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Mechanisms of Change in Mindfulness-Based Stress Reduction: Self-Compassion and Mindfulness as Mediators of Intervention Outcomes

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Research has demonstrated support for the efficacy of mindfulness-based stress reduction (MBSR) in alleviating psychological distress and symptoms. Less is known, however, about the mechanisms through which MBSR achieves its outcomes. This study examined mindfulness and self-compassion as potential mediators of MBSR’s effects on several processes and behaviors related to emotion regulation, using data from a randomized trial of MBSR versus waitlist (WL), in which MBSR participants demonstrated significantly greater improvements in worry, fear of emotion, difficulties in emotion regulation, suppression of anger, and aggressive anger expression. Mediation analysis using bootstrap resampling indicated that increases in self-compassion mediated MBSR’s effects on worry, controlling for change in mindfulness. Increases in mindfulness mediated the intervention’s effects on difficulties in emotion regulation, controlling for change in self-compassion. Both variables mediated MBSR’s effects on fear of emotion. These findings highlight the importance of mindfulness and self-compassion as key processes of change that underlie MBSR’s outcomes.

Keywords: mindfulness; self-compassion; mechanisms of change; mindfulness-based stress reduction

In recent years, mindfulness-based interventions have gained increasing popularity in both clinical and research settings. These interventions all share common emphasis on cultivating mindfulness, a form of awareness that arises through “paying attention in a particular way: on
purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p. 4). Another construct that has been proposed to be an important process and outcome in mindfulness-based interventions (Shapiro, Astin, Bishop, & Cordova, 2005) is self-compassion, which has been defined as being open to and moved by one’s own suffering, experiencing feelings of caring and kindness toward oneself, taking an understanding, nonjudgmental attitude toward one’s inadequacies and failures, and recognizing that one’s own experience is part of the common human experience. (Neff, 2003, p. 24)

Although there is conceptual overlap between mindfulness and self-compassion, most research on their psychological correlates and effects has been conducted independently, and little work has attempted to tease apart their independent contribution to psychological well-being or to the effects of mindfulness-based clinical interventions. The goal of this research was to examine the independent roles of mindfulness and self-compassion in mediating the effects of mindfulness-based stress reduction (MBSR).

MBSR is a group-based psychosocial intervention in which participants are taught principles of mindfulness and various techniques and exercises aimed at cultivating mindfulness in daily life. To date, much research has examined MBSR’s effects, and found the intervention to have a wide range of beneficial psychological and physical outcomes among psychiatric, medical, and nonclinical populations. Its effects are multidimensional, ranging from reduced depressive symptoms (Anderson, Lau, Segal, & Bishop, 2007; Sephton et al., 2007; Shapiro, Schwartz, & Bonner, 1998), anxiety (Shapiro et al., 1998), and medical symptoms (Williams, Kolar, Reger, & Pearson, 2001), to increased empathy (Shapiro et al., 1998), positive affect (Bränström, Kvílemo, Brandberg, & Moskowitz, 2010; Jain et al., 2007; Nyklíček & Kuijpers, 2008), sense of spirituality (Astin, 1997; Shapiro et al., 1998), and quality of life (Koszycki, Benger, Shlik, & Bradwejn, 2007). For a review of the effects of MBSR on psychological health, see Keng, Smoski, and Robins (2011). Results of a meta-analysis indicated a moderate effect size of $d \approx 0.50$ for the intervention’s effects on general physical and psychological well-being (Grossman, Niemann, Schmidt, & Walach, 2004). Whereas many studies have demonstrated MBSR’s positive effects on psychological symptoms and well-being, few studies have investigated the effects of MBSR on clinically relevant psychological processes, particularly processes relevant to emotional experience, regulation, and expression. MBSR may reduce individuals’ tendency to engage in maladaptive cognitive and emotional tendencies, such as worry and fear of emotion, by enhancing the ability to decenter from sensations, thoughts, and emotions. MBSR may also improve individuals’ ability to regulate emotions and express emotions in more adaptive ways. Our recently completed randomized trial of MBSR, on which this study is based, demonstrated that MBSR leads to significant improvements in worry, fear of emotion, difficulties in emotion regulation, aggressive anger expression, and suppression of anger (Robins, Keng, Ekblad, & Brantley, 2012).

