gain	3.46 (.12)	2.94 (1.97) <sup>**</sup>	3.70 (2.16) <sup>**</sup>	3.41 (2.04)	3.11 (2.07)	3.68 (2.19)	3.11 (2.08)	3.18 (2.31) <sup>*</sup>	3.55 (2.05) <sup>*</sup>	2.53 (1.84) <sup>*</sup>				
Loss	-.17 (.24) <sup>†</sup>	-.11 (.24) <sup>†</sup>	-.07 (.25) <sup>†</sup>	-.56 (.33) <sup>†</sup>	.26 (.25) <sup>†</sup>	-.29 (.32) <sup>†</sup>	.39 (.34) <sup>†</sup>	.21 (.36) <sup>†</sup>	-.26 (.23) <sup>†</sup>	.26 (.40) <sup>†</sup>				
Indifference	.72 (.23) <sup>*</sup>	.44 (.24) <sup>†</sup>	.30 (.25) <sup>†</sup>	.02 (.37) <sup>†</sup>	.61 (.24) <sup>†</sup>	.18 (.33) <sup>†</sup>	.67 (.38) <sup>†</sup>	.48 (.41) <sup>†</sup>	.51 (.21) <sup>†</sup>	-.26 (.40) <sup>†</sup>				
Intervention	.26 (.24) <sup>†</sup>	.06 (.25) <sup>†</sup>	.05 (.26) <sup>†</sup>	-.38 (.38) <sup>†</sup>	.46 (.25) <sup>†</sup>	-.36 (.34) <sup>†</sup>	.90 (.38) <sup>*</sup>	-.03 (.42) <sup>†</sup>	.10 (.22) <sup>†</sup>	-.03 (.44) <sup>†</sup>				
<b>Conscious</b>														
Gain	4.71 (2.38)	3.93 (2.18) <sup>***</sup>	5.21 (2.37) <sup>***</sup>	4.82 (2.35)	4.38 (2.36)	4.73 (2.37)	4.75 (2.24)	4.37 (2.62)	4.72 (2.26)	4.25 (2.30)				
Loss	-.47 (.26) <sup>†</sup>	-.28 (.27) <sup>†</sup>	-.62 (.27) <sup>†</sup>	-.55 (.36) <sup>†</sup>	-.40 (.27) <sup>†</sup>	-.41 (.36) <sup>†</sup>	-.20 (.37) <sup>†</sup>	-.51 (.39) <sup>†</sup>	-.46 (.25) <sup>†</sup>	-.26 (.43) <sup>†</sup>				
Indifference	.83 (.21) <sup>†</sup>	.81 (.22) <sup>†</sup>	.63 (.22) <sup>†</sup>	.54 (.33) <sup>†</sup>	1.05 (.21) <sup>†</sup>	.22 (.29) <sup>†</sup>	.97 (.34) <sup>†</sup>	.85 (.37) <sup>†</sup>	.77 (.19) <sup>†</sup>	.41 (.37) <sup>†</sup>				





**Table 5.**

Association of Change in Self-Weighing Perceptions and Self-Weighing Frequency

	<u>Self-Weighing Frequency</u>		
	<u>Weight Loss</u>	<u>Weight Maintenance</u>	<u>Full Intervention</u>
<b><u>Weight Loss</u></b>			
Helpful	.35 ***	.32 ***	.35 ***
Positive	-.19 **	-.19 **	-.19 **
Frustrating	-.15 *	-.20 **	-.19 **
Anxiety-Provoking	-.08	-.09	-.09
Self-Conscious	.08	.06	.07
<b><u>Weight Maintenance</u></b>			
Helpful	-.01	.02	-.01
Positive	.00	.00	-.00
Frustrating	-.02	-.12	-.09
Anxiety-Provoking	-.06	-.08	-.07
Self-Conscious	-.07	-.05	-.06
<b><u>Intervention</u></b>			
Helpful	.29 ***	.26 **	.29 ***
Positive	-.20 *	-.20 *	-.22 **
Frustrating	-.13	-.15	-.16
Anxiety-Provoking	-.16	-.15	-.16
Self-Conscious	.09	.06	.07

Note.

\*\*\*  
p<.001,\*\*  
p<.01,\*  
p<.05;Spearman correlation coefficients measured associations; Numbers represent *R* values