Original Article

Evaluating Nonattachment and Decentering as Possible Mediators of the Link Between Mindfulness and Psychological Distress in a Nonclinical College Sample

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Abstract

Although increasing evidence shows that mindfulness is positively related to mental health, the nature and mechanisms of this relationship are not fully understood. Based on previous research findings and suggestions, the authors of the current study hypothesized that decentering and nonattachment are 2 variables that mediate the relationship between mindfulness and psychological distress. A nonclinical, non-treatment-seeking sample of 308 students and employees from a middle-class, primarily Caucasian university filled out mindfulness, decentering, nonattachment, and mental distress measures online. Mediational analyses failed to support the hypothesis. Results suggest that mindfulness and nonattachment are independent predictors of nonclinical psychological distress and fully explain the effect of decentering on psychological distress. Results should be interpreted with caution and not generalized to clinical issues. A more comprehensive look into the mechanisms of mindfulness, especially with rigorous experimental, longitudinal studies, is warranted. The authors stress the importance of checking alternative, equivalent models in mediation studies.

Keywords

mindfulness, mechanisms, nonattachment, decentering, psychological distress

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There is an indelible relationship between mindfulness and mental health, which has been extensively discussed elsewhere in detail.[1-4] Higher levels of mindfulness in a nonclinical population have been linked to lower levels of depression, anxiety, and stress.[5-9] In an experimental pre- and postintervention investigation of a 10-day Buddhist retreat, increase in trait mindfulness led to decreases in subjective depression, anxiety, and distress.[10] These gains were maintained at a 3-month follow-up, independent of responses on a social desirability scale and whether participants practiced daily meditation. However, no control group was used in the study by Ostafin and colleagues.[10] A similar single-group mindfulness-based preventative intervention predicted reduction in depression-related dysfunctional attitudes and anxiety sensitivity in a college sample.[11]

Mechanisms in the Mindfulness–Mental Health Relationships

Little is known, however, about the "why" and "how" of the relationship between mindfulness and mental distress, whether clinical or nonclinical.[12] Various mechanisms and mediating variables have been studied, all of which point to different conclusions. The purpose of the current study is to explore 2 variables—decentering and nonattachment—as mediators in the relationship between mindfulness and nonclinical psychological distress.

Decentering. No other variable has received more attention as a possible mechanism of mindfulness than decentering. Shapiro et al[12] were the first to hypothesize that decentering, or reperceiving as they call it, is an important meta-mechanism that explains the effect of mindfulness on psychological distress. They defined reperceiving as shifting one's perspective to observe life as a third-person observer. Analogous to reperceiving, decentering is defined as the ability to remove oneself from a subjective perspective of life to a more objective one, to look upon life's drama as if a part of the audience, rather than the actor.[13] Shapiro et al[12] suggested that decentering produces positive outcomes of mindfulness by acting on 4 other

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additional mechanisms: (*a*) the ability to remain stable in the face of change and to adapt as needed; (*b*) flexibility in responses, whether emotional, behavioral, or cognitive; (*c*) clarification of values important to the self; and (*d*) direct exposure to a variety of unpleasant emotional states and situations. In a randomized controlled trial of Mindfulness Based Stress Reduction, this model failed to explain mindfulness's effect on improvement in physiological and psychological symptoms.[14] The 4 mechanisms mentioned in Shapiro et al's model[12] are inherently difficult to measure. For example, no satisfactory measure exists that assesses how well a person remembers the values that he or she holds important (clarification of values) or how much exposure a person has had to unpleasant emotional states (direct exposure to unpleasant states) or the ability to remain emotionally stable when faced with problems. Carmody et al[14] also found that mindfulness, as measured by the FFMQ (Five Factor Mindfulness Questionnaire; Baer et al[6]), and decentering, as measured by the EQ (Experiences Questionnaire; Fresco et al[15]), were very highly correlated, so much so as to suggest that they are 2 overlapping constructs instead of 2 distinct, separate phenomena. Most other authors, however, disagree and suggest that mindfulness is a process that facilitates decentering, which in turn leads to beneficial psychological effects.[16-22] Gecht et al[23] even cite statistical evidence through structural equation modeling and factor analysis to stress that mindfulness and decentering are completely different and distinct concepts. The authors of the current study also agree that theoretically and experimentally, mindfulness and decentering are 2 intimately related but separate processes. Perhaps much of the conceptual blurring around these variables occurs due to the fact that they share common roots in Buddhist tradition, and scientific research has only begun to explicate these concepts.

A substantial number of empirical studies tentatively conclude that decentering mediates the effect of mindfulness on mental distress. Brown et al[24] replicated Carmody et al's[14] study, testing Shapiro et al's[12] model again, this time analyzing results with structural equation modeling techniques. They found some evidence for the double mediated pathway (mindfulness → decentering → meta-mechanisms → mental health) suggested by Shapiro et al.[12] However, only 4 of the 5 FFMQ facets showed this relationship, and the fifth facet did not. Single mediated pathways (mindfulness → decentering → mental health) were significant only with anxiety as a measure of mental health, not depression or stress. Brown et al[24] did not evaluate any equivalent models, for example, evaluating mindfulness as mediator between decentering and mental health. In a short, mindfulness-based preventative intervention, trials with a college sample led to increases in decentering, and increases in decentering were linked to decreases in depression and anxiety symptomology.[11] In a randomized controlled trial of Mindfulness Based Cognitive Therapy (MBCT),[25] efficacy of MBCT was compared to maintenance antidepressant medication and placebo with a sample of patients in remission from depression.[26] Participants in the MBCT group showed increases in decentering related to lower risk for relapse.[26]

