Honors Thesis:

Associations among Depression, Rumination, and Mindfulness in Adolescents

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Abstract

We examined the associations among mindfulness, rumination, and depression, and between trait and state mindfulness in an at-risk adolescent sample. In addition, we tested the effect of an internet-based mindfulness intervention on depressive symptoms and rumination. Participants were 110 adolescents between 12- to 17-years-old (*Mean = 14.73, S.D. = 1.65*). The sample was 68% female and 55% White. At both pre- and post-intervention, we measured rumination, trait mindfulness, and depressive symptoms using self-report questionnaires and state mindfulness using Ecological Momentary Assessment (EMA). Using Pearson correlations, we found significant correlations among mindfulness, rumination, and depression, and between state and trait mindfulness. Multiple regression analyses revealed no significant main effects of Condition (intervention vs. control) on rumination, depression, or state mindfulness. Furthermore, baseline trait mindfulness did not moderate the effect of Condition on rumination, depression, or state mindfulness. Midpoint trait mindfulness did not mediate the effect of Condition on rumination or depression. Future research concerning mindfulness interventions for at-risk adolescents should use a larger sample. In addition, there is a need to further examine the components of a mindfulness intervention that may produce benefits for adolescents.

Associations among Depression, Rumination, and Mindfulness in Adolescents

The biological and social transition into adolescence comes with many challenges such as finding a sense of belonging, dealing with bodily changes during puberty, and navigating new social responsibilities with peers and family. The experience of adolescence varies greatly between people and is associated with a rise in mental health concerns, such as depression, from childhood to adolescence (Thapar et al., 2012). However, just as there is variability in the transition to adolescence, there are also individual differences in how adolescents experience and develop symptoms of depression which may depend on age, sex, available support systems, or personality (Thapar et al., 2012). Preventive interventions must consider these individual characteristics when examining how, or through what avenues, the intervention can be most beneficial for a variable sample.

Depression in youth is a growing public health concern. The rate of clinically diagnosed major depressive episodes (MDEs) in adolescents has notably increased over the past decade, from 8.7% in 2005 to 11.3% in 2014 (Mojtabai et al., 2016). Similarly, the percentage of adolescents with subthreshold symptoms of depression has increased from 24% in the decade before 2010 to 37% in the following decade (Shorey et al., 2022). The increased rate of subthreshold depression has been concerning because high levels of depressive symptoms or subthreshold depression have been found to be precursors to full MDEs. Furthermore, Noyes et al. (2022) revealed that adolescents with subthreshold depression exhibited similar levels of suicidal ideation as adolescents with MDD, suggesting that suicide risk is present even without a clinical diagnosis. Overall, adolescents have become increasingly vulnerable to depressive symptoms and disorders. Not only could interventions aimed at subthreshold symptoms prevent

the emergence of depressive episodes, but they also could provide essential support for adolescents who are already struggling despite not having a clinical diagnosis.

Rumination

One potential mechanism underlying the development of depression is rumination—the passive process of cyclical, intrusive negative thoughts (Nolen-Hoeksema et al., 2008). Rumination has been found to predict the onset, duration, and relapse of depressive episodes in both adolescents and adults (Abela and Hankin, 2011; Nolen-Hoeksema et al., 2008). Moreover, rumination predicted higher sensitivity to stress (Ruscio et al., 2015) and significantly contributed to heightened depressive symptoms in adolescents over time, even after controlling for neuroticism (Muris et al., 2009). Preventive interventions for adolescents may consider targeting rumination as a specific way to decrease the possibility of a full depressive episode emerging.

Mindfulness

Mindfulness is the awareness of one's thoughts, emotions, and sensations (Brown and Ryan, 2003) and can include five dimensions: non-judgment, acting with awareness, describing, observing, and non-reacting (Cortazar et al., 2020). These five facets capture the different aspects of mindfulness, which involve not only a simple awareness of one's thoughts and feelings, but also the acceptance and understanding of those emotions and thoughts.

In addition, mindfulness has two temporal dimensions—trait and state. *Trait mindfulness* refers to an individual's disposition to be mindful whereas *state mindfulness* is how mindful an individual is at a specific moment (Brown and Ryan, 2003). High levels of trait mindfulness or increases in state mindfulness through practice have been found to benefit adults and adolescents

by decreasing depressive and anxiety symptoms along with other negative behaviors (Dunning et al., 2019; Enkema et al., 2020).

Despite trait and state mindfulness showing similar mental health benefits, there are differences to how they are measured that should be considered when examining them in the context of an intervention. Whereas some trait measures assessed via questionnaires can be subject to recall bias, state measures may have greater ecological validity (Enkema et al., 2020). Furthermore, adolescents tended to be more reactive in their actions and moods than adults partially due to their continuing brain development (Romeo, 2013). Thus, tracking moment to moment changes in mindfulness in adolescents can suggest possible mechanisms underlying the process of being mindful.

Trait and state mindfulness have been found to have a relatively weak association (Bravo et al., 2018; Enkema et al., 2020; Zhang et al., 2020). Empirical studies which examine trait and state mindfulness together, however, have been limited. In a review of mindfulness and mental health, Enkema et al. (2020) identified only two articles that measured both trait and state mindfulness in the same individuals. Kiken et al. (2015) reported that a high rate of change in state mindfulness predicted a significant increase in trait mindfulness after a mindfulness-based intervention. Kiken and colleagues (2015) also found, however, that baseline trait mindfulness did not predict changes in state mindfulness. In contrast, Bravo et al. (2017) reported that the association between baseline trait mindfulness and state mindfulness depended upon which facet of mindfulness was examined. For example, one of the five facets of trait mindfulness— *observing*—had a significant direct effect on state mindfulness, as measured after a meditation practice. Moreover, this effect increased with a greater amount of previous meditation experience. In contrast, the relation of the facet of *describing* trait mindfulness to state

mindfulness was lower with more meditation experience. Clarifying how trait mindfulness interacts with state mindfulness in cross-sectional and longitudinal studies is important for understanding how interventions can improve mindfulness and whether a person's baseline level of trait mindfulness may affect how beneficial a mindfulness intervention could be for them.

Mindfulness, Rumination, and Depression

High levels of trait mindfulness and improvements in mindfulness through interventions have been found to predict lower rumination and fewer depressive symptoms (Enkema et al., 2020; Jury and Jose, 2019; Swords and Hilt, 2021). Adolescents with depression often experience a negative feedback loop in which they ruminate about being worthless and have difficulty completing daily tasks or engaging in their usual activities, which then "confirms" their negative self-view (Hards et al., 2020). Mindfulness activities teach adolescents to name their thoughts, accept them without judgment, and compare them to their actual experiences. Brown and Ryan (2003) suggested that accepting one's thoughts allowed individuals to better control their responses to challenging situations.

