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Self-Compassion, Affect, and Health-Promoting Behaviors

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Objective: Emerging theory and research suggest that self-compassion promotes the practice of health behaviors, and implicates self-regulation as an explanatory factor. However, previous investigations focused only on behavior intentions or health risk behaviors, and did not investigate the role of emotions. This study expands on this research using a small-scale meta-analysis approach with our own data sets to examine the associations of self-compassion with a set of health-promoting behaviors, and test the roles of high positive affect and low negative affect as potential explanatory mechanisms. **Method:** Fifteen independent samples ($N = 3,252$) with correlations of self-compassion with the frequency of self-reported health-promoting behaviors (eating habits, exercise, sleep behaviors, and stress management) were meta-analyzed. Eight of these samples completed measures of positive and negative affect. **Results:** Self-compassion was positively associated with the practice of health-promoting behaviors across all 15 samples. The meta-analysis revealed a small effect size (average $r = .25$; $p < .001$) of self-compassion and health behaviors, with low variability. Tests of the indirect effects of self-compassion on health behaviors through positive and negative affect with multiple mediator analyses revealed small effects for each. Separate meta-analyses of the indirect effects (IE) were significant for positive (average IE = .08; $p < .001$) and negative affect (average IE = .06; $p < .001$), and their combined indirect effects (average IE = .15; $p < .0001$). **Conclusion:** Self-compassion may be an important quality to cultivate for promoting positive health behaviors, due in part to its association with adaptive emotions.

Keywords: self-compassion, health-promoting behaviors, positive affect, negative affect, self-regulation

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With the rates of noncommunicable or lifestyle-based diseases continuing to rise, finding ways to increase the practice of health-promoting behaviors is an important yet challenging goal requiring

innovative and effective approaches. Although many people may start with the best of intentions to change health behaviors, their efforts may be derailed by distractions, temptations, and negative reactions to minor failures on the path toward attaining health goals (e.g., Sirois & Giguère, 2013). As such, identifying factors that promote resilience in the context of such barriers may contribute to successful health behavior regulation.

To this end, recent research has highlighted the potential role of self-compassion—defined as taking a kind, compassionate, and accepting stance toward oneself during difficult times (Neff, 2003b)—for enhancing health outcomes. Much of this nascent literature has focused on the role of self-compassion for promoting resilience in general (Neff, Kirkpatrick, & Rude, 2007), in the context of illness (Brion, Leary, & Drabkin, 2014), and for reducing stress (Allen & Leary, 2010; Sirois, 2014). There is, however, promising but limited evidence linking self-compassion to intentions to engage in health-promoting behaviors (e.g., Terry, Leary, Mehta, & Henderson, 2013), and to reducing health risk behaviors (Adams & Leary, 2007; Kelly, Zuroff, Foa, & Gilbert, 2010). Although Terry and Leary (2011) posited that self-compassion facilitates the practice of health behaviors by enhancing self-regulation, a recent test of this hypothesis yielded mixed results (Terry et al., 2013). In the current study, we expand on this current theory by examining the linkage of self-compassion to the practice

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of health-promoting behaviors, and by testing the potential contributing role of emotional regulation.

Self-Compassion and Health Behaviors

In their review, Terry and Leary (2011) outlined a provisional blueprint for understanding the possible pathways through which self-compassion may play a role in the self-regulation of health behavior. Self-compassion was posited to facilitate effective health behavior regulation via several processes that are central to self-regulation, including setting goals, taking action, attention to and evaluation of ongoing behavior, and emotional regulation. The three components of self-compassion, self-kindness (vs. self-judgment), common humanity (vs. isolation), and mindfulness (vs. over-identification) (Neff, 2003b), are each proposed to facilitate these adaptive self-regulatory processes. For example, a diet transgression can often result in feelings of shame, self-criticism, and unrestrained eating (Polivy, Herman, & Deo, 2010), and diet discontinuation. People with self-compassion, however, may view these transgressions less negatively, perhaps realizing that everyone makes mistakes (common humanity) and, therefore, not becoming overly self-critical (self-kindness) or embroiled in feelings of guilt, shame or frustration (mindfulness). Research demonstrating that self-compassion is associated with less negative reactions after imagining a diet-breaking scenario (Adams & Leary, 2007), and fewer binge eating symptoms (Webb & Forman, 2013), supports this proposition. As a relatively stable personality trait that can also be induced or fostered as a state (Leary, Tate, Adams, Allen, & Hancock, 2007; Neff & Germer, 2013), self-compassion may be a similarly valuable quality to facilitate goal persistence for other health goals. For example, in one study, women with greater self-compassion were more likely to adopt realistic and intrinsically motivated exercise goals (Magnus, Kowalski, & McHugh, 2010).

