

ORIGINAL PAPER

Examining the implementation of a mindfulness-based intervention for anxiety: A mixed-method, single-case study investigation

Aysun Parlar Yazıcı*¹ , Alyson Norman² , Alison Bacon² 

¹ Department of Clinical Psychology, Faculty of Letters, Hacettepe University, Türkiye

² Department of Clinical Psychology, Faculty of Health, Plymouth University, United Kingdom

Abstract

This single-case study examines the impact of a 6-week Mindfulness-Based Intervention (MBI) on an individual experiencing anxiety, with a particular focus on intolerance of uncertainty (IU). A mixed-methods approach was used, combining quantitative measures with qualitative data from session notes, interviews, and participant feedback. Quantitative findings indicated reductions in stress (DASS-21: pre-test = 36, post-test = 26), anxiety (pre-test = 30, post-test = 18), and depression (pre-test = 38, post-test = 28) scores from pre- to post-intervention. Increases were observed in mindfulness (pre-test = 42, post-test = 64) and resilience (pre-test = 28, post-test = 36), alongside a reduction in intolerance of uncertainty scores (pre-test = 48, post-test = 42). Qualitative findings, drawn from the participant's own accounts during interviews, session notes, and home practice reflections, described improvements in sleep, greater relaxation and calmness, as well as enhanced self-confidence and self-awareness. The perceived effects of the intervention were influenced by participant-related factors (symptom severity, readiness, patience, and challenges in habit change), program-related factors (session length and the absence of a practitioner during home practice), and environmental factors (the need for a distraction-free space). These findings highlight the context-specific nature of MBI outcomes and suggest that individualized support and tailored approaches may be important for sustaining potential benefits. Future research with larger samples is needed to further explore strategies for supporting individuals with high anxiety and IU in maintaining long-term mindfulness practices.

Keywords: anxiety, mindfulness-based interventions, skills development, case study, resilience

Anksiyete için bilinçli farkındalık temelli bir müdahalenin incelenmesi: Karma araştırma yöntemli tek vaka analizi

Öz

Bu tek vaka çalışması, altı haftalık bir Bilinçli Farkındalık Temelli Müdahale programının anksiyete yaşayan bir birey üzerindeki etkilerini, özellikle belirsizliğe tahammülsüzlük boyutunda incelemektedir. Araştırmada, nicel değerlendirme verileri ile oturum notları, yapılandırılmış görüşmeler ve katılımcı geribildirimlerinden elde edilen nitel veriler bir arada analiz edilmiştir. Nicel bulgular, müdahale sonrası stres (DASS-21: ön test = 36, son test = 26), kaygı (ön test = 30, son test = 18) ve depresyon (ön test = 38, son test = 28) puanlarında azalma olduğunu göstermiştir. Farkındalık (ön test = 42, son test = 64) ve psikolojik dayanıklılık (ön test = 28, son test = 36) düzeylerinde artış, belirsizliğe tahammülsüzlük puanlarında ise (ön test = 48, son test = 42) azalma gözlenmiştir. Nitel bulgular ise katılımcının görüşmelerde, oturum notlarında ve ev uygulamaları değerlendirmelerinde dile getirdiği ifadelerden elde edilmiş; uyku problemlerinde azalma, daha fazla rahatlama ve dinginlik, ayrıca artan öz güven ve öz farkındalık bildirilmiştir. Müdahalenin algılanan etkileri, katılımcıya özgü unsurlar (belirti şiddeti, müdahaleye hazır olma, sabır düzeyi ve alışkanlık değiştirmede yaşanan güçlükler), programa ilişkin unsurlar (oturum süresi ve evde yapılan uygulamalarda uzman rehberliğinin eksikliği) ve çevresel faktörler (dikkatin dağılmadığı bir çalışma ortamına duyulan ihtiyaç) tarafından şekillenmiştir. Bu vakanın bulguları, uygulanan müdahalenin sonuçlarının bağlama özgü niteliğini vurgulamakta ve olası yararların sürdürülebilirliği için bireyselleştirilmiş yaklaşımların ve sürekli desteğin önemine işaret etmektedir. Gelecek çalışmalarda, yüksek düzeyde anksiyete ve belirsizliğe toleranssızlık sergileyen bireylerin uzun vadeli bilinçli farkındalık uygulamalarını sürdürmelerini destekleyici stratejilerin daha geniş örneklerle incelenmesi önerilmektedir.

