

WHO BENEFITS FROM TRAINING IN SELF-COMPASSIONATE SELF-REGULATION? A STUDY OF SMOKING REDUCTION

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Self-compassion has been found to promote well-being but research has yet to examine whether training in self-compassion improves self-regulation (Gilbert, 2005, 2009; Neff, 2003). The present study sought to examine the impact and moderators of a self-compassion intervention on the self-regulation of cigarette smoking. One hundred and twenty-six smokers seeking to quit were randomly assigned to one of four interventions, of which one involved engaging in self-compassionate imagery and self-talk at every urge to smoke. Multilevel modeling revealed that over three weeks, the self-compassion intervention reduced daily smoking more quickly than a baseline self-monitoring condition but at the same rate as two other imagery-based self-talk interventions. Moderators of self-compassion training emerged. The self-compassion intervention reduced smoking more rapidly if participants were low in readiness to change; were high in the trait of self-criticism; and had vivid imagery during the intervention exercises. Findings suggest that training oneself to self-regulate from a self-compassionate stance might be especially effective for individuals who are able to visualize a compassionate image and whose personality and motivation would be expected to undermine the impact of traditional treatments.

A self-compassionate disposition protects against emotional distress and promotes health and well-being (Gilbert, 2005; Neff, 2003). Neff operationalized self-compassion as an approach to one's pain and suffering characterized by showing oneself kindness and understanding instead of criticism, seeing one's experiences as common

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to humanity rather than isolating, and being mindful of one's feelings instead of over-identifying with them. Individuals who score highly on Neff's (2003) Self-Compassion Scale (SCS) have been found to show less depression, anxiety, and rumination, as well as greater social connectedness and satisfaction with life (Leary, Tate, Adams, Allen, & Hancock, 2007; Neff, 2003). Self-compassionate individuals are also more resilient in the face of negative events. They report less anxious self-evaluation when asked to recall personal failures (Neff, Kirkpatrick, & Rude, 2007), and less negative emotion following ambiguous performance feedback, particularly if their self-esteem is low (Leary et al., 2007). The trait of self-compassion therefore appears to buffer against emotional distress and to promote more adaptive functioning.

Recent research also suggests that experiments and exercises aimed at increasing self-compassion can improve various forms of distress. Leary et al. (2007) found that individuals who were induced with a self-compassionate attitude were better able to acknowledge their role in a negative event without becoming overwhelmed. Gilbert (2005, 2009) developed a compassion-focused therapy aimed at increasing self-compassion among shame-prone and self-critical individuals. His compassionate mind training (CMT) exercises invite people to use imagery, memories, and letter-writing to elicit self-compassionate feelings. Gilbert and Procter (2006) found that among a group of individuals with chronic mental health difficulties, 12 sessions of CMT reduced participants' depression, anxiety, self-criticism, and shame, and improved their capacity to be self-soothing. Among distressed acne sufferers, Kelly, Zuroff, and Shapira (2009) found that two weeks of daily exercises in which participants visualized a compassionate image and related to themselves from its perspective reduced shame and skin complaints more than a control condition. Preliminary research therefore supports the emotional benefits of engaging in exercises aimed at increasing self-compassion.

SELF-REGULATION

Although self-compassion has been found to predict emotional distress and well-being, whether and for whom it facilitates self-regulation remain unknown. Baumeister and Vohs (2004) defined self-regulation as a conscious process whereby the individual devotes energy to override a natural response or behavior and replace

it with a more effortful one that is more consistent with his or her goal(s). Exercising, refraining from over-eating, and resisting urges to smoke might all be considered examples of self-regulation. To date, research on self-regulation has focused primarily on understanding individual differences in self-control and the various consequences of having a high or low dispositional capacity for self-regulatory success (Tangney, Baumeister, & Boone, 2004). Indeed, many studies equate self-regulation with self-control (Muraven & Baumeister, 2000), suggesting that self-regulated outcomes are the product of self-controlling inner processes, such as saying controlling and directive things to oneself. We suggest that people might use different intrapersonal approaches in their efforts to self-regulate; some individuals might be hostile and demanding with themselves, whereas others might be warmer and more compassionate.

Gilbert (2005, 2009) developed a neurobiological rationale for the potential value of learning to self-regulate with self-compassion. He suggested that when individuals show themselves warmth and kindness, they elicit neuroaffective responses similar to those which might be stimulated by an encouraging, supportive other. Indeed, there is increasing evidence that internally generated stimuli, such as thoughts, feelings, and images influence the brain—and activate neurophysiological systems—in ways similar to external stimuli (Gilbert, 2009). As an example, seeing something sexy might stimulate sexual arousal via the hypothalamus, but so too might fantasizing. Receiving harsh criticism from a boss might trigger anxiety via the amygdala, but so too might self-criticizing (Whelton & Greenberg, 2005). When individuals receive compassion from others, but also from themselves—by generating self-compassionate thoughts, feelings, and/or images for instance—a soothing-affiliation system in the brain is thought to be activated (Carter, 1998; Gilbert, 2005).

The soothing system evolved to give and detect signals of care and support and to signal to the organism that it is safe and free to explore its environment (Gilbert, 2005). It is subserved by oxytocin and opiates (Carter, 1998), gives rise to feelings of contentedness and well-being, and reduces sensitivities to threats (Kirsch et al., 2005). Recent research in neuroscience supports the theory that self-compassion stimulates the soothing system. Longe et al. (2010) found that individuals in an fMRI who were instructed to imagine themselves being self-reassuring displayed neuronal activity similar to what occurs in compassion and empathy for others. Among individuals trying to self-regulate an unhealthy behavior, generating self-com-

passionate imagery and self-talk might stimulate a similar neural response, helping the individual feel warm and supported, creating an awareness that he or she deserves to be cared for, and instilling in the individual the responsibility and courage to take care of himself or herself. Furthermore, the soothed feelings that self-compassion facilitates might help individuals tolerate the distress that comes with trying to change a compulsive, or habitual, behavior.

Adams and Leary (2007) conducted the first study to our knowledge on the effects of self-compassion on behavioral self-regulation. In their experiment, they assessed individuals' propensity for restrictive and guilty eating. Participants were then randomly assigned to eat an unhealthy preload or not, and to subsequently receive a brief self-compassion induction or not. They were then asked to perform a taste test on candies and were invited to eat as many as they wished. Restrictive eaters would be expected to show the disinhibition effect of overindulging after breaking dietary rules (Herman & Mack, 1975), which the preload condition required. Adams and Leary found, however, that priming participants to think self-compassionately about their eating resulted in restrictive eaters consuming less after the preload. This finding suggests that among individuals expected to struggle with self-control, self-regulatory failure can be mitigated by stimulating feelings of self-compassion.