In a cross-sectional study analyzing mindfulness, decentering, and various measures of psychological and physical health in chronic pain patients, decentering was found to explain about 6% of the variance in depression and psychosocial disability scores.[20] However, the authors did not analyze decentering and mindfulness together as predictors. Gecht et al[23] found in a sample of German university students that decentering completely mediates the effect of mindfulness on depression, and they statistically determined that mindfulness and decentering are 2 distinct variables. However, because the authors did not analyze the fit of other equivalent models, it could just as well be that mindfulness acts as a mediator between decentering and depression.[27,28] Another study using structural equation modeling techniques suggested that decentering fully mediates the effect of cognitive reappraisal and partially mediates the effect of mindfulness on clinical social anxiety.[19]

In a randomized controlled trial comparing a mindfulness intervention, relaxation training, and an inactive waitlist control with a nonclinical adult sample, researchers found decentering to be a significant mediator in the link between mindfulness and psychological well-being.[29] However, they did not find any differences in improvements on depression and anxiety scales between the mindfulness and relaxation training groups—both the mindfulness and relaxation groups showed similar decreases on the anxiety and depression measures. The inactive waitlist control showed no differences on any of the variables, which was expected since they received no intervention, and was thus not used in any mediation analyses. Josefsson et al[29] did not use a manualized or standardized mindfulness intervention, neither did they test alternate models of mediation. They also did not find any evidence of mediation between mindfulness and anxiety-depression by decentering. Another recent cross-sectional study with a large sample of college students found that decentering and purpose in life partially explained the beneficial effects of mindfulness on mental health.[21] Pearson et al[21] found preliminary evidence that suggests decentering is an important common mechanism, which mediates the relationship between mindfulness and 3 measures of mental health (anxiety, depression, and alcohol-related problems). However, they did not test alternate, equivalent models as well, meaning that decentering may be the independent variable instead of the mediator variable. They suggest further investigations to confirm this relationship and explore other possible models.

Nonattachment. A variable that has received scant attention as a mechanism of mindfulness is nonattachment. Nonattachment means to let one's happiness be free of any external influences and to be in control of it.[30] Nonattachment is often confused with detachment, which is a passive stance of uncaring and indifference. Nonattachment, however, refers to being intimately in touch with reality and experiencing all events fully, but with the firm belief and conviction that one's happiness is independent and determined only by the self.[30] Nonattachment promotes feelings of autonomy, security, and empathy, according to some Buddhist writings.[31,32] Conceptually, nonattachment

is closely related to mindfulness and decentering and is similarly derived from Buddhist traditions. Thus, it is no surprise that some researchers have theorized that nonattachment is an important possible link in the relationship between mindfulness and psychological distress[12,33] but empirical research on this hypothesis is limited.[34,35] Researchers hypothesize that being present centered and cultivating an attitude of acceptance and openness may lead a person to be happy despite whatever happens, thus leading to a reduction in distress.[34]

Coffey and Hartman[34] hypothesized that emotional regulation, nonattachment, and rumination together would mediate the effects of mindfulness on nonclinical psychological distress. However, statistical analyses did not support a full mediation model, and hence, it is inconclusive whether these 3 mechanisms (ie, emotional regulation, nonattachment, and rumination) completely explain the salutatory effects of mindfulness on mental health.[34] In another cross-sectional analysis of the Coffey and Hartman[34] model, a path analysis was conducted to parse out the effect of 4 possible mediators in the mechanism of mindfulness: (*a*) ability to manage negative emotions, (*b*) clarity about internal events, (*c*) nonattachment, and (*d*) rumination.[35] The 4 mediators did not completely explain the effect of mindfulness on psychological distress. The authors also found that there was a high degree of overlap between the mindfulness and emotional regulation measures, and used a definition of mindfulness that includes some aspects of emotional regulation, while neglecting to use some subfactors of the mindfulness scale.[35] They suggested replication of their study in future research, and using decentering as an additional possible mechanism.

A methodological reason for why the concept of nonattachment has not been studied empirically is a lack of satisfactory, valid instruments to measure the concept.[36] Coffey and Hartman[34] and Coffey et al[35] used the Linking Inventory,[37] which attempts to measure the extent to which users have delinked their happiness from events and objects in their lives. For example, the Linking Inventory scores favorably answers that indicate the respondent being happy irrespective of whether they have something they dearly desire or not, be it a job, material object, or relationship. As such, people who have not been trained in a paradigm that embraces such values will not perform reliably on this inventory. The Linking Inventory is thus unsuitable for use with a general population.

Sahdra et al[36] recently developed a measure called the Nonattachment Scale (NAS), forming the scale items after consulting various Buddhist scholars and experts and Buddhist texts; they standardized the inventory on a large sample of adults and college students in the West. The resulting items are based in a strong Buddhist framework and are meant for use with the general population. Sahdra et al define nonattachment as a form of psychological flexibility, a noncontingent happiness that leads to one having a subjective sense of well-being that is independent of external circumstances and a nonreactivity that supports greater equanimity in the face of life's obstacles.

A study that investigated nonattachment and mindfulness together and used the NAS[36] found higher levels of nonattachment to be inversely related to suicidal ideation and depression.[38] The authors also found a positive correlation between mindfulness and nonattachment.

The authors of the current study reviewed previous studies and noticed a lack of any systematic investigation studying mindfulness, decentering, and nonattachment together. They hypothesized that decentering and nonattachment may be 2 important mediators that explain the salutatory effects of mindfulness on mental distress measures. All 3 concepts are rooted in Buddhist philosophies, but have not been empirically investigated together. The authors' approach to addressing this gap in literature was more exploratory, and since this area of research is not sufficiently well developed to use a clinical sample with confidence, a nonclinical sample was used. Previous studies exploring mechanisms of mindfulness have also tended to use nonclinical, university samples, not unlike the current investigation. The current study will be the first to examine systematically a mediational model of mindfulness with decentering and nonattachment being the explanatory link in the correlation between trait mindfulness and mental health measures in a large, nonclinical sample.