Anahtar Kelimeler: anksiyete, bilinçli farkındalık temelli müdahaleler, beceri geliştirme, vaka çalışması, psikolojik dayanıklılık

INTRODUCTION

Anxiety disorders are among the most prevalent mental health conditions, representing a significant concern for individuals and healthcare systems alike (Bandelow & Michaelis, 2015). It has been estimated through large-scale, population-based research that around 33.7% of individuals will develop an anxiety disorder at some point in their lives (Bandelow & Michaelis, 2015). Comorbidity is also highly common, particularly with depressive disorders and other subtypes of anxiety (Zlomuzica et al., 2025). In addition to their clinical and functional burden, anxiety disorders are frequently associated with cognitive impairments, including heightened sensitivity to perceived threats, exaggerated stress reactivity to aversive stimuli, at-

tentional biases toward threat-related information, and deficits in the extinction of threat-related learning (Craske et al., 2011).

Among the cognitive vulnerabilities linked to anxiety, intolerance of uncertainty (IU) has emerged as a particularly relevant and well-documented construct (Carleton et al., 2007; Jensen et al., 2016). IU refers to an individual's dispositional difficulty in enduring the possibility of negative events occurring in uncertain situations, often resulting in heightened perceptions of threat and increased anxiety responses (Buhr & Dugas, 2009). Empirical evidence supports a moderate correlation between IU and anxiety symptoms (Boswell et al., 2013; Chen & Hong, 2010), suggesting that IU may play a central role in the maintenance and exacerbation of anxiety. Rather than fo-

*Corresponding Author. E-mail: aysunparlar@hacettepe.edu.tr

cusing exclusively on symptom reduction, there is growing support for targeting IU directly in therapeutic interventions (Bomyea et al., 2015; Boswell et al., 2013). As a transdiagnostic factor, IU has been implicated across various anxiety-related conditions, further highlighting its relevance in treatment development. Accordingly, enhancing individuals' psychological flexibility in the face of uncertainty and change may constitute a core component in the effective treatment of anxiety disorders (Parlar-Yazıcı et al., 2025).

Mindfulness refers to the practice of paying deliberate attention to the present moment with an open and non-judgmental attitude (Kabat-Zinn, 2013). In recent decades, mindfulness has been increasingly integrated into contemporary psychotherapy through Mindfulness-Based Interventions (MBIs). MBIs show promise in addressing various factors associated with anxiety disorders, such as rumination, cognitive distortions, and emotion dysregulation. For instance, mindfulness can reduce rumination (Batink et al., 2013), enabling individuals to respond more flexibly to the present moment and reduce reactive anxious responses (Kabat-Zinn, 2013). Additionally, mindfulness promotes cognitive restructuring by challenging negative thought patterns and fostering a non-judgmental and accepting attitude, which can help individuals develop more adaptive interpretations of events and decrease anxiety-inducing cognitive distortions (Curtiss et al., 2021).

Physiologically, mindfulness practices such as deep breathing and body scans can activate the parasympathetic nervous system and reduce the physical symptoms of anxiety (Bhattacharya & Hofmann, 2023; Hofmann & Gómez, 2017). On an emotional level, mindfulness enhances regulatory capacity by encouraging curiosity and compassion instead of avoidance or suppression (Carmody et al., 2009; Enkema et al., 2020). Beyond symptom reduction, MBIs have also been associated with improvements in overall well-being and sleep quality, both of which are often compromised in individuals with anxiety disorders (Rusch et al., 2019). Further research is needed to clarify mindfulness's therapeutic mechanisms and individual responsiveness. Overall, MBIs offer an empirically supported complement to conventional treatments for anxiety. Their integrative approach; addressing cognitive, emotional, and physiological dimensions provides a comprehensive pathway toward both symptom reduction and enhanced quality of life (McConville et al., 2017).

While several established programs exist for managing stress and anxiety, a mindfulness-based intervention specifically targeting intolerance of uncertainty (IU) may more directly address the cognitive and emotional mechanisms underlying anxiety. Tailoring such interventions to individual needs can enhance engagement and support behavioural change (Kreuter et al., 1999). Mindfulness-Based Interventions (MBIs) are flexible approaches that have shown effectiveness across various psychological conditions, particularly anxiety disorders (Hofmann & Gómez, 2017; Khoury et al., 2013). Mindfulness practices have also been found to influence cognitive processes closely related to IU, such as rumination, worry, and cognitive inflexibility (Deyo et al., 2009; Kabat-Zinn, 2013). A targeted mindfulness approach may therefore help

modify maladaptive patterns that contribute to persistent anxiety (Bomyea et al., 2015).

