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Leaves on a stream: The effectiveness of a mindfulness-based exercise on the frequency, and difficulty in “letting go” of, anxious self-statements

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A controlled trial was conducted to investigate the effect of a brief mindfulness-based intervention on the frequency, and difficulty in “letting go” of anxious self-statements. Each day for a week participants in the treatment group ($n = 28$) listened to the *Leaves on a Stream* mindfulness exercise (LeJeune, 2012), while those in the control group ($n = 29$) listened to a passage of prose of equal duration. The mean scores of both groups improved from pre- to post-intervention. However, after intervention, the treatment group did not display lower frequency or difficulty in letting go of anxious self-statements than the control group. Explanations for, and practical implications of, these results are discussed.

Key Words: Mindfulness, decentering, anxiety, negative cognitions

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The aim of the present study was to investigate the effect of the mindfulness based exercise *Leaves on a Stream* (LeJeune, 2012) on frequency, and difficulty in “letting go” of, anxious self-statements. For the purposes of this paper mindfulness refers to the awareness that arises through “paying attention in a particular way: on purpose, in the present moment, and non-judgementally” (Kabat-Zinn, 1994, p.4). “Letting go” refers to decentering: the act of viewing thoughts as events in the mind rather than necessarily being reflections of reality or accurate self-view (Feldman, Greeson, & Senville, 2010). Mindfulness training refers to instruction in relation to a series of a mental practices involving the conscious abandonment of a direct change agenda in the key domains of private events, self, and history, and an openness to experiencing thoughts and emotions as they are, not as they say they are (Hayes & Pankey, 2003). And, anxious self-statements refer to anxious cognitive content: anxious self-talk or internal speech (Kendall & Hollon, 1989).

A number of models of psychopathology emphasise the central role of cognition in aetiology and recovery. Beck and Clark (1988) for example, argue that internal dialogue involving threat and vulnerability arising from dysfunctional schemas plays a primary role in the aetiology and maintenance of anxiety disorders. Hayes, Strosahl, and Wilson (1999), propose that cognitive fusion, whereby an individual buys into the literal meaning of their thoughts, leads to avoidant behaviours to the detriment of valued ends. And, Wells (2002) argues that rumination, a process of recurrent passive thoughts about one’s distress and the circumstances contributing to it (Nolen-Hoeksema, 2000), leads to avoidant behaviours, anxious thoughts, and problematic moods. With regard to mindfulness and psychological health, cognitive theories have focused on controlled versus automatic thinking (Breslin, Zack, & McMain, 2002; Craske & Hazlett-Stephens, 2002; Segal, Williams, & Teasdale, 2002; Teasdale, Segal, & Williams, 1995; Wells, 2002). Cognitive symptoms associated with anxiety disorders have traditionally been regarded by individuals as automatic processes beyond their capacity for voluntary inhibition or control (Mathews & MacLeod, 2005). Mindfulness meditation training is thought to increase one’s capacity to decentre from internal experiences which leads to a reduction in cognitive elaboration, as well as a greater capacity to perceive negative thoughts as being more controllable and less intrusive and bothersome (Frewen, Evans, Maraj, Dozois, & Partridge, 2008; Hayes et al., 1999; Teasdale, Segal, & Williams, 1995).

Several clinical and laboratory-based studies have demonstrated that individuals who receive mindfulness training show significant decreases in rumination along with a greater capacity to “let go” of negative cognitions (for a review see Keng, Smoski, & Robins, 2011). Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1982, 1990) and Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002) are two short-term manualised intervention programmes that aim to foster a decentred relationship with internal experiences for which there exists a considerable evidence base with regard to their efficacy. Jain et al. (2007) for example, in a randomised controlled trial of mindfulness meditation versus relaxation training, found that those who underwent the MBSR programme showed a significant decrease in ruminative thoughts and behaviours when compared to the relaxation and control conditions. Similarly, Shahar, Britton, Sbarra, Figueredo, and Bootzin (2010), in a randomised wait-list controlled trial involving recurrently depressed patients, found that after therapy those who received MBCT training showed significantly lower levels of rumination and depressive symptoms. Frewen et al. (2008), have attempted to specifically examine decentring as an outcome of mindfulness training by assessing participants frequency of, and difficulty in “letting go” of, negative

automatic thoughts finding that participation in an eight week mindfulness-based training programme adapted from MBSR and MBCT resulted in fewer negative thoughts as well as lower perceived difficulty in “letting go” of those thoughts.

