

# The effect of self-compassion on the self-regulation of health behaviors: A systematic review

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## Abstract

The purpose of this review was to systematically review the published research on the effect of self-compassion interventions on health behaviors. A self-regulation intervention was defined as participants engaged in goal-setting behavior, goal-directed behavior, monitoring, and/or adjusting health behavior. Seven studies met the inclusion criteria and were analyzed in this review. Self-compassion interventions were just as effective as other behavior change techniques at improving self-regulation of health behavior. The review discusses sample characteristics, study design, health behavior measures, self-compassion intervention implementation, and the theoretical frameworks of the studies, along with limitations of the research and suggestions for future researchers.

## Keywords

behavior change, health interventions, physical activity, self-compassion, self-regulation

Many health problems are lifestyle related and nearly 50percent of mortality from such causes could be reduced with healthy behavior regulation (Knoops et al., 2004; Van Dam et al., 2008). For example, physical inactivity is associated with many chronic diseases, several mental health problems, difficulty maintaining a healthy weight, and an increase in all-cause mortality (Reiner et al., 2013; US Department of Health and Human Services (USDHHS), 2008; World Health Organization (WHO), 2010). One way to increase healthy behavior regulation in adults is through the implementation of interventions. Interventions are a systematic approach of targeting a given health behavior with the goal of increasing that behavior (Marcus and Forsyth, 2003). For example, physical activity interventions effectively increase physical activity among adults (Conn et al., 2009; Dishman and Buckworth, 1996). In a seminal review including 127 studies, Dishman

and Buckworth (1996) found physical activity interventions to have a moderately strong effect ( $r=.34$ ) on adult behavior across a variety of settings. In a more recent review of 358 physical activity interventions, Conn et al. (2011) found they were moderately effective ( $r=.19$ ) in increasing physical activity when compared to control groups. More specifically, Taylor et al. (2012) found theory-based physical activity interventions ( $r=.34$ ) produced significantly greater changes in physical activity compared to non-theory-based interventions ( $r=.21$ ). Theory-based interventions improve understanding of the physical and

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psychological mediators of behavior change (Brug et al., 2005). This helps researchers create interventions that target such behavior change mediators, improving long-term behavior maintenance (Painter et al., 2008).

One theoretical framework that explains healthy behavior adoption and maintenance is self-regulation (Baumeister and Heatherton, 1996; Carver and Scheier, 1981). Behavioral self-regulation refers to people's ability to engage in and adhere to behaviors that promote health and well-being (Carver and Scheier, 2001). Self-regulation generally includes a process loop of setting goals, goal-directed behavior, monitoring, and adjusting behavior, and is a form of control over goals and behavior (Baumeister and Heatherton, 1996; Carver and Scheier, 1981). Enhancing self-regulatory resources for health behaviors may lead to improved levels of behavior. An intervention strategy that may assist individuals with self-regulation of health behaviors by preserving self-regulatory resources is self-compassion (Sirois et al., 2015; Terry and Leary, 2011).

Self-compassion is a way of understanding and engaging toward oneself that is grounded in Buddhism (Kabat-Zinn, 1994). Self-compassion is the ability to treat oneself with the same kindness and compassion as one would treat others in the same situation (Neff, 2003a). Self-compassion involves three constructs: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification (Neff, 2003b). Common humanity involves viewing an experience as common and part of a larger human experience, rather than isolating and individual in nature. Self-kindness entails understanding and broad perspective toward oneself rather than judgment and self-criticism. Mindfulness requires a balanced awareness of thoughts and experiences, rather than over-identifying (Neff, 2003a). For example, a self-compassionate individual who missed a scheduled day of exercise may view this experience in a forgiving and kind manner, a common occurrence that others struggle with, understanding tomorrow is a new day.

Neff and colleagues have empirically studied self-compassion since 2003 and discovered it is

associated with many psychological benefits. Self-compassion is positively correlated with positive affect (Leary et al., 2007; Neff and Vonk, 2009), well-being (Neely et al., 2009), and life satisfaction and emotion-focused coping (Neff et al., 2005). Altogether, these findings demonstrate the efficacy of self-compassion for improving psychological health and the need to determine behavior change efficacy. Given the difficulties individuals experience with self-regulation, self-compassion interventions could be beneficial for individuals who are self-critical or harsh toward themselves in regard to healthy behavior regulation. Therefore, the purpose of this literature review was to systematically review the published research on the effect of self-compassion interventions on health behaviors.

