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Dispositional mindfulness in people with HIV: Associations with psychological and physical health

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ABSTRACT

We used a stress and coping model to examine the association of dispositional mindfulness, defined as the tendency to intentionally bring non-judgmental attention and awareness to one's experience in the present moment, with psychological and physical health in adults with HIV. Data were collected at baseline of a randomized controlled trial of Mindfulness-Based Stress Reduction (MBSR). Four facets of mindfulness (*acting with attention/awareness*, *non-judging of inner experience*, *observing*, and *describing*) were examined as correlates of appraisal, positive and negative affect, coping, and indicators of psychological well-being and physical health. We found that mindfulness was inversely related to depression, stress appraisal, and negative affect, and positively related to positive affect. Mindfulness was also inversely related to escape/avoidance and self-blame forms of coping. Mediational analyses indicate that perceived stress and negative affect were the most consistent mediators of the association of mindfulness and psychological well-being. The findings from this paper contribute to a growing understanding of the potential adaptive role of mindfulness in people living with the stress of serious illness.

1. Introduction

Mindfulness is defined as both the practice of mindfulness meditation and as a dispositional tendency to intentionally focus on the present, being non-judgmentally aware of moment-to-moment experience without being overly absorbed by emotional reactions or thoughts about the situation (Kabat-Zinn, 1990). Advances in western psychological theory and measurement of dispositional mindfulness (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) suggest a construct that consists of multiple components or facets including *observing* (noticing sensations, emotions and cognitions); *describing* (being able to label these experiences either verbally or mentally); *attention/awareness* (focusing on one's current experience rather than acting automatically); *non-judging* (being aware of, but not evaluating one's emotions and cognitions); and *nonreactivity to inner experiences* (experiencing thoughts, feelings, and sensations without getting caught up in them). Research has shown that dispositional mindfulness, assessed either as a whole or as particular subcomponents, is related to better mental health and is responsive to intervention. However, less is known about potential psychological pathways through which dispositional mindfulness may influence mental and physical health. This knowledge of psychological mechanisms through which mindfulness may exert an effect on health can contribute to more effective, targeted mindfulness programs. This study uses Lazarus and Folkman's (1984) stress and coping theory as a framework to guide examination of pathways through which dispositional mindfulness is related to psychological and physical health for people living with the stress of a serious illness: HIV.

1.1. Mindfulness and psychological well-being

In general, mindfulness is associated with less depression and anxiety (Brown & Ryan, 2003; Shapiro, Brown, & Biegel, 2007) and higher levels of life satisfaction (Christopher & Gilbert, 2010). Analyses looking specifically at facets of mindfulness are generally consistent with this finding (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010; Christopher & Gilbert, 2010; Jimenez, Niles, & Park, 2010), although the *observing* facet tends to be either unrelated (Christopher & Gilbert, 2010) or weakly related (Bränström et al., 2010) to depression. When all the facets are entered into a single model predicting depression, *non-judging* appears to predict the majority of the variance, and in multivariate models predicting satisfaction with life, *observing* accounts for the largest proportion of the variance (Christopher & Gilbert, 2010). Tests of the effect of mindfulness interventions, such as Mindfulness-Based Stress Reduction (MBSR), demonstrate improvements in psychological well-being compared to control conditions (e.g., Williams, Kolar, Reger, & Pearson, 2001) and there is evidence that this association is mediated by increases in mindfulness (Bränström et al., 2010; Nyklicek & Kuijpers, 2008).

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1.2. Mindfulness and physical health

Mindfulness also tends to be associated with better physical health, both in terms of self-reported health (Grossman, Niemann, Schmidt, & Walach, 2004) and in terms of more objective indicators such as immune response to vaccination (Davidson et al., 2003), although there are exceptions. Dispositional mindfulness was not associated with severity of disease among people with cardiac disease (Salmoirago-Blotcher, Crawford, Carmody, Rosenthal, & Ockene, 2011). The facets of mindfulness are also associated with better physical health, with the possible exception of the *observing* subfacet (Bränström, Duncan, & Moskowitz, 2011). Mindfulness interventions, such as MBSR, have also demonstrated beneficial health effects, including reduced symptoms in cancer (Carlson, Speca, Patel, & Goodey, 2003; Williams et al., 2001) and lower systolic blood pressure (Barnes, Davis, Murzynowski, & Treiber, 2004). However, these studies generally failed to determine whether the changes in the wake of MBSR are due to increases in mindfulness.