Yet, there are some gaps in this emerging body of research. For instance, in a recent study, self-compassion was associated with intentions to wait less time to seek medical care for a hypothetical illness (Terry et al., 2013). Although self-compassion was positively correlated with six different components of self-regulation, the relationship between self-compassion and intentions to seek prompt medical care was not accounted for by better self-regulation. This suggests that additional explanatory factors related to self-regulation, such as emotional regulation, might account for the link between self-compassion and health behavior.

The Role of Affect

The role of affect in self-regulation is an alternative explanation for the beneficial effect of self-compassion on health behaviors that has not yet been examined. As noted by Terry and Leary (2011), self-compassion attenuates the negative affective responses to challenges and failures that can interfere with effective self-regulation. Negative emotions can undermine self-regulation in a number of ways. People who are upset, frustrated, or feeling depressed are more likely to engage in self-defeating and unhealthy behaviors, such as overeating or putting off exercise, that are immediately gratifying but distally costly, as a means to regulate their mood (Baumeister, Zell, & Tice, 2007; Sirois & Pychyl, 2013). As well, negative affect associated with engaging in

a particular health behavior can trigger avoidant coping responses that can result in delay or disengagement from health behavior (e.g., Sirois & Giguère, 2013). Negative emotions can also drain self-regulatory resources that would otherwise be directed toward monitoring behavior (Baumeister & Heatherton, 1996). It is important to note that self-compassion may promote engagement in positive health behaviors because of its ameliorating effects on negative affective states (e.g., Leary et al., 2007), which might otherwise jeopardize health goals.

What is less clear is whether positive affect may serve a similar but opposing role. As a positive self-view, it is not surprising that self-compassion is associated with higher levels of positive affect (Neff, 2003b; Neff et al., 2007), and positive self-talk in response to health threats (Terry et al., 2013). Self-compassion is posited to not simply replace negative emotions, but instead generate positive emotions through the acceptance of negative states (Germer & Neff, 2013). There is also mounting evidence that positive affect is associated with the practice of health-promoting behaviors both cross-sectionally and longitudinally (Conner, 2013; Pressman & Cohen, 2005; Steptoe, 2010), possibly because it enhances self-regulation (Tice, Baumeister, Shmueli, & Muraven, 2007). Together this theory and research support the notion that positive affect associated with self-compassion may explain, in part, its association with health behaviors.

The Current Study

The purpose of this study was to extend current theory and research by testing associations between self-compassion and self-reported practice of health-promoting behaviors. Previous studies examining this linkage have focused on a limited set of factors related to health-promoting behaviors, including intentions for medical care-seeking (Terry et al., 2013), and autonomous motivations for exercising (Magnus et al., 2010), rather than actual health-promoting behaviors. We chose, therefore, to focus on a broader range of health behaviors known to be important for health promotion and disease prevention, specifically healthy diet, physical activity, adequate sleep, and stress management. For example, poor eating habits (Schulze & Hu, 2002), physical inactivity (Lee et al., 2012), and inadequate sleep (Buxton & Marcelli, 2010), have each been implicated in the development of obesity and chronic disease, whereas chronic stress is a known precursor of inflammation and disease risk (Cohen et al., 2012). To address issues of replicability and generalizability, we examined the link between self-compassion and this set of health behaviors, and hypothesized that self-compassion would be positively and significantly associated with the practice of health-promoting behaviors.

An initial scan of the literature indicated that there were few, if any, published studies examining the association of self-compassion with health-promoting behaviors. However, to ensure that there were no other eligible published studies to include, we conducted a standard search of the literature. We considered correlational, longitudinal, and experimental study designs examining the association of self-compassion with health-promoting behaviors as eligible for inclusion. However, this search yielded no eligible studies. We therefore opted to statistically meta-analyze the association of self-compassion with health behaviors in 15 of our own independent community and student samples to estimate the magnitude of these effects. This small-scale meta-analysis

approach is consistent with Cumming's (2014) recommendations for improving psychological research, and building cumulative research in an area that has not been well studied. We also tested the hypothesis that higher levels of positive affect and lower levels of negative affect may explain this association by conducting a series of multiple mediation analyses with positive and negative affect across the eight different samples to replicate the findings, and then meta-analyzed these effects to estimate the average unique and combined indirect effects of self-compassion through positive and negative affect.