Method

Participants

The sample consisted of students and employees from a medium-sized comprehensive university in Northeastern Pennsylvania. Demographics are described in Table 1.

Measures

Cognitive and Affective Mindfulness Scale–Revised (CAMS-R). To assess mindfulness, the CAMS-R[8] was used. CAMS-R assesses 4 factors of mindfulness—attention regulation, awareness, nonjudgmental acceptance, and present-focus orientation—but because internal consistency items for subscales are low, Feldman et al[8] recommend using the full scale scores. The scale consists of 12 items, with questions like "I try to notice my thoughts without judging them," "It is easy for me to concentrate on what I am doing," "I can accept things I cannot change." Satisfactory reliability and validity of the CAMS-R has been established. Because of the clinical focus in validating the CAMS-R, it is recommended that it is particularly suitable for use in research investigating mindfulness and psychological distress.[39] Hayes[40] has explicitly stated that the intention while developing the scale was for the scale to be used with mindfulness-based interventions for depression. Many other self-report measures of mindfulness exist, but every instrument is subject to its own shortcomings. For example, some do not have a clear and stable factor structure whereas some measure a capacity to be mindless rather than mindful, which is not quite the same. CAMS-R captures the 4 dimensions of mindfulness stressed by Bishop et al[41] and reflects a capacity and willingness to be mindful rather than a lack of it. It is present focused, concise, succinct, and still covers the broad multifaceted concept of mindfulness, yielding a single score that facilitates easier statistical analyses. Cronbach α of current sample was .83.

Depression, Anxiety, and Stress Scale (DASS-21). To measure depression and anxiety symptoms, the 21-item version of Depression,

Table 1. Demographic Characteristics[a].

	Gender			Age				Education				
	Male	Female	Other	Min	Max	Mean	SD	HS	UG	G	Doc	Total
Employee	10	59	0	23	69	46.4	12.2	5	14	38	12	69
Student	31	205	3	18	69	22.3	7.0	131	86	19	3	239

Abbreviations: SD, standard deviation; HS, high school; UG, undergraduate; G, graduate; Doc, doctoral.
[a]Means, standard deviation, and intercorrelations of all 4 measures are given in Table 2.

Anxiety and Stress Scale (DASS-21)[42,43] was used. Common measures of anxiety and depression often overlap with each other and correlate with each other highly.[42] Many anxiety scales also only address panic symptoms and are limited as measures of general anxiety symptoms.[42] DASS-21 can be reliably separated into 3 subscales assessing mental health symptoms experienced in the past week: Stress (7 items, eg, "I felt I found it difficult to relax"), Depression (7 items, eg, "I felt that life was meaningless"), and Anxiety (7 items, eg, "I felt scared without any good reason"). Cronbach α for the current sample was .90 for the Depression subscale, .84 for the Anxiety subscale, and .84 for the Stress subscale.

Nonattachment Scale. To measure nonattachment, the Nonattachment Scale (NAS)[36] was used. The NAS operationalizes the Buddhist concept of nonattachment in modern psychological terms and was created to reflect how nonattachment may present among a normative American population. Nonattachment is defined as the ability to not have one's happiness "attached" to any external or internal events and having the awareness that happiness is determined by the self.[36] The NAS is a 30-item survey designed to obtain a total score assessing an individual's level of nonattachment. Examples of questions included on the scale are "I find I can be calm and/or happy even if things are not going my way," "I can enjoy my family and friends without feeling I need to hang on to them," and "I am comfortable being an ordinary, less than perfect human being." Cronbach α in the current sample was .93.

Experiences Questionnaire. To measure decentering, the Experiences Questionnaire (EQ)[15] was used. Decentering is defined as the ability to observe one's thoughts and feelings from a third-person perspective and to have an awareness that these thoughts and experiences are temporary and transient rather than permanent reflections of the self.[15] The EQ is a 20-item questionnaire with items like "I can observe unpleasant feelings without being drawn to them." Respondents are asked to rate each statement on a scale from 1 (*never*) to 5 (*all the time*). The scale has 2 subscales—decentering and rumination. The EQ-decentering subscale has 11 items and is scored by summing all scores. Cronbach α for the current sample was .84.

Demographics Questionnaire. A basic demographics questionnaire assessing age, gender, category (student/employee), income level, and highest degree attained was used.

Procedure

Participants filled out a survey packet online and were told that the study investigates how daily behaviors affect stress symptoms; no mention of mindfulness or meditation was made throughout the study, so as to avoid any bias, including social desirability, in responding.

Statistical Analyses

A mediational analysis is used to parse the how part of why an independent variable affects an outcome variable.[17] As discussed earlier, research has established that practicing mindfulness significantly lowers depression, anxiety, and stress. Thus, mindfulness is the independent variable in this case, with depression, anxiety, and stress being 3 outcome variables. According to the hypothesis, nonattachment and decentering are 2 mediator variables that are posited to intervene in the relationship between mindfulness and mental health variables. A simple mediation model is explained in Figure 1.