1.3. Mindfulness and HIV

The literature on mindfulness and HIV is consistent with the literature on mindfulness and physical health more generally; most studies examine changes in health in response to a mindfulness intervention. In a randomized, waitlist controlled trial of MBSR with people living with HIV and taking antiretroviral therapy, Duncan et al. (2012) found MBSR was associated with fewer side effects from HIV medication (and less distress associated with those side effects) compared to the control. However, mindfulness did not appear to mediate the effect of the intervention on medication side effects. Cresswell, Myers, Cole, and Irwin (2009) demonstrated in a randomized controlled trial that people living with HIV who participated in MBSR had a mean increase of 20 CD4 cells compared to a mean decrease of 185 in the control condition. The authors did not assess mindfulness however, so it isn't clear whether the differences in CD4 change between groups were due to changes in mindfulness. SeyedAlinaghi et al. (2012) conducted a randomized trial of MBSR compared to an education control condition in people with HIV. Among participants who completed at least 75% of the sessions, participants in the MBSR group showed improvements in physical and psychological symptoms relative to an education control condition. The authors did not measure mindfulness so improvements in the MBSR group cannot necessarily be attributed to increased mindfulness.

In terms of psychological well-being in people with HIV, Gayner et al. (2012) found the participants randomized to MBSR had significantly lower levels of negative affect and depression and significantly higher levels of positive affect over a 6-month follow-up compared to participants in a usual care control condition. Increases in mindfulness appeared to mediate some of the effects. The MBSR study by Duncan et al. (2012) mentioned above, did not find differences between the MBSR and control conditions on perceived stress, depression, or negative affect.

1.4. Stress and coping theory

Stress and coping theory (Lazarus & Folkman, 1984) provides a useful organizing framework for testing hypotheses regarding the associations of mindfulness with psychological and physical health and highlights three key dimensions of the stress process: appraisal, coping, and emotion. *Appraisal* is an interpretation of the significance of an event for an individual's well-being. Individuals who are more mindful appear to be less likely to appraise a situation as stressful (Epel, Daubenmier, Moskowitz, Folkman, & Blackburn, 2009). Appraisals of a situation as stressful prompt *coping*, the thoughts and behaviors that are used to manage distress and the problem underlying the distress. Coping can take a number of forms ranging from behaviors aimed at addressing the source of the stress directly to cognitive strategies that aim to reduce the unpleasant feelings associated with the event.

Emotion pervades the stress and coping process. Threat appraisals, for example, generate negative emotions such as anger or fear, and challenge appraisals generate positive emotions such as eagerness and excitement (Folkman, 1985). The process continues as an encounter unfolds, coping efforts are made, and emotion changes with shifts in the person's evaluation of how things are. Over the last decade or so, there has been growing interest in the role of positive emotion in the stress process. A number of studies show that even in the midst of intensely stressful life experiences, people can experience positive emotion along with negative (Folkman, 1997; Westbrook & Viney, 1982). These positive emotions tend to be associated with positive reappraisals and coping processes that draw on underlying meaning (Folkman & Moskowitz, 2000; Moskowitz, Folkman, Collette, & Vittinghoff, 1996).

Stress and coping Theory suggests several pathways through which mindfulness may affect the response to stress. For example, mindfulness can allow the person to appraise the situation without the interference of intense emotion. Findings by Bränström et al. (2011) are suggestive of this pathway. Their research found that the *describing*, *attention/awareness*, *non-judging*, and *nonreactivity* components were all inversely associated with perceived stress (Cohen & Williamson, 1988), a measure of the individual's current appraisals of life stress.

With respect to coping, the non-judgmental properties of mindfulness should help the person avoid coping that involves self-blame, a maladaptive form of coping associated with rumination and depression (Folkman & Moskowitz, 2004; Moskowitz, Hult, Bussolari, & Acree, 2009). A study of mindfulness and rumination by Borders, Earleywine, and Jajodia (2010) found evidence in support of this idea. Further, mindfulness appears to facilitate adaptive forms of coping such as positive reappraisal (Garland, Gaylord, & Fredrickson, 2011).