Method

Participants and Procedure

The present study included data from 15 independent samples (seven undergraduate and eight community adult, total $N = 3,232$) collected over a 6-year period from 2007 to 2013 as part of a larger research program focused on self-regulation and health. Samples 2, 4, 6, 10, 11, 13, 14, and 15 consisted of community-dwelling adults recruited from online and community sources, and samples 1, 3, 5, 7, 8, 9, and 12 consisted of undergraduate student samples collected from three different postsecondary institutions, each of which provided ethical clearance for the data collection through their respective Institutional Review Boards. Recruitment and other procedural details for each study are presented in a supplemental table (available online as supplemental material). For all samples, any cases missing 20% or more on any of the key variables were removed using a listwise deletion prior to analyses.

Table 1 summarizes the demographic characteristics for each of the 13 samples. For the community samples, two of the eight community samples (Samples 2 and 10) completed a mail survey and the remaining four samples completed an online survey. Sample 2 received a \$30 incentive and Sample 13 received a \$20 incentive for completing the survey. The other community samples were given a chance to win gift cards of varying values. For the student samples, two completed the survey in a lab setting (Samples 1 and 8) and the remaining samples completed the survey

online, hosted on a secure university server. All student samples participated for course or research credit. Consent to participate was implied through the return of the online or mail survey, or by signing a consent form for those who participated in the lab.

Measures

The means, standard deviations, and Cronbach alphas for all the scales appear in Table 2. In addition to standard demographic questions about age, gender, ethnicity, and education level, participants in 13 of the 15 samples completed a chronic health condition checklist to assess their health status.

Self-compassion. Twelve samples completed the 26-item Self-Compassion Scale (SCS; Neff, 2003a). Samples 13, 14, and 15 completed the short 12-item version of this scale (SCS-12; Ackard, Henderson, & Wonderlich, 2004). The SCS assesses the three main components of self-compassion and their negative counterparts, Self-Kindness (Self-judgment), Common Humanity (Isolation), and Mindfulness (Over-identification). It includes both positively ("I try to be loving toward myself when I'm feeling emotional pain") and negatively ("I'm disapproving and judgmental about my own flaws and inadequacies") worded items reflecting the six components of self-compassion. Research indicates that the subscales are best explained by a single higher order factor of self-compassion as they are highly intercorrelated (Neff, 2003a). All items are prefaced with the statement "how I typically act toward myself during difficult times" and respondents indicate how often they behave in the described way using response options ranging from 1 (*Almost Never*) to 5 (*Almost Always*). Averaging the mean subscale scores after reverse coding the negative items yields a total self-compassion score. This scale has been successfully used in both student and community samples, demonstrating good validity, both convergent and discriminant, and excellent test-retest reliability ($\alpha = .93$) (Neff, 2003a; Neff & Pommier, 2013).

Health behaviors. The practice of positive, health-promoting behaviors was assessed in three different ways across the samples. Thirteen samples completed the Wellness Behaviors Inventory

Table 1
Demographic Characteristics of the 15 Samples

Sample	N	Female (%)	White (%)	Chronic conditions (%)	Age (years)		Education level (%)		
					M	SD	High school	College/university	Graduate school
1	145	74.5	61.4	52.4	21.27	3.92	0.0	100.0	0.0
2	93	70.2	80.2	45.3	36.90	14.88	20.4	64.5	15.1
3	395	86.1	74.7	56.6	21.16	4.01	0.0	100.0	0.0
4	139	78.7	79.1	58.2	32.61	11.91	7.1	65.8	27.1
5	238	83.5	84.8	74.5	23.46	6.58	0.0	100.0	0.0
6	195	75.6	83.8	69.5	32.09	11.69	7.1	65.8	27.1
7	339	81.7	78.6	60.2	21.68	4.92	0.0	100.0	0.0
8	189	74.2	73.2	61.1	22.41	5.89	0.0	100.0	0.0
9	349	66.5	89.0	—	21.75	5.27	0.0	100.0	0.0
10	113	73.5	90.2	46.0	31.16	15.66	7.1	78.8	14.2
11	120	73.6	97.2	65.8	33.70	17.18	14.0	78.5	7.4
12	290	71.0	92.6	63.6	21.07	4.41	0.0	100.0	0.0
13	139	52.2	—	61.1	41.75	14.58	20.9	62.6	16.5
14	403	78.4	77.1	—	28.22	11.85	13.8	66.0	20.3
15	105	75.3	77.1	—	30.32	15.06	9.6	78.8	11.5

Table 2
 Summary of the Characteristics of the Study Variables for the 15 Independent Samples