Although there is good evidence to suggest that mindfulness meditation training, and in particular the resultant improvement in ability to decentre from one’s thoughts, is advantageous to psychological well-being, instruction is most often delivered in a format which requires extensive time and financial commitment - the MBSR programme (Kabat-Zinn, 1982, 1990), for example requires participation in 30 hours of face-to-face instruction delivered by a trained professional as well as daily individual mindfulness meditation practice - and consequently this poses a barrier participation. While Ziedan, Johnson, Diamond, David, and Goolkasian (2010) have found promising results in relation to brief mindfulness meditation training, instruction in this study was delivered in person. And, although Frewen et al. (2008) have begun the task of specifically examining ability to “let go” of negative automatic thoughts as an outcome of mindfulness training, their study did not include a control group and no other studies attempt to assess decentering in this way. Thus, the present study tested the hypothesis, that the practice of a brief mindfulness-based exercise specifically designed to foster decentring from thoughts delivered via brief audio recording would lead to an increase in participants’ capacity to decentre and thus significantly fewer anxious self-statements, and significantly less difficulty in “letting go” of anxious-self statements compared with a control group. A subsidiary hypothesis was that the treatment group would show significant increases in mindfulness and significant improvement in mood.

Methodology

Research Design

In this controlled trial, a 2 X 2, groups X time, repeated measures design was used, with a treatment and control group, assessed before (Time 1) and after (Time 2) intervention. The primary dependant variables assessed at Times 1 and 2 were frequency of anxious self-statements and ability to “let go” of anxious self-statements. Secondary dependent variables assessed at Times 1 and 2 were mindfulness, positive affect and negative affect. On a daily basis, each evening, task adherence was assessed via SMS (text message). State anxiety was also assessed at time 1 for balancing purposes.

Participants

Fifty-seven adults with no previous experience of mindfulness-based exercises participated in the study. Participants ages ranged from 18-58 ($M = 31.54$, $SD = 10.08$) and there were 13 males and 44 females. Six participants dropped out before time two. Following CONSORT guidelines for the description of randomised control trials (Schultz, Altman, & Moher, 2010), a flow-chart is presented in Appendix A depicting the progress of participants across all stages of the study.

Interventions

The treatment group listened to the Leaves on a Stream exercise (LeJeune, 2012). In

this 20 minute exercise participants were invited to visualise each of their anxious thoughts pinned to a leaf floating on a stream which they could observe briefly and which then drifted out of their visual field carried by the current of the stream. This exercise was chosen as it is a brief exercise which specifically aims to foster mindfulness of, as well as capacity to decentre from, thoughts. Following Ziedan et al. (2010), the control group listened to an extract from the *Hobbit* (Tolkien, 1937) read by Dr. LeJeune, which was matched for duration and vocal affect. Both recordings were provided to participants in MP3 format via email.

Assessment Instruments

Frequency of, and difficulty in “letting go” of, anxious self-statements was assessed using the Anxious Self-Statements Questionnaire “Letting Go” Revised Version (ASSQ-LG) which was adapted from the University of British Columbia Cognition Inventory: “Letting go” Revised Version (UBC-CI-LG; Frewen et al., 2008). The UBC-CI-LG is a 77-item cognition inventory consisting of negative automatic thoughts relating to five symptom domains (panic, depression, worry, somatic preoccupation, and social fears) to which participants are required to indicate on a four point Likert scale, both the frequency, over the last week, with which they have experienced each negative automatic thought, such as “people do not enjoy my company” and “I don’t think I can go on”, as well as the degree of difficulty they experienced in “letting go” of that negative automatic thought, if they had experienced it. The scale yields scores for two subscales: frequency of negative automatic thoughts and difficulty in “letting go” of negative automatic thoughts. Good coefficient alpha and interclass correlations have been for this for this scale in previous research. In the present study, as the scale was designed for use with clinical populations, the UBC-CI-LG was adapted such that negative automatic thoughts were replaced by 32 anxious self-statements such as “I can’t take it” and “I wish I could escape” theoretically associated with anxiety derived from the Anxious Self-Statements Questionnaire (ASSQ; Kendall & Hollon, 1989). The ASSQ (Kendall & Hollon, 1989) was designed for use with both clinical and non-clinical populations. In the present study the difficulty letting go sub-scale of the AASQ-LG had alpha internal consistency coefficients of 0.95 at time 1 and 0.98 at time 2. And, the frequency of negative automatic thoughts sub-scale had alpha internal consistency coefficients of 0.96 at both time 1 and time 2.