In the present paper, we used a stress and coping model to frame our analysis of the cross-sectional association of dispositional mindfulness with appraisal, positive and negative affect, coping, and health in 175 adults with HIV. Specifically we address the following three questions:

1) What is the association of mindfulness with psychological health (depression) and physical health (CD4 and viral load) in a sample of people with early-stage HIV? Based on previous studies of mindfulness in samples living with HIV or other serious illness we hypothesize that higher levels of mindfulness will be associated with better physical and psychological well-being.
2) Are four specific facets of mindfulness (*observing*, *describing*, *attention/awareness*, *non-judging*) each correlated with psychological and physical health? There are no previous studies that assess the correlations of subfacets of mindfulness in a sample living with HIV, but based on samples of people living with cancer (e.g., Bränström et al., 2010; Bränström et al., 2011), we hypothesize that *describing*, *attention/awareness*, and *non-judging* will be positively correlated with better psychological and physical health.
3) Do aspects of the stress and coping model (appraisal, emotion, and coping) account for the associations of mindfulness with psychological and physical health? Given the theoretical and empirical links of mindfulness with appraisal, emotion, and coping, we hypothesize that stress appraisals, in particular, will mediate the effects of mindfulness on psychological and physical health. Furthermore, we hypothesize that those higher in mindfulness will report greater use of positive reappraisal and less use of self-blame forms of coping.

2. Methods

The data for the present study come from the full baseline sample enrolled in a randomized clinical trial of MBSR for people with early HIV, collected prior to delivery of the intervention. One hundred seventy-five participants who provided data on mindfulness at baseline comprise the sample included here. To be included in the study,

participants had to be HIV+, older than 18 years of age and English-speaking, and have a CD4 T-lymphocyte count >250 cells/μl, and an HIV-1 RNA >100 copies/μl. Exclusion criteria included having previous training in MBSR, having used anti-retroviral therapy (ART) in the past 120 days or having a plan to start ART in the next year.

The average age of the sample was 40.8 years and 97% percent were male. Median income was between $40,000 and $50,000 per year and 63% of the participants had a college degree. Sixty-two percent were White, 16% Latino, 8% African American, and 7% multi-racial. Ninety-six percent identified as gay or bisexual. Mean time since HIV diagnosis was 4.7 years, with a range from 3 weeks to 20 years.

2.1. Procedures

All procedures were approved by the UCSF Committee on Human Research and all participants provided written informed consent. At the baseline visit, prior to randomization into intervention (MBSR) or control groups, participants completed questionnaires using an Audio Computer Assisted Self-Interview (A-CASI). Blood draws for baseline HIV disease status measures were performed at this time. These measures included CD4 T-lymphocyte count and percent, and HIV RNA levels.

2.2. Measures

2.2.1. Mindfulness

We assessed four of the five subscales of the Five Factor Mindfulness Questionnaire (Baer et al., 2006) using an abbreviated version of the measure that included 4 facets: *observing*, *describing*, *attention/awareness*, and *non-judging*. At the time the study began, the five facet measure (Baer et al., 2006) had not yet been developed. We examined the four subscales individually and as part of an overall mindfulness construct. Means of the Likert item values for the items in each subscale were calculated, and an overall mean was calculated to create a mindfulness score. Overall mindfulness as well as each of the subfacets showed acceptable internal consistency (see Table 1).

Stress appraisal was measured with the Perceived Stress Scale (Cohen & Williamson, 1988) and the Hassles and Uplifts Scale (Gruen, Folkman, & Lazarus, 1988). The Perceived Stress Scale, designed to measure subjective perceptions of stress (Cohen, Kamarck, & Mermelstein, 1983), is now the most widely used self-report measure of stress appraisal. We used the 10 item version of the scale in which participants respond how often (1 = never to 5 = very often) during the past month they experienced thoughts and feelings such as "felt that you were unable to control the important things in your life," "been unable to control irritations in your life."

