# Longitudinal Effects of a 2-Year Meditation and Buddhism Program on Well-being, Quality of Life, and Valued Living

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Abstract

**Objectives**: Most research on mindfulness and meditation has focused on structured therapeutic interventions, such as mindfulness-based stress reduction, or meditation retreats. Such programs have received moderate empirical support for improving psychological outcomes in clinical and nonclinical populations, but there remains a paucity of research on intensive or long-term mindfulness or meditation programs for experienced practitioners, especially those that incorporate Buddhist teachings. The purpose of the current study was to investigate the effects of a long-term integrated mindfulness/meditation and Buddhism program, Dharma in Daily Life (DIDL).

**Methods**: Well-being, quality of life, valued living, and theorized processes of change were measured using a naturalistic, quasi-experimental design over the course of the 2-year program and 6-month follow-up. Participants included 17 individuals enrolled in the program and 14 individuals recruited from community meditation groups.

**Results**: Participation in the program predicted increases in subjective well-being and mindfulness over time compared to the control group. Regardless of condition, frequency of meditation predicted lower psychological inflexibility and higher mindfulness, well-being, and progress toward values. Length of meditation session predicted a greater ability to observe experience, and prior meditation experience predicted greater non-reactivity to experience.

**Conclusions**: Although preliminary, results suggest that participation in a long-term integrated mindfulness/meditation and Buddhism program may positively impact mindfulness and general well-being. Frequency of meditation sessions appears to be a particularly important variable. These findings warrant further investigation of such programs and practice parameters, as well as how each may affect key outcomes.

*Keywords:* mindfulness, meditation, Buddhism, well-being, quality of life, longitudinal

# Longitudinal Effects of a 2-Year Meditation and Buddhism Program on Well-being, Quality of Life, and Valued Living

Over the past 20 years or so, the practice of mindfulness has been gaining popularity in the West. The concept of mindfulness originates with the teachings of the Buddha, and the term is an English translation of the Pali word *sati*, Pali being the original language of the Buddha. The word *sati* is closely related to the Pali word for "remembering." As one Buddhist scholar explains, "it is due to the presence of sati that one is able to remember what is otherwise only too easily forgotten: the present moment" (Anālayo, 2003). Therefore, "mindfulness" may be understood as "present moment awareness," or the intentional act of directing one's attention to what is happening in the here and now. This understanding of mindfulness forms the basis of its Western psychological conception, although other constructs are often added. While "mindfulness" is a broad term referring to present moment awareness, "meditation" refers to a formal exercise in which time is set aside for contemplative practice, be it the development of mindfulness or other practices, such as the development of compassion or concentration. Therefore, "mindfulness" is sometimes used as an umbrella term to include informal mindfulness practices (e.g., washing the dishes with a mindful attitude) and formal meditation practices that encourage the development of mindfulness (i.e., "mindfulness meditation"). In this paper, we use "mindfulness" to refer to the skill of directing one's attention to the present moment and "mindfulness programs" as the programs that encourage the development of this skill, whether through informal or formal practices. The term "meditation" is used to refer to the formal practice only.

In recent years, mindfulness has become the foundation of many structured programs. Research looking at the effects of mindfulness has primarily focused on programs that implement formal meditation practices, including meditation retreats and group psychological interventions. Meditation retreats are often taught in the Insight, or Vipassana, meditation tradition, which is most commonly implemented through an intensive 10-day silent residential retreat, requiring multiple hours of meditation per day (Chiesa, 2010). Some of the more thoroughly researched psychological interventions include mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990) and mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2012), which usually require weekly group sessions and 45 minutes of formal at-home meditation per day over the course of 8 weeks. In addition to teaching meditation, both retreats and mindfulness-based interventions tend to include the development of mindfulness in daily activities or between meditation sessions.

Mindfulness programs have demonstrated moderate empirical support for improving psychological

outcomes in clinical (e.g., Hofmann, Sawyer, Witt, & Oh, 2010; Keng, Smoski, & Robins, 2011) and non-clinical (e.g., Khoury, Sharma, Rush, & Fournier, 2015) populations. One recent meta-analysis analyzed meditation studies in non-clinical samples from 2011 to 2015 and found a robust (i.e., unbiased) global effect size of $\bar{r}$ = .27 for studies with non-active control conditions and $\bar{r}$ = .17 for studies with active controls (Sedlmeier, Loße, & Quasten, 2018). This was similar to an earlier meta-analysis covering studies from the previous four decades (Sedlmeier et al., 2012). Several studies of Vipassana meditation retreats have found significant positive effects pre- to post-retreat on well-being, subjective stress, self-compassion, and trait mindfulness (Krygier et al., 2013; Szekeres & Wertheim, 2015). Studies have shown MBSR to be effective in improving quality of life (e.g., Demarzo et al., 2014) and psychological well-being (e.g., Nyklíček & Kuijpers, 2008) across diverse populations, including non-clinical populations and those with varying psychological (e.g., anxiety, depression) conditions. Taken together, research suggests that structured mindfulness programs are an effective method to decrease stress and improve quality of life and well-being, as well as psychological difficulties.

Despite evidence supporting the benefits of structured mindfulness programs, there remains a paucity of research on long-term mindfulness programs. A recent controlled, non-randomized study examined the effect of a 1-month Vipassana retreat on experienced meditators ($n$ = 19) compared to a matched-control group of experienced meditators ($n$ = 19) who did not attend the retreat. On average, retreat participants meditated for 8-9 hours per day. Results showed statistically significant increases pre-to post-retreat for retreat participants compared to controls on measures of mindfulness (e.g., non-attachment, observing), while demonstrating decreases on additional subscales of mindfulness (e.g. describing and negative-others). Additionally, results showed increases on measures of well-being and pro-social personality traits in retreat participants. Findings from this study suggest that experienced meditators may benefit from intensive retreats above and beyond their usual daily practice (Montero-Marin et al., 2016).

In addition to structured programs in which mindfulness is the primary focus, mindfulness skills have also been incorporated as components of other modern psychotherapies (e.g., acceptance and commitment therapy [ACT], dialectical behavior therapy) that target a range of presenting concerns (e.g., A-Tjak et al., 2015). Typically, mindfulness-based techniques are taught to clients to enable more flexible responding to distressing stimuli with the purpose of establishing more adaptive patterns of behavior (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). In other words, mindfulness skills are conceptualized as elements of the overarching skill of *psychological flexibility* – the

ability to be open to and notice inner experiences for what they are (*cognitive defusion*) in the present moment while engaging in meaningful behavior (*valued action*; Hayes et al., 2006). Psychological flexibility plays an important role in well-being (Kashdan & Rottenberg, 2010) and has been found to mediate clinically relevant outcomes (Hayes et al., 2006; Stockton et al., 2018). Thus, it is worth assessing the effect of mindfulness-based programs on psychological flexibility and its components (e.g., cognitive defusion, valued action) to clarify the generalizability of effects of mindfulness practice across domains.

In terms of the development of mindfulness skills, both formal and informal home-based practices are considered an integral part of developing an autonomous mindfulness practice and are hypothesized to be linked to outcomes. Several studies have established a clear positive relationship between home practice and outcomes of interest (e.g., Carmody & Baer, 2008; Speca, Carlson, Goodey, & Angen, 2000), while others have not (e.g., Jain et al., 2007; Nyklíček & Kuijpers, 2008). A recent systematic review and meta-analysis examined the extent to which between-session meditation practice in MBSR or MBCT was associated with treatment outcomes. Studies included in the analyses followed the standard MBSR or MBCT manuals, which consist of an 8-week program that requires 8 weekly 2.5-hour in-person meetings, one full-day retreat, and assigned home practice of approximately 45 minutes, 6 days a week. Of the 28 studies included, findings revealed a small yet significant association between participants' self-report of home practice and psychological outcome measures ($n$ = 19, $r$ = 0.26, 95% CI (.19-.34), $Z$ = 6.74, $p$ < 0.0001) and no significant difference between clinical and nonclinical populations (C. E. Parsons, Crane, Parsons, Fjorback, & Kuyken, 2017). Despite research on the general relationship between home/between-session practice and outcomes, the specific frequency and duration of practice required to experience psychological gains remain unclear. For example, the majority of studies utilize cross-sectional designs to investigate this relationship and few implement longitudinal designs that would allow tracking of temporal associations (Davidson & Kaszniak, 2015). Additionally, few studies report both meditation session length and frequency of meditation, or do not report them separately, opting instead to report an overall measure of time spent practicing (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009). Measuring and reporting these two dimensions of practice separately would be useful in determining the optimal parameters for learning mindfulness skills.