Mindfulness levels were assessed using the trait Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003). This is a fifteen-item scale designed to assess a core characteristic of mindfulness, namely, a receptive state of mind in which attention, informed by a sensitive awareness of what is occurring in the present, simply observes what is taking place. Participants were instructed to indicate, on a six-point Likert scale ranging from “almost always” to “almost never”, the frequency with which they engage in fifteen different activities theoretically associated with trait mindfulness in their everyday lives. Examples of scale items included “I find it difficult to stay focused on what’s happening in the present” and “I find myself doing this without paying attention” The scale has previously shown excellent internal consistency with alpha reliability coefficients ranging from 0.8 to 0.9. A test-retest reliability coefficient of 0.8 has been found over a 4 week period. The MAAS has been supported by the results of exploratory and confirmatory factor analyses. The scale also shows excellent convergent and divergent validity. In the present study at Times 1 and 2 the MAAS had alpha internal consistency coefficients of 0.87 and 0.90 respectively.

Affect was assessed using the Internationally Reliable Short-Form of the Positive and Negative Affect Schedule (I-PANAS-SF; Thompson, 2007). This is a ten-item adaptation of Watson, Clark, and Tellegen's (1988) original Positive and Negative Affect Schedule (PANAS) for use with populations familiar with international rather than North American English which was designed to assess emotional experience as a two factor construct. The scale yields scores for two subscales: positive affect and negative affect. Participants were presented with ten adjectives such as "hostile" and "inspired" and were instructed to indicate, on a five-point Likert scale ranging from "never" to "always", the extent to which their emotional state in the previous two weeks was characteristic of these descriptors. The scale correlates well with the original long-form PANAS for both the positive ($r = 0.95$, $p < 0.01$) and negative ($r = 0.92$, $p < 0.01$; Thompson, 2007) affect sub-scales. The I-PANAS-SF has previously shown acceptable internal consistency reliability with alpha reliability coefficients ranging from 0.8 to 0.9 (Thompson, 2007). A test-retest reliability coefficient of 0.84 has been found over an 8 week period (Thompson, 2007). The scale has been supported by the results of exploratory and confirmatory factor analyses and the scale shows excellent convergent and divergent validity (Thompson, 2007). In the present study, the positive affect subscale had alpha internal consistency coefficients of 0.80 at time 1 and 0.83 at time 2, while the negative affect sub-scale had alpha internal consistency coefficients of 0.70 at time 1 and 0.75 at time 2.

State anxiety was assessed using a six item short form of the Spielberger State-Trait Anxiety Inventory (Marteau & Bekker, 1992; STAI-6). This is a six-item adaptation of Spielberger, Gorsuch, and Lushene's (1970) original Spielberger State-Trait Anxiety Inventory (STAI). The scale contained three anxiety present statements such as "I am tense", and three anxiety absent statements such as "I feel content". Participants were instructed to indicate, on a four point Likert scale ranging from "not at all" to "very much", the degree to each statement described how they felt "right now, at this moment". The scale correlates well with the original long-form STAI with a correlation coefficient of 0.95. The scale has previously shown acceptable internal consistency with an alpha reliability coefficient of 0.82. In the present study the scale had an alpha internal consistency coefficient of 0.90.

Adherence to the treatment tasks was assessed each evening via daily SMS (text message). Verbatim instructions to participants were as follows: "Thx 4 participating! pls reply (Y/N) to this message to confirm listening to your recording today".