Hassles and Uplifts were assessed with a shortened (24 item) version of the Hassles and Uplifts Scale (Gruen et al., 1988). Hassles are defined as "irritants — things that annoy or bother you" and uplifts are "events that make you feel good." Hassles and Uplifts were assessed separately. Participants were presented with the same list of 24 events twice in separate parts of the baseline interview. For each event on the scale, the participant was asked to indicate whether that item had been a hassle or an uplift in the past week. Endorsement of an item as a hassle indicates that it was appraised as a stressor, endorsement as an uplift indicates that it was appraised as beneficial, and therefore not stressful. The scale was scored by summing separate hassle and uplift scores. The overall hassles score is interpreted as the level of minor stressful experiences over the past week.

Emotion was assessed with the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS was designed to assess high activation positive affect (interested, excited, enthusiastic) and high activation negative affect (upset, irritable, ashamed). The final scale consists of 20 items. Respondents are asked to indicate how strongly they felt each emotion during the past week on a scale from 0 = not at all to 4 = extremely. Internal consistencies for positive affect and negative affect were high (see Table 1).

Table 1
Means, standard deviations, internal consistency, and correlations among mindfulness, appraisal, emotion, and coping variables.

Variables	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Mindfulness	3.28 (0.54)	0.86	−0.75***	0.72***	0.59***	0.75***	−0.58***	−0.32***	0.14	0.34***	−0.47***	−0.05	−0.03	−0.08	0.00	−0.21**	−0.35***	0.15*	−0.02
2. Describing	3.49 (0.81)		0.87	0.34***	0.35***	0.39***	−0.32***	−0.19*	0.06	0.18*	−0.22**	−0.008	−0.02	−0.05	0.03	−0.05	−0.22**	0.17*	−0.03
3. Non-judging	3.06 (0.84)			0.87	0.12	0.51***	−0.57***	−0.3***	0.02	0.29***	−0.43***	−0.02	−0.06	−0.11	−0.09	−0.29***	−0.31***	0.01	−0.03
4. Observing	3.35 (0.70)				0.74	0.24**	−0.19*	−0.07	0.21**	0.21***	−0.22**	−0.002	0.03	−0.01	0.08	0.01	−0.13	0.18*	0.06
5. Attention/awareness	3.20 (0.70)					0.92	−0.55***	−0.33***	0.14	0.28***	−0.***	−0.13	−0.03	−0.03	−0.0004	−0.25**	−0.33***	0.07	−0.05
6. Perceived stress	18.9 (6.74)						0.90	0.54***	−0.25**	−0.43***	0.70***	−0.09	0.02	0.00	−0.03	0.20**	0.43***	−0.19*	0.02
7. Hassles	0.99 (0.55)							0.87	−0.04	−0.21**	0.58***	0.13	0.14	0.21**	0.12	0.24**	0.39***	0.09	0.17*
8. Uplifts	1.27 (0.57)								0.85	0.51***	−0.20**	0.07	0.11	0.23**	0.26***	0.22**	−0.02	0.42***	0.37***
9. Positive affect	19.21 (7.14)									0.91	−0.36***	0.07	0	0.1	0.28***	−0.03	−0.21**	0.40***	0.26***
10. Negative affect	12.34 (7.85)										0.92	−0.04	0.02	0.14	0.03	0.29***	0.41***	−0.1	−0.–
11. Confrontive	1.13 (0.66)											0.62	0.09	0.07	0.38***	0.22**	0.25***	0.36***	0.26***
12. Distancing	0.71 (0.62)												0.73	0.44***	0.01	0.25***	0.19*	0.07	0.22**
13. Self-controlling	1.07 (0.62)													0.59	0.25***	0.39***	0.35***	0.35***	0.23**
14. Seeking support	1.15 (0.75)														0.81	0.35***	0.29***	0.47***	0.35***
15. Accepting responsibility	0.90 (0.72)															0.59	0.61***	0.40***	0.44***
16. Escape/avoidance	0.85 (0.70)																0.73	0.14	0.27***
17. Planning	1.23 (0.72)																	0.75	0.41***
18. Positive reappraisal	0.52 (0.62)																		0.65

Cronbach's alpha reliability for each scale is on the diagonal.
* p < .05.
** p < .01.
*** p < .001.

Table 2
Correlations of mindfulness, appraisal, coping, and emotion variables with psychological and physical health outcomes.

