

**Evaluation of *Vipassana* meditation course effects on subjective stress, well-being,
self-kindness and mindfulness in a community sample:**

Post-course and six-month outcomes

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Abstract

Residential *Vipassana* meditation courses, which teach mindfulness skills, are widely available globally but under-evaluated. This study examined effects of a standardized community-based *Vipassana* meditation course, on subjective stress, well-being, self-kindness and trait mindfulness in a community sample. Participants completed self-report measures of these variables at pre- and post-course ($n = 122$) and outcomes were compared to a control group of early enrollers (EEs) ($n = 50$) who completed measures at parallel time points before course commencement. Six-month follow-up was undertaken in the intervention group ($n = 90$). Findings, including intention-to-complete analyses, suggested positive effects of the *Vipassana* course in reducing subjective stress, and increasing well-being, self-kindness and overall mindfulness (present-moment awareness and non-reaction). Although some reductions in post-course gains were found at follow-up, particularly in stress, follow-up scores still showed improvements compared to pre-course scores. Mindfulness change scores between pre-course and six-month follow-up were moderately to highly correlated with outcome variable change scores, consistent with the idea that effects of *Vipassana* on stress and well-being operate, at least partially, through increasing mindfulness. The present research underscores the importance of undertaking further investigations into *Vipassana* courses' effects and applications.

Keywords psychological well-being; stress interventions; positive psychology; mindfulness; meditation

Evaluation of *Vipassana* meditation course effects on subjective stress, well-being, self-kindness and mindfulness in a community sample: Post-course and six-month outcomes

The concept of mindfulness and associated practices is generally attributed to Buddhist traditions (Chiesa & Malinowski, 2011). However, they have been gaining increasing attention in Western psychological literature, due to evidence of their associations with psychological well-being, lower levels of subjective stress (Chiesa & Serretti, 2010; Hofmann, Sawyer, Witt, & Oh, 2010; Ivanovski & Malhi, 2007; Keng, Smoski, & Robins, 2011) and fewer depressive symptoms (Hofmann et al., 2010). Furthermore, therapy approaches fostering mindfulness practices have been developed to reduce stress and depressive symptoms and promote positive well-being, such as through Mindfulness-based Stress Reduction (MBSR; Kabat-Zinn, 1982) and Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999).

In addition to these Western-style programs, more traditional approaches to teaching mindfulness are available globally. The current study evaluated outcomes of the *Vipassana* course developed by S. N. Goenka, which is taught at over 120 centers internationally (<http://www.dhamma.org/en>). This course is centered around a Buddhist-derived mindfulness meditation technique called *Vipassana* meditation (*Vipassana*) (Hart, 1987).

***Vipassana* Courses and Associated Theory**

The foundation *Vipassana* course is a standardized, residential 10-day course in a secular format (Hart, 1987). Based on Buddhist philosophy, *Vipassana* theory suggests that human behavior results from reactions to bodily sensations (Hart, 1987); unpleasant sensations lead to *aversions*, which are strong desires to stop or reduce

unpleasant sensations, while pleasant sensations are associated with *cravings*, involving wanting to prolong and intensify the sensations. Human beings' automatic and habitual attempts to satisfy craving and aversions are theorized to perpetuate further aversions and cravings, thereby producing human stress, unhappiness and maladaptive coping behaviors (Hart, 1987; Khosla, 1998).

A central objective of *Vipassana* courses is, therefore, to develop mindfulness, which refers to a meta-cognitive state of awareness involving bringing one's attention to present-moment sensations and experiences in an accepting and nonreactive way (Baer, Smith, Hopkin, Krietemeyer, & Toney, 2006; Hart, 1987; Kabat-Zinn, 2003).

Developing mindfulness is seen as a fundamental shift in perspective about internal sensations and thoughts, which involves viewing those phenomena with detachment as an observer rather than reacting and trying to change those sensations. The process is referred to in psychological literature as *cognitive defusion* (Hayes, Levin, Plumb-Villardaga, Villatte & Pistorello, 2013) or *decentering* (Shapiro, Carlson, Astin & Freedman, 2006).

Vipassana course students develop mindfulness by first learning breath-focused meditation to develop sustained attention (Hart, 1987). Then *Vipassana* meditation is practiced, which involves systematically and repeatedly scanning the body from head to feet, observing with detachment and non-reaction whatever sensations or experiences arise, and developing calmness and non-reactivity to sensations that arise. On the final day, loving-kindness meditation is introduced, involving thinking loving thoughts towards the self and others. These meditation approaches have been used successfully in other therapeutic approaches, notably MBSR, which refers to *Vipassana* as *body scan* meditation (Kabat-Zinn, 1982).

Relationships between Mindfulness and Stress and Well-Being

In the psychological literature, mindfulness has been theorized to reduce subjective stress and depression, and to enhance well-being, through various mechanisms such as exposure, cognitive changes and acceptance (Baer, 2003). Mindfulness practices could reduce stress through repeated *exposure* to uncomfortable internal stimuli and arousing sensations (Baer, 2003), similarly to habituation or counter-conditioning (Kabat-Zinn, 1982; Witkiewitz, Marlatt, & Walker, 2005). Prolonged sitting can be uncomfortable, so during *Vipassana* individuals observe these potentially stressful sensations with a detached stance, allowing automatic reactions such as distress and emotional reactivity to subside (Kabat-Zinn, 1982).