Another potential issue with the Western psychological practice of mindfulness is that it has largely been decontextualized from its original Buddhist roots (Kirmayer, 2015; Lomas, 2017). Although the ways in which Buddhism has been adapted for use in mental health may differ in the West from other parts of the world, within

Western psychology, mindfulness has been secularized and studied in a primarily isolated manner (see Morita, 1998 and Ozawa-de Silva, 2015 for examples of Eastern adaptations of Buddhism to mental health). This differs from the way in which mindfulness was originally presented by the Buddha. In Buddhist teachings, mindfulness is one component of a larger system of philosophy and practice that culminates in the end of suffering. For example, the core of Buddhist teaching is the Four Noble Truths, and the last of these Truths outlines the Buddha's path to the end of suffering, the Noble Eightfold Path. Skillful mindfulness constitutes one factor of this path. Other factors include teachings on ethics, intention, and the understanding that actions lead to consequences. Each of these eight factors are interconnected and support one another. As such, it is the path as a whole, not any one factor alone, that leads to the end of suffering.

While this decontextualized form of mindfulness has been empirically demonstrated to be of value, it has been argued that its potential for increasing well-being and decreasing suffering may be further leveraged by contexualizing it within the larger whole of Buddhist teachings of which it was originally a part (Lomas, 2017). For example, including additional factors from the Eightfold Path or other Buddhist teachings in psychological interventions may provide support for practicing mindfulness, as well as introduce other practices that increase well-being, producing an additive or synergistic effect. Not only was this the context in which mindfulness was originally developed and intended to be cultivated, but some of these added components, such as compassion and lovingkindness, have a psychological research base of their own (Galante, Galante, Bekkers, & Gallacher, 2014). The Buddha also stressed the importance of connecting with a community of practitioners, known as the *sangha*. The explicit inclusion of social support from other mindfulness practioners may help those practicing mindfulness to remain consistent and committed when difficulties arise or to troubleshoot problems encountered during individual practice. In order to determine whether the inclusion of other teachings of Buddhism with mindfulness would be beneficial, it would be useful to investigate the effects of mindfulness as situated within the Buddhist teachings as a whole. However, to our knowledge, there exist very few psychological studies of programs that explicitly teach mindfulness within the context of, and including other teachings of, Buddhism.

The purpose of the current study was to investigate the effects a 2-year integrated mindfulness/meditation and Buddhism program, Dharma in Daily Life (DIDL), on well-being, quality of life, and valued living. The DIDL program was chosen for this study for the following reasons: 1) its focus on the explicit integration of meditation, mindfulness, and Buddhist teachings within one program and 2) its length, which allowed for both the integration of

these teachings into participants' everyday lives and the longitudinal investigation of their long-term effects. For these reasons, the DIDL program may have some advantages over meditation/mindfulness programs that do not include other Buddhist teachings, focus on the integration of the teachings into one's life, and/or are of a shorter duration. For example, most meditation/mindfulness programs encourage participants to use the skills they learn during the program in their everyday lives. However, programs that last 8 days to 2 weeks and take place solely (or mainly) in a separate context from participants' everyday lives (e.g., a retreat center or university laboratory) are at a disadvantage in this respect. The DIDL program's longer duration allows participants to make the practice of meditation/mindfulness and Buddhist teachings a habit that is continued over the course of 2 years and to continue to have the support of an instructor and other students while learning to adapt their practice to the varying life circumstances that are inevitably encountered over such a long period of time. Therefore, rather than simply encourage the integration of teachings into one's life, DIDL actually *teaches* this integration, and this is possible because of the length of time over which the program takes place.

For this study, a naturalistic, longitudinal, quasi-experimental design was implemented with a 6-month follow-up. In addition to investigating the effects of the program on main outcomes, we also investigated theorized processes of change through which outcomes may have been affected. Specifically, we predicted that: 1) well-being, quality of life, and valued action would increase more in the DIDL condition than in a control group of community meditators, 2) there would be a corresponding increase in theorized processes of change (mindfulness, psychological flexibility, and cognitive defusion) in the DIDL condition compared to the control condition, and 3) increases in both outcome and process of change measures would be related to practice parameters, including frequency of meditation and length of meditation sessions.

## Method

### Participants

Participants 18 years or older and willing to complete eight surveys over the course of 2.5 years were recruited through fliers, email, and in-person announcements. Participants were recruited from a 2-year integrated mindfulness/meditation and Buddhism program, the DIDL program, and from ongoing community-based meditation groups. Because both the DIDL program and the community meditation groups were established prior to the formation of the current study, and the DIDL program was not created for the purposes of this study, randomization was not possible, and a naturalistic, quasi-experimental design was therefore chosen. Thirty-one participants

responded to recruitment efforts and were enrolled in the study. The majority of participants reported currently living in Utah (*n* = 25), with remaining participants living in Colorado (*n* = 2), Wyoming (*n* = 1), New Mexico (*n* = 1), Alaska (*n* = 1), and New York (*n* = 1). Those from the DIDL program were placed in the DIDL condition (*n* = 17), and those from community meditation groups were placed in the control condition (*n* = 14). See Table 1 for participant characteristics, including baseline mean frequency of meditation, meditation experience, and familiarity with Buddhist teachings. Baseline frequency of meditation ranged from 1 to 7 days per week in both conditions. At the time of enrollment in the study, control participants reported engaging in the following meditation practices most frequently: Vipassana (*n* = 9), Zen (*n* = 4), yoga (*n* = 4), Tibetan (*n* = 2), metta (i.e., lovingkindness) (*n* = 2), mantra (*n* = 1), and no specific technique (*n* = 4), with some participants indicating more than one primary technique. In exchange for participation, participants were entered into three separate raffles (following time points 4, 7, and 8), each for an iPad Mini.

**Procedure**

The study was approved in advance by Utah State University's Institutional Review Board. All surveys were delivered via Qualtrics, an online survey platform (Qualtrics, Provo, UT). Prior to completing the first survey, participants provided informed consent. The study consisted of eight total assessment points over the course of 2.5 years: four major assessments at 0, 12, 24, and 30 months from the onset of the study (corresponding to time points 1, 4, 7, and 8), and four minor assessments at 4, 8, 16, and 20 months from the onset of the study (corresponding to time points 2, 3, 5, and 6). Time point 1 was collected at the beginning of the DIDL program and time point 8 was collected 6 months following the end of the program (i.e., 6-month follow-up). At time point 1, participants were asked to provide basic demographic information and characteristics of their meditation practice, including type and frequency of meditation, average length of each meditation session, length of lifetime meditation experience, and familiarity with meditation and Buddhism. At major assessment points, participants were asked to complete the full battery of questionnaires. In order to ease the time burden on participants, at minor assessment points they were asked to complete an abbreviated battery consisting of theorized process of change measures, frequency and length of meditation, and the Valuing Questionnaire (see Measures section).