Gilbert (2005) proposed that self-compassion training might be especially beneficial to individuals, such as restrictive eaters, who are typically forceful and harsh with themselves. These individuals are thought to show underactive soothing systems, and overactive threat-focused systems (LeDoux, 1998). The threat system evolved to defend the organism from danger by perceiving signs of threat, triggering negative feelings such as anxiety, anger, and shame, and activating self-protective behaviors such as fight or flight. One might imagine that self-regulatory attempts accompanied by harsh self-criticism, and a rigid attitude toward oneself, stimulates the threat system making it more difficult for individuals to derive the feelings of calmness and support that might help them tolerate the discomfort associated with carrying out a challenging self-regulatory behavior. Furthermore, self-critical dialogue might undermine the attitude of self-care necessary to fuel the motivation for behavior change. For individuals prone to self-punitive approaches, then, the self-regulatory benefits of training in self-compassion might be especially pronounced.

THE CURRENT STUDY

The current study sought to extend research by Adams and Leary (2007) by developing and testing a three-week self-compassion intervention designed to help individuals resist urges to smoke. We were interested in determining first, whether self-compassion would facilitate the self-regulation of cigarette consumption and second, whether there would be moderators of these effects. To quit or even reduce smoking, an individual must overcome persistent, powerful impulses to smoke while withstanding physical and emotional discomfort. Indeed, recent research has found that difficulties tolerating distress and resisting desires render smoking lapses more likely (Brown, Lejuez, Kahler, & Strong, 2002). Furthermore, one of the most powerful predictors of long-term smoking cessation is the way in which individuals cope with lapses (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). The field of smoking cessation is therefore in need of interventions that can help individuals self-regulate when faced with the physical and emotional distress that plagues the early phases of a quit attempt (Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005). We propose that self-compassion training has the potential to help smokers attain and sustain self-regulatory success, particularly among individuals expected to have fewer psychological resources with which to resist urges to smoke.

We based our self-compassion intervention on Gilbert's (2005, 2009) CMT and compassion-focused therapy. The intervention consisted of imagery-based self-talk exercises, similar to those used by Kelly et al. (2009), which were designed to stimulate the soothing-affiliation system and to yield feelings of safeness and well-being. To ensure that the moderators that emerged for our self-compassion intervention could be interpreted as pertaining to self-compassion training in particular, and not imagery-based self-talk exercises in general, we developed two additional, novel imagery-based self-talk interventions and included them as enhanced control conditions. The self-controlling intervention was designed to stimulate the threat/self-protection system, and to invite inner-dialogue similar to that which might be traditionally assumed to underlie efforts at self-regulation. The self-energizing intervention was developed to activate a third interacting affect regulation system. This incentive-focused system gives rise to the energized and excited feelings one experiences when striving toward a desired reward, during the an-

ticipation of success, and in the first flush of achievement or acquisition (Depue & Morrone-Strupinsky, 2005). We believed that the different emotional quality of the imagery-based self-talk exercises in these two other conditions would enable us to be more certain that our findings would speak to the benefits and moderators of self-talk and imagery of a compassionate quality in particular. In addition to including these enhanced control conditions, we included a baseline control condition involving daily self-monitoring exercises; these exercises were also included in the three imagery-based self-talk conditions.

HYPOTHESES

First, we hypothesized that our self-compassion intervention would reduce smoking faster than the baseline self-monitoring intervention. We did not form a priori hypotheses pertaining to differences between the self-compassion, self-energizing, and self-controlling conditions.

Second, we sought to examine whether participants' readiness to change (Velicer, Hughes, Fava, Prochaska, & DiClemente, 1995) would moderate the efficacy of the self-compassion intervention. Because individuals low in readiness to change would be expected to struggle with self-regulatory success, we hypothesized, based on Adams and Leary's (2007) findings, that self-compassion would be particularly beneficial to these individuals. From a theoretical standpoint, research on self-determination theory (SDT; Ryan & Deci, 2000) and motivational interviewing (Rollnick & Miller, 1995) suggests that a supportive interpersonal approach mobilizes autonomous motivation to engage in healthful behaviors whereas a controlling approach thwarts such motivation. We believed that the intrapersonal support provided by the self-compassion intervention would stimulate the same motivational effects as interpersonal support, and thereby facilitate self-regulation. However, we reasoned that these effects would be most pronounced among low-ready individuals, as they would presumably be most in need of such a motivational shift, and such a shift should in turn have a more noticeable impact on their behavior change. We expected that the self-regulation of high-ready participants would hinge less on motivational changes over the course of treatment.

Third, we hypothesized that the self-compassion intervention would be more beneficial for self-critics. Self-critics tend to be especially hostile in the way they relate to themselves and are impaired in their capacity for self-soothing and self-kindness (Kelly et al., 2009; Whelton & Greenberg, 2005). Self-compassion, however, can be seen as an antidote to self-criticism, and compassion-focused therapies aim to inhibit the shame and negative affect that self-attacking perpetuates among self-critical individuals (Gilbert, 2009; Kelly et al., 2009). Indeed, CMT was primarily developed to help individuals prone to shame and self-criticism. We therefore believed that self-critics would experience a pronounced shift from feelings of being threatened to feelings of calmness and self-care, and that this shift would help them tolerate difficult cigarette cravings and facilitate smoking reduction.

Finally, compassionate imagery is a central element of compassion-focused therapies but certain people experience difficulties producing these sorts of images and allowing themselves to experience compassion (e.g., self-critics; Rockliff, Gilbert, McEwan, Lightman, & Glover, 2008). We sought to determine whether compassionate imagery in our self-help intervention would determine the fruitfulness of individuals' self-regulatory efforts. We expected that the more vivid individuals' compassionate imagery was, the more they would benefit from the self-compassion intervention. Vivid self-compassionate imagery should yield a strong physiological reaction of safeness and calmness (Gilbert, 2009; Lang, 1979), which should in turn facilitate participants' capacity to resist urges to smoke and reduce cigarette consumption.

METHOD

PARTICIPANTS

Participants were recruited via advertisements for smoking cessation or reduction on McGill Classifieds, Craigslist, and Facebook. Interested individuals completed a short screening questionnaire online. To be eligible, individuals had to have smoked for at least one year, identify themselves as current smokers (smoking an average of one cigarette per day or more), and indicate wanting to quit in the next six months. This last criterion, assessed by measuring stage of change, was established to ensure that participants would

be sufficiently motivated to engage in our self-help interventions. Exclusion criteria were: current psychotherapy; current use of psychotropic medications; current use of nicotine substitute products; participation in formal smoking cessation programs in the last six months; current alcohol or drug abuse¹; and a friend, romantic partner, or relative in the study. Eligible participants were then invited to participate in the study and were provided a summary of what the experiment would entail, including the fact that they would be randomly assigned to one of four intervention conditions, each of which would require daily self-help exercises for three weeks.

