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Empirical Research

Relationships between amount of post-intervention mindfulness practice and follow-up outcome variables in an acceptance-based behavior therapy for Generalized Anxiety Disorder: The importance of informal practice

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ABSTRACT

Because most behavioral treatments are time-limited, skills and practices that foster long-term maintenance of gains made during treatment are of critical importance. While some studies have found mindfulness practice to be associated with improvements in outcome variables over the course of treatment (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009), very little is known about the effects of continued mindfulness practice following treatment termination. The current study examined the relationships between separate single item measurements of three types of mindfulness practices (formal, informal, and mindfulness of breath in daily life) and long-term outcomes in worry, clinician-rated anxiety severity, and quality of life following treatment with an acceptance-based behavior therapy (ABBT) for Generalized Anxiety Disorder (GAD) in two separate treatment studies. Results from Study 1 showed that at 9-month follow-up, amount of informal mindfulness practice was significantly related to continued beneficial outcomes for worry, clinician-rated anxiety severity, and quality of life. Similarly, in Study 2, at 6-month follow-up informal mindfulness practice was significantly related to continued beneficial outcomes for anxiety severity and worry, and at 12-month follow-up informal mindfulness practice was significantly related to continued beneficial outcomes for quality of life and worry, and mindfulness of breath was significantly related to quality of life. When results from the final time point in both studies were combined, informal practice was significant related to all three outcome variables, and mindfulness of breath was significantly related to worry and quality of life. Formal practice was not significantly related to outcomes in either study, or in the combined sample. These findings support the further study of informal mindfulness practices as important tools for continued beneficial clinical outcomes following treatment for people with a principal diagnosis of GAD.

1. Introduction

The use of between-session homework assignments in the context of therapy for the development of specific skills is a longstanding practice. The concept of self-help assignments in psychotherapy emerged in the literature as early as the 1930s (Dunlop, 1936). Between-session homework assignments are still a cornerstone of many cognitive-behavioral treatments (CBT), and are conceptualized as practices that lead to the development and utilization of specific health-promoting skills (Dozois, 2010). By providing training in skills that promote flexible and adaptive functioning, clients may be able to generalize the gains made in treatment to difficulties that arise beyond treatment termination, potentially preventing relapse. A recent meta-analysis comparing cognitive-behavioral treatments, with and without between session homework, found significantly larger effect sizes on outcome variables for treatments with homework (Kazantzis, Whittington, & Dattilio, 2010). While this finding provides some evidence that *between-session homework* leads to better outcomes at post-treatment, less is known about the potential impact of *post-treatment continued practice of homework exercises* on long-term mental health.

Mindfulness practices, with roots in Buddhist psychology and meditation practices dating back over two and a half millennia, have been increasingly applied as between-session homework in Western therapeutic contexts over the past few decades (Deatherage, 1975;

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Hayes, Follette, & Linehan, 2004). Formal mindfulness practices may take the form of the more traditional time-delineated seated meditation as well as mindful yoga and other specific meditative exercises, while informal practices refer to intentionally applying mindful awareness to daily activities such as washing the dishes, cooking, or driving (Kabat-Zinn, 1990). Mindfulness of breathing refers to even briefer moments of paying attention to one's breath throughout the day, regardless of the context or situation.

Many of the most-studied mindfulness- and acceptance-based interventions assign considerable amounts of between-session mindfulness practice. Mindfulness-based stress reduction (MBSR) and interventions modeled closely after the structure of MBSR, such as Mindfulness-Based Cognitive Therapy (MBCT), often assign 45 min of formal practice per day, 6–7 days a week (Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). Other treatments such as Acceptance and Commitment Therapy (ACT) and Dialectical Behavioral Therapy (DBT) are less directly focused on the practice of formal mindfulness meditation and may incorporate more informal mindfulness practices into between-session homework (Hayes & Smith, 2005; Linehan, 1993). Such interventions, including the acceptance-based behavior therapy (ABBT) for GAD investigated in the current two studies, incorporate both formal and informal practices in an attempt to flexibly tailor practice types and amounts to match client skill levels, preferences, and different life contexts (Roemer & Orsillo, 2009).