Procedure

The study was completed with ethical approval of UCD Human Research Ethic Committee. Participants were recruited at UCD using posters and online methods and were included if they were over 18 and had no previous experience of mindfulness meditation. Recruitment notices made reference to the study website which was set up and controlled by the first author specifically for the present study. The website contained a description of the project procedures, a consent form along with a link to the online survey tool Qualtrics (Qualtrics Labs Inc., 2009) which was used as the primary data collection instrument. After following the link to the Qualtrics survey (Qualtrics Labs Inc., 2009) participants completed a demographics questionnaire, the ASSQ-LG, MAAS, STAI, and PANAS. Matched pairs of cases were randomly assigned to treatment and control groups using a random number generator such that independent t-tests revealed no significant differences between both groups in their status on age and Time 1 scores on the ASSQ-LG, MAAS, STAI and

PANAS. Both groups were sent MP3 recordings of their respective exercises via email. The treatment group listened to the *Leaves on a Stream* exercise (LeJeune, 2012). Following Ziedan et al. (2010), the control group listened to an extract of the *Hobbit* (Tolkien, 1937), which was read by Dr. LeJeune, and matched for duration and vocal affect. In order to minimise the influence of extraneous variables, participants were instructed not to discuss the content of their recording with others. The present study concerned itself with anxious thoughts experienced during wakefulness. Thus, in order to maximise the number of wakeful hours during which the potential effects of the interventions could be borne out, it was suggested to participants that they listen to the recording in the morning. In order to minimise disengagement, participants were informed that, for the success of the project, it was necessary for them to listen to the recording even though the content of that recording may seem unrelated to the topic of the study. Intervention adherence was assessed, as outlined above, via daily SMS (text message). On day seven of the treatment week, participants were requested via email to return to the Qualtrics (Qualtrics Labs Inc., 2009) survey to complete time two scales. Participants completed scales assessing all dependant variables.

Results

Daily adherence to treatment tasks ranged from 71.9 % to 89.5% which is indicative of very high adherence (Sapsford, 2007). Independent t-tests were conducted to assess the significance of differences between the treatment group and the control, group on all dependant variables at time 1. No significant differences were observed. Independent t-tests were conducted to assess the significance of differences between completers and non-completers on all dependant variables. Significant differences were observed for state anxiety, $t(5.44) = -0.45, p < 0.05$. Thus, both a completers' and intent-to-treat analysis were conducted. Similar results were obtained from completers and intent-to-treat analyses, so for brevity, only intent-to-treat analyses are reported. In the intent-to-treat analysis, for each dependant variable, where an individual had dropped out and thus a time 2 score was not available, time 1 scores were substituted in place of those unavailable at time 2. Groups X Time, 2 X 2 ANOVA's were conducted for each of the 5 dependent variables. The rough false discovery correction was made to control for Type 1 error. ANOVA results and descriptive statistics are given in Table 1. No significant Group X Time interactions occurred on any of the primary or subsidiary dependent variables, thus the hypotheses were not supported. Significant Time effects occurred on both of the ASSQ-LG scales indicating that both interventions led to significant reductions in the frequency of anxious self-statement and difficulty in letting go of such statements. Effect sizes for all primary dependant variables ranged from 0.81 to 1.51 (see Table 1).

Discussion

The aim of the present study was to investigate the effect of the mindfulness based exercise *Leaves on a Stream* (LeJeune, 2012) on participants' frequency, and difficulty in "letting go" of anxious self-statements, and also on trait mindfulness and mood. The hypotheses that daily completion of a mindfulness exercise would have a significant impact on these variables, relative to a control group were not supported. Both treatment and control conditions led to a reduction in participants' frequency and difficulty in "letting

Table 1: Means of treatment and control groups before and after treatment, and results of 2 X 2, Groups X Time ANOVAs for primary dependant variables.