Sample (N)	Self-compassion (5-point scale)		Health behaviors		Positive affect (5-point scale)		Negative affect (5-point scale)	
	M (SD)	α	M (SD)	α	M (SD)	α	M (SD)	α
1. (145)	3.00 (.69)	.94	3.18 (.90)	—	2.69 (.78)	.88	1.58 (.67)	.89
2. (93)	3.14 (.75)	.94	3.46 (.68)	.74	2.95 (.81)	.90	1.47 (.63)	.85
3. (395)	2.99 (.59)	.92	3.24 (.47)	.69	3.23 (.67)	.87	2.40 (.70)	.87
4. (139)	3.04 (.63)	.93	3.28 (.54)	.73	—	—	—	—
5. (238)	3.04 (.67)	.93	3.14 (.53)	.69	—	—	—	—
6. (195)	2.99 (.70)	.93	3.45 (.54)	.69	3.37 (.84)	.93	2.05 (.76)	.91
7. (339)	2.99 (.57)	.91	3.39 (.60)	.68	—	—	—	—
8. (189)	3.11 (.66)	.93	3.39 (.63)	.72	—	—	—	—
9. (349)	2.98 (.58)	.91	2.29 (.67)	—	3.27 (.77)	.89	2.30 (.77)	.87
10. (113)	2.86 (.78)	.94	3.81 (.54)	.66	—	—	—	—
11. (120)	2.84 (.67)	.92	3.80 (.60)	.68	2.84 (.67)	.93	2.60 (.67)	.91
12. (290)	3.04 (.64)	.91	3.78 (.52)	.64	3.14 (.84)	.90	2.03 (.73)	.89
13. (139)	3.08 (.55)	.79	3.39 (.69)	.73	—	—	—	—
14. (403)	2.85 (.68)	.82	3.40 (.62)	.69	—	—	—	—
15. (105)	3.04 (.70)	.84	3.62 (.61)	.66	3.25 (.85)	.90	2.16 (.70)	.84

Note. All measures were scored on a 5-point scale ranging from 1 to 5, except for the Sample 9 which completed a 4-point health behaviors measure.

(WBI; Sirois, 2001), a previously validated 10-item measure of the weekly performance of common health-related behaviors (e.g., Sirois, 2007). Items such as “I exercise for 20 continuous minutes or more, to the point of perspiration” and “I eat healthy, well-balanced meals” are rated on a 5-point scale with possible responses ranging from 1 (*less than once a week or never*) to 5 (*every day of the week*). After reverse keying two items (eating junk foods and drinking three or more caffeinated beverages), a mean of all items is calculated, with higher scores indicating more frequent performance of wellness behaviors. The WBI has demonstrated good convergent validity with other health behaviors such as seeking medical and dental check-ups, and household safety behaviors, in previous research (Sirois, 2007).

Sample 1 completed four questions about how their studying behaviors impacted the practice of two health behaviors, skipping meals and missing sleep. The questions asked how often they missed sleep and skipped meals to study for exams and complete assignments rated on a 5-point scale ranging from 1 (*never*) to 5 (*always*). The four items were combined and averaged into an index of study relevant health behaviors.

Sample 9 completed one question about the number of servings of fruits and vegetables that were usually eaten per day rated on a 4-point scale ranging from 1 (*0 servings per day*) to 4 (*5 or more servings per day*).

Positive and negative affect. The positive and negative affect subscales of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) were completed by eight of the 15 samples. The PANAS consists of 20 items consisting of words describing different feelings (e.g., happy, upset), with 10 items for each of the positive and negative affect scales. Samples 3, 4, 11 and 12 completed an expanded version of the PANAS, the PANAS-X (Watson & Clark, 1994), which consisted of 36 items. To maintain consistency across the samples only the 10 item basic positive and negative affect subscales were analyzed. Respondents rated the extent to which they are currently experiencing each of these feelings on a 5-point Likert scale ranging from 1 for *very slightly or not at all* to 5 for *extremely*. Psychometric properties for

the PANAS include, in student and community samples, good discriminant validity compared to measures of anxiety and depression, and good internal reliability ($\alpha = .88$; Crawford & Henry, 2004); in the current study, reliabilities for both PANAS subscales were very good across all samples (See Table 2).