Mindfulness may also reduce stress and depression, and promote well-being and self-kindness, through *cognitive changes*. Many psychological disturbances have been linked to over-attachment or fusion to thoughts (Hayes et al., 2013) and maladaptive cognitive appraisals (Chambers et al., 2009). Worrying about the *future* fosters subjective stress, while excessive rumination about the *past* fuels negative self-judgments and depression (Hofmann et al., 2010; Kabat-Zinn, 2003). While cognitive behavioral therapies challenge the content of thoughts and substitute more 'accurate' or 'useful' thoughts, mindfulness approaches view thoughts as simply observed phenomena (Chambers et al., 2009; Hofmann et al., 2010). By viewing the self as the observer of thoughts and internal experiences, and thereby meta-cognitively lowering attachment and identification with cognitions, emotions can be better regulated (Chambers et al., 2009).

Mindfulness approaches encourage *acceptance*, which involves experiencing events, emotions and cognitions as they are, fully and without defense (Baer, 2003;

Hayes et al., 2013). Acceptance can address problems of *experiential avoidance*, which involves efforts to alter the form, frequency or intensity of body sensations, feelings or thoughts (Hayes et al., 2013). Consistent with *Vipassana* theory, experiential avoidance and attempts at suppression have been found to paradoxically result in persistence of those states, exacerbating subjective stress, depression, and anxiety (Bird, Mansell, Dickens, & Tai, 2013). Mindfulness can be an alternative response.

Research into *Vipassana* Meditation

Several studies have evaluated Goenka's *Vipassana* courses in the community and prisons. In community samples, course completers have reported greater post-course improvements in anxiety, depressive symptoms and rumination than comparison groups comprising all (Al-Hussaini et al., 2001) or mostly (Chambers, Lo & Allen, 2008) university students. In a pre-post community sample study, at three-month follow-up, reduced psychological distress was reported (Ostafin et al., 2006). Studies with incarcerated samples (Bowen et al., 2006; Simpson et al., 2007) found that *Vipassana* course completers reported lower psychiatric symptoms, and drug and alcohol use, than a treatment as usual (chemical dependency treatment and substance use education) group, including at three-month follow-up after release from prison.

Despite promising findings, methodological limitations exist. Importantly, maximum follow-up has been three months, and sample sizes have been low in community studies. Regarding comparison groups, in community studies, either no control group has been included (Ostafin et al., 2006) or control groups were mainly university students (Al-Hussaini et al., 2001; Chambers et al., 2008), who likely differ from *Vipassana* enrollees on demographics, interest in meditation and self-change

motivations. In community studies, *Vipassana* courses are run by *Vipassana* Centers, not researchers, making arranging randomized controlled trials (RCTs) difficult. In prison samples, incarcerated participants self-selected *Vipassana* versus treatment as usual (Simpson et al., 2007), possibly resulting in course participants having greater change motivation than controls.

To address these issues, our study design included a substantial sample size and six-month follow-up. A group of early course enrollers served as a non-intervention comparison group, completing measures at two time-points equivalent to a group of *Vipassana* course completers. This approach provided a control group with similar demographics and motivation to change. We considered this design acceptable since a recent meta-analysis found that meditation studies using quasi-experimental designs with a comparison group did not result in significantly different outcomes from RCTs (Sedlmeier et al., 2012).

Mindfulness as the Mechanism of Action in Mindfulness-based Programmes

When evaluating mindfulness-targeted programmes, it is important to examine the extent to which improvements in psychological indicators are linked to increases in mindfulness as theorized (Chambers et al., 2009). If mindfulness is *Vipassana*'s mechanism of effect, trait mindfulness should increase post-course, and mindfulness improvements should correlate with improvements in subjective stress, depressive symptoms and positive well-being (Walach, Buccheld, Bottenmuller, Kleinknecht, & Schmidt, 2006). Supporting this proposition, some studies have found that mindfulness mediated relationships between MBSR or meditation, and stress (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010; Carmody & Baer, 2008; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008) or positive well-being (Bränström et al., 2010; Carmody &

Baer, 2008) outcomes. However, these relationships need further examination.

Study Aims and Hypotheses

As a standardized course available globally, *Vipassana* courses could have substantial community impact, however, course proliferation has outpaced research into its effectiveness (Chiesa, 2010). Our study, therefore, examined effects of a community-based *Vipassana* course on mindfulness and a range of psychological outcomes. Pre-post changes of *Vipassana* course completers were compared to changes in early enrollers assessed at equivalent time points, with six-month follow-up outcomes assessed. Figure 1 shows a model of key factors and outcomes evaluated.

[Insert Figure 1]

It was hypothesized (Hypothesis 1; H1) that *Vipassana* course participants, compared to a no-intervention control group, would report improvements from pre-course to two weeks post-course. It was expected that *Vipassana* course participants would report greater increases in both mindfulness and acceptance post-course. It was further hypothesized that subjective stress and a measure of positive well-being and vitality that also reflects absence of depressive symptoms would improve post-course. Finally, improvements in self-kindness were expected, based on models in which mindfulness overcomes negative cognitive appraisals and possible effects of loving-kindness meditation. It was also hypothesized (H2) that improvements in *Vipassana* participants would be maintained at six-month follow-up.

Furthermore, some participants were undertaking the course for the first time (labeled in *Vipassana* courses ‘new students’), while others were repeating the course (‘old students’), enabling comparisons of outcomes for first-time versus experienced *Vipassana* meditators. *Vipassana* philosophy promotes repeating courses to deepen

lifelong mindfulness gains and act as boosters. However, to date no research has evaluated whether repeating the course enhances mindfulness and improves psychological outcomes. We hypothesized (H3) that both newly enrolling and re-enrolling students would show post-course improvements.