Thus, the active process of overall mindfulness is conceptually opposite to rumination, a passive process of repetitive negative thoughts that also may include battling those thoughts (Nolen-Hoeksema et al., 2008). This conceptual relation has been further demonstrated in the literature. For example, some studies have shown a negative association between both trait and state mindfulness and rumination (Ding et al., 2019; Swords and Hilt, 2021). Swords and Hilt (2021) examined the relation between the facets of trait mindfulness and trait rumination in three samples: general undergraduate students, general adolescents, and adolescents high in trait rumination. Non-judgement, a facet of mindfulness, was found to be negatively correlated with

rumination in every sample, suggesting one possible reason for the negative association commonly found between trait mindfulness and rumination.

Questions remained, however, regarding the temporal direction of the association between mindfulness and rumination in adolescents. For instance, a cross-sectional study of adolescents showed that mindfulness and rumination were inversely related, but there was no significant association when examined longitudinally (Royuela-Colomer et al., 2021). In contrast, Swords and Hilt (2021) reported that high levels of trait mindfulness at baseline did predict lower levels of rumination longitudinally. If high levels of mindfulness predict not only lower rumination in the moment, but also decreases in rumination over time, then a mindfulness intervention might show both short- and long-term positive effects on rumination and depression.

Mindfulness Interventions

Mindfulness interventions (MI) can take many different forms, varying in duration, individualization, goals, and purposes. Some interventions are short-term, quick exercises that may target state mindfulness more so than trait mindfulness (Hilt et al., 2023; Oberleiter et al., 2022). Other interventions may be intensive, multi-week programs that are highly individualized for the participants with the overall aim of increasing trait mindfulness (Deyo et al., 2009). Furthermore, interventions can take place through different mediums: schools, apps, online meetings, group sessions, etc. (Deyo et al., 2009; Gomez-Odriozola and Calvete, 2021; Hilt et al., 2023; Kuyken et al., 2022).

Although mindfulness interventions can differ greatly, in general, they have been found to reduce depression, anxiety, stress, and aggressive behaviors in adolescents and to improve their mindfulness, attention, and executive functioning (see Dunning et al., 2019 for a review). Not all mindfulness programs with adolescents have been successful, however. Possible reasons

that MIs may not have had a beneficial effect included a lack of individualization, practices or concepts that are explained in a way that did not fit a child's developmental level, and the willingness of the participants to engage with mindfulness (Gomez-Odriozola and Calvete, 2021; Kuyken et al., 2022).

For example, the My Resilience in Adolescence study (MYRIAD), a large school-based MI, found that the mindfulness training program was no more effective than usual social and emotional teaching in school on improving children's mental health or well-being (Kuyken et al., 2022). Moreover, the mindfulness program had adverse effects on students after the intervention and at follow-up, including higher rates of hyperactivity/inattention, panic disorder, obsessive-compulsive symptoms, and lower levels of mindfulness (Kuyken et al., 2022). Another study of a mindfulness program found beneficial effects for older adolescents, but harmful effects for younger adolescents including increased levels of cognitive and physical depressive symptoms (Gomez-Odriozola and Calvete, 2021). Both mindfulness programs were delivered in a group setting, limiting the extent to which the content of the mindfulness exercises could be tailored to the students' specific needs regarding their current level of knowledge and mindfulness skills as well as their type(s) of psychopathology (Gomez-Odriozola and Calvete, 2021; Kuyken et al., 2022). There is a need, then, to determine characteristics and forms of MI delivery to ensure participants receive the most effective and beneficial MIs for their personal contexts.

Webb and colleagues (2021) have assessed several characteristics in adolescents—specifically, high trait rumination and low emotional suppression—that predict greater benefits of MIs. Moreover, being an older adolescent or female also was linked with better outcomes (Webb et al., 2021). Age is an important consideration when researching mindfulness interventions, especially because most studies examining the associations among mindfulness,

rumination, and depression have used college student or adult samples. Much less is known about the relations among these constructs in adolescents. Thus, using adolescent samples in mindfulness intervention research can provide more information about the effect of MIs in younger populations.

In addition to these individual characteristics being potential moderators, they also may function as targets for mindfulness interventions. For example, some interventions have focused on reducing rumination (e.g., Paterniti et al., 2022; Topper et al., 2017). Paterniti et al. (2022) found that mindfulness-based cognitive therapy (MBCT) was more effective than CBT in reducing levels of rumination in adults with major depressive disorder, although both treatments were similarly effective at decreasing depressive symptoms. Topper and colleagues (2017) showed that rumination-focused CBT (RF-CBT) reduced potential depressive episodes in adolescents at a high-risk for developing depression by 45-47%. In a meta-analysis of other depression prevention methods including CBT, interpersonal psychotherapy, and more, van Zoonen et al. (2014) found a reduction of potential depressive episodes of only 21% across prevention types. Mindfulness programs that target rumination in at-risk adolescents may be especially likely to reduce rumination and depressive symptoms in adolescents.

In summary, there were several gaps in the literature regarding mechanisms of mindfulness interventions. Specifically, the associations among mindfulness, rumination, and depression as well as the relation between state and trait mindfulness required further examination to understand effective targets for mindfulness interventions, especially in at-risk adolescents. In addition, few studies had examined the effects of a mindfulness intervention on rumination and depression in a sample of at-risk adolescents or the possible moderating role of trait mindfulness on these effects.

The purpose of the current study was to examine the relations among mindfulness, rumination, and depression, and between trait and state mindfulness. The second aim was to test the effects of a mindfulness intervention on rumination. Third, we explored whether trait mindfulness moderated the effects of the intervention on depressive symptoms. Finally, we tested the extent to which changes in mindfulness accounted for the effects of the mindfulness intervention on depressive symptoms and rumination. We tested the following hypotheses:

(1) *Correlations*: The baseline, pre-intervention [i.e., baseline = Time 1 (T1)] measure of mindfulness will have a significant negative correlation with rumination and depression, respectively. Rumination and depression will have a significant positive correlation at T1. We also expect to find a significant positive correlation between trait and state mindfulness at T1.

(2) *Effect of the Mindfulness Intervention on Rumination*: There will be a significant main effect of condition (intervention/control) on trait rumination at post-intervention, controlling for level of rumination at T1, such that participants in the intervention condition will experience lower levels of rumination at post-intervention compared to participants in the control condition.