		Treatment Group		Control Group		ANOVA F Values			Effect Sizes (<i>d</i>) at Time 2
		(n = 28)		(n = 29)		Group	Time	Group X Time	Treatment vs. Control
		Time 1	Time 2	Time 1	Time 2				
Frequency of Anxious Self- Statements	<i>M</i>	59.00	53.39	62.38	60.68	1.18	4.49*	1.29	.38
	<i>SD</i>	19.31	17.55	20.42	20.99				
Difficulty in Letting Go of Anxious Self-Statements	<i>M</i>	2.31	2.00	2.30	2.18	.56	7.93*	1.51	.28
	<i>SD</i>	0.61	0.67	0.53	0.61				
Trait Mindfulness	<i>M</i>	7.82	8.07	7.55	8.00	.07	2.19	.18	.03
	<i>SD</i>	2.83	2.43	2.43	2.40				
Positive Affect	<i>M</i>	15.89	16.50	16.17	17.24	.33	3.41	.26	.21
	<i>SD</i>	4.12	3.85	3.77	3.35				
Negative Affect	<i>M</i>	12.22	10.96	12.10	11.66	.13	3.14	.08	.20
	<i>SD</i>	3.13	3.56	3.91	3.44				

Note: Time 1 = Pre-treatment. T2 = Post-treatment. ANOVA = 2 X 2, Groups X Time Analysis of Variance. *M* = Mean. *SD* = Standard Deviation. * $p < .05$

go” of, anxious self-statements. Neither condition affected trait mindfulness or positive and negative affect.

The results of the present study do not support those of similar research in this area which suggest that mindfulness training leads to less frequent unhelpful cognitions as well as a greater capacity to “let go” of those cognitions compared with control conditions (Frewen et al., 2008). Nevertheless, a number of explanations are possible. Firstly, while no normative data is available with respect to the ASSQ-LG, in a study involving participants diagnosed according to the DSM-III-R (American Psychiatric Association, 1987) diagnostic criteria as suffering from major depressive episode, dysthymia, depressive disorder not otherwise specified, or major depression recurrent, Lambertson and Oei (2008) found mean ASSQ (Kendall & Hollan, 1989) scores of 86.15 for this cohort. In the present study, the frequency of anxious self-statements sub-scale of the ASSQ-LG mean scores did not exceed 62.38 for either group at either time point suggesting that this cohort may have been a good deal less anxious than would be expected in a clinical sample. Thus, the capacity to detect an effect for the treatment intervention may have been reduced. Secondly, Althuler, Rosenbaum, Gordon, Canales, and Avins (2011) have found mindfulness training delivered via audio recording to be effective in relation to mood and quality of life outcomes for cancer patients. In this study however, participants were required to listen to recordings of up to twenty-five minutes in length, five times a week, for three months. This points toward a critical duration of treatment for the beneficial effects of mindfulness training to manifest. In the present study, either or both of the duration of daily practice, and the duration that daily practice was undertaken, may not have been sufficient for the treatment condition to exert a greater beneficial effect over the control. Thirdly, Butler (2001), in a meta-

analysis of twenty-seven studies assessing the relative importance of the component parts of several cognitive therapies, found that homework such as pleasant event scheduling was a significant facilitator of therapeutic improvement. Participants in the present study were required to schedule time to sit quietly and listen to a potentially pleasant recording. This may have effected a similar therapeutic effect in both groups and thus again the capacity of the treatment intervention to effect a greater beneficial effect than control may have been limited. Finally, both MBCT (Segal et al., 2002) and MBSR (Kabat-Zinn, 1982, 1990) as well as traditional Buddhist training (for a review see Ospina et al., 2007) begin with exercises designed to foster mindfulness of physical sensations before moving to exercises relating to mindfulness of thoughts. Thus, it may be that the sequencing of training is an important factor in effective mindfulness training. The present study used a mindfulness exercise specifically intended to foster mindfulness of thoughts with a sample that had no previous experience of mindfulness training. The fact that the sample in this study began their training with a mindfulness of thoughts exercise without first obtaining a grounding in physical mindfulness may have been a factor in the non-significance of the group x time interaction effects. Taken together, the above elements point toward issues relating to both the design (i.e., the use of a non-clinical sample, the potential therapeutic effect of pleasant event scheduling, and the short duration of treatment) and the intervention (e.g. sequencing effects) as to possible reasons for the non-detection of a group x time interaction effect.