Beyond outcome evaluation, analysing the implementation process is essential, as it can inform refinements and enhance the participant experience (Mashedder et al., 2020). The mechanisms by which MBIs exert their effects, the challenges encountered during practice, and strategies to support engagement remain underexplored and require further investigation. This study aims to contribute to this area by evaluating the intervention's content, feasibility, and effectiveness. Through detailed analysis of participant experiences and implementation factors, it seeks to inform both methodological and practical considerations, supporting the development of future large-scale studies.

This study introduces and evaluates a novel 6-week mindfulness-based intervention tailored to IU in an individual with anxiety. It uses a mixed-methods single-case design to examine both quantitative outcomes (anxiety symptoms, mindfulness, and IU) and qualitative findings (participant experiences and perceived benefits). Specifically, the study aims to evaluate: i) the benefits of the IU-focused mindfulness-based program for an anxious individual; ii) the advantages and challenges encountered during its implementation; and iii) potential ways to refine and further develop such interventions for individuals with anxiety and high IU.

A mindfulness-based intervention was adapted with a specific focus on intolerance of uncertainty and piloted with an individual experiencing both generalized anxiety and social anxiety disorder, whose symptoms were primarily linked to uncertain circumstances. This single-case design allowed for an in-depth exploration of the intervention's feasibility, acceptability, and potential benefits within this context. While the findings are not intended to be generalised, they offer valuable preliminary insights that may inform future research and the development of targeted interventions for individuals with high IU.

METHODS

Research Design

The study employed a single case study design to investigate the effectiveness of an MBI on a participant with persistent anxiety symptoms since early adolescence, which have significantly impacted his daily functioning over the years. Although not formally diagnosed, the participant's symptoms were consistent with chronic anxiety, as indicated by self-report and elevated anxiety scores on the Depression Anxiety Stress Scales-21 (DASS-21) administered prior to the intervention. Both qualitative and quantitative measures were included and analysed using thematic analysis and correlational analysis where appropriate. A convergent parallel mixed method design was employed, where both types of data are collected separately and then compared to confirm or disconfirm findings (Creswell, 2014).

Single Case Study

A single case study involves an in-depth examination of a

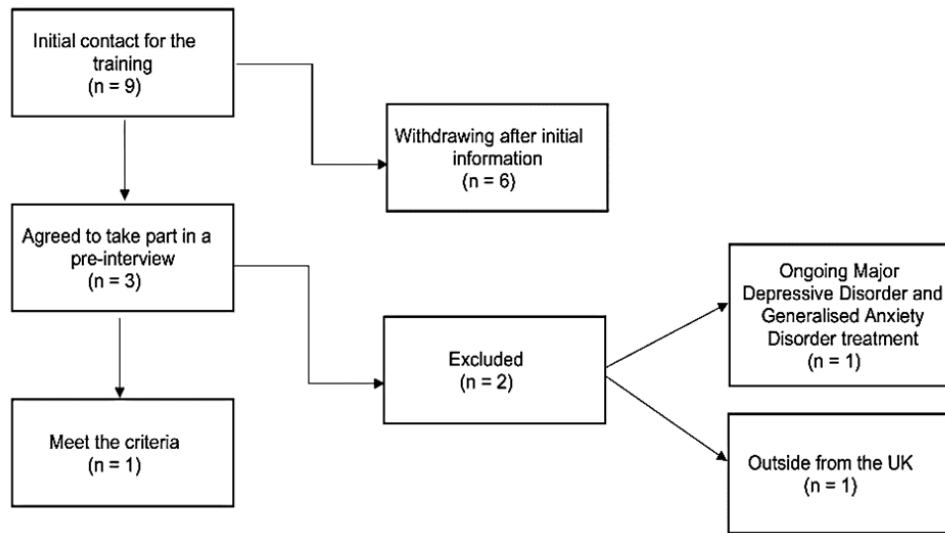


Figure 1. Recruitment Stages

single individual, group, or entity, allowing researchers to explore real-world events comprehensively (Yin, 2018). While single case studies may lack generalisability, they offer valuable insights, particularly when investigating unique interventions or scenarios (Gustafsson, 2017). In this study, a single case design was appropriate for examining the specific effects of the MBI on the anxious participant. Although the findings may not be generalisable, they can provide crucial insights into intervention implementation and inform future research directions (Baxter & Jack, 2008).