**Dharma in Daily Life (DIDL) condition.** Participants in the DIDL condition consisted of individuals enrolled to take part in a 2-year program taught by a professional meditation instructor in the Buddhist Insight Meditation tradition, Susie Harrington (www.desertdharma.org). The structure of the DIDL program was based on

the Dedicated Practitioners Program at Spirit Rock Insight Meditation Center in California, which was developed by Sally Armstrong, Eugene Cash, and others in the Spirit Rock teaching community. The curriculum of the Dedicated Practitioners Program was then further developed for DIDL by Susie Harrington. The DIDL program focused on the development of a formal daily meditation practice and the explicit integration of informal mindfulness practices and Buddhist teachings into daily life. As such, the program included meditation, mindfulness, and Buddhism components. It consisted of daily meditation practice (30 minutes per day, 6 days per week was strongly recommended), monthly readings with corresponding practices, weekly peer support phone calls with other students, monthly group video conference calls with a small number of students and the instructor, monthly one-on-one phone consultations with the instructor, and eight (approximately one every 3 months) weekend-long, silent, residential meditation retreats. Retreats were led by the program instructor and took place in southern Utah. Monthly individual phone and group video conference consultations with the instructor were used to discuss the readings/practices, provide support for daily meditation, and integrate the teachings into daily life. Weekend retreats consisted of approximately six to eight hours total of guided and unguided silent meditation, four to six talks on topics of Buddhism and meditation practice given by the program instructor, interactive exercises with other students, and silent meals. Two participants completed the meditation retreats at a distance via recordings from the in-person retreats. Assigned readings covered fundamental Buddhist teachings (including original suttas), commentaries, and other writings of contemporary Buddhist teachers. Exclusion criteria from the DIDL program included less than 1 year of meditation experience, no previous experience with meditation retreats, and/or significant functional impairment resulting from a mental health condition. No participants were excluded from DIDL.

**Control condition.** Participants in the control condition were individuals attending community meditation groups in northern Utah. Many control participants were experienced meditators (see Table 1 for participant characteristics), some with prior retreat experience, and a small number of whom ($n$ = 3) had completed previous versions of the DIDL program. No control participants were currently enrolled in the program. Control participants were not asked to change their mindfulness or meditation practices in any way, but to continue with whatever practices they currently maintained. There were no exclusion criteria for control participants as they did not receive an intervention and were asked only to complete questionnaires, incurring minimal risk.

**Measures**

**Quality of Life Scale (QOLS).** The QOLS (Flanagan, 1978) is a 16-item self-report questionnaire that assesses subjective quality of life across 16 life domains, such as health, relationships, and work. Respondents are asked to score their satisfaction in each domain on a scale of 1 (*terrible*) to 7 (*delighted*). Total scores range from 16 to 112, higher total scores indicate greater quality of life, with a mean score of 90 for healthy populations. The QOLS has good validity and test-retest reliability ($r$ = 0.78 – 0.84) based on healthy and chronically ill samples (Burckhardt & Anderson, 2003; Dronavalli & Thompson, 2015). Internal consistency in this study was $\alpha = 0.90$.

**The Warwick-Edinburgh Mental Well-being Scale (WEMWBS).** The WEMWBS (Tennant et al., 2007) is a 14-item self-report questionnaire that measures subjective well-being by focusing on positive aspects of mental health. It asks respondents about the frequency of feelings and thoughts experienced over the past 2 weeks and is scored on a scale of 1 (*none of the time*) to 5 (*all of the time*). Items include "I've been feeling relaxed" and "I've been interested in new things." Scores range from 14 to 70, with higher scores indicating greater well-being. The WEMWBS has good validity, high test-retest reliability ($r$ = 0.83), and has been validated in nonclinical samples (Lloyd & Devine, 2012; Tennant et al., 2007). In the current study, internal consistency was $\alpha = 0.93$.

**The WHO (Five) Well-being Index (WHO-5).** The WHO-5 is a widely used measure of mental well-being developed by the World Health Organization (WHO; Bech, Olsen, Kjoller, & Rasmussen, 2003). It includes five items that assess how respondents have been feeling over the past 2 weeks. It is rated on a scale of 0 (*at no time*) to 5 (*all of the time*) and includes items such as "I have felt cheerful and in good spirits" and "I have felt active and vigorous." Raw scores are multiplied by 4 to obtain a percentage score that ranges from 0 to 100, representing the worst possible to best possible quality of life, respectively. The WHO-5 has demonstrated good psychometric properties in clinical and nonclinical samples (Bech et al., 2003; Topp, Østergaard, Søndergaard, & Bech, 2015). In the current study, internal consistency was $\alpha = 0.88$.

**Valuing Questionnaire (VQ).** The VQ (Smout, Davies, Burns, & Christie, 2014) is a 10-item self-report questionnaire assessing the extent to which respondents enacted their values over the past week. It asks questions about general rather than domain-specific values and includes items such as "I made progress in the areas of my life I care most about" and "When things didn't go according to plan, I gave up easily." It is scored on a scale of 0 (*not at all true*) to 6 (*completely true*), with five items contributing to the Values Progress subscale and five items contributing to the Values Obstruction subscale. Both subscale scores range from 0 to 30, with higher Values Progress scores indicating greater progress in meaningful areas of life and higher Values Obstruction scores

indicating greater difficulty making progress in meaningful areas of life. The VQ has shown good psychometric properties in a nonclinical sample (Smout et al., 2014). In the current study, internal consistency was $\alpha = 0.89$.

**Acceptance and Action Questionnaire-II (AAQ-II).** The AAQ-II (Bond et al., 2011) is a 7-item self-report questionnaire assessing psychological inflexibility, or difficulties persisting in or changing behavior when doing so serves valued ends. Items include "I'm afraid of my feelings" and "emotions cause problems in my life." Respondents to rate how true each statement is for them on a scale from 1 (*never true*) to 7 (*always true*). Scores range from 7 to 49, with higher scores indicating greater psychological inflexibility. Scores exceeding 24 to 28 are considered clinically significant. The AAQ-II shows high validity and good test-retest reliability ($r = 0.79$ - $0.81$) in both clinical and nonclinical samples (Bond et al., 2011). Internal consistency in this study was $\alpha = 0.93$.

**Five Facet Mindfulness Questionnaire (FFMQ).** The FFMQ (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is a 39-item self-report questionnaire that assesses trait mindfulness along five subscales: Observe, Describe, Act with Awareness, Non-judgment, and Non-reaction. Items include phrases such as "I am easily distracted" and "I watch my feelings without getting lost in them." Items are rated on a scale of 1 (*never or very rarely true*) to 5 (*very often or always true*), indicating how true each statement generally is for the respondent. Total scores range from 39 to 195, with higher scores representing greater mindfulness. The FFMQ has good psychometric properties and has been validated among a sample of meditators (Baer et al., 2006; Christopher, Neuser, Michael, & Baitmangalkar, 2012). In the current study, internal consistency was $\alpha = 0.95$.

**Cognitive Fusion Questionnaire (CFQ).** The CFQ (Gillanders et al., 2014) is a 7-item self-report questionnaire assessing cognitive fusion, or the degree to which respondents tend to identify with their thoughts and feelings. Items are rated on a scale from 1 (*never true*) to 7 (*always true*) and include statements such as "I struggle with my thoughts" and "my thoughts cause me distress or emotional pain." Scores range from 7 to 49, with higher scores indicating more cognitive fusion. The CFQ has shown high validity and test-retest reliability in clinical and nonclinical samples ($r = 0.80$; Gillanders et al., 2014). In the current study, internal consistency was $\alpha = 0.94$.

**Frequency and length of meditation.** At each time point, participants were asked to retrospectively report the number of days they meditated (frequency) and the average length of their meditation sessions in minutes (length) over the previous week.