Although between-session mindfulness practice is presumed to be an important component of these approaches to treatment, clients present to treatment from diverse cultural and socioeconomic statuses and some may find it impossible to commit to regularly scheduled, time intensive practices (Sobczak & West, 2013). For example, a single-mother working multiple jobs to support her family might have very little extra time for lengthy daily formal practices. Thus, research examining both the statistical and clinical impact of the amount and type of practice on psychological well-being is needed to guide the development empirically-informed clinical recommendations. A meta-analysis of mindfulness-based group intervention studies by Vettese et al. (2009) found that fewer than 25% of the 96 studies included in their analysis provide data on the relationship between amount of reported practice and outcomes. Thirteen (54%) of the 24 studies that did examine this relationship found that more practice was associated with better outcome; the remaining 11 studies that conducted these kinds of analyses did not. Importantly, the majority of the studies included in this meta-analysis assessed only formal mindfulness meditation, and thus cannot inform our understanding of the potential relationship of informal practice to clinical outcomes. While evidence is mixed, and moderator variables such as "quality" of practice may help explain some of the inconsistent findings, some evidence points to between-session mindfulness practice being related to improvements in outcomes.

While investigations of mindfulness practice and outcomes during treatment are limited, our understanding of such practices in relation to long-term outcomes post-treatment is even more meager. Only a few studies have looked at mindfulness practice during follow-up periods in relation to long-term outcomes and nearly all of them are studies of MBSR or closely-related treatments. For 19 organ-transplant patients who completed an 8-week MBSR program, minutes of total formal practice during a 3-month follow-up period was significantly correlated with continued improvements in sleep quality and anxiety measures, while depression gains were not maintained and were unrelated to amount of formal practice (Gross et al., 2004). Sephton et al. (2007) found that, in a community sample of women with fibromyalgia who completed an MBSR program, those who reported continuing to engage in formal mindfulness practice at the two-month follow-up period reported the greatest reduction in depressive symptoms. In a study of Mindfulness-Based Cognitive Therapy (MBCT), improvements in depressive symptoms over follow-up periods ranging from 12 to 34 months were significantly associated with both duration and frequency of post-treatment formal and informal mindfulness practices, although the authors did not describe their practice measures (Mathew, Whitford, Kenny, & Denson, 2010). The remaining studies, three with participants in MBSR programs (Davidson et al., 2004; Kabat-Zinn, Lipworth, Burney, & Sellers, 1987; Kabat-Zinn et al., 1992) and one following a 10-day intensive mindfulness meditation retreat (Ostafin et al., 2006), did not find significant relationships between amount of post-intervention practice and long-term outcomes. These studies found significant improvements in outcome variables attributable to intervention participation, and some failed to find significant relationships between practice amounts and follow-up outcomes, however, methods of quantifying practice levels varied widely. In particular, measurements of informal practice were rarely included. Since the purpose of most mental health treatments is to promote long-term adaptive functioning following treatment termination, continued investigation of mindfulness practices and outcome variables during follow up periods may help guide treatment to maximize long-term effectiveness.

The present study analyzed follow-up data from two randomized control trials exploring the efficacy of an acceptance-based behavior therapy (ABBT) for Generalized Anxiety Disorder (GAD). The main results for Study 1, which were reported by Roemer, Orsillo, and Salters-Pednault (2008), showed large magnitude improvements at post-treatment and maintenance of gains across follow-up time points for worry, clinician-rated severity of GAD symptoms, and quality of life. To investigate the role of continued mindfulness practice in long-term outcomes following the 16-week treatment in Study 1, we examined the relationships between the self-reported amount of formal mindfulness practice, informal mindfulness practice, and mindful breathing and changes in GAD severity, worry, and quality of life from pre-treatment to 9 months after the completion of treatment. The main results for Study 2, which are reported by Hayes-Skelton, Roemer, and Orsillo (2013), showed significant improvements at post-treatment and maintenance of gains through the 6-month follow-up time point for worry, severity of GAD symptoms, and quality of life. To replicate the procedures of Study 1 and extend the time period, we examined the same relationships from pre-treatment to 6 and 12 months after the completion of treatment in Study 2. To our knowledge this is the first study looking at the relation of continued formal and informal mindfulness practice and follow-up outcomes in an individual ABBT for people with a principal diagnosis of GAD.

2. Study 1

2.1. Methods

2.1.1. Participants

Participants in this study were drawn from a randomized controlled study in which clients with a principal diagnosis of GAD were randomized to receive either the treatment or be on a waitlist prior to receiving the treatment (Roemer, Orsillo, & Salters-Pedneault, 2008). Data were analyzed from the 15 individuals who completed 16 sessions of ABBT and a 9-month follow-up assessment. All 15 self-identified as White, 9 (60%) identified their gender as female, 6 (40%) as male. The mean age of the sample was 38.27 (SD = 13.47; range 21–66) years. All participants began treatment with a principal diagnosis of GAD and on average 2.56 (SD = 1.59) comorbid diagnoses, with depressive disorders ($n = 9$), Social Anxiety Disorder ($n = 8$), and