## Methods

A search for literature relevant to the research purpose was conducted within GoogleScholar, PubMed, and EbscoHost (PsychINFO and SPORTDiscus) up to March 2016. Selfcompassion.org was also searched as a secondary source. The search used combinations of the following keywords: *self-regulation*, *exercise*, *physical activity*, *self-compassion*, *mindful self-compassion (MSC)*, *compassionate mind training (CMT)*, *compassion focused therapy (CFT)*, *health behavior*, *diet*, *weight loss*, and *smoking*. Articles were included if they met the following criteria: (a) peer-reviewed, (b) written in English, (c) published between 1981 and 2015, (d) included self-regulation as an intervention, (e) included self-compassion training in the intervention, and (f) the primary outcome variable was a measurable health behavior such as smoking cessation, eating/diet intake and monitoring, physical activity behavior and monitoring, and eating disorder symptomatology and behavior. A self-regulation intervention was defined as participants engaged in goal-setting behavior, goal-directed behavior, monitoring, and/or adjusting health behavior (Baumeister and Heatherton, 1996; Carver and Scheier, 1981). For example, if an intervention required participants to monitor and regulate food intake, self-regulation occurred. However, interventions that required participants

to only record weight loss was not considered self-regulation. The publication dates were based on the seminal self-regulation article published in 1981 by Carver and Scheier. Articles were excluded if they measured self-compassion, but did not include measurement of health behavior.

## Results

The searches identified 445 articles (PubMed=249, GoogleScholar=149, EbscoHost=47). Duplicate articles and articles not meeting the inclusion criteria were removed, resulting in a final sample of seven articles for the review (PubMed using keywords *self-compassion*, *health behavior*, and *CFT*=three; EbscoHost using keywords *self-compassion* and *health behavior*=two; EbscoHost using keywords *self-compassion* and *smoking*=one; GoogleScholar using keywords *self-compassion* and *health behavior*=one). Table 1 provides a summary of the articles included within the review.

### Participant characteristics

The total number of participants in the seven studies was 553 ( $M=79$ ,  $SD=31.4$ , median=84). The smallest sample size was 41 (Kelly and Carter, 2015) and the largest sample size was 126 (Kelly et al., 2010). The targeted populations included individuals with eating disorders/disordered eating ( $n=4$ ; Adams and Leary, 2007; Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2014), medical students ( $n=1$ ; Greeson et al., 2015), smokers ( $n=1$ ; Kelly et al., 2010), and individuals attempting to lose weight ( $n=1$ ; Tapper et al., 2009).

Only five of the seven studies reported participant age ( $M=33.9$ ,  $SD=10.7$ , median=28.0). The youngest average participant age was 24.4 years (Kelly et al., 2010), and the oldest average participant age was 45 years (Kelly and Carter, 2015). Females represented 82.5 percent of the participants across the seven studies. Three studies included samples that were at least 95 percent female (Adams and Leary, 2007; Gale et al., 2014; Kelly et al., 2014); however, none of the studies had a sample with

a majority representation of male participants. Only three of the seven studies reported information about race/ethnicity (Kelly and Carter, 2015; Kelly et al., 2010, 2014) and those samples included mostly White or Caucasian participants (76.9%), followed by Hispanic (7.5%), and mixed race (4.6%). Finally, three studies reported body mass index (BMI) information ( $M=25.4$ ,  $SD=5.4$ ; Adams and Leary, 2007; Kelly et al., 2014; Tapper et al., 2009).

### Intervention components

The seven self-compassion interventions were conducted over various durations ( $M=5.2$  weeks, median=3 weeks, range=1 day–12 weeks). The majority of the self-compassion intervention durations were relatively short ( $\leq 1$  month) and included 1 day ( $n=1$ , Adams and Leary, 2007), 3 weeks ( $n=3$ , Kelly and Carter, 2015; Kelly et al., 2010; Tapper et al., 2009), and 4 weeks ( $n=1$ , Gale et al., 2014). Longer durations (2–3 months) included 11 weeks ( $n=1$ , Greeson et al., 2015) and 12 weeks ( $n=1$ , Kelly et al., 2014). Only four studies reported attrition rates ( $M=17.9$ , Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2010; Tapper et al., 2009). The 12-week intervention reported the highest attrition rate (22%; Gale et al., 2014), and the lowest attrition rate was for a 3-week intervention (14.6%; Kelly and Carter, 2015). Finally, none of the included studies conducted follow-ups to assess the long-term impact of the intervention on behavioral self-regulation.