**Data Analyses**

Two main analyses were used to assess the associations in the QOLS, WEMWBS, WHO-5, and VQ outcomes across conditions and time. First, descriptive statistics were computed, stratified by condition. Next, mixed effects models (i.e., multilevel models) were used to evaluate if the two conditions predicted changes in the outcomes and whether that depended on time, which was treated as discrete (i.e., time 1, time 2, etc.). That is, we tested if there were interactions between condition and time regarding each of the outcomes. In cases in which the interaction was significant, we also assessed the interaction in the subscales of the measures if they were available. In these same models, we further tested if the practice measures (frequency of meditation and length of meditation session) predicted the outcome measures. Notably, we assessed whether separate models for the practice measures and condition/time changed the conclusions; they did not. Thus, a single model for each outcome was sufficient.

As done with the outcome measures, mixed effects models were used to determine whether the two conditions predicted changes in the process of change measures (i.e., AAQ, FFMQ, CFQ), and whether this depended on time. In cases in which the interaction was significant, we also assessed the interaction in the subscales of the measures if they were available. In these same models, the effects of frequency of meditation and length of session on the process measures were investigated.

## Results

Descriptive statistics with the bivariate tests of association showed no statistically significant differences between conditions at $p < .05$ across demographic characteristics at baseline (Table 1), including meditation history, frequency of meditation, age, and education level. There were significant differences between conditions at baseline on the WEMWBS, $t(29) = 2.65$, $p = 0.013$, and FFMQ, $t(29) = 2.75$, $p = 0.012$, with lower scores for the DIDL condition in both cases. No other outcome or process of change measure differed significantly between conditions at baseline ($p$s $< .05$). Six participants were lost to attrition, most of whom were in the control condition ($n = 5$), though the difference was not statistically significant ($\chi^2 = 2.67$, $p = 0.102$). However, there was a statistically significant difference on the FFMQ at baseline between those who completed the study and those who did not, with higher scores for those who did not complete the study, $t(29) = 4.0$, $p = .001$. There was also a significant difference in age between completers and non-completers, with the latter being younger, $t(-3.69)$, $p = .004$. In order to account for this difference, age was included as a covariate in each of our statistical models. For full descriptive statistics at each time point, see the Appendix.

Pearson correlations between predictors were calculated, and the highest correlation was between meditation session length and frequency, at $r = .37$. Additionally, the variance inflation factor (VIF) of each predictor was calculated. A VIF greater than 10 indicates multicollinearity. For the models in the current analyses, VIFs were between 1.00 and 1.16, providing evidence that multicollinearity in the current models was not an issue.

**Outcome Measures**

Differences between the two conditions were tested via mixed effects models using the lme4 (Bates, Mächler, Bolker, & Walker, 2015) and lmerTest (Kuznetsova, Brockhoff, & Christensen, 2017) packages in R (R Core Team, 2016) for each of the outcome measures (Table 2; all p-values from the mixed effects models use Satterthwaite approximations to degrees of freedom). The models each contained the condition and the time point (in discrete units) and the interaction of the two in order to assess the different trajectories over time by condition. In addition, each model contained the practice measures (frequency of meditation and length of meditation session) and history of meditation. Age was included as a covariate. Condition only predicted a different trajectory for WEMWBS ($p < .001$), wherein the DIDL condition increased over time while the control condition slightly decreased over time (Figure 1). All other interactions were not statistically significant, indicating that the trajectories of the QOLS, WHO-5, and VQ over time did not differ between conditions. The WEMWBS did not have subscales to further assess the interactions. For the models without significant interactions, the main effects of condition were also tested, showing no main effects across the outcome measures. This indicated no difference in overall level of these outcome measures between groups.

The relationships between the practice measures (meditation frequency and length of meditation session) and the outcomes were tested within these same mixed effects models. The results are also shown in Table 2. Here, the effect of meditation frequency was significant for WEMWBS ($p = .01$) and VQ Progress ($p < .001$), both showing a positive relationship (i.e., as meditation frequency increases, on average, well-being and progress toward values increase). The amount of time spent meditating per session (length of session) and the history of meditation (prior experience meditating) were not significant for any of the outcomes.

**Process of Change Measures**

Differences were also tested for the process of change measures via mixed effects models (Table 3). Two process measures showed a different trajectory over time by condition, CFQ ($p = .047$) and FFMQ ($p = .004$). For CFQ, the DIDL condition decreased in scores over time faster than the control, although both decreased over the

course of the study (Figure 2a). Further, the DIDL condition predicted having a positive trajectory in FFMQ scores while the control condition remained constant (Figure 2b). All other interactions were not significant. For the models without significant interactions, the main effects of condition were also tested, showing no main effects across the process measures. FFMQ has five subscales that were available to assess as well. Of these, three were significant: condition by time on FFMQ Describe ($p$ = .012), FFMQ Observe ($p$ = .019), and FFMQ Nonreactivity ($p$ = .021). These interactions are shown in Figure 2, panels c – e. In each, the DIDL condition increased over time in the respective FFMQ subscale while the control remained approximately constant across time. Notably, in nearly all panels of Figure 2, it is shown that the control condition had high variability compared to the DIDL condition via the raw data points and the thickness of the band around the line (representing the standard error of the mean). These results indicate that cognitive fusion in the DIDL condition decreased more quickly over time than that in the control condition, whereas mindfulness increased over time in the DIDL condition compared to the control condition.

The relationships between the practice measures (meditation frequency and length of meditation session) and the process of change measures were tested with mixed effects models in these same models. The results are shown in Table 3. Here, meditation frequency was significantly associated with the AAQ-II ($p$ = .046) and FFMQ ($p$ = .021) and with subscales on the FFMQ, specifically FFMQ Observe ($p$ = .033) and FFMQ Nonreactivity ($p$ = .009). Meditation frequency had a positive relationship with each of the FFMQ subscales and a negative relationship with the AAQ-II and CFQ. Length of meditation sessions also had a positive relationship with FFMQ Observe ($p$ = .002) and meditation history was positively related to FFMQ Nonreactivity ($p$ = .020). No other relationships between practice measures and process measures were significant. These results indicate that, accounting for the effects of session length, more frequent meditation practice is associated with lower levels of psychological inflexibility and higher levels of mindfulness (especially in the areas of observing one's experience and non-reactivity). Furthermore, accounting for the effects of frequency of meditation, longer meditation session length is associated with greater mindfulness in the area of observing one's experience. Additionally, one's prior meditation experience was associated with a greater ability to refrain from immediately reacting to experience. It is important to note that three participants in the control condition had completed a previous version of the DIDL program and had prior exposure to the intervention. Analyses were re-run excluding these participants, and the overall pattern of results did not change. Therefore, we elected to retain these participants in order for the control group to most accurately reflect the community of meditators and thus to better answer our research questions.

## Discussion

Our findings indicate that those who participated in a long-term program focusing on the integration of daily meditation, mindfulness, and Buddhist teachings (Dharma in Daily Life, or DIDL) increased their subjective well-being (WEMWBS), cognitive defusion (CFQ), and mindfulness (FFMQ) over time compared to those who continued mindfulness/meditative practices as normal and did not participate in DIDL. The differential trajectories of the groups provide some evidence for the benefits of active engagement in such a program. Overall, the trajectories of the dependent variables show a consistent pattern wherein the DIDL group started at a lower process of change/outcome level than the control group (although only the WEMWBS and FFMQ were significantly different) and ended at similar levels by the conclusion of the study. For the CFQ, the control group began at higher levels than DIDL, which is also consistent with this pattern, as higher CFQ scores are indicative of greater symptomatology (see Figures 1 and 2). A possible explanation for this pattern is that those individuals who chose to participate in DIDL were seeking to decrease their suffering and may have had lower well-being and mindfulness skills to begin with, factors that could have motivated their participation. Given that individual-level characteristics rather than the DIDL program could have led to changes over time, these baseline group differences weaken possible conclusions regarding the positive impact of DIDL on outcomes. However, our results show that the self-selecting individuals who participated in DIDL did see improvements in outcomes, so it is possible that DIDL is helpful for individuals with a specific profile. This caveat applies to the findings discussed below.