Variables	BDI	CD4	LogVL
Mean (SD)	8.90 (7.15)	507.28 (184.16)	4.15 (0.70)
1. Mindfulness	−0.38***	0.02	−0.11
2. Describing	−0.15	−0.07	−0.03
3. Non-judging	−0.43***	0.14	−0.07
4. Observing	−0.14	−0.07	−0.03
5. Attention/awareness	−0.34***	0.03	−0.18*
6. Perceived stress	0.63***	−0.1	0.03
7. Hassles	0.62***	−0.06	0.03
8. Uplifts	−0.24**	0.004	0.05
9. Positive affect	−0.52***	0.03	−0.1
10. Negative affect	0.69***	−0.09	0.07
11. Confrontive	−0.01	0.03	−0.1
12. Distancing	0.006	−0.02	−0.003
13. Self-controlling	0.13	0.06	0.07
14. Seeking support	−0.03	0.01	−0.07
15. Accepting responsibility	0.27***	0.04	0.03
16. Escape/avoidance	0.42***	−0.09	0.03
17. Planning	−0.11	0.03	−0.03
18. Positive reappraisal	−0.04	−0.05	0.03

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Coping was assessed with the short Ways of Coping (Folkman, Lazarus, Pimley, & Novacek, 1987) which consists of 31 items that factor into 8 subscales: Confrontive coping, Distancing, Self-controlling, Self Blame, Escape-Avoidance, Planful Problem-Solving, Positive Reappraisal, and Seeking Social Support. Participants were asked to report a recent difficulty they experienced with another person then to indicate the extent to which each of the items described what they did in response to this interpersonal difficulty. Responses ranged from 0 = "not used" to 3 = "used a great deal". Some of the internal reliabilities fall below conventional standards for acceptable reliability (See Table 1). However, as noted by Folkman (personal communication), the low reliability has to do with the nature of coping; if one response on a scale is effective, there is no need to attempt others. Thus, in response to a particular situation, only one of several coping responses is used and if effective, the other responses won't be endorsed.

Depression was assessed using *Beck Depression Inventory* (Beck, 1973). The BDI consists of 21 items that are rated on a 4-point scale according to how severely they are experienced Although there is overlap between the BDI and emotion measures (in this sample $r = .69$ for BDI and PANAS negative affect; $r = -.52$ for BDI and PANAS negative affect), they are not the same construct.

HIV disease status was assessed directly with CD4 T cell counts and viral load (log transformed).

2.3. Analysis

Associations of mindfulness with physical and psychological health and with variables from the stress and coping model were tested using correlations. We tested for mediation by bootstrapping the product of the coefficients in the mediating pathway, as recommended by Shrout and Bolger (2002) and implemented in Mplus, version 5 (Muthén & Muthén, 2007). Following Baron and Kenny (1986) when the product of the coefficients was significant (i.e., when the asymmetrical confidence interval did not include 0), we characterize the result as partial mediation. If additionally the direct path changes from significant to nonsignificant (indistinguishable from 0), we characterize the result as complete mediation.

3. Results

Means, standard deviations, internal consistency (Cronbach's alpha) and correlations among mindfulness and hypothesized mediator variables are in Table 1. Correlations with depression and physical health indictors are in Table 2. The total mindfulness score was inversely related to depression. Examination of the mindfulness facets indicated that *non-judging* and *attention/awareness* were significantly correlated with lower depression while *describing* and *observing* were not. Physical health indicators of CD4 and viral load were not significantly associated with total mindfulness or any of the subfacets, with one exception: *Attention/awareness* was weakly, but significantly, correlated with lower log viral load.

In terms of the stress and coping variables of appraisal, coping, and emotion, overall mindfulness was significantly correlated with lower perceived stress, fewer hassles, less negative affect, and more positive affect. Correlations of the mindfulness facets with these stress and coping variables generally followed the same pattern. There were fewer significant correlations with coping. Greater mindfulness was associated with less escape-avoidance and self-blame forms of coping.