Although the efficacy of MBSR is relatively well established, less is known regarding the mechanisms through which MBSR achieves its psychological effects. Of a number of processes proposed to be potential mechanisms of effects of MBSR, increases in mindfulness have been noted as a potentially crucial mechanism of change. Research has found that MBSR leads to increased self-reported mindfulness (Anderson et al., 2007; Bränström et al., 2010; Campbell, Labelle, Bacon, Faris, & Carlson, 2012; Carmody, Reed, Kristeller, & Merriam, 2008; Dobkin & Zhao, 2011; Garland, Gaylord, & Fredrickson, 2011; Gaylord et al., 2011; Gayner et al., 2012; Hölzel et al., 2011; Jensen, Vangkilde, Frojkjær, & Hasselbach, 2012; Kilpatrick et al., 2011; Kimbrough, Magyari, Langenberg, Chesney, & Berman, 2010; Lau et al., 2006; Robins et al., 2012; Schmidt et al., 2011; Shapiro, Brown, & Biegel, 2007; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008; Vollset, Sivertsen, & Nielsen, 2011), and that intervention-related increases in mindfulness predicted increases in positive states of mind, self-compassion, and spirituality, and
decreases in perceived stress, psychological distress, depression, anxiety, rumination, and worry (Anderson et al., 2007; Bränström et al., 2010; Campbell et al., 2012; Carmody et al., 2008; Dobkin & Zhao, 2011; Garland et al., 2011; Gayner et al., 2012; Gross et al., 2010; Hölzel et al., 2011; Jensen et al., 2012; Lau et al., 2006; Shapiro et al., 2007; Vøllestad et al., 2011). Other studies have shown that increases in mindfulness statistically mediated the effects of mindfulness interventions on outcomes including reductions in rumination, anxiety, perceived stress, avoidance behavior, and cognitive reactivity (Bränström et al., 2010; Nyklíček & Kuijpers, 2008; Raes, Dewulf, Van Heeringen, & Williams, 2009; Shapiro et al., 2008; Vøllestad et al., 2011), and increases in positive states of mind and quality of life (Bränström et al., 2010; Nyklíček & Kuijpers, 2008). In addition, changes in self-reported mindfulness have been found to partially mediate the relationship between the amount of time spent in formal mindfulness homework practice during the MBSR program and changes in perceived stress, psychological symptoms, and psychological well-being (Carmody & Baer, 2008).

Although these studies point to mindfulness as a mediator of mindfulness-based interventions’ effects, none have taken into account other potential constructs that may mediate the effects of mindfulness-based interventions. One construct that has been identified as a potentially important process and outcome of mindfulness-based interventions is self-compassion, which has been associated with positive psychological outcomes, including lower depression and anxiety, and increased satisfaction with life (Neff, 2003). Like mindfulness, self-compassion is a concept prominent in Buddhist psychology, and it involves adopting a caring and compassionate attitude toward oneself, recognizing one’s experience as part of the larger human experience, and bringing nonjudgmental awareness to one’s painful thoughts and experiences rather than overidentifying with them. There is some conceptual overlap between the constructs of mindfulness and self-compassion, in that both involve an attitude of nonjudgment toward one’s experiences. It is thus perhaps unsurprising that research has found that MBSR led to significant increases in self-compassion, and that increases in self-compassion predicted decreases in perceived stress resulting from the intervention (Shapiro et al., 2005).

To date, there has been some preliminary work examining the relative role of mindfulness and self-compassion in psychological well-being. In a cross-sectional, correlational study by Van Dam, Sheppard, Forsyth, and Earleywine (2011), self-compassion was found to be a stronger correlate of symptom severity and quality of life of individuals with mixed anxiety and depression than mindfulness. In a randomized controlled trial of mindfulness-based cognitive therapy (MBCT), an adaptation of MBSR was developed for recurrently depressed patients; the effects of MBCT on depressive symptoms were found to be mediated by changes in both mindfulness and self-compassion (Kuyken et al., 2010). One limitation of this study is that changes in mindfulness and self-compassion were each included as a mediator in separate analyses, which does not control for possible shared variance between the two constructs. This study’s sample consisted of patients with a history of recurrent depression, and it is unknown the extent to which the findings are generalizable to other populations, for example, a nonclinical population. This study is a preliminary attempt at addressing the present knowledge gap regarding the relative role of mindfulness and self-compassion in MBSR’s treatment outcome by examining the extent to which each construct independently mediates the effects of MBSR on several psychological health-related outcomes, including maladaptive cognitive and overt behaviors, using data from a randomized, waitlisted controlled trial conducted by our group (Robins et al., 2012). This study also aims to broaden the literature concerning mechanisms of change of mindfulness-based interventions by assessing mindfulness using a frequently used measure, the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), and by investigating the mechanisms of MBSR in a nonclinical sample. Given the exploratory nature of this work, we made no specific predictions.
whether changes in mindfulness or self-compassion would more strongly mediate the effects of MBSR on a particular outcome.