The causal steps approach[44] and Preacher and Hayes'[45] INDIRECT macro were used to test for mediation. Preacher and Hayes'[45] INDIRECT macro tests the mediational model by using 5000 nonparametric, bootstrapped resamples. Based on the approximate distribution of resamples, 95% confidence intervals for different effects are generated; if zero does not lie within these confidence intervals, it can be concluded that the effect is not zero with 95% confidence. Multiple tests of mediation were carried out, because many authors have criticized the causal steps approach.[17,46,47] Bootstrap resampling method (confidence interval or bias-corrected bootstrapping) is the more modern and recommended method to analyze indirect mediation effects.[17,48,49]

Researchers also caution against not testing other equivalent mediation models.[27,28,50] For example, the current hypothesis in this study is M → D → Dep.* Even if this hypothesis is supported, how can one assume that D → M → Dep or Dep → D → M is also not equally statistically significant? Little et al[28] suggest that the order of equivalent full mediation models (M → D → Dep and Dep → D → M) is determined only by a strong theoretical basis, and nonequivalent full mediation models (M → D → Dep or D → M → Dep) must be statistically tested to rule out possible statistical equivalency. A strong theoretical basis for the order of equivalent full mediation model has been established in the literature review (Mindfulness → Depression/Anxiety/Stress and Decentering/Nonattachment → Depression/Stress/Anxiety). Mediation analyses have thus been carried out on nonequivalent full mediational models (eg, D → M → Dep or NAS → M → Anx or NAS → D → Dep) as well to rule out alternate models. The approach to statistical analyses in the current article, then, can be described as more exploratory.

Results

All correlations obtained were significant at $P < .01$, and in the expected direction. All 6 variables are correlated with each other significantly, thus satisfying the condition for analyzing mediation (see Table 2). It should be noted that the words depression, anxiety, and stress refer to nonclinical manifestations of these variables in the results, not clinical, as the sample

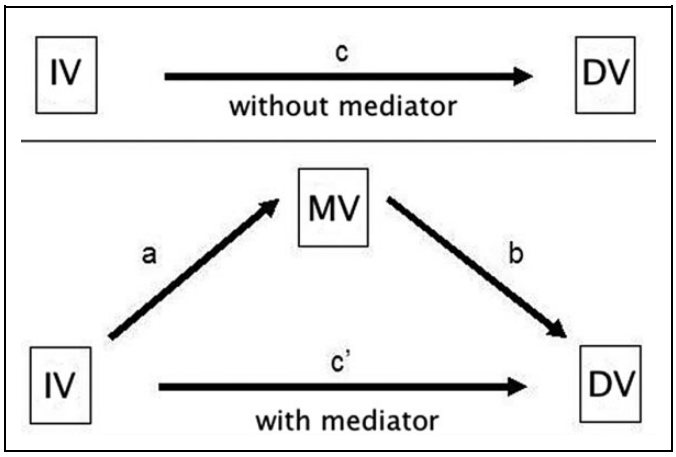

Figure 1. Mediation analysis.

Table 2. Means, standard deviations, correlations between variables (N=308).

		Pearson Correlations					
	Mean (SD)	M	D	NAS	Dep	Anx	Str
M	31.97 (6.08)	1	.696**	.683**	−.502**	−.484**	−.510**
D	36.96 (6.23)		1	.677**	−.387**	−.346**	−.410**
NAS	4.23 (7.45)			1	−.449**	−.453**	−.506**
Dep	4.67 (4.46)				1	.725**	.713**
Anx	4.87 (4.25)					1	.753**
Str	7.65 (4.23)						1

Abbreviations: M, Mindfulness (CAMS-R); D, Decentering (EQ-D); NAS, Nonattachment (Nonattachment Scale); Dep, Depression (DASS-Depression subscale); Anx, Anxiety (DASS-Anxiety subscale); Str, Stress (DASS Stress subscale).
*$P < .05$. **$P < .01$.

was drawn from a general, nonclinical population of college students and employees.

In every regression analysis, mindfulness was found to significantly predict depression ($R^2 = 0.252$, $R^2_{\text{Adjusted}} = 0.249$, $F[1, 306] = 102.86$, $\beta = -0.502$, $P < .001$), anxiety ($R^2 = 0.235$, $R^2_{\text{Adjusted}} = 0.232$, $F[1, 306] = 93.83$, $\beta = -0.484$, $P < .001$), and stress ($R^2 = 0.260$, $R^2_{\text{Adjusted}} = 0.258$, $F[1, 306] = 107.68$, $\beta = -0.510$, $P < .001$).

The Relationship Between Mindfulness and Depression: Decentering and Nonattachment as Mediators

Mindfulness was found to be a significant predictor of depression using the enter regression method ($\beta = -0.502$, $P < .001$). When decentering was added to the analysis, decentering was not a significant predictor of depression ($\beta = -0.073$, $P = .290$). Mindfulness was still a significant predictor ($\beta = -0.451$, $P < .001$) and alone explained almost 25% of the variance in depression scores ($R^2 = 0.25$, $R^2_{\text{Adjusted}} = 0.249$, $F[2, 305] = 52.01$, $P < .001$).

This suggests the model D → M → Dep, instead of M → D → Dep, indicating that mindfulness mediates the relationship between decentering and depression. A test of this model D → M → Dep by the bootstrapping method resulted in a significant *c* path ($\beta = -0.276$, $P < .001$) changing to an insignificant c' path ($\beta = -0.052$, $P = .29$); the indirect path from decentering to mindfulness to depression was significant. Thus, the hypothesis that decentering will mediate the relationship between mindfulness and depression was rejected, and results support the alternative model that mindfulness mediates the relationship between decentering and depression. The model M → D → Dep was also similarly tested by the bootstrapping method, and was not supported, the *b* path (decentering predicting depression with mindfulness scores controlled, D → Dep) being insignificant and the c' path (M → Dep with decentering scores controlled) still significant.