Participant

This single-case study involved one volunteer with persistent anxiety who took part in a 6-week mindfulness-based program. Inclusion criteria were: 1) experiencing severe stress or anxiety for over 6 months, 2) age 18 or older, 3) availability for weekly sessions over two months, 4) interest in meditation, and 5) willingness to report any changes in anti-anxiety medication during the program. Individuals with comorbid psychiatric conditions were excluded. The study was advertised on social media, and interested individuals contacted the researcher via email. A detailed pre-interview ensured eligibility. Nine people requested more information; six did not respond further. Of the remaining three, two were excluded—one due to living abroad, the other due to a diagnosis of major depressive disorder and ongoing treatment. Figure 1 illustrates the recruitment process.

The demographic characteristics of the participant are shown in Table 1 below. For the protection of anonymity, the participant will be referred to as Jack instead of his real name.

As indicated in Table 1, the participant, a 30-year-old British male, has been grappling with persistent anxiety since his secondary school years. Currently a university student, he expressed experiencing anxiety and associated sleep difficulties during the pre-interview, indicating his interest in mindfulness training to alleviate these distressing symptoms. Despite a long history of anxiety, he had not

Table 1. The Demographics of the Participant

| | |
|---------------------------------|--|
| Participant pseudonym | Jack |
| Gender | Male |
| Age | 30 |
| Ethnicity | British |
| Occupation | Undergraduate Student at the university |
| Medical Diagnosis | No Diagnosis |
| Condition (Self-Report) | Chronic Anxiety Social Anxiety Sleep Problems |
| Medical and Clinical Background | Counselling Private Therapy-CBT based. Pharmaceutical treatments including SSRI |
| Family Background | Has a family that separated at an early age Living with a stepmother and a chronically ill father |
| Significant Life Events | Family Separation Being bullied at school His father's illness Pandemic |

received any formal diagnosis or treatment until now, although he had sought help from general practitioners (GPs) and engaged in private therapies, including CBT. Significant life events, such as parental separation and living with a stepmother at an early age, peer bullying during secondary school, and currently, his father's chronic illness, have contributed to his anxiety. Jack perceives himself as prone to general anxiety disorder, exacerbated by the pandemic and increased technology use, which has also led to social anxiety, making face-to-face interactions challenging, including attending classes.

Measures

This study used both quantitative and qualitative measures to evaluate the participants' experiences before, during, and after the mindfulness-based intervention (MBI). The tools included semi-structured interviews, psychometric scales, session notes, and feedback forms.

Table 2. Intervention Stages: Adapted from the 8-Week Mindfulness Now Programme

| Week | Session Title | Key Content | Home Practice |
|------|------------------------------|--|---|
| 1 | Waking Up | <ul style="list-style-type: none"> - Introductions - Raisin meditation - Mindfulness attitudes - Sitting meditation (breath) - Formal vs informal mindfulness - Automatic pilot - Short body scan | <ul style="list-style-type: none"> - Eat one meal mindfully - Sitting meditation (10 min/day) - Short body scan (5 min, 4×/week) - One mindful daily activity - Feedback reflection |
| 2 | Awareness of the Body | <ul style="list-style-type: none"> - Breathing space - Review of Week 1 - Sitting meditation (breath & body) - Stress & anxiety reflection - Thoughts are not facts exercise - Full body scan | <ul style="list-style-type: none"> - Body scan (20 min, 5×/week) - Breathing space (1×/day) - Informal mindfulness daily - Pleasant experiences calendar - Feedback reflection |
| 3 | Focus on the Body – Movement | <ul style="list-style-type: none"> - Mindful movement - Change takes time - Fear of the unknown - Sitting meditation (sounds & feelings) - Second thoughts & feelings exercise | <ul style="list-style-type: none"> - Mindful movement (20 min, 5×/week) - Breathing space (3×/day) - Sitting meditation (sounds & feelings) - Unpleasant events diary - Feedback reflection |
| 4 | Responding vs Reacting | <ul style="list-style-type: none"> - Breathing space - Tolerating uncertainty - Negative thoughts checklist - STOP practice - Mountain meditation - Responding to unpleasant events | <ul style="list-style-type: none"> - Sitting meditation (20 min, 5×/week)—alternate with mindful walking - Breathing space (3×/day) - Thought checklist (2×/week) - Feedback reflection |
| 5 | Allowing – Letting Be | <ul style="list-style-type: none"> - Full sitting meditation - Resilience & mindfulness - Lake meditation - Automatic thoughts questionnaire - Exploring difficulty meditation | <ul style="list-style-type: none"> - Full sitting meditation (30 min/day or choice incl. mountain) - Breathing space (3×/day) - Mindful walking (15–20 min/day) - STOP & exploring difficulty as needed |
| 6 | The Power of Compassion | <ul style="list-style-type: none"> - Loving-kindness meditation - Self-care: draining vs sustaining activities - Full sitting meditation - Revisiting body scan - Closing and course review | <ul style="list-style-type: none"> - Meditations without guidance (30 min/day) - Silent meditation (10 min, 3×/week) - Do something pleasant after breathing space - Feedback reflection |