Analyses

To estimate the average effect size between self-compassion and positive health behaviors, a random effects model meta-analysis was conducted using the Comprehensive Meta-analysis, Version 2 software (Borenstein, Hedges, Higgins, & Rothstein, 2005), which first transforms the individual correlation coefficients into Fisher's z scores before meta-analyzing them. Because of the relatively small number of unpublished studies included, and that other researchers were not contacted to obtain other unpublished studies, a failsafe N was calculated. The failsafe N provides an estimate of the number of studies with null results that would have to be included in the meta-analysis to render the current findings insignificant (Rosenthal, 1979). Given the different samples used to obtain these effects, a subgroup moderator analysis comparing the student to the community samples was planned if there was evidence of significant heterogeneity among the effect sizes. Similar moderator analyses were planned to assess the potential influence of age, gender, education level, and health status as each of these may influence the relationship between self-compassion and positive health behaviors. Two methods were used to assess between studies' variability in effect sizes; a) the degree of variability among the pool of effect sizes was assessed with the heterogeneity statistic, Q (Card, 2012); and, b) an estimate of the proportion of variability present that is not due to sampling error within studies was assessed with the I^2 statistic (Slosar, 2009). In general, I^2 values of 25% or less reflect low heterogeneity, 50% reflect moderate heterogeneity, and 75% or more reflect high heterogeneity.

The issue of why self-compassion may be associated with the practice of health behaviors was addressed using a unique two-step

approach. First, a series of multiple mediation analyses were conducted with the eight samples that included the measure of positive and negative affect. Mediation was tested following the Preacher and Hayes (2008) procedure which uses bootstrapping rather than Sobel tests to estimate the significance of indirect effects. This procedure involves drawing bootstrapped samples from the data in order to estimate the indirect effect for each of the resampled data sets (Preacher & Hayes, 2004; Shrout & Bolger, 2002). The multiple mediation analyses for positive and negative affect were conducted using the Hayes macro PROCESS (Hayes, 2013) with 5,000 bootstrapping resamples and bias-corrected 95% confidence intervals for each of the indirect effects calculated. Next, the indirect effects and bootstrapped standard errors from these analyses were meta-analyzed to estimate the average indirect effects of self-compassion on positive health behaviors through positive and negative affect across the eight samples. According to Card (2012), this is a suitable approach when the variables used in each of the mediation analyses being meta-analyzed are roughly similar. The average indirect effects for positive and negative affect controlling for the effects of each, as well as the combined indirect effects of both variables, were calculated with the metafor package in R version 2.15.2 (Viechtbauer, 2010), using the standardized indirect effects and their bootstrapped standard errors as suggested by Card (2012).

Results

Meta-analysis of Self-Compassion and Health Behaviors

The meta-analysis revealed that self-compassion was significantly associated with the practice of positive health behaviors ($r = .25$; $k = 15$; $p < .001$; see Table 3, Figure 1). The tests of heterogeneity were, however, nonsignificant and indicated a low amount of unexplained variability among the study effect sizes ($Q(14) = 14.96$, ns ; $I^2 = 6.44\%$). Accordingly no moderator analyses were conducted. The failsafe N analysis revealed that an additional 826 studies with null results would need to be included in the meta-analysis to reduce the p value below .05.

Understanding the Link Between Self-Compassion and Health Behaviors

The correlations among the mediation model variables are presented in Table 4. The model variables were significantly correlated in the expected directions in each of the eight samples, except for samples 1, 9, and 11 where the correlations with at least one of the affect variables were not significant. For the other samples, self-compassion was positively correlated with positive affect which, in turn, was positively correlated with the practice of positive health behaviors, and negatively correlated with negative affect, which was inversely related to positive health behaviors.

Analyses of the indirect effects of self-compassion and health behaviors through positive and negative affect controlling for the effects of each revealed significant indirect effects for positive affect in all but Sample 1 (see Table 5). For negative affect, the indirect effects were significant for all but four of the samples (Samples 1, 3, 9, 15). For the total model, combining both positive and negative affect, the indirect effects were significant for all but

Table 3
Meta-Analyzed Bivariate Correlations Between Self-Compassion and Positive Health Behaviors, Across 15 Samples
(Total $N = 3,252$)

Sample	N	Sample	Health behaviors	Bivariate correlations	95% CI
1	145	Students	Study health behaviors	.305	[.15, .45]
2	93	Community	WBI	.307	[.11, .48]
3	395	Students	WBI	.239	[.14, .33]
4	139	Community	WBI	.445	[.30, .57]
5	238	Students	WBI	.201	[.08, .32]
6	195	Community	WBI	.268	[.13, .39]
7	339	Students	WBI	.235	[.13, .33]
8	189	Students	WBI	.288	[.15, .41]
9	349	Students	Daily fruits/vegetables	.165	[.06, .27]
10	113	Community	WBI	.307	[.11, .48]
11	120	Community	WBI	.232	[.01, .40]
12	290	Students	WBI	.265	[.16, .37]
13	139	Community	WBI	.314	[.16, .46]
14	403	Community	WBI	.184	[.09, .27]
15	105	Community	WBI	.304	[.12, .47]
	3,252		Meta-analysis results	.251 (15)	[.22, .29]
			$Q(14)$	14.96	
			I^2	6.44%	

Note. WBI = Wellness Behaviors Inventory.