Using the enter method with mindfulness and nonattachment as independent variables, a regression analysis suggested that mindfulness ($\beta = -0.366$, $P < .001$) and nonattachment ($\beta = -0.199$, $P = .003$) both significantly predicted depression. The bootstrapping approach supported the causal steps method, suggesting that mindfulness (c' path significant, $\beta = -0.268$, $P < .001$) and nonattachment (*b* path significant, $\beta = -1.185$, $P = .0032$) are both individual, significant predictors of depression. Checking the model NAS → M → D also produced the same result. No evidence of mediation thus exists in this case. Together, mindfulness and nonattachment explain about 27% of the variance in depression scores ($R^2 = 0.273$, $R^2_{\text{Adjusted}} = 0.268$, $F[2, 305] = 57.16$, $P < .001$). The hypothesis that nonattachment mediates the relationship between mindfulness and depression was rejected in favor of the alternate model that suggests nonattachment and mindfulness are 2 individual predictors of depression.

The Relationship Between Mindfulness and Anxiety: Decentering and Nonattachment as Mediators

As described before, mindfulness was found to be a significant predictor of anxiety using the enter regression method ($\beta = -0.484$, $P < .001$). When decentering was added to the analysis, the same result was obtained with anxiety as was with depression—decentering was not a significant predictor of anxiety ($\beta = -0.017$, $P = .811$). Mindfulness was still a significant predictor ($\beta = -0.473$, $P < .001$) and alone explained almost 23% of the variance in anxiety scores ($R^2 = 0.235$, $R^2_{\text{Adjusted}} = 0.230$, $F[2, 305] = 46.80$, $P < .001$). Checking the model D → M → Anx by the bootstrapping approach resulted in a significant *c* path ($\beta = -0.236$, $P < .001$) changing to an insignificant c' path ($\beta = -0.0114$, $P = .811$), suggesting that mindfulness fully mediates the relationship between decentering and anxiety. The model M → D → Anx was also checked and was not supported.

Using the enter method with mindfulness and nonattachment as independent variables, a regression analysis suggested that mindfulness ($\beta = -0.328$, $P < .001$) and nonattachment ($\beta = -0.230$, $P = .001$) both significantly predicted anxiety. The bootstrapping method supported the causal steps approach, suggesting that mindfulness (c' path significant, $\beta = -0.229$,

$P < .0001$) and nonattachment (*b* path significant, $\beta = -1.308$, $P = .0007$) are both individual, significant predictors of anxiety. No evidence of mediation thus exists in this case, as both the models M → NAS → Anx and NAS → M → Anx were significant. Together, mindfulness and nonattachment explain about 26% of the variance in anxiety scores ($R^2 = 0.263$, $R^2_{\text{Adjusted}} = 0.258$, $F[2, 305] = 54.35$, $P < .001$).

The Relationship Between Mindfulness and Stress: Decentering and Nonattachment as Mediators

As mentioned before, mindfulness was found to be a significant predictor of stress using the enter regression method ($\beta = -0.510$, $P < .001$). When decentering was added to the analysis, the same result was obtained with stress as was with depression and anxiety. That is, decentering was not a significant predictor of stress ($\beta = -0.106$, $P = .120$). Mindfulness was still a significant predictor ($\beta = -0.436$, $P < .001$) and alone explained almost 27% of the variance in stress scores ($R^2 = 0.266$, $R^2_{\text{Adjusted}} = 0.261$, $F[2, 305] = 55.30$, $P < .001$). The bootstrapping approach backed this result, checking the model D → M → Str resulted in a significant *c* path ($\beta = -0.278$, $P < .001$) changing to an insignificant *c*′ path ($\beta = -0.0722$, $P = .120$), suggesting that mindfulness fully mediates the relationship between decentering and stress. The model M → D → Str was also checked, and was not supported.

Using the causal steps method with mindfulness and nonattachment as independent variables, a regression analysis suggested that mindfulness ($\beta = -0.308$, $P < .001$) and nonattachment ($\beta = -0.295$, $P < .001$) both significantly predicted stress. The bootstrapping approach supported the causal steps approach, mindfulness (*c*′ path significant, $\beta = -0.214$, $P < .001$) and nonattachment (*b* path significant, $\beta = -1.671$, $P < .001$) both significantly predicted stress, with no evidence of mediation. Checking the model NAS → M → Str produced the same result. Results thus suggest that mindfulness and nonattachment are independent and significant predictors of stress. Together, mindfulness and nonattachment explain about 30% of the variance in stress scores ($R^2 = 0.307$, $R^2_{\text{Adjusted}} = 0.302$, $F[2, 305] = 67.48$, $P < .001$).

The Relationship Between Decentering, Nonattachment, and Mental Health

An important relationship to attend to here is the relationship between the 2 hypothesized mediators—decentering and nonattachment. Do these hypothesized mediators independently predict mental health variables or are they related? Regression analyses were carried out similarly using the causal steps and bootstrapping approaches to ascertain the directionality of the relationship between these 2 mediators and mental health variables. Because no previous literature has examined the relationship between nonattachment and decentering, no hypotheses were formed about the directionality of the model. Both D → NAS → Dep and NAS → D → Dep models were tested.

Using the enter method, regression analysis determined that decentering is a significant predictor of depression ($\beta = -0.387$, $P < .001$). When nonattachment was entered into the analysis, decentering still remained a significant predictor ($\beta = -0.153$, $P = .027$), along with nonattachment also being a significant predictor of depression scores ($\beta = -0.345$, $P < .001$). This suggests that decentering and nonattachment independently predict depression scores, together accounting for 21% variance ($R^2 = 0.214$, $R^2_{\text{Adjusted}} = 0.209$, $F[2, 305] = 41.53$, $P < .001$). The bootstrapping approach supported this conclusion, with the *c*′ path of NAS → D → Dep model significant ($\beta = -2.06$, $P < .0001$), meaning that nonattachment predicts depression scores even with decentering scores controlled; and *b* path (D → Dep with nonattachment controlled) also significant ($\beta = -0.109$, $P = .0272$). Similar results were obtained with testing the D → NAS → Dep model, confirming that decentering and nonattachment independently predict depression.