**METHOD**

**Participants and Procedure**

The sample, recruitment procedures, treatment conditions, and measures used in the current analyses have been described in detail in Robins et al. (2012). We were interested in studying the effects of MBSR in a nonclinical sample, similar to the population for whom the MBSR program typically is provided. In brief, participants met the following study criteria: (a) aged at least 18 years, (b) no prior participation in an MBSR program, (c) no active psychotic symptoms or suicidal ideation, (d) no psychiatric hospitalizations within the past 6 months, (e) able to attend MBSR classes at designated times, (f) able to commit to daily home practice of mindfulness exercises, and (g) no regular mindfulness meditation practice (or any other form of meditative practice such as yoga or contemplative prayer) for more than an average of 20 min a week within the past 6 months. The recruitment materials stated the duration and content of the program (i.e., examples of types of mindfulness exercises taught) and procedures that participants would go through if they enrolled in the study. Fifty-six individuals met the study criteria and were randomly assigned to MBSR (n = 28) or waitlist (WL) (n = 28). Participants completed assessments prior to the beginning of MBSR and immediately after the intervention group’s completion of MBSR (Time 2; 2 months after Time 1). Participants were paid $10 for completing each assessment session, and the WL group was offered a course of MBSR after the MBSR group completed their course. Twenty MBSR participants completed both the program, defined as having attended at least five out of the eight regular class meetings, and the Time 2 (post-MBSR) assessment, and 21 WL participants completed the Time 2 assessment. Participants’ mean age was 46.25 years (SD = 12.97; range = 21–87). The sample was 84% female and 91% White. Fifty-eight percent were married, living with a partner, or in an intimate relationship, and 51% had a graduate degree.

In this study, mindfulness was measured using the FFMQ (Baer et al., 2006), which consists of 39 items in five subscales: nonreactivity to inner experience, observing (noting or attending to sensations/perceptions/thoughts/feelings), acting with awareness, describing (noting or labeling experiences with words), and nonjudging of experiences. According to Baer et al. (2006), the internal consistencies of the subscales range between .75 and .91. Self-compassion was assessed using the Self-Compassion Scale (Neff, 2003), a 26-item questionnaire consisting of six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and overidentification. The scale’s internal consistency and test–retest reliability were .92 and .93, respectively (Neff, 2003). The Affective Control Scale provides a measure of fear of the experience of emotions and fear of loss of control over internal and behavioral reactions to emotions (α = .94 and test–retest r = .78; Williams, Chambliss, & Ahrens, 1997). Worry was measured using the Penn State Worry Questionnaire (Meyer, Miller, Metzger & Borkovec, 1990), a 16-item self-report inventory designed to assess generality, excessiveness, and uncontrollability of pathological worry. Meyer et al. (1990) reported that the questionnaire’s internal consistency and test–retest reliability were .93 and .92, respectively. The Difficulties in Emotion Regulation Scale was used as a measure of difficulties with emotion regulation (α = .93 and test–retest r = .88; Gratz & Roemer, 2004). Lastly, the two subscales (anger-out and anger-in) of the Spielberger Anger Expression Scale (Spielberger et al., 1985) provided a measure of expression of anger as aggressive behavior and suppression of anger respectively. Internal reliabilities for each of the subscales were reported as .73 and .70, respectively (Knight, Chisholm, Pauling, & Waal-Manning, 1988).
Statistical Analyses