Sample 1. Meta-analyses revealed small but significant mean indirect effects for both positive and negative affect, independently, as well as in combination. The individual a and b paths for each affect variable also suggested these weak effects were largely due to weaker paths between affect and health behaviors (path b), rather than the paths between self-compassion and affect (path a). The tests of heterogeneity of the indirect effects revealed the least variance for negative affect, and the most variance for the indirect effects of positive affect. Because the amount of variance for the positive affect indirect effects was in the moderate to high range, we conducted a moderator analysis on the indirect effect of self-compassion through positive affect focusing on the stronger a path to probe the source of this variance. The test of the moderation of this a path by sex, age, education level,¹ and health status was conducted using the Hayes macro PROCESS (Hayes, 2013), and the indices of moderated mediation resulting from the analysis of each sample were then meta-analyzed.² The index of moderated mediation is an effect modification index that incorporates the moderator's effect on the $X \rightarrow M(\text{action})$ path (i.e., the interaction coefficient) and the $M \rightarrow Y$ path (theory path) coefficients as a

¹ Because there was no variance in the education level for the student samples, only the four community samples were included in the moderated mediation analyses for education level.

² Although testing the moderation of the indirect effects using this approach may be viewed as less desirable than using individual patient data (IPD), modeling the effects with an IPD meta-analysis requires taking a multilevel modeling approach with the patients/participants as the Level 1 variable and the studies as the Level 2 variable. However, a minimum of 20 groups is recommended for Level 2 variables to conduct even a simple moderation using multilevel modeling techniques, making this approach not viable for a test of moderated meditation with the eight studies (or fewer) we tested (Heck & Thomas, 2000; Hox, 2002).

Table 4
Correlations of Self-Compassion and Health Behaviors With Positive and Negative Affect for Eight Independent Samples

	Sample 1 (N = 145)	Sample 2 (N = 93)	Sample 3 (N = 395)	Sample 4 (N = 139)	Sample 9 (N = 349)	Sample 11 (N = 120)	Sample 12 (N = 290)	Sample 15 (N = 105)
Self-compassion								
Positive affect	.33**	.43**	.44**	.60**	.48**	.16	.32**	.51**
Negative affect	-.38**	-.42**	-.49**	-.54**	-.45**	-.24**	-.41**	-.62**
Health behaviors								
Positive affect	.05	.32**	.34**	.47**	.21**	.30**	.19**	.41**
Negative affect	-.21*	-.42**	-.19**	-.44**	-.10	-.36**	-.29**	-.27**

* $p < .05$. ** $p < .01$.

product (Hayes, 2013). It can therefore be thought of as the amount the indirect effect will change given a unit change in the moderator value (Hayes, 2013). None of the individual moderated mediation analyses were significant for any of the four moderators, and the meta-analyses of the moderated mediation indices (MMI) for each of the four moderator were also not significant, sex MMI = 0.003, [-.020, 0.027]; age MMI = -.000, [-.002, 0.001]; education level MMI = -.005, [-.030, 0.019]; health status MMI = -.000, [-.032, 0.031]. However, it is possible for the interaction coefficient for the action path to be significant even when the index of moderated mediation is nonsignificant, and especially when the theory path is weakly related to the outcome. Accordingly, we tested whether the interaction effects for the action paths alone were significant. All tests were nonsignificant; sex $b = -.050$, $SE = .034$; age $b = -.003$, $SE = .003$; education level $b = -.050$, $SE = .123$; health status $b = -.025$, $SE = .028$; $ps > .05$.

Discussion

Across 15 student and community samples, individuals high in self-compassion reported more frequent practice of health-promoting behaviors, and the meta-analysis of these effects revealed low variability across these associations. In addition, a test of the indirect effects for eight of these samples indicated that the

relationship between self-compassion and health behaviors was explained, in part, by the combination of high levels of positive affect and low levels of negative affect.