(3) *Moderation*: The effect of condition on depressive symptoms at T3 (post-intervention) will vary by baseline trait mindfulness, controlling for depression at T1. That is, the effect of the intervention on depressive symptoms at T3 will be stronger for individuals in the mindfulness condition with lower trait mindfulness at T1 as compared to those with high baseline trait mindfulness. In the control condition, level of depressive symptoms at post will not vary by baseline level of trait mindfulness.

The effect of the mindfulness intervention on rumination at T3 will vary by T1 trait mindfulness, controlling for rumination at T1, such that the effect of the intervention on rumination at T3 will be stronger for individuals in the mindfulness condition with lower trait

mindfulness at T1 as compared to those with high trait mindfulness at T1. In the control condition, level of rumination at T3 will not vary by level of trait mindfulness at T1.

The effect of condition on state mindfulness at T3 will vary by T1 trait mindfulness; among youth in the intervention condition, those with lower trait mindfulness at T1 will show a greater increase in state mindfulness as compared to youth with high trait mindfulness at T1. In the control condition, state mindfulness will not vary by level of trait mindfulness at T1.

(4) *Mediation*: The relation between condition and depressive symptoms at T3 will be partially mediated by mindfulness at T2 (mid-intervention), controlling for depression and mindfulness at T1. There will be a significant direct effect of condition on depression at T3, controlling for depression and mindfulness at T1. There will be a significant indirect effect of mindfulness at T2 that partially accounts for the effect of condition on depression at T3. The same model will be used with rumination at T3 (replacing T3 depressive symptoms). There will be a significant indirect effect of mindfulness at T2 that partially accounts for the effect of condition on rumination at T3.

Methods

Participants

Inclusion criteria were being between 12- and 17-years-old, reading level of fourth grade or higher, English speaker, and scoring 1.67 or higher on the measure of negative affect (NA-15). Exclusion criteria were: a current diagnosis of a DSM-5 anxiety or depressive disorder with significant clinical impairment, current suicidality, a current substance use disorder, or a lifetime diagnosis of bipolar disorder, schizophrenia, autism, conduct disorder, or developmental delay. The study was multi-site and conducted at Vanderbilt University, Nashville, TN; University of

California – Los Angeles; and Northwestern University, Evanston, IL. Table 1 shows the demographic and clinical characteristics of the sample.

Procedure

Participants were recruited in several ways including a university listserv, advertisements on Facebook and in subways (in Chicago), and community events. Individuals who were eligible based on their scores on the NA-15 were then interviewed with the Schedule for Affective Disorders and Schizophrenia for School-aged Children (KSADS) to assess exclusion criteria. If eligible based on the psychiatric interview, participants then completed several online surveys (e.g., S-FFMQ; CRSQ; PHQ-9; EMA). All eligible adolescents were then randomized to either the intervention or the control condition. Participants in the control group completed all of the same assessments as those in the intervention. After the post intervention assessment at 10 weeks, they were given access to the mindfulness materials.

The Youth Mindfulness Awareness Program (YMAP) is a 9-week mindfulness-based online program for adolescents with high negative affect. There were three main time points of interest: T1 (baseline: this was pre-intervention and before randomization), T2 (midpoint of the intervention at week 5), and T3 (post-intervention, at week 10). Each participant was paired with a mindfulness coach who worked with them for the entirety of the intervention. The coach taught each participant mindfulness concepts and how to apply them to their daily lives within 40- to 50-minute weekly sessions. In addition, coaches helped participants create their own goals for the program and for weekly mindfulness practices outside the sessions, which included both guided and self-directed practices. The intervention began with an app called MyLife as the online program, but then shifted to accessing the practices through Qualtrics. Coaches taught participants how to use the practice portal in the first week.

During each weekly session, the coach reviewed the participant's practices for the past week, discussed the agenda for the day, delivered new content, introduced new practices, and worked with the participant to create a practice plan for the coming week. In Weeks 5 and 9, coaches and participants reviewed the participants' progress toward their overall goals and examined any changes or challenges the participant had faced throughout the intervention.

All three sites (Vanderbilt, UCLA, Northwestern) used the same coaching manual and gave their participants the same packet to track their practice and the content they learned. All mindfulness coaching sessions were recorded to evaluate fidelity. All coaches attended their own site's supervision either in-person or online with the PI, other YMAP mentors, and coaches after each session to review their coaching notes and brainstorm what questions, topics, or strategies they should include in the next session with the participant.

Measures

Negative Affect (NA-15). The NA-15 consisted of 12 items from the Eysenck Personality Questionnaire Neuroticism Scale (Eysenck and Eysenck, 1975) and 3 items from the International Personality Item Pool version of the NEO Neuroticism Scale (Goldberg, 1999) ($\alpha = 0.849$). Using a 4-point Likert scale (0 = "not at all" and 3 = "much"), participants rated how much they agreed with a statement that describes an aspect of negative affect. For example, item statements included, "My mood often goes up and down," and "I get angry easily." It was scored by taking an average of the participant's scores from each statement, with a higher score indicating higher levels of negative affect. This measure was administered to assess eligibility prior to T1.

Trait Mindfulness: S-FFMQ (Short-Five Facet Mindfulness Questionnaire). The shortened version of the Five Facet Mindfulness Questionnaire (S-FFMQ) was used to measure

trait mindfulness. Abujaradeh and colleagues (2019) adapted this version for adolescents from an earlier shortened FFMQ (Tran et al., 2013). The shortened version is 15 items and only includes four of the five facets: describing, acting with awareness, non-judging, and non-reactivity (α = 0.737). The observing facet and one item from describing were excluded due to low correlation with the rest of the facets and a weaker factor loading, respectively (Abujaradeh et al., 2019). The participants rated each item on a 5-point Likert scale (1 = "never or very rarely true" to 5 = "very often or always true") based on how much they agreed with the statement. Each facet was represented by 4 items, except for "describing" which had 3. This measure was administered at all three timepoints.

Rumination: Children's Response Style Questionnaire (CRSQ). The Children's Response Style Questionnaire (CRSQ) was adapted from the Response Styles Questionnaire by Abela et al. (2007). Overall, there are 25 items (α = 0.749) including statements such as, "When I feel sad, I think about how sad I feel" and "When I feel sad, I think: There must be something wrong with me." Participants rated how much they agreed with each statement on a 4-point Likert scale (1 = "almost never" to 4 = "almost always"). There are three subscales: Ruminative Response (13 items), Distracting Response (7 items), and Problem-Solving (5 items). Each subscale is scored separately and a high score indicates a greater tendency to have that specific response style. We only used the Ruminative Response scale (α = 0.864) given that the target response style is rumination. This measure was administered at T1 and T3.