Finally, it was hypothesized (H4) that increases in mindfulness, and acceptance, from pre-course to post-course, and pre-course to follow-up, would be significantly associated with decreases in subjective stress, and increases in well-being and self-kindness over those time periods.

Method

Sample

Participants were 172 adults (122 female, 50 male, M_{age} 39.9 years, $SD = 12.3$, age range: 22 – 71) enrolled to attend a 10-day course at a *Vipassana* meditation center in Australia. Table S1 displays demographics.

[Link to Table S1]

Instruments

A self-report questionnaire covered demographics and the following measures.

Meditation Practice and Mindfulness. Questions assessed prior *Vipassana* experience, including whether participants had completed a *Vipassana* course previously.

Subjective Stress. The *Depression Anxiety Stress Scales* (DASS) short form–*Stress* subscale (Lovibond & Lovibond, 1995) assessed difficulty relaxing, nervous arousal, and being over-reactive and impatient. Seven items (e.g., “I found it hard to wind down”) are rated from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). DASS scores have shown good construct validity (Henry &

Crawford, 2005), and correlate $r = .73$ with Perceived Stress Scale scores (Osman et al., 2012). Guidelines by the developers suggest categories for interpreting DASS-21 scores: after doubling the score (to make it equivalent to the long form), 0 -14 reflects normal stress levels, 15 - 18 mild stress, 19 - 25 moderate stress, and 26+ severe stress (Lovibond & Lovibond, 1995). Our sample's Cronbach's α was .90.

Well-Being and Depression. The *WHO (five) Well-Being Index* (WBI-5; WHO, 1998) assessed positive psychological well-being and a lack of depressive symptoms (Bech, Gudex, & Johansen, 1996; Bech, 2004; Löwe et al., 2004). Items (“I feel cheerful and in good spirits”) are rated from 0 (*at no time*) to 5 (*all the time*) regarding the past two-week period. Standardized percentage scores range from 0 to 100 (high well-being). Scores ≤ 36 have demonstrated 82% sensitivity and 75% specificity in screening for depressive disorders (Löwe et al., 2004). Our Cronbach's α was .84.

Self-Kindness. *Self-Kindness* and *Self-Judgment* subscales of the *Self-Compassion Scale* (SCS; Neff, 2003) include items (“I'm tolerant of my own flaws and inadequacies”) are rated from 1 (*almost never*) to 5 (*almost always*). These subscales load on a single factor (Neff, 2003). Self-kindness items were summed with reversed self-judgment items to form *Non-judging Self Kindness* (*Self-kindness*; Cronbach's $\alpha = .80$).

Mindfulness. The short-form *Freiburg Mindfulness Inventory* (Mindfulness; Walach et al., 2006) assessed nonjudgmental present-moment observation and openness to negative experience. Items (“I watch my feelings without getting lost in them”) are rated from 0 (*rarely*) to 4 (*almost always*). Short-form scores correlated $r = .95$ with long-form scores, and show good construct validity for meditators and non-meditators. Factor analyses produce a single factor (Walach et al., 2006). Our Cronbach's α was

.91.

The 7-item *Acceptance and Action Questionnaire - Acceptance* subscale (*Acceptance*; Hayes et al. 1999) assessed willingness to accept undesirable feelings and thoughts. Seven items (“It’s OK to feel depressed or anxious”) were rated from 1 (*never true*) to 7 (*always true*). Scores have shown good psychometric properties (Bond & Bunce, 2003). Our Cronbach’s α was .74.

Social Desirability. The *Marlowe-Crowne Social Desirability Scale* (Crowne & Marlowe, 1960) *short form* (Strahan and Gerbasi, 1972) assessed social desirability responding at post-course (Time 2). This form correlates highly with the original scale (Fischer & Fick, 1993). Our Cronbach’s α was .68, typical for social desirability scales (Strahan & Gerbasi, 1972).

Vipassana Course

Vipassana courses are standardized, 10-day residential retreats. Table S2 describes course components. Participants meditate 10 hours daily, refrain from reading and religious practices, eat vegetarian foods twice daily, and remain silent during the course (except during question periods). These processes eliminate distractions that could prevent being present to moment-to-moment experiences, thereby helping to settle the mind and fostering openness to the meditative practices. During the first three days, students observe the natural flow of incoming and outgoing breath to develop focused attention and present-moment awareness. From Day 4, students practice *Vipassana*. On Day 10, loving-kindness mediation is taught.

[Link to Table S2]

Procedure

University ethics and *Vipassana* Center approvals were obtained. Participants enrolling online for a *Vipassana* course received a *Vipassana* Center email inviting them to participate in an independent university project evaluating *Vipassana* and course outcomes. After informed consent, participants received a code number and online survey web link or, if preferred, a questionnaire with post-paid envelope to complete prior to course commencement. Participants could enter a prize draw.

Participants who enrolled at least six weeks prior to course commencement were allocated to an early enroller (EE) condition. These participants completed questionnaires at least 6 weeks before pre-course (T1) and again approximately 2 weeks pre-course (T2). Later enrollers were allocated to the *Vipassana* condition. *Vipassana* participants completed questionnaires 2 weeks pre-course (T1); at least 2 weeks post-course (T2); and 6 months post-course (T3). Time 2 (T2) questionnaires were similar to T1, with social desirability added. The follow-up (T3) questionnaire replicated T1 measures.