Both D → NAS → Anx and NAS → D → Anx models were tested. Using the enter method, regression analysis determined that decentering is a significant predictor of anxiety ($\beta = -0.346$, $P < .001$). However, when nonattachment was entered into the analysis, decentering was not a significant predictor of anxiety ($\beta = -0.071$, $P = .302$), while nonattachment was a significant predictor ($\beta = -0.405$, $P < .001$). This suggests that nonattachment mediates the relationship between decentering and anxiety, alone accounting for 20% variance ($R^2 = 0.208$, $R^2_{\text{Adjusted}} = 0.203$, $F[2, 305] = 40.14$, $P < .001$). Analyses with the bootstrapping method supported this conclusion, with the *c*′ path of NAS → D → Anx model significant ($\beta = -2.307$, $P < .0001$), meaning that nonattachment predicts anxiety even with decentering scores controlled; and *b* path (D → Anx with nonattachment controlled) insignificant ($\beta = -0.049$, $P = .302$). Similar results were obtained while testing the D → NAS → Anx model, with the significant *c* path (D → Anx without nonattachment in the equation, $\beta = -0.236$, $P < .001$) becoming a nonsignificant *c*′ path (D → Anx with nonattachment controlled, $\beta = -0.049$, $P = .302$).

As before, both D → NAS → Str and NAS → D → Str models were tested, as no previous literature has examined the relationship between nonattachment and decentering. Using the enter method, regression analysis determined that decentering is a significant predictor of stress ($\beta = -0.410$, $P < .001$). However, when nonattachment was entered into the analysis, decentering was not a significant predictor of stress ($\beta = -0.124$, $P = .063$), while nonattachment was a significant predictor ($\beta = -0.422$, $P < .001$). This suggests that nonattachment mediates the relationship between decentering and stress, alone accounting for 26% variance ($R^2 = 0.264$, $R^2_{\text{Adjusted}} = 0.260$, $F[2, 305] = 54.83$, $P < .001$). Analyses with the bootstrapping method supported this conclusion, with the *c*′ path of NAS → D → Str model significant ($\beta = -2.389$, $P < .0001$), meaning that nonattachment predicts stress even with decentering scores controlled; and *b* path (D → Str with nonattachment controlled) insignificant ($\beta = -0.084$, $P = .063$). Similar results were obtained with testing the D → NAS → Str model, with the

significant c path (D → Str without nonattachment in the equation, $\beta = -0.278$, $P < .001$) becoming a nonsignificant c' path (D → Str with nonattachment controlled, $\beta = -0.084$, $P = .063$).

It is now possible to draw a clear picture of the various relationships between the mindfulness, decentering, nonattachment, depression, anxiety, and stress variables. Taking all the aforementioned conclusions into consideration, 3 models can be constructed. Refer to Figures 2, 3, and 4 for the models. Model 1 describes that mindfulness fully mediates the effect of decentering on depression, and nonattachment and mindfulness are significant predictors of depression. Model 2 suggests that mindfulness and nonattachment independently act as intervening variables between decentering and anxiety and are significant predictors of anxiety scores. Model 3 similarly suggests that mindfulness and nonattachment fully mediate the effect of decentering on stress, and are independent, significant predictors of stress.

Preacher and Hayes'[44] INDIRECT macro can also be used to check mediation models with more than one mediator. Two or more parallel mediators can be entered into the macro, along with one independent variable and one dependent variable to check model fit. The above-mentioned 3 models were entered into the macro and verified. Results of this analysis are reported in Table 3, and verify the 3 models described above. Other full equivalent and nonequivalent models were also tested and rejected in favor of the current models.

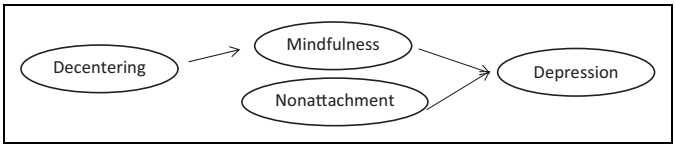

Figure 2. Model 1: Mindfulness fully mediates the effect of decentering on depression, and nonattachment and mindfulness are significant predictors of depression.

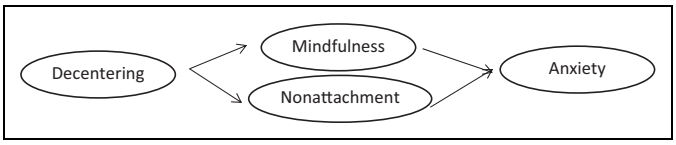

Figure 3. Model 2: Mindfulness and nonattachment independently act as intervening variables between decentering and anxiety and are significant predictors of anxiety scores.

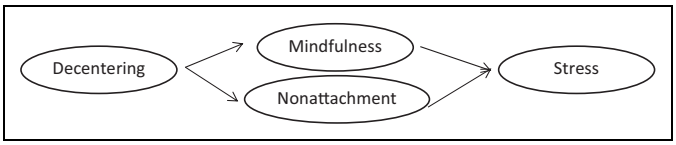

Figure 4. Model 3: Mindfulness and nonattachment fully mediate the effect of decentering on stress and are independent, significant predictors of stress.

Discussion

Even though mindfulness is increasingly being incorporated in many modern-day psychotherapeutic approaches and daily lives, it is still unclear as to how and why it has its many beneficial effects on a range of physical and psychological health variables. This study was undertaken to explore 2 possible mediators of the mindfulness-psychological distress relationship, namely, decentering and nonattachment. Because of the nascent stage of this research and previous mixed findings obtained in the area, the authors took a more exploratory approach in investigating this mediation.