Our findings build on and extend emerging theory and research on self-compassion and health in several important ways. This is the first study that we are aware of to demonstrate that self-compassion is associated with a set of health behaviors known to promote health and reduce risk for disease, and to replicate and meta-analyze this finding across multiple samples. Previous work has focused on reducing single health-risk behaviors such as overeating (Adams & Leary, 2007; Webb & Forman, 2013), and smoking (Kelly et al., 2010), or on intentions to engage in health behaviors rather than the behaviors themselves (Magnus et al., 2010; Terry et al., 2013). In the current study we assessed, via the Wellness Behaviors Inventory (WBI), four broad types of health behaviors—healthy eating, physical activity, sleep behavior, and stress management—each of which has been identified as key for health promotion. In addition, the associations of self-compassion with the other two measures of health behaviors—student eating and sleep habits, and daily fruit and vegetable consumption—did not significantly differ from those obtained with the WBI, providing further support for the idea that self-compassionate people are more likely to practice health-promoting behaviors in general.

Table 5
Meta-Analyzed Indirect Effects From a Multiple Mediation Model of Self-Compassion on Positive Health Behaviors Through Positive and Negative Affect After Controlling for the Effects of Each Across Eight Samples (Total N = 1,635)

Sample	N	Positive affect				Negative affect				Total indirect effects	95% CI	R ² Total model
		a path	b path	Indirect effects	95% CI	a path	b path	Indirect effects	95% CI			
1	145	0.329	-0.034	-.011	[-.08, .05]	-0.380	-0.106	.040	[-.01, 11]	.029	[-.07, 13]	.11**
2	93	0.412	0.204	.083	[.01, 19]	-0.430	-0.333	.142	[.04, 26]	.225	[.08, 36]	.25**
3	395	0.438	0.283	.124	[.08, 17]	-0.494	-0.095	.045	[-.01, 10]	.171	[.10, 25]	.13**
4	139	0.597	0.310	.185	[.08, 31]	-0.520	-0.214	.112	[.03, 21]	.297	[.17, 46]	.30**
9	349	0.477	0.161	.077	[.02, 14]	-0.448	-0.006	.00	[-.05, 05]	.080	[.01, 16]	.05**
11	120	0.143	0.289	.052	[.00, 14]	-0.237	-0.370	.082	[.02, 15]	.133	[.04, 24]	.25**
12	290	0.317	0.150	.047	[.01, 09]	-0.402	-0.236	.095	[.04, 16]	.142	[.08, 22]	.13**
15	105	0.510	0.340	.174	[.06, 30]	-0.618	-0.138	.085	[-.06, 26]	.259	[.08, 45]	.19**
Average indirect effects (SE)				.078 (0.02)	[.04, 12]			.064 (0.02)	[.03, 10]	.146 (0.03)	[.09, 20]	
Q statistic (p)				20.93 (0.004)				10.63 (0.16)		14.62 (0.04)		
F ² (%)				69.01%				38.13%		53.73%		

Note. Standardized effects. a path = individual self-compassion to affect path for each affect variable; b path = individual affect to health behaviors path for each affect variable.

* $p < .05$. ** $p < .01$.

Our study also offers new insights into the processes that may explain why self-compassion promotes engagement in positive health behaviors. Terry and Leary (2011) posited that self-compassion is linked to the practice of health behaviors through its impact on self-regulation in general. However, our findings provide preliminary evidence that the experience of positive and negative affect, in particular, may be an important route through which self-compassion has behavioral benefits for health. Although there were some inconsistencies in the effects for the individual sample multiple mediation analyses, the overall meta-analyzed indirect effect sizes were small (Cohen, 1988), but significant, for both positive and negative affect, with the indirect effects for positive affect showing the most variability. More consistent were the findings for the combined indirect effects of positive and negative affect. This pattern of effects suggests that self-compassion may facilitate the experience of healthy emotions in the context of health behavior change by tempering the potential negative responses to minor setbacks and failures encountered, and by encouraging the positive emotions necessary to maintain motivation during the pursuit of health goals. Further research, of a prospective nature, is needed to clarify these interrelationships, as both positive and negative affect appear to play synergistic and dynamic roles in self-regulation (Baumeister et al., 2007).

Although limited by the cross-sectional nature of the data, our findings suggest that self-compassion is a potentially important quality to cultivate to facilitate the practice of health-promoting behaviors. It is important to note that previous research suggests that enhancement of self-compassion is possible (e.g., Neff & Germer, 2013), and that self-compassion interventions can have beneficial effects for reducing health risk behaviors such as smoking (Kelly et al., 2010) and overeating (Adams & Leary, 2007). The relative ease of administering self-compassion interventions makes them a potentially useful tool for promoting health behavior change. Therapeutic encouragement of self-compassion may be accomplished utilizing an array of strategies, including evoking self-compassionate imagery, writing a compassionate-self letter, loving-kindness meditation, and affectionate breathing (Adams & Leary, 2007; Neff & Germer, 2013). Delivery mechanisms for these approaches include group workshops or training sessions and individual therapy, as well as self-initiated exercises.