To address whether the association of mindfulness with well-being may be attributable to appraisal, emotion, or coping, we conducted a series of mediational analyses, systematically controlling for each potential mediator — perceived stress, hassles, and uplifts as appraisal, self blame, escape avoidance, and planning, as coping, and the PANAS positive and negative scales for emotion. Results are in Table 3. The inverse association of overall mindfulness with depression was completely mediated by lower levels of perceived stress, and negative affect. There was evidence of partial mediation by hassles, self blame, and positive affect such that mindfulness was associated with fewer hassles, less self blame, and more positive affect which, in turn, were each associated with lower levels of depression.

The pattern of associations of the mindfulness facets with potential mediators was largely the same as for overall mindfulness (Table 4). Perceived stress completely mediated the associations of all four facets with depression. Negative affect completely mediated the associations of the *describe*, *observe*, and *awareness* facets with depression.

4. Discussion

Diagnosis with HIV brings with it a host of potentially stressful experiences including physical health concerns, the need to interact with a complex healthcare system, stigma, and the challenge to come to terms with a new identity as someone living with HIV (Baumgartner,

Table 3
Results of meditational analyses predicting BDI from total mindfulness scores.

Variable	Mindfulness → mediator	Mediator → BDI	Mindfulness (with mediator) → BDI	Mindfulness → mediator → BDI (indirect effect)
Mindfulness	–	–	−.38 (p < .001)	–
Perceived stress	−.581 (p < .001)	.661 (p < .001)	.004 (p = .962)	−.384 (p < .001)
Hassles	−.319 (p < .001)	.553 (p < .001)	−.204 (p = .003)	−.176 (p < .001)
Uplifts	.141 (p = .110)	−.212 (.001)	−.350 (p < .001)	−.030 (p = .158)
Positive affect	.338 (p < .001)	−.443 (p < .001)	−.230 (p = .001)	−.150 (p < .001)
Negative affect	−.465 (p < .001)	.655 (p < .001)	−.075 (p = .228)	−.305 (p < .001)
Accepting responsibility	−.210 (p = .001)	.200 (p = .002)	−.338 (p < .001)	−.042 (p = .034)
Escape/avoidance	−.354 (p < .001)	.337 (p < .001)	−.261 (p = .001)	−.119 (p < .001)
Planning	.154 (p = .044)	−.074 (p = ,262)	−.369 (p < .001)	−.011 (p = .353)

Table 4
Results of meditational analyses predicting BDI from mindfulness subfacet scores.

Variable	Mindfulness → mediator	Mediator → BDI	Mindfulness (with mediator) → BDI	Mindfulness → mediator → BDI (indirect effect)
Non-judging			−.43 (p < .001)	
Perceived stress	−.570 (p < .001)	.576 (p < .001)	**−.091 (p = .291)**	−.328 (p < .001)
Hassles	−.301 (p < .001)	.534 (p < .001)	−.272 (p < .001)	−.161 (p < .001)
Uplifts	.009 (p = .916)	−.240 (p < .001)	−.433 (p < .001)	−.002 (p = .916)
Positive affect	.287 (p < .001)	−.437 (p < .001)	−.308 (p < .001)	−.125 (p = .001)
Negative affect	−.426 (p < .001)	.617 (p < .001)	−.170 (p − .014)	−.263 (p < .001)
Accepting responsibility	−.293 (p < .001)	.159 (p = .019)	−.387 (p < .001)	−.047 (p = .056)
Escape/avoidance	−.310 (p < .001)	.321 (p < .001)	−.333 (p < .001)	−.099 (p = .001)
Planning	.005 (p = .938)	−.111 (p < .09)	−.433 (p < .001)	−.001 (p = .948)
Attention/awareness			−.34 (p < .001)	
Perceived stress	−.550 (p < .001)	.647 (p < .001)	**.034 (p = .690)**	−.356 (p < .001)
Hassles	−.324 (p < .001)	.567 (p < .001)	−.153 (p = .044)	−.184 (p < .001)
Uplifts	.133 (p = .133)	−.203 (p = .002)	−.310 (p < .001)	−.027 (p = .176)
Positive affect	.277 (p < .001)	−.467 (p < .001)	−.209 (p = .004)	−.129 (p = .004)
Negative affect	−.444 (p < .001)	.673 (p < .001)	**−.038 (p = .577)**	−.299 (p < .001)
Accepting responsibility	−.246 (p < .001)	.202 (p = .002)	−.289 (p < .001)	−.050 (p = .02)
Escape/avoidance	−.334 (p < .001)	.351 (p < .001)	−.220 (p = .004)	−.117 (p < .001)
Planning	.069 (p = .353)	−.091 (p = .175)	−.331 (p < .001)	−.006 (p = .536)

Values in bold indicate complete mediation.