As Figure 1 illustrates, the between-group difference on the WEMWBS was characterized by an increase in the DIDL group and a decrease in the control group in subjective well-being over time. Outcomes were not different for quality of life (QOLS) and mental well-being (WHO-5), which assess other dimensions of well-being. It may be that the QOLS and WHO-5, which were developed for use in clinical populations, are less sensitive to changes within a “healthy” range (Burckhardt & Anderson, 2003; Topp et al., 2015), whereas the WEMWBS, which was designed to assess positive mental health and was normed in a nonclinical sample (Tennant et al., 2007), was more appropriate for use and sensitive to changes in well-being in the present nonclinical sample.

The CFQ and FFMQ were also significantly different across groups over time, with the DIDL group starting with lower levels of cognitive defusion (i.e., higher levels of cognitive fusion) and mindfulness skills and increasing over time, while the control group remained relatively constant. By looking at specific subscales on the FFMQ, it is apparent that changes in mindfulness within the DIDL group were driven by increases in these

participants' ability to observe and describe their experiences without immediately reacting to them (i.e., Describe, Observe, and Nonreactivity subscales), but not by acting with awareness or nonjudgement (i.e., Awareness and Nonjudgement subscales). This pattern across subscales suggests that awareness and nonjudgment skills may have been previously established or similarly targeted in both groups, whereas engaging in the DIDL program was more helpful for honing specific skills, including labeling internal experiences for what they are (observing), being present during activities (describing), and allowing thoughts and feelings to arise without becoming attached or reacting automatically to them (nonreactivity). Although an explanation for why this was the case would be speculative at this point, it is worth noting that these three skills particularly overlap with the construct of cognitive defusion.

Participation in the DIDL program included a number of components that may have contributed to the above findings, including frequent interaction with an experienced teacher, structure and accountability regarding individual practice, regular retreat attendance, contextualization of mindfulness within the original teachings of the Buddha, explicit integration of Buddhist teachings and mindfulness into daily life, and the extended period of time (2 years) over which the program was conducted. Because of the integrated nature of the DIDL program, it is difficult to discern the unique aspects of DIDL that contributed to these findings. Nevertheless, our results suggest that such an integrated program may have positive effects on individuals who start off with weaker mindfulness skills. More research into unique aspects of a structured Buddhist and mindfulness/meditation program relative to unstructured weekly mindfulness/meditation practice would clarify this explanation.

In the full sample, meditation frequency significantly predicted positive changes in subjective well-being, progress toward values, psychological flexibility, and mindfulness (specifically in the Observe and Nonreactivity subscales of the FFMQ). Session length was positively associated with FFMQ Observe, whereas meditation history was positively related to FFMQ Nonreactivity. These findings indicate that meditation frequency may be the most influential practice parameter in terms of impact on outcomes and processes of change, given that skills linked to session length and meditation history were also shifted by frequency. These results corroborate previous research that suggests regular meditation practice improves attentional and emotional self-regulation, constructs that relate to the processes measured in the current study (Aftanas & Golosheykin, 2005; Moore, Gruber, Derose, & Malinowski, 2012). Frequency of meditation has also been correlated with mindfulness and well-being contemporaneously, and aspects of mindfulness (observing, awareness) have been shown to mediate the relationship between frequency of meditation practice and well-being (Campos et al., 2016). The replication of these positive effects across related

outcomes and study designs support the wide-ranging benefits of regular meditation, suggesting that regular meditation sessions can be a helpful, convenient way to yield the benefits of meditation, and longer sessions may not be necessary to reap these benefits. Given that long meditation sessions may present a barrier to entry for individuals who want to begin practicing meditation, regular shorter sessions may be a viable and effective alternative.

Conversely, session length and meditation history were linked to improvement in specific mindfulness skills (observing and nonreactivity, respectively), beyond the contribution of session frequency. Thus, individuals seeking to refine aspects of their meditation practice may still benefit from engaging in longer meditation sessions and sustaining their practice over time, which could allow for more opportunities to improve the skills of observing and nonreactivity. The unique link between meditation history and nonreactivity may be partly due to the complexity of enacting equanimity in the face of internal experiences to which we tend to respond automatically and instinctively. In a way, nonreactivity rests on the foundation of observing, describing, acting with awareness, and nonjudging, representing a culmination of those aspects of mindfulness.

**Limitations and Future Research**

Notably, a limitation of the current study is that it lacked statistical power in many instances. Although the power was increased through the use of mixed effects models in analyzing the longitudinal data, many smaller effects were likely not captured in this study. In addition to a small sample size, six participants were lost to attrition, with the majority of these from the control condition. Greater attrition in the control condition may be due to the fact that these participants were less motivated to remain in the study since they were not taking part in the DIDL program. DIDL was a highly structured program specifically designed to keep participants engaged, while the control condition lacked this structure. Therefore, it is not surprising that there was greater attrition in this group. The control group also began the study with significantly higher levels of mindfulness than the DIDL group, which may explain why non-completers also began the study with higher levels of baseline mindfulness than completers.

Due to the use of a quasi-experimental design, we cannot ascribe causal power to the DIDL condition. Although we statistically controlled for initial scores, it is possible that other individual factors were different between groups (e.g., factors that would lead individuals to seek a structured mindfulness program in the first place) and helped to explain the discrepant trajectories in addition to the respective meditation practices. Furthermore, our sample was demographically homogeneous (mostly White, highly educated, and middle-aged) and self-selected; these factors limit generalizability of current findings to other populations. Replication of this study design with a

larger, more diverse sample and use of randomization would provide a more robust examination of our hypotheses, as well as allow for mediational tests. Randomization is particularly important for future research to maximize the probability that groups are equal at the start. Without baseline group equivalence, it is difficult – if not impossible – to control for the effects of confounding variables and to precisely determine which variables lead to changes in outcomes over time. A randomized design would clarify whether meditation practice has positive effects across individuals or if the benefits are specific to those who start off with lower levels of well-being and/or mindfulness skills. In addition, it would be worth testing which components of the DIDL program are most active in terms of impact on well-being. It may be that certain components are independently effective or that the combination of components has a Gestalt effect on outcomes.

Finally, meditation practice parameters were based on retrospective self-report of the previous week, and outcomes were measured via self-report questionnaires. The use of retrospective self-report of meditation frequency/length did not account for periods of meditation prior to the week immediately before an assessment point. Self-report measures inherently include some amount of measurement error due to the possibility of recall bias and variable accuracy and reliability of the self-reported data. More objective measures of the duration and frequency of meditation sessions, for example with the use of technology or outside observers to corroborate self-reports, could theoretically improve the reliability of these measures, as could behavioral measures of study outcomes. However, such methods may have also placed an undue measurement burden on participants that outweighed the benefits gained from their participation in the study. Given the naturalistic design and 2.5-year length of the study, use of self-report was considered appropriate in order to reduce this burden as much as possible and ensure maximal participant retention. Future research would be strengthened by the use of behavioral measures of mindfulness and well-being, concurrent (i.e., daily) tracking of meditation practice, and/or the use of technology or outside observers to obtain data on reliability of self-reported practice.

Despite these limitations, the current study was a first step in examining a meditation program of this length and comparing its effects to the continuation of regular mindfulness/meditative practices that did not include participation in a structured program. Furthermore, the intensive longitudinal design (seven assessment points over 2 years and a 6-month follow-up) allowed for examination of longer term and more nuanced changes over the course of the study. We also examined frequency and length of meditation sessions separately and found differential effects for these practice parameters, supporting the claim that these variables are distinct predictors of outcomes. Given

that established mindfulness-based therapies, such as MBSR and MBCT, require 45-minute daily meditation sessions, which might have diminishing returns, clarifying how frequency and length differentially impact outcomes could be used to streamline use of meditation practice in clinical practice. One way to do so is by using an experimental design to manipulate parameters of frequency and length to determine which aspects of meditation practice are most crucial for improving outcomes and the thresholds at which benefits plateau. Another potential future direction is to experimentally explore the additive effect of other aspects of Buddhist teachings in addition to mindfulness (e.g., compassion, ethics, generosity) to see if contextualization of mindfulness practice provides incremental benefits to mindfulness practice that lacks explicit integration with other Buddhist teachings.