Statistical Analyses

Completer and intention-to-complete analyses were conducted. For intention-to-complete analyses, participants who had been assigned to the *Vipassana* course or EE conditions but who had not completed the T2 questionnaire had T1 data recorded for both time-points (Heinicke, Paxton, McLean, & Wertheim, 2007).

Alpha level was set at .05. No assumption violations were found. Effect size used was r , with interaction effect sizes calculated as $F/(F+df_{err})$. In accordance with Cohen (1988), effect sizes were estimated to be small (.10), medium (.30) or large (.50).

Results

Sample Characteristics

Figure S1 shows participant flow.

[Link to Figure S1]

Post-Course Analyses

Baseline Analyses. In the T2 completer sample, no significant differences were found between *Vipassana* and EE conditions on any T1 variable using *t*-tests or chi-square tests (all $p > .14$). In intention-to-complete analyses no differences between conditions were found, $t(256-269) < 1.75$, $p > .08$, except for T1 self-kindness, $t(256) = 2.39$, $p = .02$, for which the EE group scored higher than the *Vipassana* group.

Attrition Analyses. No significant T1 differences between *Vipassana* participants completing T2 questionnaires (completers, $n = 122$) and those not completing (non-completers, $n = 62$) were found on outcome variables. For demographics, only age was significant, $t(182) = -2.86$, $p = .005$, with completers being older. Analyses revealed no significant T1 differences between EE completers of T2 questionnaires ($n = 77$) and EE non-completers ($n = 27$) on any demographic or outcome measures, $p > .31$.

Post-course Outcomes. To examine *Vipassana* post-course effects, group (*Vipassana*, EE) x time (T1, T2) x previous *Vipassana* experience (old student, new student) analyses of variance (ANOVA) were conducted. As shown in Table I, when examining completers, significant group x time interaction effects (the main effect of interest) were found for all outcome variables, except acceptance, which tended towards significance, $p = .06$. For the *Vipassana* group, in follow-up *t*-tests, significant improvements from T1 to T2 were found for all variables, with medium to large effects; for the EE group no significant differences between T1 and T2 were found (Table 1).

These interaction effect sizes were not significantly different (Fisher r to z transformations, $p > .05$) from Sedlmeier et al.'s (2012) meta-analytic effect sizes.

[Insert Table I]

The three-way interaction (group x time x prior experience) examined whether having completed the course previously acted as a moderator of course effects. No three way interactions were found for any outcome variable, $F(1, 170) < 1.82, p > .18$.

At T2, 5.7% of the *Vipassana* group scored in moderate or severe stress ranges, compared to 29.5% at T1. At T2, 8.2% of the *Vipassana* group met the WBI-5 cut-off for screening for depressive disorders, compared to 24.6% at T1. Regarding possible harmful course effects, only 6.6% of the *Vipassana* group reported T1 to T2 stress increases, compared to 30% of the EE group; and 6.6% of the *Vipassana* group reported well-being decreases, compared to 20% of the EE group.

Table S3 shows intention-to-complete group (EE, *Vipassana*) x time (T1, T2) interaction effects. These were significant, $p < .0005$, for stress, well-being, mindfulness and self-kindness with medium to large effect sizes, including when T1 self-kindness was entered as covariate, $F(1, 259) > 2.33, p < .0005$. The acceptance interaction, however, was not significant, $p = .07$. In t -tests, for the *Vipassana* group, but not the EE group, significant improvements were found from T1 to T2 for all outcome variables, with mostly large effects.

[Link to Table S3]

Social Desirability. No significant differences between *Vipassana* and EE conditions were found for T2 social desirability, $t(170) = -0.97, p = .33$. Social desirability was not correlated significantly with outcome variable T1 to T2 change scores ($r < .16, p > .07$).

Six-Month Follow-Up of *Vipassana* Course Participants (T3)

Attrition Analyses. No significant differences between T3 completers ($n = 90$) and non-completers ($n = 32$) were found on gender or age, $p > .22$. However, t -tests indicated T3 completers scored higher than non-completers on T2 well-being, $t(120) = -2.26, p = .03$, mindfulness, $t(120) = -2.63, p = .01$, and acceptance, $t(120) = -2.15, p = .03$, with non-significant tendencies towards lower stress, $t(120) = 1.92, p = .06$, and higher self-kindness, $t(120) = -1.76, p = .08$, for completers.

Maintenance of Changes. For the *Vipassana* completers group, t -tests compared T2 to T3 outcomes. Table II shows significant and medium size increases were found in stress levels, with small but significant reductions in well-being. Self-kindness and mindfulness scores did not change significantly. Further analyses revealed significant improvements from T1 to T3 on stress, well-being, self-kindness, mindfulness, and acceptance, with effect sizes ranging from $r = .47$ to $r = .56$

[Insert Table II]

Intention-to-complete analyses on the full sample allocated to the *Vipassana* condition also indicated improvements, $r = .32$ to $.39$ (Table S4). Of *Vipassana* participants completing follow-up, 11.1% scored in the moderate or severe stress range at follow-up versus 30.0% at pre-course, and 12.4% of *Vipassana* participants merited screening for depression (based on WBI-5 scores) at follow-up versus 23.6% at pre-course.

[Link to Table S4]

Relationships between Mindfulness, Acceptance and Other Outcomes.

To assess the extent to which mindfulness changes explained changes in outcome variables, standardized residual change scores for each variable were

calculated using regression analyses, regressing the T2 variable onto the T1 variable; then correlations were conducted between these change scores. As shown in Table III, residual change scores (from T1 to T2 and T1 to T3) for mindfulness were moderately to highly correlated with residual change scores for stress, well-being, acceptance and self-kindness. These correlations ranged from $r = .46$ to $r = .69$, in expected directions. Parallel analyses conducted correlating residual change scores for acceptance with residual change scores for stress, well-being and self-kindness were also significant, $r = -.34$ to $r = .51$ in expected directions.