The initial recruited sample consisted of 126 individuals. Of these, 24 dropped out before the second lab session; a chi-square test revealed these participants were evenly distributed across conditions. Five participants reported smoking more than 3 standard deviations (*SDs*) from the sample mean at Time 1 and were thus excluded from analyses. After removing these outliers, we found that two remaining participants reported smoking zero cigarettes per day over the pre-study week and we thus excluded them from analyses. The final sample consisted of 64 females and 55 males with a mean age of 24.42 (*SD* = 6.54). Ethnic composition was: 76 Caucasian (63.9%), 5 Hispanic/Latin (4.2%), 10 Middle-Eastern (8.4%), 19 Asian (16%), and 9 mixed race (7.6%).

MEASURES

Cigarettes Per Day (CPD). Participants were asked to retrospectively recall their CPD for each of the seven days before the study and to record these on a day-by-day form. For the three study weeks, participants were asked to record their CPD each day; these were submitted by e-mail after weeks 1 and 2 and in the lab after week 3.

1. Alcohol abuse was assessed with a question developed by the research team. It asked participants to select which option of the following best characterized their alcohol habits: (a) I don't drink; (b) I have one or two drinks about 1 to 3 days per week; (c) I have one or two drinks more than 3 days per week; (d) I have three or more drinks about 1 to 3 days per week; (e) I have three or more drinks more than 3 days per week; (f) I consider myself an alcoholic; and (g) other—please specify. Participants who endorsed e or f or whose response in g suggested possible alcoholism were excluded from participation. Drug abuse was assessed with an open-ended question: "Please describe any recreational drug use, if any (e.g., regular marijuana use, occasional cocaine use)." The research team reviewed responses to this question and omitted participants who engaged in regular drug use (i.e., marijuana several times per week, cocaine more than once per year).

Although biochemical tests are typically considered the most valid measure of cigarette consumption, self-reports demonstrate high accuracy. A meta-analysis of 26 publications involving 52 comparisons between biochemical measures and self-report revealed high sensitivity and specificity of self-report (i.e., means of 87.5% and 89.2% respectively; Patrick et al., 1994). Mean CPD for the pre-study week was 6.02 ($SD = 4.00$) indicating a sample of light smokers.

Readiness to Change. Participants' readiness to change their smoking behavior was assessed with the Smoking Stage of Change–Short Form (DiClemente et al., 1991). This 3-item measure was administered both at the time of screening and in the first lab session. A sample item was: "Are you seriously thinking of quitting smoking? Please select the option that best characterizes your thoughts of quitting." Participants would then answer with one of the following four options: "no, not thinking of quitting," "yes, within the next 6 months but not within the next 30 days," "yes, within the next 30 days," and "yes, I have already begun my quit attempt." We treated readiness to change as a continuous variable to obtain greater power in our analyses. On a scale of 0 (pre-contemplative levels) to 5 (maintenance levels), mean readiness to change in our sample was 3.17 ($SD = 0.73$) indicating that the average participant fell roughly in the preparation stage of change, with participants one standard deviation above the mean falling roughly into action and those one below the mean falling roughly into contemplation.

Trait Self-Criticism. Trait self-criticism was assessed using the self-criticism scale of the Depressive Experiences Questionnaire (McGill Revision) (DEQ; Santor, Zuroff, Mongrain, & Fielding, 1997) and the Self-Compassion Scale (SCS; Neff, 2003), both of which participants completed online before attending their first lab session.

The original DEQ (Blatt, D'Afflitti, & Quinlan, 1976) is a 66-item questionnaire that assesses trait levels of self-criticism and dependency, both dispositions associated with vulnerability to depression (Zuroff & Mongrain, 1987). Previous research has found good convergent and discriminant validity for the DEQ (Blaney & Kutcher, 1991) as well as high test-retest reliability (Zuroff, Moskowitz, Wielgus, Powers, & Franko, 1983). The current study used a shortened version of the DEQ which has been found to preserve the psychometric properties of the original scale (Santor et al., 1997). Both versions of the DEQ use a 7-point Likert scale, ranging from Strongly Disagree to Strongly Agree. The current paper was only concerned

with the 30-item self-criticism scale of the 48-item DEQ; in our sample, the scale yielded a Cronbach alpha of .74. Individuals high in self-criticism identify strongly with items such as, "If I fail to live up to expectations, I feel unworthy."

The SCS assesses the extent to which individuals show themselves compassion during difficult times. The scale consists of 26 items which comprise six subscales, of which the first three are positively scored and the second three negatively scored: Self-kindness ("When I'm going through a very hard time, I give myself the caring and tenderness I need"), Mindfulness ("When I fail at something important to me I try to keep things in perspective"), Common Humanity ("When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people"), Self-judgment ("When I fail at something important to me I become consumed by feelings of inadequacy"), Over-identification ("When I'm feeling down I tend to obsess and fixate on everything that's wrong"), and Isolation ("When I fail at something that's important to me, I tend to feel alone in my failure"). The SCS consistently demonstrates high validity, and correlates positively with well-being measures and negatively with indices of psychopathology (Neff, 2003, 2009). The Cronbach alpha for the total score in our study was .93.

The DEQ self-criticism factor and the SCS correlated $r = -.69$, $p < .001$. A composite self-criticism factor was computed by taking the difference between participants' standardized scores on these two measures.

Imagery Vividness. Participants in the three enhanced interventions were asked to rate the vividness of their imagery at the end of their first, second, and third weeks of the study. Specifically, they were asked to report on the extent to which they could: (1) hear the voice of the image, (2) see the facial expressions of the image, (3) visualize the gestures of the image, and (4) picture the image interacting with them. The measure used a 5-point scale from Marks (1973) where 1 was "perfectly clear and as vivid as in-person," 2 was "clear and reasonably vivid," 3 was "moderately clear and vivid," 4 was "vague and dim," and 5 was "no image at all, you only 'know.'" Cronbach alphas for the three intervention weeks were .85, .90, and .92.

Correlations between the three potential moderator variables were as follows: $r = .09$ between readiness to change and self-criticism, $r = -.24$ between readiness to change and imagery vividness, and $r = .14$ between imagery vividness and self-criticism. These correlation

coefficients demonstrated that the variables were assessing different constructs.