Semi-Structured Interviews Pre- and post-intervention interviews gathered insights into demographics, anxiety history, and views on mindfulness. Additionally, brief weekly interviews were conducted at the beginning of each session to assess the participant's experiences with home mindfulness practices (e.g., ease of use, emotional responses, challenges). These ongoing "home practice interviews" supported monitoring engagement and adherence during the intervention.

Session Notes Weekly session notes documented evaluations of meditations and discussions, providing a comprehensive qualitative record.

Response Feedback Form Participants completed weekly feedback forms with Likert-type scales and open-ended questions to assess session satisfaction, mood, pain, stress, and relaxation, along with qualitative feedback.

Psychometric Scales Quantitative data were collected pre- and post-intervention using validated self-report scales assessing resilience, mindfulness, anxiety, and intolerance of uncertainty—key constructs targeted by mindfulness-based interventions (MBIs). The selected measures align with the intervention's core aims: enhancing present-moment awareness (MAAS), emotional regulation and stress reduction (DASS-21), intolerance of un-

certainty (IUS-12), and psychological resilience (CD-RISC-25).

Depression, Anxiety, and Stress Scale–21 (DASS-21)

A 21-item scale assessing emotional distress over the past week across three subscales: depression, anxiety, and stress. Items are rated on a 4-point Likert scale (0–3), with subscale scores ranging from 0–21 and total scores from 0–63. Internal consistency: Depression ($\alpha = .91$), Anxiety ($\alpha = .84$), Stress ($\alpha = .90$), Total ($\alpha = .90$) (Lovibond & Lovibond, 1995).

Intolerance of Uncertainty Scale–12 (IUS-12)

Measures responses to uncertainty using 12 items on a 5-point Likert scale (1–5), with scores ranging from 12–60. Selected due to MBI's relevance to enhancing tolerance of uncertainty. Reliability: $\alpha = .91$ (Carleton et al., 2007).

Mindful Attention Awareness Scale–15 (MAAS-15)

Assesses present-moment awareness with 15 items rated on a 6-point scale (1–6), yielding scores from 15–90. Higher scores indicate greater mindfulness. Internal consistency: $\alpha = .87$ (Brown & Ryan, 2003).

Connor–Davidson Resilience Scale–25 (CD-RISC-25) Evaluates resilience via 25 items rated on a 5-point Likert scale (0–4), with total scores from 0–100. Chosen

for its alignment with MBI's focus on enhancing coping and emotional strength. Internal consistency: $\alpha = .89$ (Connor & Davidson, 2003).

Adapting the Mindfulness-based Intervention (MBI)

The 6-week program was based on the Mindfulness Now curriculum, which integrates Mindfulness-Based Stress Reduction (MBSR)—originally developed for chronic pain (Kabat-Zinn, 1982)—and Mindfulness-Based Cognitive Therapy (MBCT), designed for recurrent depression (Teasdale et al., 2000). This combined approach supported both mindfulness skills for present-moment awareness (Kabat-Zinn, 2013) and cognitive strategies to challenge unhelpful thoughts related to uncertainty (Kuyken et al., 2008; Teasdale et al., 2000). MBSR techniques such as body scans and mindful movement complemented MBCT's cognitive tools, promoting resilience and quality of life. These evidence-based interventions have shown efficacy in treating various anxiety disorders including social anxiety (Hjeltnes et al. 2017; Kim et al., 2016; 2017). Given that IU is a transdiagnostic factor in anxiety disorders (Boswell et al., 2013), and that the participant in this study exhibited both generalised and social anxiety features, evaluating an IU-focused mindfulness intervention in this context offers insights into its clinical relevance and broader applicability.