The mediation analyses were conducted using a bootstrap resampling procedure that allows for the simultaneous examination of multiple mediators (Preacher & Hayes, 2008). This procedure is a multivariate extension of the Sobel test that does not assume normality of the sampling distribution of the indirect effect ($ab$ product), an assumption that is typically violated in small study samples. The bootstrapping approach has been recommended over the Sobel test or the traditional causal steps approach by several researchers, given that the former approach has been demonstrated to have higher power with reasonably controlled Type I error rate (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004). In this study, bootstrapping was accomplished by taking 3,000 random samples of the original sample size and computing the $ab$ product for each mediator in each sample. The point estimate of the indirect effect is the mean of the $ab$ product over 3,000 samples. The procedure yields a 95% bias-corrected confidence interval. If the upper and lower limits of the confidence interval do not contain zero, the indirect effect is significant. The procedure allows for examination of the total indirect effect and the individual effect of a specified mediator, over and above the effects of other mediators. In the current analyses, changes in mindfulness and changes in self-compassion were entered as candidate mediators of MBSR’s effects on changes in worry, fear of emotion, anger suppression, aggressive anger expression, and difficulties in emotion regulation. The analyses were conducted using SPSS macros for mediation analysis provided online at http://www.afhayes.com/spss-sas-and-mplus-macros-and-code.html#indirect

Results

At baseline, there were no significant group differences on any demographic or dependent variables, except that the MBSR group included a higher number of participants with some prior meditation, yoga, or contemplative practice experience, $\chi^2(1, N = 41) = 4.08, p = .04$. This variable was therefore included as a covariate in the mediation analyses.

Table 1 presents the means and standard deviations of the candidate mediators and dependent variables for both groups at both time points. Robins et al. (2012) reported that MBSR

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention ($N = 20$)</th>
<th>Waitlist ($N = 21$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td></td>
<td>$M (SD)$</td>
<td>$M (SD)$</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>121.6 (20.31)</td>
<td>138.35 (13.27)</td>
</tr>
<tr>
<td>Self-compassion</td>
<td>49.20 (12.80)</td>
<td>60.95 (10.57)</td>
</tr>
<tr>
<td>Worry</td>
<td>58.14 (13.96)</td>
<td>45.50 (14.53)</td>
</tr>
<tr>
<td>Fear of emotion</td>
<td>129.31 (35.08)</td>
<td>105.60 (26.28)</td>
</tr>
<tr>
<td>Aggressive anger</td>
<td>12.45 (2.76)</td>
<td>11.55 (1.88)</td>
</tr>
<tr>
<td>expression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppression of anger</td>
<td>18.15 (4.26)</td>
<td>14.80 (3.19)</td>
</tr>
<tr>
<td>Difficulties with</td>
<td>89.66 (22.72)</td>
<td>72.00 (12.93)</td>
</tr>
<tr>
<td>emotion regulation</td>
<td></td>
<td></td>
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</tbody>
</table>
participants showed significantly greater increases in trait mindfulness and self-compassion, and significantly greater decreases in fear of emotions, suppression of anger, aggressive anger expression, worry, and difficulties regulating emotions. Self-compassion and mindfulness were correlated $r = .55$, $p < .001$ at pretreatment and $r = .60$, $p < .001$ posttreatment. Changes in both variables from pretreatment to posttreatment are correlated at $r = .53$, $p < .001$.

The bootstrap resampling procedure produced the point estimate of each indirect effect and their associated 95% confidence intervals. These data are presented in Table 2. The analyses indicated that increases in self-compassion independently (accounting for mindfulness) mediated MBSR’s effects on worry. Increases in mindfulness independently mediated the effects of MBSR on difficulties in emotion regulation. Finally, both variables were significant mediators of MBSR’s effects on fear of emotion, even when controlling for each other. Neither mindfulness nor self-compassion mediated the effects of MBSR on aggressive anger expression or suppression of anger. Pairwise contrasts between the two mediators showed that changes in mindfulness and self-compassion did not differ significantly in their mediating effects on worry or fear of emotions, but the mediating effect of mindfulness was significantly