Compliance with Intervention. Two short compliance measures were administered after each week of the study. The first asked participants to check off the number of times they engaged in their assigned self-monitoring exercises for each of the seven days in the prior week. The options were: zero, once, twice, three times, four times, and more than four times. The second assessed compliance with imagery/self-talk exercises and was therefore not completed by participants in the baseline self-monitoring condition. Participants in the enhanced conditions were asked to reflect on the last week and to evaluate, using a scale of 1 (never) to 7 (always), how often they engaged in their imagery and self-talk when: (1) they missed smoking, (2) they felt a strong desire to smoke, (3) they experienced withdrawal symptoms, (4) they felt anxious or agitated, (5) they felt sad or upset, and (6) they smoked.

PROCEDURE

Participants came to the lab on two occasions three weeks apart. The first lab session began with the completion of questionnaires, during which time the research assistant examined the randomization output from SAS 9.1 (SAS Institute, 2008) to determine the condition to which the participant had been assigned. Once participants finished the questionnaires, the research assistant informed them of their condition, and opened a condition-specific PowerPoint document, as well as a blank Microsoft Word document to be used over the course of the slide show. Participants were instructed to follow the text on the slide show while listening to the accompanying audio with headphones. The slideshow for the baseline self-monitoring condition lasted approximately 20 minutes, whereas those for the enhanced imagery/self-talk conditions lasted an additional 25 minutes.

Following the first lab session, participants were expected to engage in their assigned intervention exercises for three weeks. They were also e-mailed short questionnaires to complete from home after weeks 1 and 2 of the study. Remuneration occurred in the second lab session and consisted of \$25 per week completed amounting to a maximum of \$75.

SELF-MONITORING INTERVENTION

Given that all four conditions included a self-monitoring component, all participants were presented with a detailed rationale for the value of becoming more aware of one's smoking patterns by monitoring them on a daily basis. Participants were told that they would receive smoking diary forms and would be instructed to complete them twice daily, once in the afternoon and once in the evening. At each time point, they were asked to record information about the last two cigarettes they smoked or resisted (in the event that they had an urge to smoke but did not). Specifically, they were asked to reflect on the preceding block of time (morning or afternoon) and note the situations in which they smoked or resisted the two cigarettes, the feelings they were experiencing, and the thoughts they were having. Participants were instructed to re-read their completed form at the end of each day and reflect on any patterns that emerged.

After learning about the self-monitoring exercises, participants were given the chance to practice the exercise in the lab. They were given a sample self-monitoring form and asked to reflect back and record information about the last two cigarettes they smoked or resisted. They were then guided to re-read the form and to think about patterns. The first halves of the slideshows in the enhanced conditions were identical to the presentation in the self-monitoring condition.

SELF-COMPASSION INTERVENTION

Participants assigned to the self-compassion condition were provided with a rationale as to why learning to engage in compassionate imagery and self-talk at urges to smoke might be a helpful way to reduce their smoking. The self-compassion slideshow explained that:

When someone acts in a warm, kind, and caring way with us, they send us external signals of compassion, making us feel safe and soothed. But we can also imagine someone acting toward us in a warm, kind, and caring way, or actually talk to ourselves in this way, and send our brain internal signals of compassion. Again, doing either of these

things internally creates the same safe and soothed response in our brain and body.

They were told that a self-compassionate approach to smoking reduction and cessation involves showing oneself the following elements of compassion (Gilbert, 2005): understanding of how hard it is to quit; wisdom to see what is best for you; strength to cope with set-backs; nonjudgment in the face of failures; and warmth in the way you relate to yourself. They were told that the approach involves understanding and empathizing with your struggle to quit, yet still encouraging yourself with care, strength, wisdom, and warmth to keep at your efforts.

The slideshow then guided participants in the creation of an ideal image of compassion to call on for support during difficult urges to smoke. It then led participants through self-compassionate imagery using exercises from Gilbert and Irons' (2005) CMT. The audio guide for these exercises invited participants to spend time visualizing the age, appearance, facial expressions, postures, and inner emotions of their ideal compassionate image. Participants were asked to record these qualities on a form. They were then asked to partake in another imagery exercise in which they imagined that a self-compassionate part of themselves could be thought of as a person and slowly visualized themselves becoming that person. Throughout both exercises, the audio guide prompted participants to attend to their feelings.

Participants were subsequently asked to write themselves a letter from the perspective of their self-compassionate image, focused on supporting them through the upcoming challenges they would be facing as they tried to quit or reduce smoking. Before participants wrote their letter, they were presented with the following sample letter which was read by an actress speaking with a warm, compassionate, and soothing tone of voice.

I'm really glad that you're taking some steps toward helping yourself feel better in the long-term. Just making this decision is very difficult and brave, and I know it's hard for you. I'd like to help you try and get through the moments that are particularly difficult. It will be stressful but let's try and tolerate the short-term pain because we want you to feel healthier and happier in the long-term. This is hard; giving up cigarettes is a huge loss for you. Remember I'm here with you. Let's try to focus on smoking reduction as one of the kindest things you can do for yourself.

After participants wrote their compassionate self-letter (in a Word document opened on the computer), they proceeded to receive the intervention instructions. They were told that every time they felt a desire to smoke over the next three weeks, they were to: (1) visualize their compassionate image, feeling its warmth, understanding, wisdom, and strength; (2) relate to themselves from their image's perspective, which might involve imagining a dialogue in their head, talking out loud, or writing; and (3) feel themselves receiving compassion from the image. The following sample self-talk was presented, again spoken in the same compassionate manner:

I know that you REALLY want this cigarette. I feel how hard this is for you and I really wish I could tell you to just go ahead and smoke it. But remember that I'm here with you—you are not alone. Let's try and focus on your long-term well-being. To feel better and be healthier, let's try to resist this cigarette in spite of how hard it is for you. I'm here to help you try to tolerate this distress. This is really hard but I know you can do it, and that you'll be grateful that you did over time. I'm so glad that together we're working toward doing what will be best for you and your health.

SELF-ENERGIZING AND SELF-CONTROLLING INTERVENTIONS

The slideshows for the self-energizing and self-controlling intervention conditions were identical in format to the self-compassion condition, but differed in content, including different rationales, affective descriptors, instructions, and self-talk samples. The instructions for participants in the self-energizing condition were to visualize an ideal energizing image at every urge to smoke, and to talk to themselves from this perspective by cheering themselves on in their struggle to quit, focusing with excitement, enthusiasm, and liveliness on all the things to be gained once they quit. The sample letter and self-talk, presented in Appendix A, were delivered in a lively, enthusiastic tone of voice. Participants in the self-controlling condition were asked to visualize an ideal instructive image, firmly focused on the task at hand, at every urge to smoke. They were asked to then talk to themselves from this image's perspective by pointing out what they needed to do to resist smoking effectively and efficiently, directing themselves to take all steps necessary, and firmly persevering until they overcame the challenge of quitting

smoking. The sample letter and self-talk, presented in Appendix A, were provided in a firm, instructive tone of voice.