[Insert Table III]

Discussion

Overall, findings indicated positive effects of the *Vipassana* course on trait mindfulness, subjective stress, well-being (also indicating lack of depressive symptoms) and self-kindness in this community sample. At post-course, substantial improvements were reported by *Vipassana* participants, compared to EE controls, at levels similar to those found in a meta-analysis of studies examining meditation intervention effects compared to no-treatment controls (Sedlmeier et al., 2012). Six-month follow-up outcomes suggested significant improvements compared to pre-course with medium effects in conservative intention-to-complete analyses. The findings provided support for effectiveness of the course in both the short and longer terms.

Hypothesis 1 was partially supported, with *Vipassana* course participants reporting improvements on stress, well-being, self-kindness and mindfulness, but not acceptance, two weeks post-course. Simple pre-post changes for all significant variables showed large effects. The findings support prior studies of *Vipassana* course's positive effects, extending beyond findings related to anxiety, depression, rumination, obsessive

symptoms and substance use, to demonstrate positive gains in subjective stress, positive well-being (vitality, cheerfulness), and non-judging self-kindness.

Our study's primary mindfulness measure resulted in a pre-post effect size of $r = .38$, although the acceptance r in our study was only $.14$. The mindfulness measure assessed present-moment awareness and non-reactance, while the acceptance scale, derived from ACT, emphasized reframing anxiety and depressive symptoms (and to a lesser extent disturbing thoughts), as 'okay' and part of human existence (Hayes et al., 1999). A focus of ACT involves addressing symptoms of anxiety and depression and shifting cognitive responses to them. In contrast, since *Vipassana* courses are not conceptualized as 'therapy', individuals are encouraged to observe *all* bodily sensations with calmness and objectivity, without a primary focus on specifically reframing anxiety and depressed feelings and related thoughts (Chiesa & Malinowski, 2011); therefore, acceptance effects of *Vipassana* related to those states may be more indirect.

Regarding Hypothesis 2 comparing post-course to six-month follow-up, subjective stress increased substantially at follow-up, suggesting that some course effects were time-limited. Decreases in well-being from post-course to follow-up were also significant, however the effect size was smaller than for stress, and no declines from post-course in self-kindness or mindfulness were found.

The *Vipassana* course consists of many elements likely to reduce stress in the short term, including withdrawal from daily hassles, temporary changes in eating and substance use, and extensive meditation. If post-course stress reductions resulted from temporary environmental changes, as opposed to skill development and mindfulness transformations, one might expect positive effects to diminish. Further research is

needed comparing intensive residential approaches such as *Vipassana* courses to interventions that teach similar practices progressively over longer time periods.

Despite some reduction in improvements at follow-up, scores on stress, well-being, mindfulness, and self-kindness remained significantly improved compared to baseline with medium effects. Acceptance scores also increased among *Vipassana* course participants from baseline to follow-up. However, the latter effect needs to be interpreted cautiously, since there were no significant improvements at post-intervention compared to control group outcomes. These follow-up findings need further confirmation with comparisons to a non-intervention control group.

Non-significant three-way interaction effects suggested outcomes were not moderated by previous experience with *Vipassana* (Hypothesis 3). Thus, there were no differences in gains reported by first-time versus repeat student enrollees, suggesting that repeating *Vipassana* courses can continue to enhance mindfulness and positive psychological indicators in experienced meditators. In addition, course repetition could serve as a booster reinstating gains lost over time.

Finally, consistent with Hypothesis 4, increases in trait mindfulness in *Vipassana* participants paralleled improvements in stress, well-being, and self-kindness. These findings support *Vipassana* conceptualizations, in which mindful awareness is a key mechanism of change (Chambers et al., 2009). They further support a growing literature reporting that mindfulness mediates the relationship between mindfulness practices and positive psychological outcomes (Bränström et al., 2010).

Improvements in outcome measures were also paralleled by improvements in acceptance. It is possible that maintenance of changes would have been greater if the *Vipassana* programme had more impact on acceptance; however, the correlations

between mindfulness increases and outcome variable increases tended to be higher than correlations between acceptance increases and outcome variable increases, suggesting mindfulness may be more instrumental in promoting changes. Nonetheless, future research should examine the comparative roles of mindfulness and acceptance in promoting change and maintaining it.

Alternative mechanisms of change should be studied, such as changes in diet, substance use, and use of maladaptive avoidance strategies, as well as removal from life stressors. The roles of various types of cognitive changes are also important to evaluate. Similarly, future research should distinguish between effects of *Vipassana* on its own, which promotes accepting thoughts as impermanent phenomena without altering thought content, versus loving-kindness meditation, which introduces new thoughts. The role of mindfulness interventions in enhancing self-management ability by pausing before reacting to stressors also merits study (Baer, 2003).

Limitations of the study included levels of attrition and self-report data. However, conservative intention-to-complete analyses demonstrated medium to large effects and social desirability bias did not correlate significantly with reported improvements, supporting the robustness of findings. Future research could assess significant other reports, clinical interviews, and objective measures of sustained attention and stress.