The Mindfulness Now curriculum is accredited by the British Psychological Society and was approved for use in this study. To address intolerance of uncertainty (IU)—a cognitive vulnerability linked to generalized and social anxiety (Carleton, 2016)—the program was adapted to include targeted psychoeducation and structured exercises aimed at identifying uncertainty-related distress and building tolerance for ambiguity. These additions were informed by research on mindfulness's role in enhancing cognitive flexibility (e.g., Goldin & Gross, 2010) and reducing worry-based thought patterns (Dugas & Robichaud, 2007).

Each session consisted of 90 minutes of in-person instruction, incorporating mindfulness practices (e.g., body scan, sitting meditation), and content on anxiety, stress, and cognitive distortions. Daily home practice was encouraged and monitored through weekly interviews. The intervention was delivered by the first author, then a PhD psychology student, who had completed certified Mindfulness Now training and received ongoing supervision. The facilitator adhered closely to the approved curriculum and was qualified to lead mindfulness-based interventions. A summary of the weekly session content is presented in Table 2.

Procedure

Ethical approval was granted by the Faculty of Health Ethics Committee at the University of X. Prior to data collection, the participant provided written informed consent after reviewing detailed information about the study's purpose, the voluntary nature of participation, withdrawal rights, and confidentiality measures. Once the signed form was returned via email, data collection and training began. The intervention took place between January and March

Table 3. Data Collection Procedure

| Stage | Dataset | Duration |
|-------------------------|---|--------------|
| Before the Intervention | Pre-Interview | 60-minute |
| | Pre-test: Applying four scales | 15-minute |
| Session 1 | Session notes containing comments of the participant on meditations and inquiry | 90-minute |
| After Session 1 | Response Feedback Form | 15-minute |
| Session 2 | Semi-structured interview on home practice | 20-30-minute |
| | Session Notes containing comments of the participant on meditations and inquiry | 90-minute |
| After Session 2 | Response Feedback Form | 15-minute |
| Session 3 | Semi-structured interview on home practice | 20-30-minute |
| | Session Notes containing comments of the participant on meditations and inquiry | 90-minute |
| After Session 3 | Response Feedback Form | 15-minute |
| Session 4 | Semi-structured interview on home practice | 20-30-minute |
| | Session Notes containing comments of the participant on meditations and inquiry | 90-minute |
| After Session 4 | Response Feedback Form | 15-minute |
| Session 5 | Semi-structured interview on home practice | 20-30-minute |
| | Session Notes containing comments of the participant on meditations and inquiry | 90-minute |

2022, following full ethical clearance and participant consent.

All sessions were held weekly in a 30-square-meter room at the university, equipped with a table and chairs and suitable for light physical activity. The researcher obtained the necessary permissions and reserved the space in advance. Each session began with a 20-minute review of the participant's home practice, followed by a 10-minute break and a 90-minute mindfulness session. After each session, the participant completed a response feedback form, which was emailed to the researcher on the same day. A detailed table presenting the sequence and content of the collected data is provided below.

Data Analysis

Qualitative Analysis

Content analysis was used to examine qualitative data, aligning with the case study's in-depth focus (Baškarada, 2014). This method supports drawing valid insights from verbal, visual, or written data (Downe-Wamboldt, 1992). The

Table 4. Table of themes and subthemes

| |
|---|
| The participant's general characteristics |
| 1. Anxiety History |
| 2. Onset and Triggers |
| The mediating factors regarding the MBI |
| 1. Physical Environment |
| 2. Length of Practice |
| 3. Intolerance of uncertainty in practice |
| 4. Need for guided practice and reassurance |
| 5. Difficulties of changing habits |
| 6. Lack of Patience |
| 7. Severity of Anxiety |
| 8. Needing more practice to establish the habit |
| Skills development from the MBI |
| 1. Calmness and Relaxation |
| 2. Being Present |
| 3. Cognitive fusion |
| 4. Self-confidence |
| 5. Reducing Overthinking |
| 6. Increasing resilience |
| Views on Sustaining the MBI |
| 1. Future uses of mindfulness practice |
| 2. Experiencing benefits |
| 3. Beliefs in long-term gains |
| 4. Being ready to self-care |
| 5. The participant's satisfaction with the MBI |

Note. MBI = Mindfulness Based Intervention

process involved decontextualization, open coding, recontextualization, category creation, and abstraction (Elo, 2014). Transcripts were reviewed, coded, and grouped into categories to identify themes relevant to the research questions. Non-essential content was excluded while retaining the core meaning.