RESULTS

ANALYTIC STRATEGY

We conducted analyses in SAS 9.1 using PROC MIXED (SAS Institute, 2008). Multilevel modeling was used with maximum likelihood estimation. Each model included a fixed-effects portion and a random-effects portion which included a random intercept, a random effect for time, and an autoregressive (AR[1]) error structure. In each of our three primary analyses, participants' average CPD over the four time points (i.e., the week previous to the study and the first, second, and third weeks of the study) served as the dependent variable. Time, condition, and Condition \times Time were always included as fixed effects in the model, where a negative slope for time indicated a decrease in CPD. Various additional variables and their interactions with time were, one at a time, included as fixed effects in preliminary analyses. These were variables which are frequently controlled in the smoking literature: sex; ethnicity; education; number of lifetime quit attempts; the presence of a quit attempt in the previous year (yes/no); duration of the last quit attempt; number of years smoking; and time before the day's first cigarette, considered a prime indicator of nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). None of the interactions with time influenced results so the variables were trimmed from the final models presented below.

To test whether readiness to change, self-criticism, and imagery vividness moderated the impact of the self-compassion intervention, the moderator in question and its two-way and three-way interactions with condition and time were added to the model. These three potential moderators were standardized; three-way interactions were then probed by estimating simple slopes, that is, the regression of the dependent variable on the predictor at specific values of the moderator. In our case, the slope of CPD over time, corresponding to high (+1 SD) or low (-1 SD) levels of the moderator variable, was estimated within each condition. Effect size correlations were computed for each significant effect using Rosnow and Rosenthal's (1996) formula of $r = [F / (F + df)]^{1/2}$. Interpretations

applied Cohen's (1988) criteria of $r = .10$ as a small effect and $r = .30$ as a medium effect.

COMPLIANCE WITH INTERVENTIONS

Multilevel modeling revealed that compliance with the self-monitoring exercises did not differ across the four conditions, $F(3, 102) = 1.44, p = ns$. Across the three enhanced interventions, compliance with the imagery/self-talk exercises also did not differ, $F(2, 77) = 1.45, p = ns$. Mean compliance ratings were 3.58 ($SD = 1.13$) for the self-monitoring exercises and 3.96 ($SD = 1.66$) for the imagery/self-talk exercises indicating that participants were adequately compliant with their assigned interventions.

RATE OF SMOKING REDUCTION

Condition x Time. Our first analysis examined the effects of condition on the rate of participants' smoking reduction over the three-week intervention period. Condition x Time was a significant predictor, $F(3, 284) = 2.78, p < .05$, effect size $r = .10$, indicating that rate of CPD reduction differed as a function of condition. Contrasts revealed that as hypothesized, the self-compassion intervention reduced CPD more rapidly than the baseline self-monitoring condition, $F(1, 114) = 4.74, p < .05$, effect size $r = .19$. Pairwise contrasts also revealed that the three enhanced interventions did not differ from each other in the rate at which they reduced smoking: self-compassion versus self-controlling, $F(1, 114) = 0.44, p = ns$; self-controlling versus self-energizing, $F(1, 114) = 2.82, p = ns$; and self-energizing versus self-compassion, $F(1, 114) = 1.27, p = ns$. Together, however, the enhanced conditions were on average quicker at reducing CPD than the self-monitoring condition, $F(1, 114) = 5.42, p < .05$, effect size $r = .21$.

Readiness to Change x Condition x Time. To test the moderating effect of readiness to change, we tested the significance of Readiness to Change x Condition x Time. This three-way interaction significantly predicted smoking reduction, $F(3, 279) = 4.49, p < .05$, effect size $r = .13$. Simple slopes were estimated for each condition and supported our hypothesis. As depicted in Figure 1, the self-compassion intervention reduced CPD at a significant rate among those

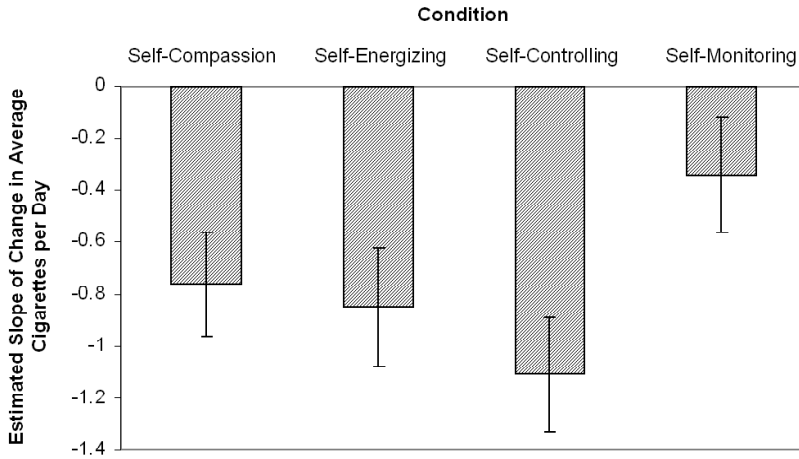


FIGURE 1. Interaction of condition and time predicting the rate of smoking reduction. Rate of smoking reduction was estimated in each condition. The graph illustrates that the self-compassion condition reduced smoking faster than the self-monitoring condition, and that the three imagery-based self-talk conditions were on average more effective than the self-monitoring condition.

low in readiness to change, $B = -1.04$, $t(279) = -4.02$, $p < .001$, effect size $r = .23$, but not among those high in readiness, $B = -.43$, $t(279) = -1.65$, $p = ns$. Moderating effects occurred in the other conditions as well. In the self-energizing intervention, the rate of smoking reduction was nonsignificant for those low in readiness to change, $B = -.12$, $t(279) = -.30$, $p = ns$, but significant for those high in readiness, $B = -1.22$, $t(279) = -4.43$, $p < .001$. In the self-controlling condition, the slope was significant for those both low and high in readiness to change, $B = -1.34$, $t(279) = -5.24$, $p < .0001$ and $B = -.74$, $t(279) = -2.32$, $p = .02$. Finally, participants in the self-monitoring condition had nonsignificant rates of smoking reduction at both low and high levels of readiness for change, $B = -.36$, $t(279) = -1.11$, $p = ns$ and $B = -.36$, $t(279) = -1.16$, $p = ns$. Therefore, readiness to change did not significantly influence rate of smoking reduction in the self-controlling and self-monitoring interventions; however, self-compassion only helped less-ready participants and self-energizing only helped ready participants.