Five of the seven studies included in the review were theory-based (Adams and Leary, 2007; Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2010, 2014). Two studies used the self-regulation theory (Adams and Leary, 2007; Kelly et al., 2010). Specifically, goal-setting, self-monitoring, and behavioral adjustment were included in the interventions. The three other theory-based studies used CFT theory (Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2014). These studies specifically targeted affiliated emotions often associated with behavior and adjusting such emotions. These studies also included components of cognitive-behavioral

Table 1. Characteristics of included studies.

Study	Sample characteristics	Intervention	Measure(s) of health behavior	Self-compassion duration and attrition	Theoretical framework; behavior modification strategies	Intervention outcomes
Adams and Leary (2007)	N = 84; female undergraduate students. RCT with three groups: (1) preload/self-compassion, (2) preload/no self-compassion, and (3) no-preload control	Preload/SC and preload/no-SC conditions ate preload of food, and participants in the no-preload control group received no food to eat. Preload/SC received SC intervention. All participants performed a bogus taste test (to measure eating behavior) and completed self-report measures	Behavior: Overeating Measure: Revised Rigid Restraint Scale	Duration: 2 minutes Attrition: NA	Self-regulation theory Emotional regulation strategies; self-compassionate imagery, thinking, emotions, and behavior	Self-compassion preload food condition at least as effective at reducing eating behavior over time as the non-self-compassion preload food condition
Gale et al. (2014)	N = 99; 95% female, M age = 28.01, Single-group RM design	Introduced 4-week self-compassion intervention during week 8 of traditional 16-week eating disorder treatment program to improve eating disorder symptomatology	Behavior: Eating disorder Symptomatology Measure: Eating Disorder Examination Questionnaire	Duration: 4 weeks of self-compassion 12 weeks total treatment Attrition: 22%	Compassion Focused Therapy Emotional regulation strategies; self-compassionate imagery, thinking, emotions, and behavior	Self-compassion training in addition to traditional CBT improved eating disorder symptomatology over the 16-week intervention
Greeson et al. (2015)	N = 44 medical students, 66% female, 34% male, qualitative interviewing	Participants received 4 1.5-hour self-care workshops and homework over the course of 11-week course in addition to monitoring a chosen self-care goal	Behavior: Self-care (sleep, exercise, eating) Measure: Qualitative interview	Duration: 11 weeks Attrition: 16%	No theory Self-care and skill-building workshop, stress reduction, meditation, reflection	Thematic analysis of qualitative interviews revealed increased perceived self-care behaviors including sleep, eating, and exercise
Kelly and Carter (2015)	N = 41 BED patients, 83% female, 17% male, 75% White, M age = 45 years, three-group RCT design: (1) waitlist control, (2) behavioral strategies, and (3) self-compassion strategies	All conditions received CBT for eating disorder symptomatology. The behavioral condition received ways to replace binge-eating impulses with other behaviors. The self-compassion condition viewed a PowerPoint, wrote a self-compassionate letter to themselves, and learned compassionate imagery and self-talk	Behavior: Eating disorder symptomatology Measure: Eating Disorder Examination Questionnaire	Duration: 3-week self-compassion 12-week total treatment Attrition: 14.6%	Compassion Focused Therapy PowerPoint, letter writing, imagery, and self-talk	Self-compassion intervention was equally effective as a behavioral-replacement intervention in reducing weekly binge-eating episodes and weekly binge days over a 12-week period