<table>
<thead>
<tr>
<th></th>
<th>Point Estimate</th>
<th>SE</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Worry</strong></td>
<td>M</td>
<td>-2.09</td>
<td>2.97</td>
<td>-8.96</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>6.89</td>
<td>3.29</td>
<td>1.57</td>
</tr>
<tr>
<td></td>
<td>Total indirect</td>
<td>4.80</td>
<td>2.89</td>
<td>-.44</td>
</tr>
<tr>
<td><strong>Fear of emotion</strong></td>
<td>M</td>
<td>8.56</td>
<td>5.13</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Total indirect</td>
<td>14.76</td>
<td>4.42</td>
<td>8.24</td>
</tr>
<tr>
<td><strong>Aggressive anger expression</strong></td>
<td>M</td>
<td>-.37</td>
<td>.62</td>
<td>-1.52</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>-.65</td>
<td>.61</td>
<td>-2.27</td>
</tr>
<tr>
<td></td>
<td>Total indirect</td>
<td>-1.02</td>
<td>.77</td>
<td>-2.96</td>
</tr>
<tr>
<td><strong>Suppression of anger</strong></td>
<td>M</td>
<td>-.63</td>
<td>.88</td>
<td>-2.24</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>1.26</td>
<td>.84</td>
<td>-.12</td>
</tr>
<tr>
<td></td>
<td>Total indirect</td>
<td>.63</td>
<td>.88</td>
<td>-1.19</td>
</tr>
<tr>
<td><strong>Difficulties in emotion regulation</strong></td>
<td>M</td>
<td>13.30</td>
<td>4.59</td>
<td>5.59</td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>.72</td>
<td>2.03</td>
<td>-2.97</td>
</tr>
<tr>
<td></td>
<td>Total indirect</td>
<td>14.02</td>
<td>3.76</td>
<td>7.80</td>
</tr>
</tbody>
</table>

Notes. Confidence intervals that do not contain zero indicate that the point estimate is statistically significant. M = mindfulness; SC = self-compassion; BCa = bias-corrected and accelerated confidence intervals; SE = standard error.

*Indicates a significant effect.
greater than the mediating effect of self-compassion on difficulties in emotion regulation. Given that mindfulness significantly mediated the effects of MBSR on fear of emotion and difficulties in emotion regulation, we additionally examined whether the distinct facets of mindfulness assessed by the FFMQ differentially mediated the effects of MBSR on these two variables. Controlling for the effects of other facets of mindfulness, none of the mindfulness facets uniquely mediated the effects of MBSR on fear of emotion and difficulties in emotion regulation.

**DISCUSSION**

This study aimed to examine the relative contribution of changes in mindfulness and self-compassion as mediators of the effects of MBSR on maladaptive cognitive and behavioral tendencies, including worry, fear of emotion, aggressive anger expression and suppression of anger, and difficulties in emotion regulation. Results indicated that changes in mindfulness independently mediated the effects of MBSR on difficulties in emotion regulation, controlling for changes in self-compassion, whereas changes in self-compassion mediated the effects of the intervention on worry, controlling for changes in mindfulness. Both variables mediated the effects of MBSR on fear of emotion, and neither mediated MBSR's effects on aggressive anger expression nor suppression of anger. Controlling for changes in other facets of mindfulness, none of the individual facets of mindfulness assessed via the FFMQ uniquely mediated MBSR's effects on difficulties in emotion regulation and fear of emotion. These findings are consistent with previous intervention studies that indicate that changes in self-compassion and/or mindfulness each mediated some aspects of outcome of mindfulness-based interventions, including perceived stress (Bränström et al., 2010; Nyklíček & Kuijpers, 2008; Shapiro et al., 2005; Shapiro et al., 2008), depressive symptoms (Kuyken et al., 2010), and quality of life (Nyklíček & Kuijpers, 2008), with the added advantage of a direct comparison of the relative contribution of each of these two constructs controlling for the other construct.