Depression: PHQ-9 (Patient Health Questionnaire). The Patient Health Questionnaire (PHQ-9) is a self-report measure of depression (Kroenke et al., 2001). The measure asked participants about 9 DSM-IV depression criteria within the past two weeks (α = 0.860). For each item, participants rated on a 4-point Likert scale (0 = "not at all" to 3 = "nearly every day") how

often they experienced a particular depressive symptom. Scores can range from 0 to 27; higher

scores indicate greater symptom severity. This measure was administered at all three timepoints.

     State Mindfulness: Ecological Momentary Assessment (EMA). The Ecological

Momentary Assessment (EMA) included a measure of state mindfulness. In total, participants

had 20 opportunities to complete EMA surveys at T1 and again at T3; the surveys were sent 4

times a day for five days on their baseline and post-intervention weeks. The survey delivery time

was randomized but based around the participants' sleep/wake schedule. In the fourth survey of

the day, there was a short 10-item questionnaire similar to the FFMQ which included statements

such as, "Today I walked around without noticing what I was doing," and "Today I stopped

myself from having feelings I didn't like." For each item, participants rated on a 5-point Likert

scale (1= "not at all" to 5 = "very much") how much they agreed with the statement. All

statements were worded negatively such that each statement had to be reverse scored so that a

high final score reflected high levels of state mindfulness. The EMA included two other series of

questions pertaining to mindfulness, but due to their lack of specificity and different scaling (4-

point vs. 5-point Likert scale), only the end-of-day questions were used to create the state

mindfulness measure for this study.

Data Analysis

     Prior to beginning data analyses, we engaged in data cleaning to account for missing data.

We excluded 25 participants from all analyses for complete missingness of measures of interest

(PHQ, CRSQ, FFMQ). Overall, the demographics of these participants did not differ

significantly from the remaining participants in the sample, however, it did result in the overall

sample losing five (50%) Black participants and three gender diverse (60%) participants. In

addition, we excluded one more participant from the state and trait mindfulness correlation

analysis due to complete missingness of their baseline state mindfulness measure. Furthermore, we excluded eleven more participants from the analysis for hypothesis 3C, in which we examined to what extent the effect of Condition on post state mindfulness was moderated by baseline trait mindfulness. These participants were excluded for complete missingness of their post state mindfulness measure. In these eleven, there was a greater proportion of male participants and a lower mean age as compared to the remaining participants. Remaining item-level missingness was accounted for with multiple imputation, using the mice package in R developed by Stef van Buuren and Karin Groothuis-Oudshoorn (2011).

We created summary scores for all measures to be included in analyses and examined the internal consistency of the various measures by calculating coefficient alphas for each one. Data were centered for the moderation and mediation analyses.

For hypothesis 1, we conducted Pearson correlation analyses among the measures of mindfulness, rumination, and depression at Time 1, and tested the association between state and trait mindfulness at T1.

For hypothesis 2, we conducted a multiple regression analysis to test the effect of Condition on T3 rumination, controlling for T1 rumination. This test examined the effect of the independent variable—Condition (intervention vs. control conditions)—on rumination post-intervention, accounting for the individual's starting level of rumination.

For hypothesis 3, we examined three different questions using multiple regression. In each model, the moderator was baseline trait mindfulness. For each question, two models were created: a main effects model and a model with an interaction term to test for moderation. Hypothesis 3A used a multiple regression analysis with Condition as the independent variable, T1 depressive symptoms as a covariate, and T3 depressive symptoms as the dependent variable.

The interaction model included all the same variables as in the main effects model and the Condition by T1 trait mindfulness interaction as a predictor of depressive symptoms at T3.

For hypothesis 3B, the main effects model included Condition as the independent variable, T1 rumination as a covariate, and T3 rumination as the dependent variable. The interaction model included the same variables and the Condition by T1 trait mindfulness interaction as a predictor of rumination at T3.

Hypothesis 3C included the following in the main effects model: Condition as the independent variable, T1 state mindfulness as a covariate, and T3 state mindfulness as the dependent variable. The interaction model included all the same variables and the Condition by T1 trait mindfulness interaction as a predictor of state mindfulness at T3.

For hypothesis 4, we used the Preacher-Hayes (2004) method of mediation to test for direct and indirect effects in two different models. Specifically, the mediation package in R was used (Tingley et al., 2014). First, we examined the effects of Condition on depressive symptoms at T3 and to what extent T2 trait mindfulness mediates this relation. Second, we examined to what extent T2 trait mindfulness mediates the effects of Condition on rumination at T3. The Preacher-Hayes (2004) method can increase power in smaller sample sizes, as is the case for YMAP, and thus increase the power to find an effect. Because this method examines direct and indirect effects, it is possible to compare the effect of Condition on depressive symptoms and rumination with and without the hypothesized mediators.

Results

See Table 1 for demographic and clinical characteristics of the sample.

Correlations

Pearson correlations were run to determine associations among trait mindfulness,

rumination, depression, and state mindfulness at T1 (see Table 2). Trait mindfulness and rumination at T1 had a significant negative correlation, $r(82) = -0.522$, $p = 3.42 \times 10^{-7}$. Trait mindfulness and depression at T1 had a significant negative correlation, $r(80) = -0.489$, $p = 3.216 \times 10^{-6}$. Rumination and depression at T1 had a significant positive correlation, $r(81) = 0.307$, $p = 0.005$. State and trait mindfulness at T1 also were significantly correlated, $r(81) = 0.268$, $p = 0.014$.

Hypothesis 2: Multiple Regression

There was no significant main effect of Condition on rumination at post, controlling for baseline rumination, b = -0.674, t = -0.370, p = 0.712, [-4.230, 2.951]. See Figure 1 for a comparison between Condition means at pre- and post-intervention.

Hypothesis 3: Multiple Regression with Moderation

Two multiple regression models were run: one to test main effects and one to examine the interaction effects. There was no significant main effect found between Condition and depression at post, controlling for baseline mindfulness and baseline depression, b = -0.810, t = -0.668, p = 0.506, [-3.222, 1.602]. This result indicates that participants did not differ significantly between the intervention and control groups on their levels of depression at the end of the study. The Condition by baseline mindfulness interaction predicting depression at post was not significant indicating that baseline mindfulness was not a significant moderator of the relation between Condition and depression at post, controlling for baseline mindfulness and baseline depression, b = 0.065, t = 0.456, p = 0.650, [-0.220, 0.351].