Self-Criticism \times Condition \times Time. To determine whether trait self-criticism moderated the impact of the self-compassion intervention, the three-way interaction between condition, time, and self-criti-

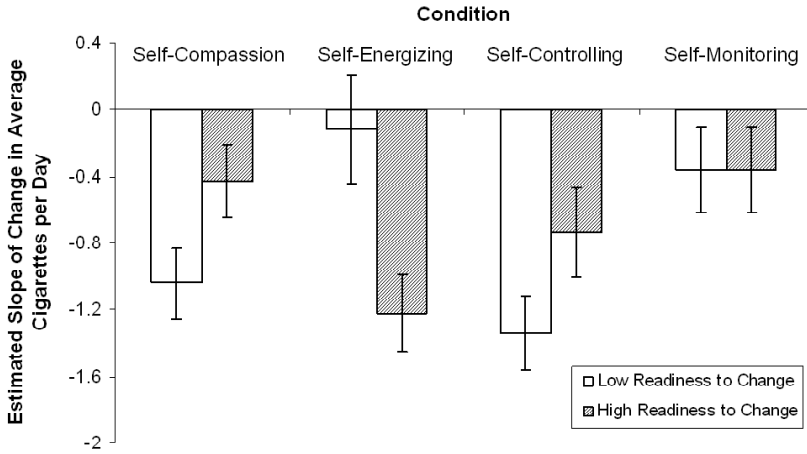


FIGURE 2. Interaction of readiness for change, condition, and time predicting the rate of smoking reduction. Estimated standardized values were calculated for high and low levels of readiness for change where -1 SD was low and $+1$ SD was high. The graph illustrates that the self-compassion and self-controlling conditions reduced smoking more quickly for individuals low in readiness for change whereas the self-energizing condition reduced smoking more quickly for those high but not low in readiness for change.

cism was examined as a predictor of smoking reduction. As hypothesized, it emerged as significant, $F(3, 281) = 4.49, p < .01$. Simple slopes were estimated and are presented in Figure 2. These slopes further supported our hypothesis revealing that the self-compassion intervention reduced smoking at a significant rate among high self-critics, $B = -1.00, F(1, 281) = 19.8, p < .001$, effect size $r = .26$, but not low self-critics, $B = -.50, F(1, 281) = 5.48, p = ns$. These two slopes differed significantly, $t(278) = -2.12, p < .05$. Simple slopes were calculated for the three other conditions as well. As seen in Figure 3, a similar pattern emerged in the self-energizing condition where rate of smoking reduction was again significant for high but not low self-critics, $B = -1.36, F(1, 281) = 29.7, p < .001$ and $B = -.54, F(1, 281) = 5.71, p = ns$. In the self-controlling condition, both high and low self-critics showed significant slopes for smoking reduction, $B = -1.00, F(1, 281) = 15.1, p < .001$ and $B = -1.08, F(1, 281) = 23.81, p < .001$. The self-monitoring condition did not reduce smoking at a significant rate among high self-critics, $B = -.21, F(1, 281) = .77, p = ns$, whereas it did for low self-critics, $B = -.43, F(1, 281) = 4.28, p < .05$. In sum, trait self-criticism did not influence the rate of smoking re-

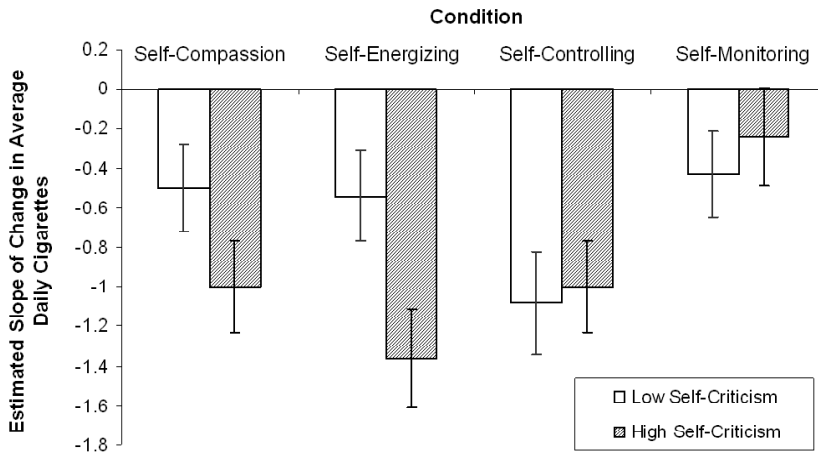


FIGURE 3. Interaction of self-criticism, condition, and time predicting the rate of smoking reduction. Estimated standardized values were calculated for high and low levels of trait self-criticism, where -1 SD was low and +1 SD was high. The graph illustrates that self-criticism had a moderating effect on the rate of smoking reduction in the self-compassion and self-energizing conditions. Specifically, high self-critics in these two conditions were especially successful at reducing their smoking.

duction in the self-controlling or self-monitoring interventions, but it did in the self-compassion and self-energizing conditions, where only high self-critics reduced their smoking at a significant rate.

Imagery Vividness x Condition x Time. To determine whether imagery vividness moderated the effects of the self-compassion intervention on smoking reduction, we examined the three-way interaction between imagery vividness, condition, and time. Because the baseline self-monitoring condition did not contain an imagery component, participants in this group were omitted from the model. A significant effect was found for Imagery Vividness \times Condition \times Time, $F(2, 128) = 4.45, p = .01$. As depicted in Figure 4, simple slope estimates supported our hypothesis; the self-compassion intervention reduced CPD at significant rate for participants with high but not low levels of imagery vividness, $B = -1.29, F(1, 128) = 13.32, p < .001$, effect size $r = .28$ and $B = .40, F(1, 128) = 2.13, p = ns$. These two slopes differed significantly from each other, $t(128) = -3.72, p < .001$. In the self-energizing condition, the slope for smoking reduction was not significant at high imagery vividness, $B = -.56, F(1, 128)$

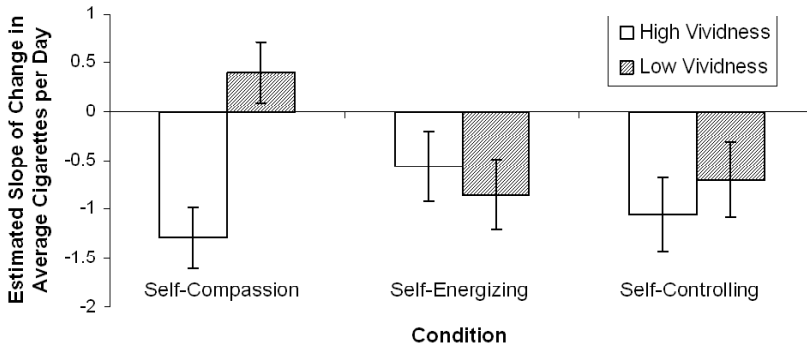


FIGURE 4. Interaction of imagery vividness, condition, and time predicting the rate of smoking reduction across the three enhanced intervention conditions. Estimated standardized values were calculated for high (+1 SD) and low (-1 SD) levels of imagery vividness. The graph illustrates that imagery vividness had a moderating effect the rate of smoking reduction in the self-compassion condition such that vividness facilitated smoking reduction.