**Table 1. (Continued)**

Study	Sample characteristics	Intervention	Measure(s) of health behavior	Self-compassion duration and attrition	Theoretical framework; behavior modification strategies	Intervention outcomes
Kelly et al. (2014)	N = 97 ED inpatients, M age = 28 years, 97% female, 3% male, 79% White, 11% Latino, 5% East Asian, 5% other Single-group RM design	All participants received group-based cognitive-behavioral therapy in addition to self-compassion training throughout 12 weeks of treatment	Behavior: Eating disorder symptomatology Measure: Eating Disorder Examination Questionnaire	Duration: 12-week combination of CBT and self-compassion Attrition: 35%	Compassion Focused Therapy Emotional regulation strategies: self-compassionate imagery, thinking, emotions, and behavior	Self-compassion training in conjunction with CBT resulted in significant improvements in eating disorder symptomatology following the 12-week intervention
Kelly et al. (2010)	126 adults, M age = 24 years, 54% females, 46% males, 64% White, 4% Hispanic, 8% Middle-Eastern 16% Asian, 8% Mixed, 4-group RCT	All four conditions received 20-minute PowerPoint rationale about self-monitoring (control). Self-compassion group received a guided self-compassion PowerPoint to help create ideal self and self-talk. The self-energizing and self-controlling interventions received tailored PowerPoints to improve those constructs	Behavior: Cigarette smoking behavior Measure: Self-reported cigarettes smoked/week	Duration: 3 weeks Attrition: 19%	Self-regulation theory PowerPoint, imagery, and creation of the ideal self-compassionate self	Over a 3-week period, the self-compassion intervention reduced cigarettes per day to the same degree as two other imagery-based self-talk interventions
Tapper et al. (2009)	N = 62 individuals, M age = 44 years (intervention), 31 years (control), M BMI = 31, two-group RCT	Intervention participants received ACT via pen and paper, homework, and metaphors over 3 weeks to enhance, help break links between food- and exercise-related thoughts and behavior, and improve acceptance, in addition to a CD with imagery and meditation	Behavior: Physical Activity Measure: Brief Physical Assessment Tool	Duration: 3-week ACT Attrition: 16%	No theory Personal health values, motivation, cognitive diffusion, reducing link between food- and exercise-related thoughts and behavior, meditation, and imagery	ACT intervention condition reported statistically significantly greater increase in self-reported physical activity in comparison to the control condition over the intervention

RCT: randomized controlled trial; SC: self-compassion; NA: not applicable; BMI: body mass index; ACT: acceptance commitment therapy; BED: binge-eating disorder; CBT: cognitive-behavioral therapy; ED: eating disorder; RM: repeated measure; CD: compact disc.

therapy because participants were concurrently admitted into traditional eating disorder treatment programs.

The two remaining studies did not report using any theory to guide their intervention (Greeson et al., 2015; Tapper et al., 2009). One study included components of CFT like emotional associations with food and resultant behavior; however, they did not explicitly state the study was grounded in such theory (Tapper et al., 2009). The last study included components of self-regulation theory like teaching healthy behaviors, adjusting behavior, and enhancing self-care behaviors without mentioning this theory (Greeson et al., 2015).

Various types of self-compassion interventions were used in the seven studies. Four of the included studies used some variation of CFT (Adams and Leary, 2007; Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2014). Adams and Leary (2007), Gale et al. (2014), and Kelly et al. (2014) incorporated similar CFT programs that focused on emotional regulation strategies; understanding personal self-criticism, shame, and pride; development of motivation and emotion toward oneself and others; understanding fears and barriers to developing self-compassion; and developing overall self-compassion using a variety of interventions including compassionate imagery, thinking, emotions, and behavior (Gilbert and Procter, 2006); whereas, Kelly and Carter (2015) used a different form of CFT to target self-compassion. This intervention used a PowerPoint to teach self-compassion and reduce anxiety, blame, self-criticism, shame, and guilt. Participants were asked to write themselves a self-compassionate letter for a time of struggle and use imagery and self-talk to cultivate self-compassion (Goss, 2011; Goss and Allan, 2011, 2014).

The remaining three studies used different types of self-compassion interventions. One intervention used a self-compassion PowerPoint in association with CMT ( $n=1$ ; Kelly et al., 2010). The intervention focused on self-compassionate imagery and the creation of the ideal self-compassionate self (Gilbert and Irons, 2005). Another type of intervention used was acceptance commitment therapy (ACT) to

improve self-compassion ( $n=1$ ; Tapper et al., 2009). The intervention focused on improving personal health values, enhancing motivation, cognitive diffusion, and having compassion and tolerance toward personal negative feelings, and to help reduce the link between food- and exercise-related thoughts and behavior (Hayes, 2005). The final study used a self-care and skill-building workshop as a means of improving self-compassion and self-regulation of behavior ( $n=1$ ; Greeson et al., 2015). The objectives of this intervention were to reduce perceived stress, increase mindfulness in a non-judgmental manner, and provide support and improvement of self-care and health behaviors (Saunders et al., 2007).