There was no significant main effect of Condition on rumination at post, controlling for baseline rumination, b = -0.674, t = -0.370, p = 0.712, [-4.230, 2.951]. That is, there was no significant difference between the intervention and control participants on their rumination levels

at the post-intervention assessment. In addition, the Condition by baseline mindfulness interaction was not significant, controlling for baseline rumination (see Table 3). Thus, baseline mindfulness did not significantly moderate the relation between Condition and level of rumination at post, $b = -0.028$, $t = -0.217$, $p = 0.899$, $[-0.464, 0.409]$.

Finally, there was no significant main effect of Condition on state mindfulness at post, controlling for baseline state mindfulness, $b = -0.229$, $t = -1.868$, $p = 0.066$, $[-0.473, 0.015]$. The interaction of Condition by baseline trait mindfulness on post state mindfulness, controlling for baseline state mindfulness was not significant, $b = 0.002$, $t = 0.137$, $p = 0.891$, $[-0.026, 0.029]$. Thus, baseline trait mindfulness was not a significant moderator of the relation between Condition and state mindfulness at post-intervention.

Hypothesis 4: Preacher-Hayes Mediation

The first mediation model examined Condition predicting depression at post with trait mindfulness at midpoint as a potential mediator. There was no significant indirect effect of trait mindfulness on depression at post, thus there was no mediation by trait mindfulness on the relation between Condition and depression, $b = -0.019$, $p = 0.94$, $[-1.541, 1.330]$. The second mediation model examined Condition predicting rumination at post with trait mindfulness at midpoint as a potential mediator. There was no significant indirect effect of trait mindfulness on rumination at post, and thus no mediation, $b = -0.021$, $p = 1.00$, $[-1.575, 1.540]$.

Discussion

The goal of this study was to examine the associations among rumination, depression, and mindfulness and the relation between trait and state mindfulness in an adolescent sample. Second, we examined if a mindfulness intervention was effective at reducing rumination and depression in adolescents with high negative affect. In addition, the study aimed to assess

individual characteristics of these adolescents that may impact the effectiveness of the intervention, such as baseline trait mindfulness and improvements in trait mindfulness over the course of the study.

Results showed that trait mindfulness had a significant negative correlation with rumination and depression; that is, higher levels of trait mindfulness were associated with less rumination and lower depression. Moreover, higher levels of rumination were associated with higher levels of depressive symptoms. These findings are consistent with previous studies that have shown conceptual and statistical relations among these constructs (Abela & Hankin, 2011; Ding et al., 2019; Enkema et al., 2020; Swords & Hilt, 2021).

In addition, state and trait mindfulness were significantly, positively correlated. This result is consistent with other studies that have reported significant, but low associations between state and trait mindfulness (Bravo et al., 2018; Enkema et al., 2020; Zhang et al., 2020). The relatively low correlation raises the question of whether there are differences in the mechanisms behind trait and state mindfulness or differences in the constructs themselves which may lead to a weak, although significant, association.

Second, we found no significant difference in the rumination levels between control and intervention conditions at post-intervention, controlling for pre-intervention rumination scores. Previous studies have found that mindfulness interventions significantly reduced rumination in adolescents and adults (Paterniti et al., 2022; Topper et al., 2017; Webb et al., 2021). This discrepancy is interesting for two main reasons: YMAP recruited adolescents who were high in negative affect, which has a moderate, significant positive correlation with rumination, $r(83) = 0.48$, $p = 3.85 \times 10^{-6}$ and this association has been found in a previous study (Aldao et al., 2014). Second, the mean score for rumination at T1 in the whole sample was 32.49 with the highest

possible score in the scale being 39. Thus, the YMAP sample had a high level of trait rumination. Future studies should examine whether an intervention like YMAP affects state rumination. Perhaps the general disposition to ruminate did not change, but moment to moment rumination might decrease, which would support a similar finding by Ding and colleagues (2019).

Next, we examined to what extent did baseline trait mindfulness moderate the effect of Condition on (a) depression, (b) rumination, and (c) state mindfulness at post-intervention? There was no evidence of significant moderation by baseline trait mindfulness on any of the relations between Condition and these outcome variables. The literature is mixed regarding how T1 trait mindfulness is related to changes in state mindfulness. Kiken and colleagues (2015) found that baseline trait mindfulness was not a significant predictor of changes in state mindfulness after a mindfulness intervention, whereas Bravo et al. (2017) reported that the separate facets of baseline trait mindfulness were related differently to state mindfulness (e.g., *describing* facet predicted lower state mindfulness, whereas the *observing* facet predicted higher state mindfulness). Although the current study was unable to clarify the questions left by this previous literature, it highlights an important direction for future research; that is, examining the different aspects of multi-faceted trait mindfulness in relation to the outcomes of interest may provide a clearer indication of which components of trait mindfulness are affected by the intervention. Moreover, understanding the relation between baseline trait mindfulness and changes in state mindfulness as a function of a mindfulness program may help identify which adolescents could receive greater benefits from a mindfulness intervention.

In addition, participants in the intervention condition did not show a significantly greater decrease in depression or rumination or a greater increase in state mindfulness than did participants in the control condition. Some prior studies have found that MIs are successful in

decreasing rumination and depressive symptoms in adolescents (Dunning et al., 2019; Enkema et al., 2020). One possible reason for our failure to find significant effects of the mindfulness program on the outcomes of interest is that the sample size for this study was not large enough to garner enough power. The meta-analysis by Dunning et al. (2019) examined a variety of RCTs in which all found small, but significant improvements in the mindfulness intervention conditions compared to control conditions. These 33 studies had an even split between active controls (another type of intervention or an unrelated activity like reading) and passive controls (waitlist and no-contact). The sample sizes ranged from 27 to 320 among the RCTs, but importantly, most studies used a general community sample. The main sample size for YMAP was 85—after the necessary exclusion of 25 participants due to missing full measures at post—with a passive control. YMAP used a selective, small sample of adolescents high in negative affect. Future research should attempt to replicate this study with a larger, similarly selective sample size.

The final research question was whether the relation between condition and depression and rumination was partially mediated by trait mindfulness at T2. In other words, will an increase in mindfulness halfway through the intervention period partially account for the effect of Condition on depression and rumination? Results found no significant indirect effects of mindfulness at midpoint on the effect of Condition on either rumination or depression. Similar to the moderation results, this may be due to a small sample size. It also may be due to the mindfulness intervention itself not being sufficiently effective. The target outcome variable for YMAP was momentary negative affect (mNA), or state negative affect. State mindfulness and state negative affect were both tracked through ecological momentary assessment (EMA). The intervention's goal was to decrease mNA, which could be accomplished through different means, including an increase in either state or trait mindfulness. The moderation analyses revealed no

significant main effect of Condition on post state mindfulness either so it is unlikely that this study would have found significant mediation by state mindfulness anyway (nor was it possible to do this analysis as there was no midpoint measure for state mindfulness).