= 2.76, $p < .10$, but was significant at low vividness, $B = -.85$, $F(1, 128) = 5.57$, $p < .05$. These two slopes did not differ from each other, $t(128) = 0.23$, $p = ns$. Finally, the self-controlling condition reduced CPD at a significant rate among participants with high imagery vividness, $B = -1.05$, $F(1, 128) = 9.18$, $p < .01$, but not low vividness, $B = -.70$, $F(1, 128) = 3.42$, $p < .10$. In sum, imagery vividness conferred additional self-regulatory benefits in the self-compassion and self-controlling conditions.

DISCUSSION

The current study investigated the impact and moderators of a self-compassion intervention on the self-regulation of smoking behavior. Over a three-week time period, the self-compassion intervention, which involved engaging in self-compassionate imagery and self-talk at every urge to smoke, reduced daily cigarette consumption more rapidly than a baseline self-monitoring condition and just as rapidly as a self-energizing and a self-controlling imagery-based self-talk intervention. Importantly, our three moderators of interest interacted with the self-compassion condition to predict the rate at which participants changed their behavior. Individuals who trained in self-compassionate imagery and self-talk over the three-week study period showed faster reductions in smoking if their readi-

ness to change was low, their level of trait self-criticism was high, and their self-compassionate imagery was vivid. Findings suggest that imagery-based self-talk exercises aimed at increasing self-compassion might facilitate the self-regulation of compulsive behaviors such as smoking, particularly among a subset of individuals. Future research should examine whether these findings emerge for other self-regulatory challenges.

The self-compassion intervention reduced smoking more quickly than the self-monitoring intervention, a treatment that has proven to be one of the most valuable components in smoking cessation programs (Edmunds, Conner, Jones, Gorayeb, & Waranch, 1991). The effect size for this result was small to medium, which is notable given the short time period of the intervention. The finding therefore suggests that engaging in self-compassionate imagery and self-talk in challenging self-regulatory moments might be more helpful to smokers than simply self-monitoring their problem behavior on a daily basis. Perhaps the feelings of calmness and safeness these exercises were designed to stimulate helped participants resist the tempting behavior of smoking. It warrants pointing out, however, that the self-energizing and self-controlling imagery-based self-talk interventions were as effective as the self-compassion intervention at reducing smoking. It is therefore unclear whether something specific about the self-compassion intervention facilitated self-regulatory success among its participants, or whether something more general about the imagery-based self-talk exercises was responsible for the faster rate of smoking reduction in those conditions. These enhanced interventions may have conferred more self-regulatory benefits than self-monitoring by virtue of being longer, more elaborate, and possibly more credible to participants.

We nevertheless believe that the specific pattern of interactions observed between the moderators and the self-compassion condition suggests that factors specific to the self-compassion intervention, and to the other enhanced interventions, promoted self-regulation among its participants. The present study therefore illustrates one way in which models of affect regulation might help to inform lapse-prevention techniques for individuals looking to quit smoking. Our results suggest that when faced with the urge to smoke, engaging in affect-based imagery and self-talk exercises can help lessen daily cigarette consumption over a short period of time. Furthermore, the emotional style of the imagery and self-talk most likely to help might depend on certain features of the smoker.

READINESS TO CHANGE AS A MODERATOR OF SELF-COMPASSION TRAINING

Readiness to change moderated the effects of the self-compassion intervention on self-regulatory success. Specifically, the self-compassion condition reduced smoking at a significant rate for participants low but not high in readiness to change, demonstrating a medium effect size for these less ready participants. Perhaps these individuals were more welcoming of the self-compassion condition's caring, nonpressuring approach. Such an orientation to behavior change may have been perceived as insufficiently action-oriented among participants who were feeling ready and prepared to quit smoking. Indeed, Gilbert (2005) suggests that people who have high expectations of themselves and focus on performance may fear that self-compassion is too tolerant an approach to goal attainment. On the other hand, among participants who were less ready to quit, the self-compassion exercises may have led them to feel motivated to take better care of themselves, and calmer about the prospect of resisting urges to smoke, both states that may have promoted greater self-regulatory success. It could also be that the self-directed support elicited the same motivational shift that occurs when individuals receive interpersonal support (Ryan & Deci, 2000), and that this shift facilitated healthier behavior choices.

In contrast to the self-compassion intervention, the self-energizing intervention facilitated self-regulation among individuals high but not low in readiness to change. Gilbert (2005) suggested that energizing positive affect orients individuals toward desired rewards and goals. It could therefore be that the enthusiastic feelings stimulated by the self-energizing intervention only helped participants for whom quitting was a presently active goal. For individuals still contemplating their desire to quit, energizing imagery and self-talk may have been experienced as incompatible with their current goals, consequently proving ineffective. Taken together, the moderating effects of readiness to change on the self-compassion and self-energizing conditions has the counterintuitive implication that trying to energize less motivated individuals may not be as helpful as teaching them to be self-compassionate.

TRAIT SELF-CRITICISM AS A MODERATOR
OF SELF-COMPASSION TRAINING

The self-compassion intervention was especially effective at reducing the smoking of self-critical individuals. Individuals high in this trait tend to criticize themselves for failing to attain their many goals and standards (Blatt et al., 1976) and show little capacity for self-reassurance (Gilbert, 2005; Kelly et al., 2009). Our self-compassion intervention encouraged participants to direct warmth and understanding toward themselves as they tried to resist urges to smoke. It is plausible that for high self-critics in particular, a self-compassionate approach to goal attainment may have inhibited reflexive tendencies toward rumination and self-judgment when faced with the challenges and set-backs common to self-regulatory attempts. Rather than feeling threatened and pressured, self-critics may have felt cared for, supported, and tolerant of their distress as they tried to resist urges to smoke. This interpretation would be consistent with the rationale behind Gilbert's (2005) compassion-focused therapy, which posits that self-critics attain greater well-being and success when they begin to self-regulate via the soothing system rather than the threat system (Gilbert, 2005, 2009). The medium effect size for this interaction lends strong support to Gilbert's theory given the short time frame of the study.