**Ethical approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (Utah State University IRB protocol 6235) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Author Contributions:** BMS designed and executed the study, assisted with data analysis, wrote the methods and half the introduction, and edited the manuscript. CWO: Wrote the discussion and offered major edits to the full manuscript. TSB: conducted data analysis and wrote the results. EJB: collaborated on study design and wrote half the introduction. TAS: collaborated on study design, advised on aspects related to the DIDL program, and offered edits to the full manuscript. MPT: collaborated on study design and offered edits to the full manuscript.

**Informed Consent:** Informed consent was obtained from all individual participants included in the study.

**Data Availability Statement:** All data are available at the Open Science Framework (https://osf.io/64awp/?view_only=1724e125c9d2485e9276fb561a7a652f).

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Table 1.
*Descriptive statistics of the sample at baseline in the total sample and by condition.*

| Characteristic | Total ($N$ = 31) | DIDL ($n$ = 17) | Control ($n$ = 14) | $t$ or $\chi^2$ | $p$ |
|---|---|---|---|---|---|
| Age in years, *M* (*SD*) | 45.1 (15.9) | 47.5 (16) | 42.2 (15.8) | 0.93 | 0.362 |
| Gender | | | | 0.16 | 0.688 |
| Female | 20 (64.5%) | 12 (70.6%) | 8 (57.1%) | | |
| Race/Ethnicity | | | | 2.22 | 0.329 |
| Hispanic/Latinx | 3 (10%) | 1 (5.9%) | 2 (15.4%) | | |
| White | 26 (86.7%) | 16 (94.1%) | 10 (76.9%) | | |
| Multiracial | 1 (3.3%) | 0 (0%) | 1 (7.7%) | | |
| Education | | | | 7.04 | 0.218 |
| High School | 1 (3.2%) | 1 (5.9%) | 0 (0%) | | |
| Some college | 2 (6.5%) | 0 (0%) | 2 (14.3%) | | |
| Bachelor's degree | 7 (22.6%) | 5 (29.4%) | 2 (14.3%) | | |
| Some grad school | 1 (3.2%) | 1 (5.9%) | 0 (0%) | | |
| Master's degree | 13 (41.9%) | 8 (47.1%) | 5 (35.7%) | | |
| Doctoral degree | 7 (22.6%) | 2 (11.8%) | 5 (35.7%) | | |
| Marital status | | | | 3.41 | 0.492 |
| Single | 12 (38.7%) | 7 (41.2%) | 5 (35.7%) | | |
| Married | 12 (38.7%) | 5 (29.4%) | 7 (50%) | | |
| Divorced | 4 (12.9%) | 2 (11.8%) | 2 (14.3%) | | |
| Remarried | 1 (3.2%) | 1 (5.9%) | 0 (0%) | | |
| Domestic partner | 2 (6.5%) | 2 (11.8%) | 0 (0%) | | |
| Religion | | | | 5.20 | 0.518 |
| Christian | 5 (16.7%) | 2 (11.8%) | 3 (23.1%) | | |
| Buddhist | 9 (30%) | 5 (29.4%) | 4 (30.8%) | | |
| Agnostic | 3 (10 %) | 2 (11.8%0 | 1 (7.7%) | | |
| Spiritual | 2 (6.7%) | 0 (0%) | 2 (15.4%) | | |
| Atheist | 3 (10%) | 2 (11.8%) | 1 (7.7%) | | |
| None | 2 (6.7%) | 2 (11.8%) | 0 (0%) | | |
| Other | 6 (20%) | 4 (23.5%) | 2 (15.4%) | | |
| Meditation experience in months, *M* (*SD*) | 95.2 (107) | 88.4 (124.7) | 103.6 (84.4) | -0.40 | 0.69 |
| Frequency of meditation in days, *M* (*SD*) | 4.5 (2.0) | 4.9 (1.9) | 4 (2.0) | -1.26 | 0.22 |
| Familiarity with Buddhist teachings | | | | 4.66 | 0.199 |
| Very familiar | 2 (6.5%) | 0 (0%) | 2 (14.3%) | | |
| Pretty familiar | 12 (38.7%) | 6 (35.3%) | 6 (42.9%) | | |
| Somewhat familiar | 14 (45.2%) | 10 (58.8%) | 4 (28.6%) | | |
| Not very familiar | 3 (9.7%) | 1 (5.9%) | 2 (14.3%) | | |
| Not at all familiar | 0 (0%) | 0 (0%) | 0 (0%) | | |

*Note.* DIDL = Dharma in Daily Life.

Table 2.
*Results of the mixed effects models for predicting trajectories of the outcome measures by assigned condition, meditation frequency, and length.*

| | QOLS | WEMWBS | WHO-5 | VQ Pro | VQ Obs |
|---|---|---|---|---|---|
| Intercept | 58.86 *** | 40.25 *** | 29.90 * | 17.85 *** | 14.47 *** |
| | (10.32) | (5.69) | (13.21) | (3.70) | (3.59) |
| Condition (DIDL) | -4.30 | -7.61 ** | -9.93 | -2.46 | 2.03 |
| | (5.04) | (2.95) | (6.95) | (1.80) | (1.73) |
| Time | -0.47 | -0.75 * | -0.67 | 0.08 | -0.09 |
| | (0.47) | (0.31) | (0.76) | (0.18) | (0.17) |
| Frequency | 1.21 | 1.00 ** | 1.70 | 0.79 *** | -0.33 |
| | (0.64) | (0.38) | (0.90) | (0.20) | (0.19) |
| Session Length | 0.03 | -0.01 | 0.09 | -0.03 | 0.01 |
| | (0.07) | (0.04) | (0.11) | (0.03) | (0.02) |
| Meditation History | 7.19 | 1.64 | 3.75 | 1.85 | -0.26 |
| | (4.87) | (2.66) | (6.15) | (1.77) | (1.72) |
| Age | 0.16 | 0.15 * | 0.41 * | -0.03 | -0.10 * |
| | (0.13) | (0.07) | (0.17) | (0.05) | (0.05) |
| Condition * Time | 0.77 | 1.34 ** | 1.45 | 0.16 | -0.14 |
| | (0.64) | (0.41) | (0.98) | (0.24) | (0.22) |
| AIC | 779.90 | 763.54 | 944.63 | 1223.13 | 1195.81 |
| Num. obs. | 102 | 112 | 112 | 205 | 205 |