### *Assessment of health behaviors*

The seven included interventions targeted self-regulation of five different health behaviors. Three of the interventions targeted eating disorder symptomatology (Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2014). Self-compassion was used to decrease the number of eating disorder signs and symptoms over the course of treatment. Another one of the interventions targeted overeating in restrictive and guilty eaters (Adams and Leary, 2007). One intervention used self-compassion to attenuate smoking behavior (Kelly et al., 2010). Although the goal of another self-compassion intervention was weight loss, participants self-regulated physical activity behavior throughout the intervention (Tapper et al., 2009). The last intervention was designed to improve overall self-care behaviors such as sleep and exercise (Greeson et al., 2015).

All of the interventions used self-report measures to assess a change in health behavior. Five of the interventions measured behavior using valid and reliable questionnaires (Adams and Leary, 2007; Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2014; Tapper et al., 2009). Of these, three assessed the frequency of eating disorder behaviors and severity of symptoms over the past 28 days with the Eating Disorder Examination Questionnaire (EDE-Q; see Fairburn and Beglin,

1994; Gale et al., 2014; Kelly and Carter, 2015; Kelly et al., 2014). In addition to weighing eaten food (i.e. grams), the Revised Rigid Restraint Scale (RRRS; Herman and Polivy, 2004) measured effort to avoid eating unhealthy or “forbidden foods” (Adams and Leary, 2007). Finally, the Brief Physical Assessment Tool (BPAT; Smith et al., 2005) measured the frequency of 30-minute bouts of moderate intensity physical activity, the frequency of 30-minute bouts of walking, and the frequency of 20-minute bouts of vigorous physical activity performed during the past week (Tapper et al., 2009). Two of the interventions did not use valid and reliable questionnaires (Greeson et al., 2015; Kelly et al., 2010). Participants self-reported the number of cigarettes smoked per day (Kelly et al., 2010) and perceived improvement of self-care behaviors was measured by five open-ended questions created by the researchers (Greeson et al., 2015).

### *Intervention design and treatment effectiveness*

Four of the seven studies were randomized controlled trials (RCTs; Adams and Leary, 2007; Kelly and Carter, 2015; Kelly et al., 2010; Tapper et al., 2009). The most common type of design included a three-group RCT (Adams and Leary, 2007; Kelly and Carter, 2014), followed by a four-group RCT (Kelly et al., 2010) and two-group RCT (Tapper et al., 2009). Two of the RCTs targeted eating behavior (Adams and Leary, 2007; Kelly and Carter, 2015), and the other two targeted cigarette smoking behavior (Kelly et al., 2010) and physical activity (Tapper et al., 2009). Three of the RCTs used traditional control groups (Adams and Leary, 2007; Kelly et al., 2010; Tapper et al., 2009), and one RCT used a waitlist control group design (Kelly and Carter, 2015).

All four of the self-compassion RCTs significantly improved self-regulation of health behaviors compared to the respective control groups (Adams and Leary, 2007; Kelly and Carter, 2015; Kelly et al., 2010; Tapper et al., 2009). In addition, results from the RCTs that included more than two groups (i.e. self-compassion group,

behavioral group(s), control group), the self-compassion interventions were at least as effective as the other types of behavioral interventions (Adams and Leary, 2007; Kelly and Carter, 2015; Kelly et al., 2010). For instance, over a 3-week period, the self-compassion intervention reduced cigarettes per day to the same degree as two other imagery-based self-talk interventions (Kelly et al., 2010). Adams and Leary (2007) reported a significant interaction in which a self-compassion preload food condition was at least as effective at reducing eating behavior over time as the non-self-compassion preload food condition. Finally, a self-compassion intervention was equally effective as a behavioral-replacement intervention in reducing weekly binge-eating episodes and weekly binge days over a 12-week period (Kelly and Carter, 2015).