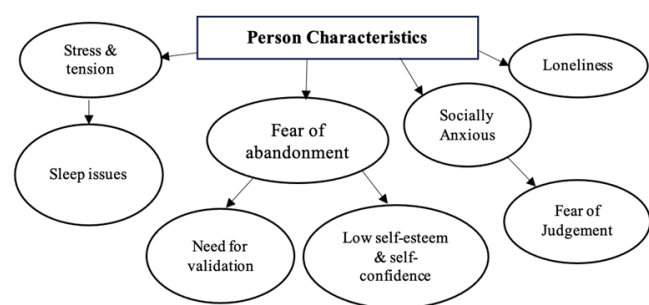


Figure 2. The Participant's General Characteristics

Quantitative Analysis

Quantitative data from pre- and post-intervention psychometric measures were analysed using SPSS. Given the single-participant design, statistical tests (e.g., comparisons or correlations) were not applicable. Instead, changes were assessed by comparing pre- and post-test mean scores. Total scores for each scale are reported in the results to illustrate changes across the intervention.

RESULTS

The data were extracted from session notes, response feedback forms, pre- and post-semi-structured interviews, semi-structured interviews related to the participant's home practices, and the scales. After analyzing the data,

the qualitative data were presented under the subtitles: 1. *The participant's general characteristics*, 2. *Barriers and facilitators in the practice of the MBI*, 3. *Skills development from the MBI*, 4. *Views on Sustaining the MBI*. Table 4 presents the main themes and sub-themes identified from qualitative data (session notes, interviews before, after and about home practice, and the qualitative part of the feedback form). Quantitative data are also presented at the end of this section.

Qualitative Data

The Participant's General Characteristics

Data on Jack's general characteristics were gathered through pre-interviews and session notes. The subsections below provide detailed information on his anxiety history, onset, and triggers. A summary of these characteristics is presented in Figure 3, which outlines the participant's general profile.

i. Anxiety history Jack described himself as an individual with social anxiety despite not having a medical diagnosis. He often only sleeps three to four hours a night and associated his sleep problems with his anxiety. He noted that he had received therapy for these issues in the past. Jack expressed a strong, and unhealthy, need for validation: *It's kind of, you fear that other people can look at you and think what you're doing here is such a strange, unreasonable way of looking at life. But I think that's just how I've learned. I've learned that other people's opinions matter more than mine. And I'm always looking for validation, and it's not healthy, really.*

During meditation sessions, Jack reflected on his feelings, bodily sensations, and thoughts, frequently tying them to his life experiences. Jack's biggest fears include being judged and rejected, yet social support is crucial to him. He values being accepted, loved, and listened to: *I envy people that are in relationships because I think it is quite nice to have somebody next to you, close by, to kind of like there is this mutual trust, to protect one another. But when I am alone, I feel sort of neglected a lot of the time. It is very difficult to feel that state of calm.*

Jack often discussed his fear of loneliness and feeling neglected, indicating that loneliness is one of his greatest concerns: *When you already feel quite lonely as a person, that is your lifestyle and has been for so long, pretty much your entire life, it removes that sense of calm and comfort that comes with it.*

ii. Onset and triggers Regarding his anxiety history, Jack stated that it was an ongoing problem for many years during the pre-interview. He defined the main factors predisposing him to anxiety as below: *I've suffered from anxiety most of my life due to an unstable upbringing. My parents separated when I was young, and my mum wasn't really present. My relationship with my stepmum has always been difficult. I've felt naturally anxious as I try to find my way in the world. Anxiety has affected me since I was about 13, when I was bullied and felt alone in school. It reaffirmed the feeling that I was unlovable.*

Jack stated that his biggest fear was isolation. Therefore, he reported that his anxiety was triggered by situations such as being judged by others, being alone and

being rejected: “I would say predominantly is fear of judgment, and fear of rejection. Fear of just being left as well. I do suffer from abandonment problems. Because I have not really had much consistency with relationships with regards to friendships, family, you know, romance, things like that. It has been very difficult for me to find my place. So predominately, I would say triggers are isolation.”

During the pre-interview, Jack also noted uncertainty as a trigger for his anxiety: “The uncertainty makes me anxious if there are more social consequences. For instance, going into a lecture, I think the uncertainty stems from whom am I going to sit next to? Are they going to like me? Are there going to be group activities? Who am I going to work with? Will they want to speak to me?”