Limitations

Limitations of this study highlight possible directions for future research. Most important to note is the missing data, which shrunk the sample size. It is expected that some participants will withdraw from longitudinal studies, and especially longitudinal studies that require a decent amount of interaction on the part of the participants. In addition, adolescents are busy with school, extracurriculars, and family responsibilities. As the intervention goes on, even those who are still interested in participating may not be able or may not remember to complete all parts of the study's interventions, leading to missing data at post-intervention.

Even so, the exclusion of these participants decreased the generalizability of the study's results. How can we increase engagement with these participants? Perhaps lessening the study participation burden on the adolescents with fewer or shorter questionnaires could be useful. In terms of the missing state mindfulness data, it may be that the younger participants had difficulty remembering to complete the EMA or that they were more likely to need access to devices that they didn't own (like a parent's phone or a home computer), which would make it complicated to do the EMA. Future tests of the YMAP intervention should ensure that the intervention is given to a diverse sample so that results can be more applicable to a diverse population.

Second, the overall study's design may not have been the best fit for this sub-study. In a study concerned with individual characteristics of participants and how they may affect the relation between condition and outcomes, it is important that those individual characteristics are well-represented in the sample. For example, the standard deviation in this study for trait

mindfulness at T1 was 8.47 while the mean was 42.96. Greater variability in baseline trait mindfulness may have been needed for the moderation analyses.

Third, the validity of the state mindfulness measure used here was not well-established. The individual scores for state mindfulness questions in the EMA were averaged across various days, creating mean individual question scores for each participant. The total score for the state mindfulness measure was then created by averaging those scores together. In the end, the state mindfulness measure was a mean of means, which raises the question, to what extent is a combined state measure equivalent to a trait measure? Does the average of state mindfulness scores across time represent what is being captured on the measure of trait mindfulness?

Furthermore, there were two questions that specifically asked about state mindfulness in the EMA, but due to being on different scales, it was difficult to combine them and as a result, we used the longer, more detailed scale that was only provided at the end of each day. Rather than obtaining data points from throughout the participant's day, the state measure only came from the end of the participant's day. The questions were specific to that day and thus they were still more state-oriented than trait-oriented, which would ask for the participant's general tendencies regardless of the day they took the assessment; the use of only this one end-of-day scale may have lost some information on each participant's levels of state mindfulness.

Finally, though not exactly a limitation, but rather an exploration of context for this study, exploratory analyses found that the means of rumination and depression scores for both control and intervention conditions decreased over the study period. These decreases were not statistically significant. The study, however, began in 2020 during the height of the pandemic. In general, global mental health worsened, but especially for adolescents, during the pandemic (Kauhanen et al., 2023). YMAP concluded in 2023—after life had mostly returned to normal in

the US. Adolescents were back in school and had more opportunities to socialize with friends and family in person. It is possible that all adolescents' mental health improved at least a little over those three years. One question to consider, then, is how effective the intervention was specifically for participants who completed the study in 2020. Is there a difference between those participants and the ones who completed the study in 2023? Future research on interventions should certainly consider how context influences different cohorts as the study progresses.

Future Directions

The composition of the sample for future studies on mindfulness interventions should reflect the goals of the MI targets and the populations that may benefit. For example, this study might have yielded significant results if the sample had high rumination or greater variability in baseline trait mindfulness in both the intervention and control conditions; such variability would allow us to examine how these individual differences contribute to the relation between Condition and outcome variables. In addition, future studies should recruit a diverse sample to increase generalizability of mindfulness interventions and consider whether the content of the intervention is culturally sensitive and applicable to adolescents from various backgrounds.

Future research should also further parse which components of a mindfulness intervention increase its efficacy for adolescents. This may involve comparing content, intervention delivery methods, and intervention goals among various types of mindfulness interventions. In addition, researchers could examine whether other possible mediators, such as state mindfulness, could explain the effects of Condition on outcome variables to further understand the path through which MIs affect participants.

Finally, more research is needed to understand the relation between trait and state mindfulness. Studies examining both temporal dimensions of mindfulness should ensure that

their state mindfulness scale is available at all time points when collecting data through EMA; that is, if a survey is sent four times a day, then each survey should contain the same state mindfulness measure. This would allow for maximum state mindfulness data collection. Other data analysis approaches also may be more suited to studying state mindfulness, such as multilevel modeling, for its ability to look at the individual time points rather than having to aggregate scores for each participant. It also would be interesting to examine at what point state mindfulness measures begin to represent the underlying trait mindfulness construct.

In conclusion, this study added to the literature by replicating the significant associations among mindfulness, rumination, and depression and between trait and state mindfulness. The mechanisms of mindfulness interventions and the individual characteristics of participants in MIs may contribute to the effects of MIs, although a larger sample is needed to adequately test moderators and mediators of the intervention effects on outcomes.

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Table 1. *Demographic and clinical characteristics for the whole sample and in each condition.*

		Total N = 110	Mindfulness N = 52	Control N = 58
Sex/Gender:	% Female	68.18	65.39	70.67
	% Male	29.09	28.85	29.31
	% Gender Diverse	4.55	3.85	5.17
Age: Mean (S.D.)		14.17 (1.60)	14.08 (1.64)	14.25 (1.56)
Ethnicity:	%Latinx/Hispanic	31.82	38.46	25.86
Race:	% Black	9.09	13.46	5.17
	% Asian	4.55	1.92	6.90
	% White	54.55	53.85	55.52
	% Multiple races	17.27	13.46	20.67
Scores at Baseline (T1)		**Mean (S.D.)**	**Mean (S.D.)**	**Mean (S.D.)**
Negative Affect (NA-15)		1.93 (0.52)	1.92 (0.54)	1.94 (0.52)
Trait Mindfulness (S-FFMQ)		42.96 (8.47)	43.53 (8.54)	42.51 (8.48)
Rumination (CRSQ)		32.49 (8.20)	32.08 (8.26)	32.83 (8.23)
Depression (PHQ-9)		11.54 (7.17)	10.95 (6.90)	12.02 (7.41)
EMA State Mindfulness		3.97(0.70)	4.17(0.55)	3.80(0.77)
Scores at Post (T3)				
Negative Affect (NA-15)		1.23 (0.65)	1.10 (0.68)	1.34 (0.60)
Trait Mindfulness (S-FFMQ)		46.26 (9.06)	47.79 (8.96)	45.02 (9.05)
Rumination (CRSQ)		28.41 (9.62)	27.79 (10.15)	28.91 (9.25)
Depression (PHQ-9)		7.54 (6.14)	6.87 (6.31)	8.09 (6.01)
EMA State Mindfulness		4.23(0.62)	4.21(0.64)	4.25(0.61)

S-FFMQ = Short form - Five Facet Mindfulness Questionnaire; CRSQ = Children's Response Style Questionnaire; PHQ-9 = Patient Health Questionnaire; EMA = Ecological Momentary Assessment; TBD = to be determined

Note. Some participants were missing data in some categories.