A further limitation was lack of random assignment; however, the quasi-experimental design using early enrollers appeared to be an acceptable alternative, especially since the two groups were similar on pre-course measures. Effectiveness trials of highly accessible community interventions, such as *Vipassana* courses, are needed to ascertain real world outcomes. Nonetheless, replication using RCTs, studies

including active interventions as comparison groups, and controlled comparisons at long-term follow-up are recommended.

Many participants reported pre-course stress and well-being scores suggesting at least subclinical symptomatology. The proportions of individuals with scores suggesting moderate or severe stress and meeting screening cut-offs for depression dropped substantially at post-course and were reduced at six-month follow-up. While these patterns suggest individuals with subclinical psychopathology can benefit from *Vipassana* courses, studies to date have not examined outcomes in clinical groups. Furthermore, *Vipassana* courses generally recommend against participation of individuals with mental disorders (<http://www.dhamma.org/en>), so we consider courses more suitable for resilience-building and stress reduction in normative populations.

Further research is needed to better understand factors influencing maintenance of gains. The role of continued practice of *Vipassana*, and other forms of meditation, should be assessed, to determine whether initial gains need support by subsequent, regular practice. Similarly, continued contact with the *Vipassana* Centre may help remind individuals of lessons and skills learned. Additionally, tracking subjective experiences of change processes, evaluating how individuals handle specific post-course life stressors, and assessing changes in potential biological mechanisms, such as cortisol and β -endorphin levels (Chiesa, 2010), could inform about factors promoting or inhibiting maintenance of gains.

In summary, our findings suggest positive, medium to large size effects of a 10-day *Vipassana* course on stress, well-being, self-kindness and mindfulness when assessed at least two weeks after course completion. Furthermore, despite some increases in subjective stress between post-course and follow-up, improvements

between pre-course and follow-up on stress, well-being, self-kindness and mindfulness were still found, with medium-sized effects. Increases in mindfulness were associated with improvements in outcome variables, supporting theories of mindfulness as a mechanism for coping with stress and enhancing well-being. The present research is the first to evaluate outcomes of a 10-day residential *Vipassana* course compared to an equivalent control group, with an extended follow-up period of six months. The findings add further to a growing body of research suggesting the potential of *Vipassana* meditation and other mindfulness approaches.

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Table I

Means (Standard Deviations) and Summary Statistics for Completer Repeated Measures ANOVAs Comparing Vipassana and Control Conditions Across Time 1 and 2 and Compared to Meta-analysis Effect Sizes of Sedlmeier et al. (2012)

	Control (<i>n</i> = 50)				Vipassana (<i>n</i> = 122)				Group x Time		Meta-analysis	
	T1	T2	<i>t</i>	<i>r</i>	T1	T2	<i>T</i>	<i>r</i>	<i>F</i>	<i>r</i> ^b	<i>r</i> ^a	[95% CI]
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)						
Well-being	58.72 (21.28)	60.00 (21.37)	-.68	.10	53.67 (19.53)	65.48 (16.96)	-7.34***	.55	14.19***	.28	.23	[22, 24]
Stress	14.36 (9.28)	13.76 (9.52)	-.62	.09	15.23 (9.12)	8.18 (6.75)	8.73***	.62	21.03***	.33	.27	[26, 28]
Self-Kindness	3.10 (0.77)	3.18 (0.85)	-1.48	.21	2.94 (0.70)	3.42 (0.71)	-8.70***	.62	15.79***	.29	Not applicable	
Mindfulness	36.06 (8.23)	36.14 (8.73)	-.11	.02	34.30 (8.04)	40.50 (7.62)	-9.80***	.67	31.07***	.39	.28	[27, 29]
Acceptance	31.04 (7.69)	31.96 (7.85)	-1.39	.20	29.46 (6.81)	32.24 (6.87)	-4.83***	.40	3.51 ^(.06)	.14	Not applicable	

*** $p < .0005$. ^a Sedlmeier et al. (2012) meta-analysis effect sizes.

^b Mean r across outcomes of our study = .29, mean meta-analysis effect size across outcome measures = .28.

Table II

Paired-Samples T-Tests Comparing Time 2 to Time 3 and Time 1 to Time 3 Outcomes for Vipassana Course Participants (n = 90)

	Time 2	Time 3	<i>t</i>	<i>r</i>	Time 1	Time 3	<i>t</i>	<i>r</i>
	Mean (SD)	Mean (SD)			Mean (SD)	Mean (SD)		
Well-being	67.51 (16.28)	63.38 (19.96)	4.03*	.39	54.31 (19.49)	63.38 (19.96)	-4.97***	.47
Stress	7.49 (6.16)	10.38 (7.71)	15.41***	.85	15.20 (9.43)	10.38 (7.71)	5.01***	.47
Mindfulness	41.55 (7.40)	40.03 (9.03)	3.76	.37	34.79 (8.47)	40.03 (9.03)	-6.31***	.56
Self-kindness ^a	3.49 (.72)	3.41 (.82)	1.96	.21	2.95 (0.68)	3.41 (0.82)	-6.01***	.54
Acceptance ^b	33.09 (6.63)	33.25 (6.72)	.07	.01	29.78 (6.99)	33.35 (6.68)	-4.93***	.47

^a*n* = 89 for Self-kindness, ^b*n* = 88 for Acceptance

p* < .05, * *p* < .0005

Table III

Intercorrelations Between Mindfulness and Well-being Standardized Residual Change Scores From Baseline to Post-Course (T2; n =121-122) and Follow-Up (T3; n = 88-90) in Vipassana Course Participants