*Note.* QOLS = Quality of Life Scale, WEMWBS = Warwick-Edinburgh Mental Well-Being Scale, WHO-5 = WHO (5) Well-Being Index, VQ Pro = Valuing Questionnaire Progress subscale, VQ Obs = Valuing Questionnaire Obstruction subscale, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 3.
*Results of the mixed effects models for predicting trajectories of the process of change measures and FFMQ subscales by assigned condition, meditation frequency, and length.*

| | | | | FFMQ Subscales | | | | |
|---|---|---|---|---|---|---|---|---|
| | AAQ-II | CFQ | FFMQ | Observe | Act Aware | Describe | Nonjudge | Nonreact |
| Intercept | 33.13 *** | 34.50 *** | 111.33 *** | 26.07 *** | 23.35 *** | 25.44 *** | 19.43 *** | 16.55 *** |
| | (6.40) | (6.28) | (14.02) | (4.00) | (1.89) | (4.85) | (5.61) | (3.04) |
| Condition (DIDL) | 3.45 | 3.99 | -14.56 * | -2.68 | -0.87 | -2.97 | -4.37 | -3.35 * |
| | (2.89) | (2.84) | (6.24) | (1.75) | (0.91) | (2.14) | (2.51) | (1.42) |
| Time | 0.13 | -0.21 | 0.77 | 0.17 | 0.05 | 0.14 | 0.38 * | 0.08 |
| | (0.22) | (0.22) | (0.45) | (0.11) | (0.09) | (0.14) | (0.18) | (0.13) |
| Frequency | -0.50 * | -0.48 | 1.16 * | 0.27 * | 0.11 | 0.06 | 0.33 | 0.36 ** |
| | (0.25) | (0.25) | (0.50) | (0.12) | (0.10) | (0.16) | (0.21) | (0.14) |
| Length of Session | -0.02 | 0.03 | 0.09 | 0.05 ** | -0.01 | 0.02 | 0.01 | 0.02 |
| | (0.03) | (0.03) | (0.06) | (0.02) | (0.01) | (0.02) | (0.03) | (0.02) |
| Meditation History | -3.86 | -1.93 | 11.94 | 2.00 | 0.37 | 3.51 | 2.50 | 3.65 * |
| | (3.11) | (3.05) | (6.83) | (1.96) | (0.91) | (2.37) | (2.73) | (1.47) |
| Age | -0.13 | -0.15 | 0.02 | -0.03 | 0.02 | -0.05 | 0.08 | -0.01 |
| | (0.09) | (0.08) | (0.19) | (0.05) | (0.02) | (0.06) | (0.07) | (0.04) |
| Condition * Time | -0.51 | -0.58 * | 1.70 ** | 0.34 * | 0.11 | 0.48 * | 0.34 | 0.38 * |
| | (0.29) | (0.29) | (0.58) | (0.14) | (0.12) | (0.19) | (0.24) | (0.16) |
| AIC | 1315.46 | 1318.21 | 1593.22 | 1051.38 | 942.28 | 1150.66 | 1251.20 | 1086.92 |
| BIC | 1348.69 | 1351.49 | 1626.45 | 1084.66 | 975.56 | 1183.89 | 1284.48 | 1120.20 |
| Num. obs. | 205 | 206 | 205 | 206 | 206 | 205 | 206 | 206 |

*Note.* AAQ-II = Acceptance and Action Questionnaire-II, FFMQ = Five Facet Mindfulness Questionnaire, CFQ = Cognitive Fusion Questionnaire, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion.
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

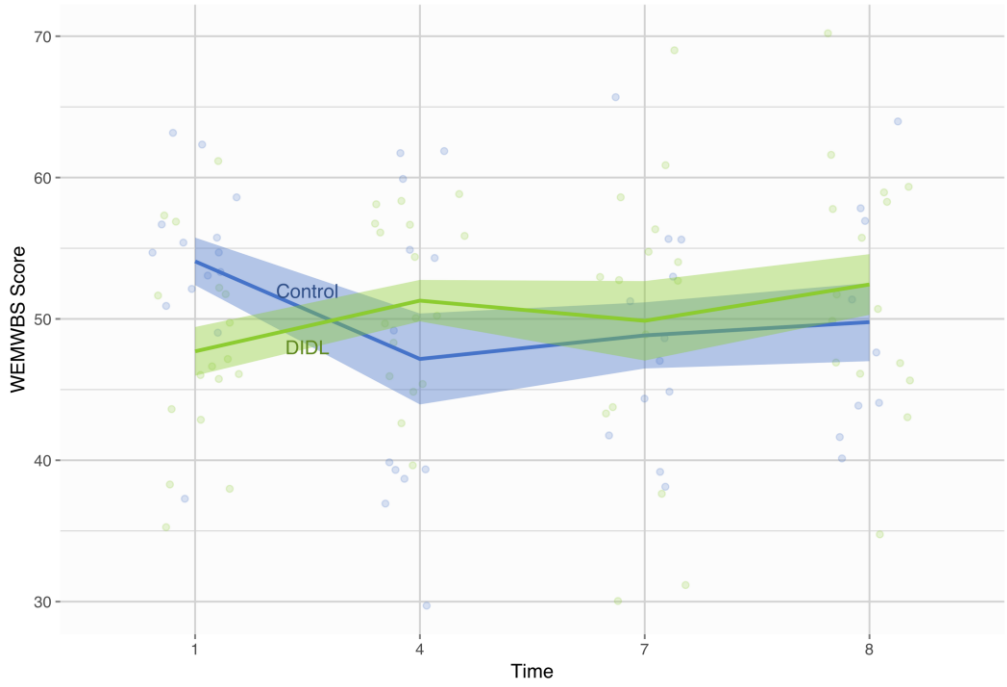


*Figure 1*. The statistically significant interaction between time and condition regarding WEMWBS. Lines represent the mean, and colored bands represent standard error of the mean.

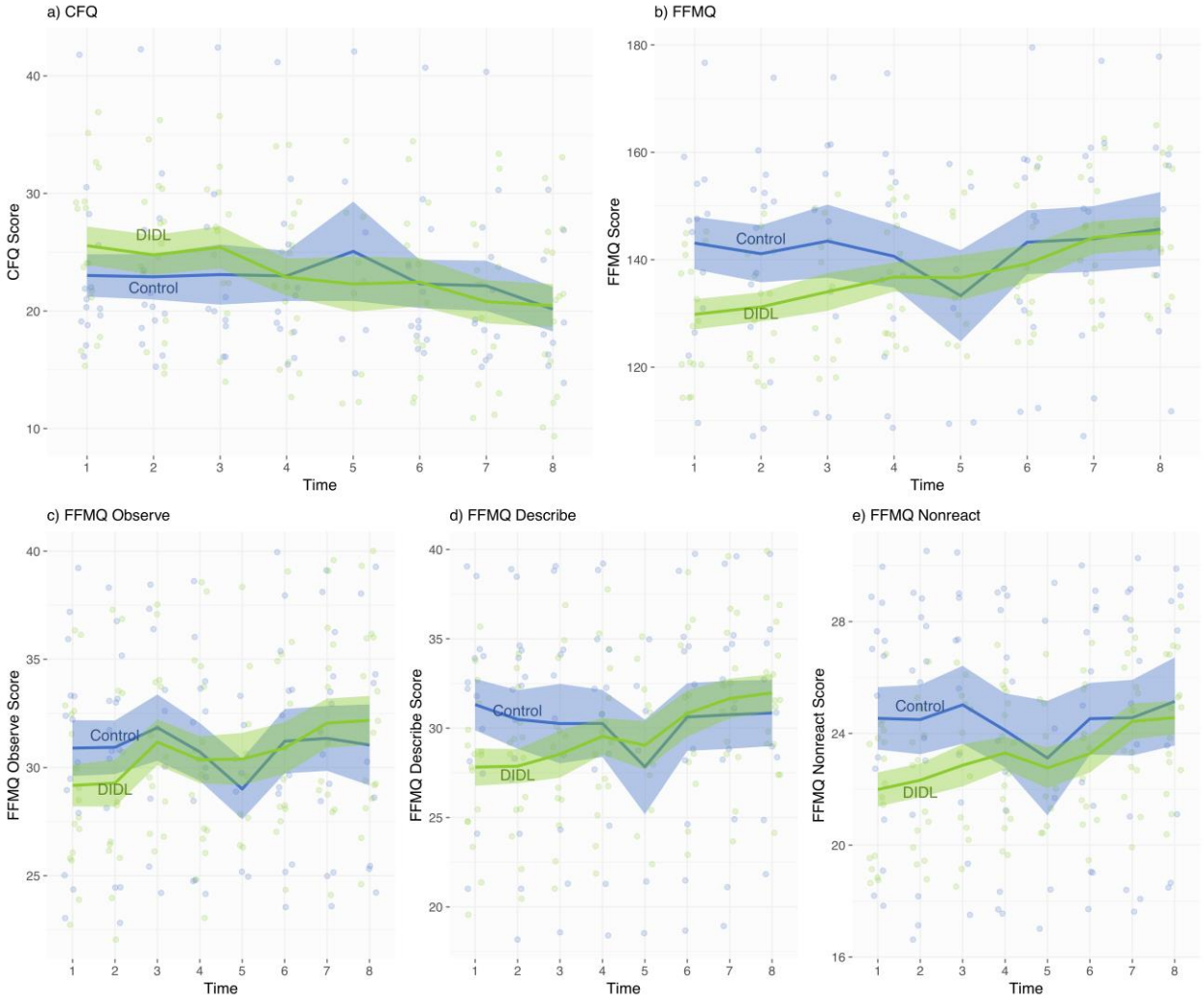


*Figure 2.* The statistically significant interactions between time and condition for the process of change measures. Panel a) is the interaction of time and condition regarding CFQ. Panels b – e are the main FFMQ score and various sub-scores of FFMQ that had significant interactions. Lines represent the mean, and colored bands represent standard error of the mean.