As hypothesized, mindfulness was significantly inversely related to depression, anxiety, and stress in a population of college students and adults, consistent with a host of previous research.[6,7] Higher levels of decentering were linked to lower levels of psychological distress (depression, anxiety, stress), consistent with prior research.[15,19-22] Higher levels of nonattachment were also linked to lower mental distress, also consistent with previous research.[36,38] Theoretically, mindfulness has been suggested as a technique to cultivate nonattachment.[51] Research on nonattachment is limited, as a scale to measure nonattachment was recently developed by Sahdra et al,[36] and has since then been used in a handful of published studies and dissertations. This study was the first to explore mindfulness, nonattachment, and decentering together, and significant intercorrelations between these variables were also found. The hypothesis that decentering and nonattachment mediate the relationship between mindfulness and psychological distress was not supported. Instead, interesting new relationships emerged when alternative models were tested.

Mindfulness fully mediated the relationship between decentering and depression, anxiety, and stress. Most research has posited decentering as an important mechanism underlying the relationship between mindfulness and psychological health, suggesting that practicing mindfulness leads to increases in decentering, which in turn facilitates psychological distancing from distress, leading to lower levels of anxiety and depression.[14,19,21,23,24] Only Gecht et al[23] and Pearson et al[21] found evidence of complete mediation, whereas Brown et al,[24] Carmody et al,[14] and Hayes-Skelton and Graham[19] found mixed results. However, these studies did not explore alternative mediation models. Because alternate mediation models were ignored, it cannot be concluded with reasonable certainty that the model suggested by these authors is "the" model, or the "only" model that explains relationships between these variables.[27,28,50] The current study finds evidence for an alternate model of the one proposed by these previous studies. Findings from the current investigation suggest that mindfulness directly affects nonclinical depression, anxiety, and stress, and that decentering does not mediate this relationship. In fact, results argue that mindfulness mediates the effect of decentering on psychological distress. Instead of being more present-centered and aware fostering a sense of objective awareness of our surroundings and mental events, perhaps being more objective and having a bird's eye's view of our life leads to a sense of present moment contentedness. The only other

Table 3. Results of Checking Model 1, 2, and 3 With the Preacher and Hayes[44] Bootstrapping Macro.

Model		β	*P* Value
Decentering → Mindfulness & Nonattachment → Depression			
The indirect path from decentering to mindfulness and nonattachment to depression was thus significant	Decentering → Mindfulness	0.679	.000
	Decentering → Nonattachment	0.081	.000
	Mindfulness → Depression	−0.270	.000
	Nonattachment → Depression	−1.120	.006
	Decentering → Depression	−0.0038	.943
Decentering → Mindfulness& Nonattachment → Anxiety			
The indirect path from decentering to mindfulness and nonattachment to anxiety was thus significant	Decentering → Mindfulness	0.679	.000
	Decentering → Nonattachment	0.081	.000
	Mindfulness → Anxiety	−0.255	.000
	Nonattachment → Anxiety	−1.49	.004
	Decentering → Anxiety	−0.0583	.250
Decentering → Mindfulness & Nonattachment → Stress			
The indirect path from decentering to mindfulness and nonattachment to stress was thus significant	Decentering → Mindfulness	0.679	.000
	Decentering → Nonattachment	0.081	.000
	Mindfulness → Stress	−0.217	.000
	Nonattachment → Stress	−1.69	.000
	Decentering → Stress	−0.0069	.887

empirical finding closest to the current results was an investigation conducted to study formal and informal methods to teach mindfulness, which evaluated mindfulness and decentering as mediators between the teaching method and stress (Hindman, Glass, Arnkoff, & Maron, 2014).[52] They found that only mindfulness mediated the outcome between the teaching method and stress, whereas decentering did not.

The results evaluating decentering as a potential mechanism of mindfulness are inconsistent at best. The number of mindfulness measures that exist and are used in different studies further complicate this problem. For example, Gecht et al[23] used the German version of KIMS,[5] even though a better, more validated version of the KIMS (FFMQ[6]) has been developed. Hindman et al. used both the MAAS (Mindful Attention Awareness Scale; Brown and Ryan[7]) and the FFMQ. Carmody et al[14] used only selected subscales of the FFMQ, while ignoring others. Pearson et al[21] used the unidimensional MAAS. Josefsson et al[29] used 4 scales of the FFMQ, ignoring the fifth. While it is advantageous to have different scales to measure a construct, the same advantage becomes a problem when each measure conceptualizes the construct being measured differently. Mindfulness is treated by some as a technique, by some as a naturally occurring trait and as a state to be cultivated by yet others.[53] New scales are being developed almost every year.[54] In many ways, this is a common state of affairs in a field that is still in its nascent stage, where scientific analysis is just beginning and available accounts vary widely.[53] Because the findings of the current study are inconsistent with many previous reports, they should be interpreted with caution and treated as tentative until other investigations have replicated these results.