2007; Moskowitz, Wrubel, Hult, Maurer, & Acree, 2013). To the extent that these are HIV-specific stressors, it is possible that the associations among mindfulness, stress and coping variables, and well-being differ in people living with HIV compared to people coping with other kinds of stress. There is growing interest in mindfulness-based interventions for people living with HIV (Riley & Kalichman, 2014), but less is known about the potential pathways through which these interventions have an effect. The first step in delineating these pathways is to explore associations of mindfulness with hypothesized mediators in samples of people living with HIV. Guided by a stress and coping theoretical framework (Folkman, 1997; Lazarus & Folkman, 1984), the present study demonstrates that higher levels of dispositional mindfulness were significantly associated with lower levels of depression. The three key dimensions of the stress and coping process – appraisal, coping, and emotion – all mediated this association to some extent and suggest a likely mechanism through which mindfulness interventions, such as MBSR, influence psychological health.

We found that mindfulness was associated with lower perceived stress and fewer appraisals of everyday events as hassles. Perceived stress fully mediated the association of mindfulness with depression. This finding is consistent with previous studies that have demonstrated that people who are more mindful report fewer stress appraisals (e.g., Bränström et al., 2011). Our data provide additional information that specific facets of mindfulness, particularly the *non-judging* and *attention/awareness* facets, may be particularly helpful in decreasing the likelihood that an event is going to be appraised as stressful.

Emotion also served as a strong mediator of the associations between mindfulness and depression, consistent with previous research (Brown & Ryan, 2003). The associations of positive emotion with mindfulness are essentially of the same magnitude as the associations of negative emotion and mindfulness but, perhaps not surprisingly, negative emotion plays a stronger meditational role with depression.

Coping also appears to mediate the association of mindfulness with psychological well-being, although these results were not as strong as those for appraisal or emotion. Our data demonstrate that mindfulness was associated with a lower likelihood of engaging in two types of coping that tend to be maladaptive — self blame which includes items such as "criticized or lectured yourself" and escape-avoidance which includes items such as "wished that this situation would go away or somehow be over with." This is consistent with findings in other samples (Borders et al., 2010).

A number of associations that we expected to be significant were not. For example, it is interesting that mindfulness was not associated with positive reappraisal, given the strong associations of mindfulness with more benign appraisals. One might also expect that mindfulness would be associated with less distancing given that mindfulness is characterized by attention and awareness. The correlations of mindfulness and distancing in our sample were essentially zero. Neither overall mindfulness nor any of the facets were associated with distancing, which suggests that distancing may be more of a coping strategy for not dwelling on a stressful experience as opposed to the mindfulness concept of being aware of the experience without becoming overly identified with it.

Although there was some suggestion that the attention/awareness facet was correlated with a lower viral load in this sample, the effect was not strong. This finding is surprising given the significant effect of MBSR on CD4 found by Cresswell et al. (2009). One possible explanation for this discrepancy is that mindfulness is not the pathway through which MBSR exerts effects on CD4. Alternatively, it may be that the lack of a strong association between mindfulness with HIV-1 viral load and CD4+ T-cell count is a function of our reliance on cross-sectional assessment of dispositional mindfulness and the restricted range of physical health in our sample at baseline.

As with most studies, there were some weaknesses in the present study. The primary drawback was that the data were cross-sectional, preventing us from determining causality. Alternative causal directions such as stress appraisals reducing levels of mindfulness cannot be ruled out. Clinical trials of mindfulness interventions will be better suited for providing experimental manipulations of these factors that can lead to more definitive conclusions regarding the direction of effects.

This study demonstrates the importance of examining specific facets of mindfulness in order to determine which are most active at the various stages of the stress and coping process. Overall, this study provides a framework for studying how mindfulness might lead to reduction of stress experienced in daily life. Stress and coping theory defines pathways that are compatible with mindfulness, which should facilitate the testing of hypotheses about cause–effect relationships, including mediating pathways, in prospective studies.

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