Table 2. *Correlations among Study Variables*

	Age	Trait Mindfulness	Rumination	Depression	Negative Affect	State Mindfulness
Age	1					
Trait Mindfulness	0.039	1				
Rumination	0.294**	-0.508***	1			
Depression	0.055	-0.441***	0.259**	1		
Negative Affect	0.122	-0.480***	0.492***	0.571***	1	
State Mindfulness	-0.256*	0.232*	-0.353***	-0.175	-0.320**	1

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

Table 3. *Moderation Regression for Rumination Model*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	28.714	1.234	23.268	**2×10^{-16}**	[26.258, 31.170]
Condition	-0.661	1.847	-0.358	0.721	[-4.336, 3.014]
Trait Mindfulness T1	-0.005	0.159	-0.030	0.976	[-0.321, 0.311]
Rumination T1	0.591	0.131	4.507	**2.22×10^{-5}**	[0.330, 0.852]
Condition*Trait Mindfulness T1	-0.028	0.219	-0.217	0.899	[-0.464, 0.409]

Figure 1. *Difference in Means of Rumination Scores Pre and Post Between Conditions*
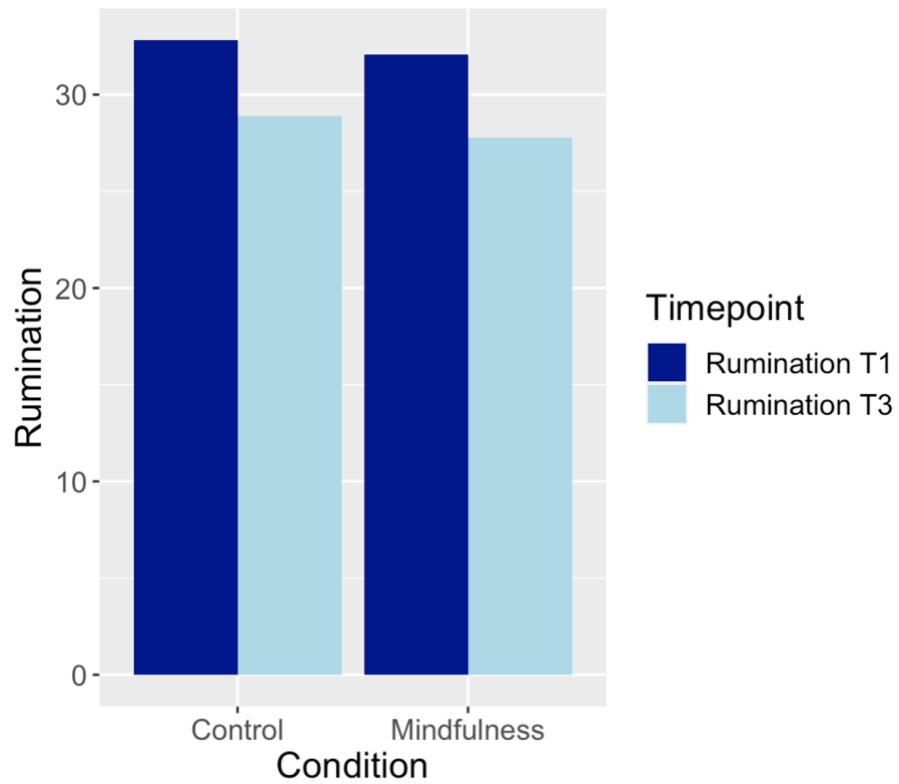
Appendix

Supplementary Materials

Table 4. *Main Effect of Condition on Rumination at T3*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	9.187	3.846	2.389	**0.019**	[1.537, 16.837]
Condition	-0.674	1.823	-0.370	0.712	[-4.230, 2.951]
Rumination at T1	0.601	0.111	5.408	6.15×10^{-7}	[0.380, 0.822]

Table 5. *Moderation Regression for Rumination Model*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	28.714	1.234	23.268	2×10^{-16}	[26.258, 31.170]
Condition	-0.661	1.847	-0.358	0.721	[-4.336, 3.014]
Trait Mindfulness T1	-0.005	0.159	-0.030	0.976	[-0.321, 0.311]
Rumination T1	0.591	0.131	4.507	2.22×10^{-5}	[0.330, 0.852]
Condition*Trait Mindfulness T1	-0.028	0.219	-0.217	0.899	[-0.464, 0.409]

Table 6. *Main Effects of Condition on Depression at T3*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	7.903	0.809	9.765	2.18×10^{-15}	[6.293, 9.513]
Condition	-0.810	1.212	-0.668	0.506	[-3.222, 1.602]
Depression at T1	0.379	0.085	4.478	2.41×10^{-5}	[0.211, 0.547]

Table 7. *Moderation Regression for Depression Model*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	7.865	0.807	9.752	**2.94×10^{-15}**	[6.260, 9.470]
Condition	-0.762	1.207	-0.631	0.530	[-3.165, 1.641]
Trait Mindfulness T1	-0.157	0.102	-1.542	0.127	[-0.359, 0.045]
Depression T1	0.310	0.096	3.214	**0.002**	[0.118, 0.501]
Condition*Trait Mindfulness T1	0.065	0.144	0.456	0.650	[-0.220, 0.351]

Table 8. *Main Effects of Condition on State Mindfulness at T3*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	4.335	0.081	53.531	**$<2 \times 10^{-16}$**	[4.174, 4.497]
Condition	-0.229	0.123	-1.868	0.066	[-0.473, 0.015]
State Mindfulness T1	0.537	0.088	6.108	**4.650×10^{-8}**	[0.362, 0.713]

Table 9. *Moderation Regression for State Mindfulness Model*

	Estimate	SE	t-statistic	P-value	CI at 95%
Predictor/Intercept	4.333	0.082	52.976	**$<2 \times 10^{-16}$**	[4.170, 4.497]
Condition	-0.225	0.124	-1.816	0.074	[-0.472, 0.022]
Trait Mindfulness T1	0.005	0.009	0.516	0.608	[-0.014, 0.023]
State Mindfulness T1	0.520	0.091	5.686	**2.780×10^{-7}**	[0.338, 0.702]
Condition*Trait Mindfulness T1	0.002	0.014	0.137	0.891	[-0.026, 0.029]