Scale	Acceptance	Well-being	Stress	Self-kindness
Mindfulness (T2 – T1)	.49**	.62** ^a	-.49**	.55**
Acceptance (T2 – T1)	-	.39** ^a	-.34**	.47**
Mindfulness (T3 – T1)	.46**	.61**	-.57**	.67** ^b
Acceptance (T3 – T1)	-	.51**	-.44**	.47** ^b

** $p < .01$;

^a these two r s were significantly different, Fisher $z = 2.42, p = .02$

^b these two r s were significantly different, Fisher $z = 1.97, p = .048$

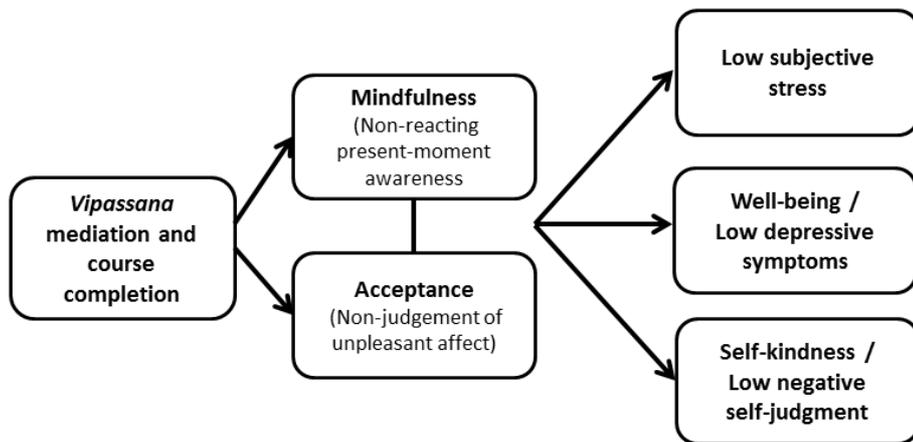


Figure 1. Hypothesized model linking *Vipassana* course completion and meditation to improvements in subjective stress, well-being and self-kindness outcomes, via mindfulness and acceptance

Supplementary materials

Figure S1. Flow of participants through each time point.

Table S1. *Summary of Demographics*

Table S2. *Ten-Day Vipassana Course Overview*

Table S3. *Intention-to-Complete Paired-Samples T-Tests Comparing Time 1 and 2 for Control and Vipassana Conditions*

Table S4. *Intention-to-Complete and Completers Paired-Samples T-Tests Comparing Time 1 and Time 3 for Vipassana Course Participants*

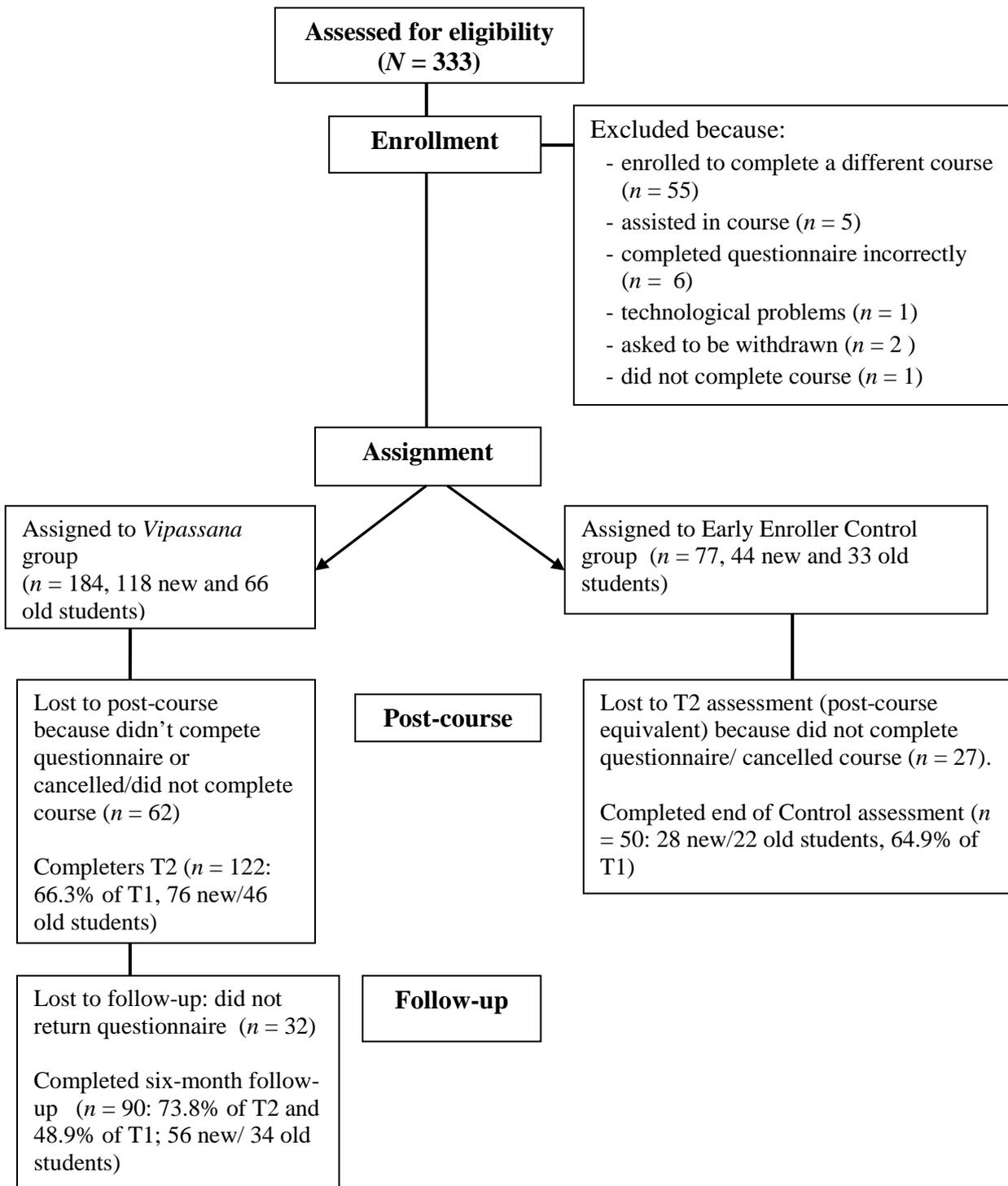


Figure S1. Flow of participants through each time point.