Such interventions may be especially valuable for clinical and at-risk populations for whom making health behavior changes is critical. In particular, our novel findings suggest that promotion of adaptive health-promoting behaviors is a potential outcome of self-compassion, as opposed to only reducing health-risk behaviors. For example, in individuals with modifiable disease trajectories such as diabetes, cardiovascular heart disease, and hypertension, engendering self-compassion may result in engagement in exercise behaviors and healthy eating, and may improve sleep hygiene—all of which can contribute to better functioning and prognosis (Buxton & Marcelli, 2010; Lee et al., 2012; Schulze & Hu, 2002). Finally, by capitalizing on the tendency for self-compassionate individuals to focus on goals that are of personal benefit to their well-being, and their enhanced ability to disengage with unhealthy or unattainable goals and reengage with more adaptive health-related goal pursuits (Neely, Schallert, Mohammed, Roberts, & Chen, 2009), clinicians and health-service providers who promote self-compassion may be able to effect positive behavioral change in those under their care.

What is unknown, however, is the amount of change in self-compassion that may be necessary to affect health behaviors beneficially. Previous research focused on amelioration of harmful health behaviors, rather than promotion of adaptive health behaviors, suggests that only minimal change in self-compassion is necessary; for instance, only small improvements in the self-compassion components of isolation ($\Delta = .28$; effect size = .26) and self-kindness ($\Delta = .08$; effect size = .10) were needed to reduce alcohol misuse (Brooks, Kay-Lambkin, Bowman, & Childs, 2012), and, in a separate study, small changes in self-compassion were related to reduced cigarette smoking (effect size = .19; Kelly et al., 2010). Although future prospective research is needed, it is likely that interventions yielding similar effects would contribute to the promotion of adaptive health behaviors.

Despite the promise of these findings for research and practice, they should be considered in light of certain limitations. The cross-sectional nature of the data in each of the samples precludes any strong causal conclusions about the nature of the association between self-compassion and health behaviors. Nonetheless, the proposition that self-compassion may facilitate the practice of health-promoting behaviors is consistent with current theory on trait self-compassion (Terry & Leary, 2011), and previous experimental and intervention work focused on health risk behaviors. For example, in one study, a self-compassion induction had beneficial effects on unrestrained eating among highly restrictive eaters after a disinhibition prime (Adams & Leary, 2007). There may also be other causal factors that link self-compassion to health behaviors aside from positive and negative affect that have yet to be explored. Although future longitudinal and experimental work focusing on health-promoting behaviors is needed to bring clarity to these issues, our findings provide solid preliminary evidence to guide future research in this area.

Like many investigations of health behaviors, the current study relied upon self-report measures, which may introduce reporting biases. However, replication with different samples and measures is one known way to address potential reporting bias; further, across samples, there was some variety in the type and quality of measures utilized, and in the methodology of data collection. Notably, the quality of the health behavior measures varied. For example, the single item measure in Sample 9 was of less quality than the 10-item WBI. The use of this measure in this sample likely underestimated the size of the effect between self-compassion and health behaviors, and the indirect effects through positive and negative affect. In this regard, our meta-analytic approach also helped to diminish this concern by demonstrating a reliable and consistent link between self-compassion and a variety of health-promoting behaviors. As well, meta-analyzing the indirect effects of positive and negative affect across eight samples is a novel approach that increases the likelihood of replicating these findings. Nonetheless, there was significant heterogeneity among the indirect effects. The moderator analysis conducted for positive affect indicated that this heterogeneity was not explained by the demographic factors tested, suggesting other sources of variability for future research to examine. Replication with other samples, such as chronic illness samples, would further address this issue.

Overall, our findings provide compelling evidence that self-compassion may be an important quality to cultivate for the promotion of positive health behaviors, due in part to the healthy

emotions associated with being self-compassionate. With further longitudinal research, including research on interventions, self-compassion may prove to be as valuable an addition to the repertoire of tools available for facilitating health behavior change as other positive views of the self, such as the reflective valuing involved in self-affirmation (Armitage, Harris, & Arden, 2011; Harris & Epton, 2009). Similarly, in the context of health functioning and engagement in health-promoting behaviors, taking a kind, accepting, and noncritical view of the self may prove to be an effective and relatively simple way to improve engagement in, and the success of, important health behavior changes.

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