In the current study, nonattachment did not mediate the relationship between mindfulness and mental health, a result inconsistent with what Coffey and Hartman[34] and Coffey et al[35] found. Both Coffey and Hartman[34] and Coffey et al[35] used an old measure of nonattachment, which has low validity and is suitable only for participants having substantial experience in living a meditative and nonattached life. The difference may be due to the current study using the NAS,[36] which is a validated and theoretically sound measure of nonattachment intended for use with a general population. The authors of this study found that mindfulness and nonattachment were 2 independent, strong predictors of depression, anxiety, and stress, together explaining about 25% to 30% of the variance in each variable. Though Lamis and Dvorak[38] do not clarify, their study also seems to suggest that mindfulness and nonattachment are independent predictors of suicidal rumination and depression. It is clear, however, why nonattachment would be conceptually related to lower psychological distress. If one can maintain their happiness unconditionally, without being dependent on any circumstances or situations or events in the mind, one would not react to aversive situations with sadness, anxiety, or stress. Such a person would be able to maintain their equanimity in the face of challenges or suffering in life, which can be an important coping skill. According to Buddhist philosophy, suffering is the only constant in life, and if a person can learn to be nonattached to the outcomes of his ''karma,'' he or she can attain true happiness.

Tying it together, the present study finds that mindfulness and nonattachment are 2 independent mediators that explain the relationship between decentering and nonclinical anxiety and stress, mindfulness mediates the relationship between decentering and nonclinical depression while nonattachment also independently predicts depression. These findings should be treated as preliminary until other studies have replicated these results; future studies in this area should test alternate, equivalent mediation models to fully explore mediation.

The current findings have important implications for nonclinical populations. That mindfulness is related to and leads to

lower psychological distress is an established fact. The current study underscores this point, and suggests that nonattachment is also an important (and independent from mindfulness) determinant of lower mental distress. Cultivating a sense of being happy irrespective of events happening around one and in one's mind would buffer the impact of stressors and help live a satisfied, autonomous, and contented life. Practicing both mindfulness and nonattachment appears to be intimately linked to living a life free of depression, anxiety, and stress. The practice of decentering or cognitively reappraising events in a more objective way seems to be importantly only insofar as it leads to one being mindful. As such, mindfulness and nonattachment exercises would eliminate the need for decentering exercises. Various techniques to increase mindfulness exist, but methods and practices to increase nonattachment need to be investigated and validated.

The current findings have implications for future studies with clinical populations. While these findings cannot directly be applied to clinical populations, they can inform future research with a clinical sample to investigate whether the same pattern of results is obtained.

Future Research

Future research needs to establish these causal relationships by way of randomized controlled trials and longitudinal sequential designs, where it would remain to be seen if changes in nonattachment precede and lead to changes in psychological distress. It seems, however, that nonattachment is a unique concept that merits investigation on its own and not as a mechanism of mindfulness. Mindfulness and decentering are closely interrelated concepts that are often taught together as a way to enhance well-being. Future studies will need to determine if the current study's findings as related to these 2 concepts are replicated, and parse this relationship.

Limitations

There are various limitations to the study that should be noted. First, the sample consisted of primarily female college age students at a comprehensive university in Pennsylvania, severely limiting the generalizability of results. To be able to draw conclusions with certainty, present findings would have to be replicated with other, more diverse samples. Second, the study used a cross-sectional, survey approach, which does not lend itself to any causal analysis, despite strong tests of mediation. True cause–effect relationships can only be determined by experimental studies that establish that changes in the independent variable led to changes in a mediator variable, which preceded and predicted change in the dependent variable. Third, the present study used a comparatively less used measure of mindfulness (CAMS-R[8]). Research is needed to explicate and explore mindfulness measures in detail, and perhaps conduct meditational analyses with all extant scales of mindfulness to increase our understanding of the concept. Fourth, the authors did not collect data on meditation experience of the sample to avoid any bias in responding, which could still have proved to be a confounding variable. Mindfulness is a popular buzzword that the layman often tends to use without really understanding it, whereas some people want nothing to do with it as they believe it involves difficult meditation or religious practices. To avoid drawing a sample that is biased in favor of mindfulness, the authors decided not to mention the words "mindfulness" or "meditation" in the title or description of the study. This led to foregoing an important demographic question on whether the respondent is experienced in meditation. Fifth, the study used self-report measures, which are liable to many measurement errors. Participants can choose to present themselves in a certain way, which may not be representative of who they really are or might be a complete lie. They may not be able to choose from the options given on a scale and lose a chance to explain their responses in detail. Another drawback to consider is that respondents may simply not have enough self-awareness to be able to answer self-report measures in a reliable and valid manner. Multimodal assessments, including qualitative measures, are required to ascertain results obtained with self-report measures. Sixth, there may be other mechanisms at work in the mindfulness–mental health relationship that have not been examined here. Variables like emotional regulation, rumination, self-awareness, attentional processes, and so on may be legitimate mediators that merit investigation. Seventh, the study was conducted at a predominantly Caucasian university, with limited diversity in terms of ethnicity, which limits generalizability of results. Another limitation is that the sample used in the study was nonclinical, and thus the present results cannot be extrapolated to clinical populations.

Conclusion

The authors of the current study hypothesized that decentering and nonattachment would mediate the relationship between mindfulness and nonclinical psychological distress, based on results from previous studies. However, the hypotheses were disproved, and the results indicated that mindfulness and nonattachment independently predict mental distress variables. The study also found that mindfulness and nonattachment explain the effect of decentering on mental health, that is, the effect of decentering on mental health is accomplished via mindfulness and nonattachment. The results are preliminary, as they are consistent with some prior research and inconsistent with others. The authors suggest that further research seek to address this and other limitations, and also study the 3 central variables extensively. The authors stress special importance on testing equivalent models of mediation to increase the validity of findings.

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Author Contributions

The first author designed and implemented the study. The first author performed statistical analyses and wrote the manuscript. The second author edited the manuscript drafts and provided supervision in implementation of the study.

Declaration of Conflicting Interests

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Ethical Approval

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The local institutional review board approved the study, and informed consent was obtained from all participants before beginning study procedures. Approval was received from the local IRB – Marywood University Exempt Review Committee, and the approval number was 2014-E036, 634839-2.

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