(Note: The period between T1 and T2 was 25 - 71 days for *Vipassana* participants, $M = 37.64$, $SD = 7.40$, and 30-71 days for Early Enroller participants, $M = 44.12$, $SD = 10.0$.)

Table S1. *Summary of Demographics*

Demographics		%
Country of birth	Australia	62.8%
	Europe/UK	16.1%
	Asia	10.0%
	New Zealand	3.4%
	North America	3.4%
	Middle East	1.5%
	Africa	1.5%
	South America	1.1%
Highest level of education completed	Year 11 or below	2.7 %
	Year 12	10.3%
	Certificate or diploma	26.1%
	Bachelor degree	33.0%
	Postgraduate	26.4%
	Other	1.5%
Employment status	Unemployed	16.9%
	Self-employed	20.7%
	Part-time or casual	20.3%
	Full-time	42.1%
Religion	Protestant Christian	4.6%
	Roman Catholic	11.5%
	Other Christian	2.7%
	Jewish	0%
	Muslim	0.8%
	Hindu	1.9%
	Buddhist	10.3%
	Spirituality	3.1%
	Multi-faith	3.1%
	Other	3.4%
None	57.1%	
Unknown	0.8%	

Table S2. *Ten-Day Vipassana Course Overview*

Course Context	Course Structure
<ul style="list-style-type: none"> • Situated in a naturalistic setting, accommodation provided. Students remain on site throughout course. • Students remain silent the first nine days, except for daily question times or speaking to teacher about technique or problems. • Students refrain from reading and writing and suspend religious practices. • Students eat two vegetarian meals daily, plus new students eat fruit in evening. 	<ul style="list-style-type: none"> • During the course, students agree to refrain from: 1) killing, 2) stealing, 3) lying, 4) sexual misconduct (celibacy is agreed to) and 5) use of intoxicants. • Participants do sitting meditation for 10 hours daily, with rest periods. • Students receive various meditation instructions several times daily, with incremental technique changes described. Pre-recorded discourses by S.N. Goenka, describe practice. • Days 1 - 4 (3.5 days): Students learn <i>Anāpānasati</i> meditation, awareness of respiration, to develop concentration. • Days 4 - 10: <i>Vipassana</i> meditation is practiced, involving systematic body scanning with awareness and equanimity. • Day 10: <i>Mettā-bhāvana</i> meditation (loving-kindness) is introduced.

Table S3. *Intention-to-Complete Paired-Samples T-Tests Comparing Time 1 and 2 for Control and Vipassana Conditions*

	Control ($n = 77$) ^a				Vipassana ($n = 184$) ^a				Group x Time	
	T1		T2		T1		T2		<i>F</i>	<i>r</i>
	<i>M (SD)</i>	<i>M (SD)</i>	<i>t</i>	<i>r</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>t</i>	<i>r</i>		
Well-being	56.83 (21.88)	57.66 (22.02)	-.68	.08	53.24 (19.15)	61.06 (16.96)	-6.83***	.45	13.03***	.22
Stress	14.34 (9.01)	13.95 (9.17)	-.62	.07	15.87 (9.55)	11.20 (9.14)	7.94***	.51	18.47***	.26
Self-kindness	3.13 (.76)	3.19 (.81)	-1.47	.17	2.89 (.73)	3.21 (.78)	-7.44***	.48	26.18***	.30
Mindfulness	35.96 (8.13)	36.01 (8.46)	-.11	.01	34.26 (8.09)	38.36 (8.37)	-8.71***	.54	13.87***	.22
Acceptance	30.57 (7.45)	31.17 (7.61)	-1.39	.16	28.91 (6.73)	30.75 (7.05)	-4.69***	.33	3.41 ^(.07)	.11

^a For Self-kindness and Acceptance early-enroller group $n = 76$ and Vipassana group $n = 182$.

*** $p < .0005$.

Table S4. *Intention-to-Complete and Completers Paired-Samples T-Tests Comparing Time 1 and Time 3 for Vipassana Course Participants*

Intention to complete analyses			
Time 1	Time 3	<i>t</i>	<i>r</i>
Mean (SD)	Mean (SD)		
(<i>n</i> = 184) ^b	(<i>n</i> = 184) ^b		
53.24 (19.15)	57.67 (20.14)	-4.66***	.33
15.87 (9.55)	13.51 (9.27)	4.70***	.33
34.25 (8.09)	36.82 (8.94)	-5.74***	.39
2.89 (.73)	3.12 (.84)	-5.52***	.38
28.93(6.75)	30.66 (7.05)	-4.63***	.32

^a *n* = 89 for Self-kindness and *n* = 88 for Acceptance

^b *n* = 182 for Self-kindness and Acceptance

****p* < .0005