Table 10. *Mediation Results for Depression Model*

	Estimate	P-value	CI at 95%

Average Causal Mediation Effect	-0.019	0.94	[-1.52, 1.37]
Average Direct Effect	-1.157	0.32	[-3.44, 1.12]
Total Effect	-1.176	0.37	[-3.77, 1.49]
Proportion Mediated	0.016	0.71	[-2.83, 6.04]

Table 11. *Mediation Results for Rumination Model*

	Estimate	P-value	CI at 95%
Average Causal Mediation Effect	-0.021	1.00	[-1.56, 1.59]
Average Direct Effect	-1.168	0.56	[-5.24, 2.68]
Total Effect	-1.188	0.56	[-5.71, 3.20]
Proportion Mediated	0.017	0.77	[-2.69, 3.45]

Measures

<u>Negative Affect (NA-15)</u>

	Not at all	**A little**	**Some**	**Much**
1. My mood often goes up and down.	**0**	**1**	**2**	**3**
2. I feel miserable for no reason.	**0**	**1**	**2**	**3**
3. I often worry about things I have said or done.	**0**	**1**	**2**	**3**
4. My feelings get hurt easily.	**0**	**1**	**2**	**3**
5. I often feel fed-up (e.g., can't take it anymore)	**0**	**1**	**2**	**3**
6. I get angry easily.	**0**	**1**	**2**	**3**
7. I often feel like things are my fault.	**0**	**1**	**2**	**3**
8. I am a nervous person.	**0**	**1**	**2**	**3**
9. I am a worrier.	**0**	**1**	**2**	**3**
10. I get irritated (i.e., annoyed) quickly	**0**	**1**	**2**	**3**
11. I am a tense or high-strung (on edge) person.	**0**	**1**	**2**	**3**
12. I worry too long after I do something embarrassing.	**0**	**1**	**2**	**3**
13. I have problems with my nerves	**0**	**1**	**2**	**3**
14. I often feel lonely.	**0**	**1**	**2**	**3**
15. I get annoyed or frustrated easily.	**0**	**1**	**2**	**3**

Patient Health Questionnaire (PHQ-9)

Over the <u>last week</u>, how often did you experience each of the following problems? *(Circle the number to indicate your answer)*	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Little interest or pleasure in doing things, even things you usually like to do	0	1	2	3
2. Feeling down, depressed, sad, miserable, or irritable, easily annoyed	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling very tired; have little energy to do things, even things you want to do	0	1	2	3
5. Poor appetite, don't feel like eating; or overeating, even when not hungry	0	1	2	3
6. Feeling bad about yourself — thinking that you are a failure, or "no good," or "worthless," or that you have let yourself or others down	0	1	2	3
7. Trouble concentrating on things such as reading (e.g., books, homework), watching television, or talking to someone	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed (like you were walking through Jello). Or the opposite — being very fidgety, restless, pacing; moving around a lot more than usual	0	1	2	3
9. Thinking that you would be better off dead or having thoughts of hurting yourself in some way	0	1	2	3

Children's Response Style Questionnaire (CRSQ)

1. When I am sad, I think about how alone I feel.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
2. When I am sad, I help someone else with something, so I don't think about my problem.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
3. When I am sad, I go away by myself and think about why I feel this way.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
4. When I am sad, I watch TV, play video games, or spend time on my phone so I don't think about how sad I am.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
5. When I am sad, I think: "I'm ruining everything."	1. Almost never	2. Sometimes	3. Often	4. Almost Always
6. When I am sad, I go to my favorite place to get my mind off my feelings.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
7. When I am sad, I think about how sad I feel.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
8. When I am sad, I spend a lot of time on my schoolwork.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
9. When I am sad, I go someplace alone to think about my feelings.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
10. When I am sad, I do something I enjoy.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
11. When I am sad, I think about how angry I am with myself.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
12. When I am sad, I do something fun with a friend.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
13. When I am sad, I think about other times when I have felt sad.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
14. When I am sad, I read something (e.g., book, magazine).	1. Almost never	2. Sometimes	3. Often	4. Almost Always
15. When I am sad, I think about a recent situation and wish it had gone better.	1. Almost never	2. Sometimes	3. Often	4. Almost Always

16. When I am sad, I ask a friend, parent or teacher to help me solve my problem.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
17. When I am sad, I think: "There must be something wrong with me."	1. Almost never	2. Sometimes	3. Often	4. Almost Always
18. When I am sad, I try to find something good in the situation or something I have learned.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
19. When I am sad, I think: "I am disappointing my friends, family, or teachers."	1. Almost never	2. Sometimes	3. Often	4. Almost Always
20. When I am sad, I talk it out with someone who I think can help me feel better.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
21. When I am sad, I think about all my failures, faults, and mistakes.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
22. When I am sad, I think of a way to make my problem better.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
23. When I am sad, I think: "Why can't I handle things better?"	1. Almost never	2. Sometimes	3. Often	4. Almost Always
24. When I am sad, I remind myself that this feeling will go away.	1. Almost never	2. Sometimes	3. Often	4. Almost Always
25. When I am sad, I think about how I don't feel like doing anything.	1. Almost never	2. Sometimes	3. Often	4. Almost Always

Short-Form Five Facet Questionnaire (S-FFMQ)

1. When I do things, my mind wanders and I get distracted easily.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
2. I just observe my feelings and do not get lost in them.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
3. I don't pay attention because I daydream, worry, or get distracted.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
4. In difficult situations, I can stop/pause without reacting right away.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
5. Some of my thoughts are bad/not normal and I believe I should not think that way.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
6. I have trouble finding the right words to express how I feel.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
7. I have trouble focusing on what is happening in the present.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
8. When I have distressing thoughts or images, I "step back" without getting taken over by them.	1. Never or very rarely true 2. Rarely true 3. Sometimes true

	4. Often true 5. Very often true or always true
9. I am easily distracted.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
10. When I have a sensation in my body, I can't find the right words to describe it.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
11. When I have a distressing thought or image, I feel calm soon after.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
12. I tell myself that I should not think the way I do.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
13. I believe that some of my emotions are bad and I should not feel them.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
14. I judge myself as good or bad when I have distressing thoughts or images.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true
15. I can usually describe in detail how I feel in the moment.	1. Never or very rarely true 2. Rarely true 3. Sometimes true 4. Often true 5. Very often true or always true