Interestingly, self-criticism had a similar moderating effect on the self-energizing intervention, in which participants were instructed to engage in enthusiastic, cheerful imagery and self-talk. Among threat-focused self-critical individuals (Gilbert & Procter, 2006), the activating positive affect this intervention was designed to stimulate may have provided them with energy and drive conducive to seeking out the resources likely to help them cope with temptations to smoke. The fact that high self-critics were especially quick at reducing their smoking in both the self-energizing and self-compassion conditions suggests that for individuals prone to self-directed hostility and self-scrutiny about their performance, there is something especially helpful about self-regulating with positive affect. Fredrickson's (1998) broaden-and-build theory postulates that positive emotions enable individuals to expand their cognitive focus away from threats and toward more flexible and often more adaptive ways of thinking, attending, and behaving. Our current results suggest that these advantages might be even more pronounced among

individuals who are typically rigid, harsh, and ruminative in their self-orientation.

IMAGERY VIVIDNESS AS A MODERATOR OF SELF-COMPASSION TRAINING

The vividness of participants' imagery moderated the rate at which they reduced their smoking in the self-compassion intervention. Although imagery vividness facilitated smoking reduction in the self-controlling intervention as well, participants with low vividness in this condition showed a trend toward reducing their smoking whereas this was not the case in the self-compassion condition. The current finding, which was medium in its effect, suggests that self-compassionate self-talk yields self-regulatory success only when a vivid compassionate self-image is present. Neuroscientists have found that individuals who are able to visualize compassionate images can derive considerable physiological and psychological benefits (Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008; Pace et al., 2009). Together with our present finding, this body of research suggests that improving people's capacity for compassionate imagery might assist self-compassionate attempts at self-regulation. In addition, an individual's capacity to envision self-compassionate images might be an important target of therapeutic intervention in compassion-focused therapies. Gilbert (2005) has found that self-critics struggle to visualize self-compassionate images, and that this difficulty might derive from the absence of nurturing memories in childhood. In such a context, perhaps the ability to visualize a self-compassionate image over the course of therapy would be a marker of progress.

LIMITATIONS AND FUTURE RESEARCH

First, the duration of our study was short, creating two general limitations. First, the treatment period was much shorter than most smoking cessation studies, and led us to investigate cigarette reduction rather than cessation. Although smoking reduction has been found to predict later quitting (Broms, Korhonen, & Kaprio, 2008), future research would need to replicate our findings in the context of longer-term trials to determine whether training in self-compassion facilitates the complete cessation of smoking.

Second, the effects and moderators of self-compassion training might be different over a longer time period. Neff et al. (2007) found self-compassion is associated with a greater commitment to making adaptive health changes in one's life. Future research would benefit from investigating the effects of self-compassion on self-regulatory maintenance, and the moderators of such effects, over extended periods of time.

Third, our questionnaires assessing smoking behavior may have contained retrospective bias. The fact that self-reports demonstrate adequate validity for smoking consumption (Patrick et al., 1994), however, give us confidence in our results. Furthermore, the condition-specific interactions cast doubt on the possibility that this bias explains our findings.

Fourth, our sample consisted of light smokers, limiting the extent to which we can extend our conclusions to heavier smokers.

Fifth, one might argue that common factors in our enhanced interventions, such as shared method variance, or a more compelling treatment rationale, might explain the fact that they emerged as more effective than the self-monitoring condition. Once again, however, we believe the condition-specific interactions that emerged undermine this argument, suggesting that treatment-specific factors were responsible for the observed effects.

Finally, we did not collect detailed information on baseline drug and alcohol use (see Footnote 1), nor did we assess psychiatric disorders. It was therefore impossible to control or examine the moderating effects of these variables. Future research would be wise to determine whether co-occurring substance abuse problems influences the self-regulatory benefits conferred by self-compassion training to cigarette smoking.

SUMMARY AND IMPLICATIONS

The present results suggests that among individuals trying to quit smoking, self-compassion might be a helpful self-regulatory strategy, particularly among those who are not yet committed to changing, who tend to have a self-critical personality, and who are able to vividly engage in compassionate imagery. Findings suggest that the emotional quality of an individual's self-talk might be a worthwhile target for assessment and treatment in lapse-prevention programs and extend endeavors to develop theoretically-derived techniques

aimed at helping individuals tolerate the discomfort that arises from trying to refrain from smoking (e.g., Brown et al., 2008). Findings also add to the growing body of research on the beneficial effects of self-compassion (Neff, 2003, 2009; Gilbert, 2009) and suggest that its therapeutic value may lie not only in the area of mood and emotion regulation, but also in the area of behavior change. The current study extends the literature on self-regulation, suggesting that successful self-control might be attained through a variety of inner approaches and that the most effective process might depend on an individual's personality and motivation. Our findings further suggest, as did Adams and Leary's (2007), that among individuals expected and/or expecting to struggle with a particular self-regulatory challenge, self-compassion might be an especially helpful way to attenuate powerful impulses.

APPENDIX A

SELF-ENERGIZING INTERVENTION

Sample Letter. Wow, way to go! Kicking the smoking habit . . . Awesome! You can do it! I know you can. You've gone through tough times before! And just think—it'll be so great once you've quit. Your breath and your clothes will smell so much better! You'll save so much money that you'll feel rich! You'll be able to buy that iPod you want! Think of all the smokers who will look up to you for being such a champion. Just remember all these things and keep at it! You can do it! You're amazing!!!

Sample Self-Talk. You've done amazingly so far! I bet you'll keep it up next week! Just think about all the money you're saving up for that iPod! Your breath is already starting to smell better, and your skin is looking better too. You can do it! So far you've been awesome!! I know you're feeling anxious and are having various withdrawal symptoms, but just think of all that you're gaining—it's gonna be incredible!!

SELF-CONTROLLING INTERVENTION

Sample Letter. OK, it's time to quit. You need to make this your top priority. Stay as far away from cigarettes as possible over the next few months or there's no way you'll have the will power to resist

urges and temptations. Don't go places where people will be smoking. It's time to buckle down and focus on kicking this terrible habit. When you get a craving, just really focus on exerting self-control as much possible. When you start to miss cigarettes, just try to distract yourself and focus on the goal at hand.

Sample Self-Talk. Don't do it!! You know that if you have one, you're setting yourself up to have many more and you'll never be able to quit. Come on—this is the time to do it. Throw away the cigarettes now. Try to go some place where you'll stop thinking about this craving just as we decided. Come on—do NOT have this cigarette; you'll regret it after and you'll just be failing to get to where you want to go.

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