In addition to RCTs, two studies used a single-group repeated-measures design to assess the impact of CFT in conjunction with traditional psycho-educational therapy treatment on eating disorders (Gale et al., 2014; Kelly et al., 2014). Both of these studies reported significant improvements in eating disorder symptomatology following the respective 12-week (Kelly et al., 2014) and 16-week (Gale et al., 2014) interventions. Finally, one qualitative study indicated self-compassion increased self-care behaviors such as exercise, sleep, and engaging in social support (Greeson et al., 2015). Overall, 100 percent of the self-compassion interventions included in this review reported significant improvements in health behavior.

## **Discussion**

The purpose of this review was to examine the effect of self-compassion interventions on health behaviors. The findings from the seven studies indicated a positive impact of self-compassion on self-regulation of health behaviors including eating disorder symptomatology, overeating, physical activity, smoking cessation, and self-care behaviors. In addition to evaluating the effectiveness of self-compassion interventions for health behavior regulation, the current review provided information about participant

characteristics, intervention components, and behavioral assessment to better inform future research.

All seven of the self-compassion interventions were effective at improving self-regulation of health behavior regardless of study design. Four of the seven interventions were RCTs, the preferred method of assessing effectiveness of a health behavior intervention (Rothwell, 2005). Although the interventions included in this review revealed statistically significant results when comparing treatment to control, the results are less conclusive when comparing self-compassion groups to the other experimental condition groups within each intervention. None of the studies used the exact same self-compassion intervention, which is needed to determine if self-compassion alone is effective at improving self-regulation of health behaviors. Efficacy of RCT or non-RCT may depend on patient preferences of treatment and type of behavior being targeted (Group, 2008; Rothwell, 2005). Finally, the effectiveness of self-compassion interventions may be better determined if the intervention is not paired with other forms of treatment, as seen with the interventions targeting eating disorders symptoms.

All seven studies reported gender (95% female), but only five reported age ( $M=33.9$  years) and three reported race (76.9% Caucasian/White). Inconsistent reporting of sample characteristics and lack of diversity across the samples are critical limitations. Results of a recent meta-analysis indicated males have significantly higher self-compassion than females (Yarnell et al., 2015), but differences in how such an intervention influences levels of self-compassion and resulting health behavior regulation between genders have not been examined. Common changes associated with aging such as loss of physical or mental functioning can lead to self-criticism (Mirowsky and Ross, 1992). Although self-compassion is positively associated with aging successfully and overall well-being and negatively correlated with impairment (Allen et al., 2012), future researchers should assess how a self-compassion intervention can improve health behaviors and reduce self-criticism associated with

aging. Finally, self-compassion does not differ between races (Lockard et al., 2014); however, minority races tend to engage in lower levels of various health promoting behaviors (Schoenborn et al., 2013). Employing a self-compassion intervention across a representative sample would help determine whether such an intervention is equally effective across genders, races, and wider age ranges.

The seven self-compassion interventions positively impacted self-regulation of health behaviors across varying durations, although the majority of the interventions (71.4%) were relatively short (i.e.  $\leq 1$  month/4 weeks) and demonstrated the ability to retain participants. Only four of the studies reported attrition rates and the average attrition rate across these four interventions (17.9%) was within the lower end of the range often seen in health behavior change interventions (7%–84%; Linke et al., 2011; Maher et al., 2014; Skelton and Beech, 2011). An 8-week MSC intervention was created and validated by Neff and Germer (2013) that may help prevent attrition because it is 4 weeks shorter than the intervention with the highest level of attrition. Furthermore, although this intervention is associated with greater emotional regulation (Neff and Germer, 2013), its effect on self-regulation of health behavior is yet to be investigated. Finally, it should be noted that none of the studies conducted follow-up assessments of the long-term impact of the interventions. Although short-term initiation and behavior change and regulation are critical, long-term change has important health implications. Future researchers should implement the 8-week MSC intervention to determine its efficacy for self-regulation of short- and long-term health behavior change.