The study had a number of methodological strengths. Firstly, the sample size exceeded the minimum number of participants indicated by statistical power analysis (Hinkle, Weirisma, & Jurs, 2003). Secondly, the same individual recorded both the treatment and control recording, with both recordings matched for length and vocal affect. Thus, extraneous variables were minimised with regard to differences in the interventions offered to the treatment and control groups. Finally, responses were collected via electronic means and so human error with regard to scoring assessment instruments was minimised.

The study had a number of methodological weaknesses. Firstly, a number of meditative traditions suggest that practice be undertaken in the morning for maximum effect (Ospina et al., 2007). No research with regard to the timing of daily mindfulness meditation practice exists within the literature. However, it is conceivable that this could be an important factor with regard to the effectiveness of mindfulness-based interventions. While it was suggested to participants that they listen to their respective recordings in the morning, no measures were put in place to ensure that this took place. Thus, the effectiveness of the Leaves on a Stream (LeJeune, 2012) exercise may have been curtailed. Secondly, as the ASSQ-LG was designed specifically for the present study, this was the first instance of the use of this scale. Thus, evidence of higher order measures of reliability and validity such as test-retest reliability and concurrent and construct validity has not been established for this scale. Nevertheless, high internal consistency reliability coefficients were obtained in the present study and higher order measures of reliability and validity have been established for the ASSQ (Kendall & Hollon, 1989) from which the anxious-self statements were taken for the ASSQ-LG.

The results of the present study raise a number of important issues with regard to practical implications and future research. Firstly, the present study sought to explore the effectiveness of brief mindfulness instruction delivered via audio recording. Although Ziedan et al. (2010) have found positive results in relation to brief mindfulness instruction, in this study training was delivered in person. And, although Altchuler et al. (2011) have

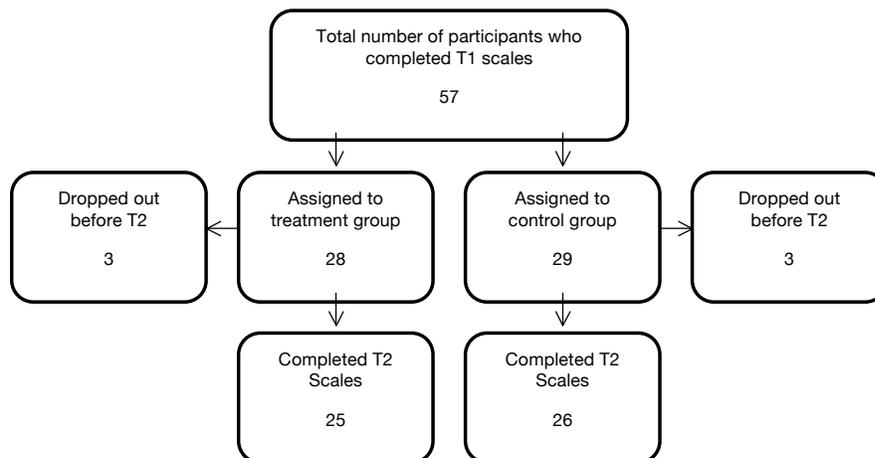
found promising results with regard to mindfulness training delivered via audio recording, training in this study required considerable time investment on the part of the participant. Taken together, these findings, along with the non-significant interaction effects observed in the present study, suggest that although both brief and audio delivered mindfulness training may be effective, these effects may be lost when delivery is both brief, and via audio recording without the physical presence of an instructor suggesting the existence of an optimum instructor absent/present and recording length mix. Similarly, it appears that the content of mindfulness interventions is also important with the sequencing of mindfulness training a possible key factor in successful training such that an introduction to mindfulness of physical sensations is necessary before training in mindfulness of thoughts can be successfully undertaken. To our knowledge, no studies exist within the literature exploring the relative importance of, or interaction between, these three key factors identified in the present study (presence/absence of an instructor, intervention duration, and sequencing effects). Thus, future research should aim to illuminate this avenue of inquiry in order that mindfulness-based interventions be designed for delivery in the most efficient manner possible.

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Appendix A: Numbers of participants assigned to treatment and control group, and dropouts.



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