This study’s findings highlight the importance of changes in both self-compassion and mindfulness as mediators of the effects of the intervention, and suggest that there are unique processes in MBSR that are responsible for specific outcomes. Changes in self-compassion, above and beyond changes in mindfulness, mediated reductions in worry; a cognitive behavior that is a key feature of anxiety disorders (Borkovec, Shadick, Hopkins, & Rapee, 1991). This finding is consistent with a previous cross-sectional study’s finding that self-compassion, relative to mindfulness, was more strongly related to anxious and depressive symptomatology of individuals with mixed anxiety and depression (Van Dam et al., 2011). Changes in both self-compassion and mindfulness significantly mediated the effects of MBSR on fear of emotion, suggesting that improvements in both processes may help reduce avoidance and fear of emotion. The finding that self-compassion mediated the effects of the intervention on both worry and fear of emotion is worth noting, given that previously found effects of MBSR on outcomes related to maladaptive cognitive tendencies, such as rumination (Shapiro et al., 2008), have been primarily linked to changes in mindfulness rather than self-compassion. These findings suggest that enhancing focus on developing self-compassion in MBSR, or other mindfulness-based interventions, may bring about direct benefit in terms of reducing maladaptive cognitive coping tendencies and increasing willingness to accept and experience emotions.

The finding that the effects of MBSR on difficulties in emotion regulation were mediated by improvements in mindfulness, but not self-compassion (after controlling for changes in mindfulness), was surprising given that self-compassion has previously been positively correlated with some aspects of emotional intelligence, including clarity of individuals’ experience of their
emotions and individuals’ ability to regulate their mood states (Neff, 2003). This finding suggests that in the context of MBSR, relative to self-compassion, improvements in mindfulness may play a stronger role in reducing difficulties in emotion regulation. It is unclear why neither self-compassion nor mindfulness mediated the effects of MBSR on aggressive anger expression and suppression of anger. We suspect that the effects of MBSR on these outcomes may be mediated by processes that are unexamined in this study, such as interpersonal functioning and the ability to regulate expression of emotions.

Although the study was designed to highlight the unique contributions of mindfulness and self-compassion to the benefits of MBSR, it should be noted that the two constructs are not unrelated, as we highlighted in the introduction section. In this study, self-compassion and mindfulness were correlated at preintervention and postintervention. We do not suggest that these constructs operate fully independent of each other. In fact, we posit that mindfulness allows for greater clarity in developing self-compassion, whereas self-compassion “clears the way” for mindfulness by reducing attention-interfering cognitions such as negative rumination. Future studies can examine these hypotheses by incorporating additional assessment time points and testing a path model in which changes in mindfulness lead to changes in self-compassion, or vice versa. Even though mindfulness and self-compassion might work together to produce improvements, this study shows that these constructs are in fact differentiable in their impact on clinical and psychological outcomes, and thus may be emphasized to a greater or lesser degree in mindfulness-based interventions.

This study’s strengths include an experimental design that involves randomized assignment to treatment or a WL control group, inclusion of assessment of constructs that have not been examined in previous MBSR trials (such as fear of emotion and difficulties in emotion regulation), and use of data analytic strategies (bootstrap resampling) that are appropriate for the sample size and purpose of the study. This study has several limitations. First, we analyzed only data of completers because of the relatively small sample and lack of interim assessment points, which precludes statistically rigorous approximation of missing data points. Future studies should include a larger sample and interim assessment points and perform intent-to-treat analyses of treatment effects. The lack of interim assessment points also precludes a strong conclusion regarding mediation. Because changes in the proposed mediators and outcomes were calculated from the same two time points, we cannot assess whether changes in the outcome were temporally preceded by changes in the mediators. Future studies that include multiple assessment time points during the course of the intervention will permit stronger conclusions regarding mediation. Another limitation of this study is that the sample recruited was a self-selected sample that was predominantly female, White, and highly educated, which limits generalizability of the findings. Future studies should aim to recruit participants from more diverse ethnic, educational, and socioeconomic backgrounds.

To the authors’ knowledge, this study is the first to assess the unique roles of mindfulness and self-compassion as mediators of outcomes of MBSR by using a statistical model that enables examination of one mediator’s effect while accounting for effects of other mediators. The findings of this study illustrate the differential effects of both constructs in mediating MBSR’s outcome, and underscore the importance of self-compassion as a mechanism of change for a range of outcomes. Although the findings must be interpreted with caution given previously noted limitations of the study, they point to the value of simultaneously investigating multiple key variables as mediators of effects of mindfulness-based interventions. Future studies should continue to examine the mediating effects of mindfulness and self-compassion, as well as those of other potential processes of change, in the interest of broadening our understanding of the mechanisms of mindfulness-based interventions and eventually, refining and enhancing their treatment specificity.
REFERENCES


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