Five of the seven interventions used a specific, single theoretical framework to guide the interventions and each of the interventions implemented various emotional and behavioral change techniques. Previous meta-analytic reviews indicated interventions based on a single theory that included multiple behavior change techniques were more effective for changing health behavior than non-theory or



multiple theory-based interventions containing fewer techniques (Gourlan et al., 2016; Prestwich et al., 2014; Taylor et al., 2012; Webb et al., 2010). Historically, behavioral techniques are more effective than emotional techniques in terms of behavior change; however, the included interventions that used self-compassion, a form of emotional regulation, were equally effective as behavioral techniques, potentially because these studies were theory-based (Adams and Leary, 2007; Gale et al., 2014; Kelly et al., 2014; Webb et al., 2010). While the non-theory-based interventions also improved self-regulation of health behavior, these interventions could be associated with various theories. Researchers should explicitly state what theory and specific constructs the intervention is targeting to help determine the effectiveness of self-compassion interventions and the mediators of self-regulation of health behavior change (Prestwich et al., 2014). Future self-compassion interventions could be structured around the self-regulation theory because self-regulation has been hypothesized to impact health behavior change (Sirois, 2015; Terry et al., 2013).

The interventions included in this review improved self-regulation of a variety of health behaviors including eating disorder symptomatology, overeating, smoking, physical activity, and overall self-care behaviors. Results confirmed the efficacy of self-compassion for improving regulation of all these health behaviors. The majority of the interventions used valid and reliable self-report assessments to measure behavior. Valid measurements are necessary to assess and understand the impact of an intervention on behavior change in relation to theory (Rothwell, 2005). For certain behaviors like physical activity, direct monitoring is especially helpful because participants tend to over-report frequency of behavior (Prince et al., 2008). The validated 8-week MSC intervention (Neff and Germer, 2013) should be implemented across various health behaviors. Follow-up assessments are necessary to determine the effectiveness of self-compassion on long-term behavior regulation and maintenance. Less clinical behaviors, such as physical activity adoption

and maintenance, need to be targeted as well. Physical activity is an important health behavior that was only targeted in one of the interventions, but not assessed for follow-up effectiveness (Tapper et al., 2009). Physical activity is a growing health concern that can be targeted with interventions in which long-term maintenance is a crucial factor for attaining various health benefits (Painter et al., 2008; Reiner et al., 2013).

With the rise of adult physical inactivity and the prevalence of associated negative health complications (Reiner et al., 2013; USDHHS, 2008), finding a way to improve physical activity adoption and adherence could greatly improve adult health. Self-compassion is associated with higher emotional regulation and improved behavioral regulation (Keng et al., 2011). There is potential for self-compassion to help individuals self-regulate physical activity behavior with less fear of failure and emphasis on being perfect (Neff, 2003a; Neff et al., 2005). With previous self-compassion interventions improving other health regulatory behaviors, there is reason to believe self-compassion could improve physical activity behavior. Understanding the influence of the MSC intervention on physical activity behavior could help lead to a greater understanding of long-term self-regulation of physical activity behavior.

There are limitations of the review that should be considered when interpreting the results. Only seven studies met the inclusion criteria of the review; therefore, a greater number of studies are needed to substantiate these findings. The quality of the included studies is another limitation. Although four studies were RCTs, the others included single group and qualitative designs. In addition, there was also great variability across studies regarding intervention duration, experimental design, and so on. The assessment of behavior change was another limitation of the interventions included because self-report measures were used across all seven studies and two did not rely on valid and reliable self-report instruments. Finally, because the review did not include unpublished studies or those published in languages other than English, relevant studies may have been excluded.

## Conclusion

Self-compassion is at least as effective as other behavioral techniques at improving self-regulation of various health behaviors. However, there is limited research that uses a self-compassion intervention to improve health behavior regulation. Self-compassion training impacts psychological, emotional, and physical well-being. Such a holistic view on health is needed and has the potential to revolutionize how society approaches health and behavior. Continuous reviews of the literature should be conducted to help summarize self-compassion research and help provide researchers understand gaps in research. Future researchers should continue to assess the effectiveness of self-compassion on health behavior across a wider range of ages, races, and gender. A RCT design is necessary to determine the difference in treatment between a self-compassion group, theory-based behavioral group, and control group on self-regulation of health behavior. Future researchers should also use the validated self-compassion intervention (Neff and Germer, 2013) along with other theory-based techniques to target specific theoretical constructs to improve regulation of health behaviors. Future researchers also need to examine each health behavior repeatedly within the above guidelines to establish the validity and reliability of a self-compassion intervention on regulation of each health behavior. Health behaviors should be directly monitored or at least measured with valid and reliable assessments to ensure the quality of the outcome measures. In summary, although the review was based on a small number of studies, it provides preliminary evidence of the effectiveness of self-compassion interventions for health behavior regulation.

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