Appendix

Table A1.
*Means and standard deviations of each outcome measure at each time point in the total sample and by condition.*

| | | Time Point | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Total | | *n* = 31 | *n* = 30 | *n* = 24 | *n* = 29 | *n* = 16 | *n* = 25 | *n* = 27 | *n* = 25 |
| | QOLS | 82.8 (12.3) | | | 81.9 (14.8) | | | 82.2 (14.0) | 84.0 (15.1) |
| | WEMWBS | 50.6 (7.4) | | | 49.6 (8.6) | | | 49.4 (9.6) | 51.5 (8.4) |
| | WHO-5 | 60.4 (18.2) | | | 58.5 (21.6) | | | 60.4 (20.0) | 62.6 (18.4) |
| | VQ Pro | 20.0 (4.8) | 22.3 (5.2) | 21.7 (6.3) | 21.3 (6.2) | 22.1 (5.3) | 21.8 (5.0) | 21.0 (6.4) | 21.6 (6.6) |
| | VQ Obs | 9.9 (4.4) | 9.3 (5.1) | 8.8 (6.2) | 8.1 (4.4) | 9.0 (6.6) | 8.3 (6.0) | 10.4 (6.2) | 7.2 (4.5) |
| DIDL | | *n* = 17 | *n* = 16 | *n* = 13 | *n* = 17 | *n* = 10 | *n* = 13 | *n* = 15 | *n* = 16 |
| | QOLS | 80.6 (13.6) | | | 84.0 (10.0) | | | 80.8 (15.9) | 84.8 (15.1) |
| | WEMWBS | 47.7 (7.1) | | | 51.3 (6.0) | | | 49.9 (10.9) | 52.4 (8.6) |
| | WHO-5 | 56.9 (20.2) | | | 62.4 (17.9) | | | 60.8 (20.2) | 62.8 (19.6) |
| | VQ Pro | 18.7 (4.7) | 21.0 (5.4) | 21.8 (6.7) | 21.6 (5.6) | 22.8 (3.9) | 20.2 (5.2) | 20.1 (6.5) | 20.9 (6.7) |
| | VQ Obs | 11.1 (4.7) | 9.3 (5.2) | 9.1 (6.3) | 8.1 (4.0) | 8.1 (6.9) | 9.7 (7.3) | 10.8 (6.9) | 7.5 (4.3) |
| Control | | *n* = 14 | *n* = 14 | *n* = 11 | *n* = 12 | *n* = 6 | *n* = 12 | *n* = 12 | *n* = 9 |
| | QOLS | 84.9 (11.0) | | | 78.7 (19.9) | | | 83.7 (12.2) | 82.6 (16.0) |
| | WEMWBS | 54.1 (6.3) | | | 47.2 (11.1) | | | 48.8 (8.1) | 49.8 (8.3) |
| | WHO-5 | 64.6 (15.1) | | | 53.0 (25.7) | | | 60.0 (20.6) | 62.2 (17.2) |
| | VQ Pro | 21.5 (4.6) | 23.8 (4.6) | 21.5 (6.2) | 20.9 (7.1) | 20.8 (7.4) | 23.6 (4.3) | 22.1 (6.5) | 22.8 (6.8) |
| | VQ Obs | 8.5 (3.8) | 9.3 (5.3) | 8.4 (6.3) | 8.1 (5.1) | 10.5 (6.5) | 6.8 (3.8) | 9.9 (5.4) | 6.7 (5.0) |

*Note.* QOLS = Quality of Life Scale, WEMWBS = Warwick-Edinburgh Mental Well-Being Scale, WHO-5 = WHO (5) Well-Being Index, VQ Pro = Valuing Questionnaire Progress subscale, VQ Obs = Valuing Questionnaire Obstruction subscale

Table A2.
*Means and standard deviations of each process of change measure at each time point in the total sample and by condition.*

| | | Time Point | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Total | | *n* = 31 | *n* = 30 | *n* = 24 | *n* = 29 | *n* = 16 | *n* = 25 | *n* = 27 | *n* = 25 |
| | AAQ-II | 18.8 (8.7) | 19.4 (7.9) | 19.7 (8.7) | 19.4 (8.2) | 19.3 (11.7) | 18.5 (8.6) | 19.7 (9.9) | 16.8 (7.7) |
| | CFQ | 24.7 (8.3) | 24.8 (7.5) | 24.2 (8.1) | 21.5 (8.0) | 22.5 (10.0) | 22.0 (9.0) | 22.3 (9.1) | 20.6 (9.5) |
| | FFMQ | 133.9 (18.5) | 135.2 (17.9) | 137.6 (17.5) | 140.2 (19.8) | 139.6 (20.1) | 144.0 (19.4) | 142.9 (20.3) | 142.2 (18.6) |
| DIDL | | *n* = 17 | *n* = 16 | *n* = 13 | *n* = 17 | *n* = 10 | *n* = 13 | *n* = 15 | *n* = 16 |
| | AAQ-II | 20.2 (8.3) | 19.5 (6.8) | 20.5 (8.1) | 18.6 (7.0) | 17.4 (9.9) | 19.2 (8.9) | 20.2 (11.1) | 16.0 (7.0) |
| | CFQ | 26.6 (7.2) | 25.4 (6.5) | 24.6 (7.0) | 20.6 (6.8) | 21.5 (9.2) | 23.0 (9.7) | 22.5 (11.1) | 20.2 (10.1) |
| | FFMQ | 126.4 (14.0) | 131.9 (12.3) | 135.2 (12.4) | 138.8 (12.8) | 140.9 (14.4) | 141.7 (16.8) | 140.1 (17.8) | 144.0 (16.3) |
| Control | | *n* = 14 | *n* = 14 | *n* = 11 | *n* = 12 | *n* = 6 | *n* = 12 | *n* = 12 | *n* = 9 |
| | AAQ-II | 17.1 (9.2) | 19.3 (9.3) | 18.8 (9.7) | 20.6 (9.8) | 22.5 (14.6) | 17.8 (8.6) | 19.1 (8.5) | 18.2 (9.1) |
| | CFQ | 22.3 (9.3) | 24.2 (8.7) | 23.6 (9.8) | 22.7 (9.6) | 24.2 (11.8) | 21.0 (8.5) | 22.2 (6.3) | 21.4 (8.7) |
| | FFMQ | 143.8 (19.4) | 138.9 (22.6) | 140.8 (22.8) | 142.1 (27.5) | 137.5 (28.7) | 146.4 (22.4) | 146.2 (23.3) | 138.9 (22.8) |

*Note.* AAQ-II = Acceptance and Action Questionnaire-II, FFMQ = Five Facet Mindfulness Questionnaire, CFQ = Cognitive Fusion Questionnaire