In addition to the main factors from the past, Jack reported that the COVID-19 pandemic and the lockdown triggered greater anxiety as he had to remain alone and away from his close friends: “When I think about the consequences of having lockdown events, I was incredibly lonely for long periods and still remain that way. Because, you know, all my friends were actually Erasmus students or international students in my first year when I started. And they all left of course, and it meant that during the lockdown, the friends that I would have had weren't there anymore, because they went home. This increased my anxiety, and it damaged my self-confidence in my social life.”

Barriers and Facilitators in the Practice of the MBI

This theme examines various factors influencing the implementation of mindfulness practice, based on session notes, home practice interviews, and the post-session interview. Figure 4 below illustrates these factors as described by the participant.

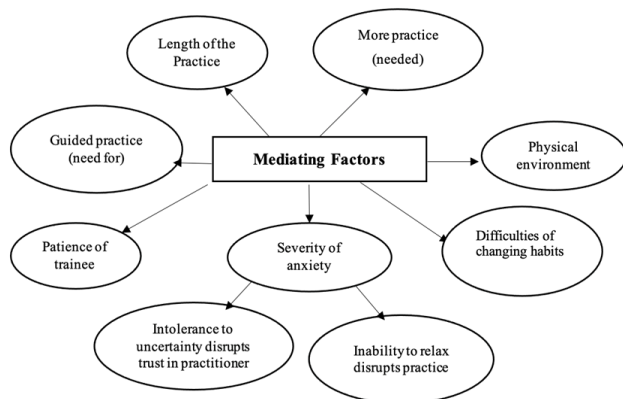


Figure 3. The Mediating Factors Regarding the Mindfulness Based Intervention

i. Physical environment During the third session, Jack struggled with meditation due to intense noise from students outside, stressing the need for a quiet space to focus: “It’s very challenging. I was trying not to hear about it. But what’s going on out there? I mean, in previous sessions, we’ve done those exercises where there have been small bits of chatter going on, but that hasn’t made that much of an effect. But this time it’s like trying to do mindfulness at a football match which is just difficult because everybody’s just screaming and shouting.”

Jack’s weekly session feedback forms mirrored these views, highlighting the challenges posed by the physical environment. He noted that anxiety naturally made it hard to focus during meditations. Table 5 below details the difficulties Jack identified in each session.

ii. Length of practice According to session notes, Jack reported difficulty staying present during longer meditations (20–30 minutes), such as sitting meditation. This suggests that extended practices may pose a challenge for anxious individuals, as they can invite intrusive thoughts, rumination, and heightened anxiety: “I just found myself swaying in all sorts of directions whilst also listening. I did find this one was very dope. I think this one was longer than other meditations... I am feeling a bit tired and I feel like oh my gosh, I almost fall asleep. In the end that one really got me sort of thinking but in a very constructive way”.

iii. Intolerance of uncertainty in practice During the session notes, Jack believed that sometimes it can be difficult for an anxious individual in meditation to give control to the person conducting meditations. Because that meant losing control for a while during the meditation: “It’s strange because there’s still anxiety. It was still a little bit of anxiety trying to get in. It’s maintaining quiet vulnerability, you’re vulnerable because you are off guard. You don’t know what is going to be the next step. You’re not in control. As a trainer, you’re telling me what to think about. You are kind of at that moment you’re drifting.”

iv. Need for guided practice and reassurance In interviews about home practice, Jack stated that the main problem in mindfulness home practice was the absence of a practitioner physically being present and still feeling alone: “When you’re not under direct guidance, it’s easy to lose focus, especially when you’re normally anxious. While listening to an audio recording, your mind can slip into bad habits more easily than when someone is physically present. Having someone there validates your calmness and reduces anxiety, but with a voice recording, you’re reminded that you’re still alone, dealing with your anxieties by yourself.”

v. Difficulties of changing habits Regarding home practices, one of the situations that Jack stated as difficult was the mindful eating exercise: “When I was younger, things were not easy for our family. I was having out-of-date food because that was what we had... The fact that I have this habit of just golfing down food is really strange. So, it was very hard for me at the moment when I was trying to eat my meals to sort of try to work to slow down and you know, try to really feel the textures and the flavours and the sensation that you get. So that one I have struggled a bit with, but the others I have tried to keep up with.”

vi. Lack of patience In the post-interview, when Jack was asked if anyone can learn mindfulness, he stated that it might be challenging for some people as mindfulness is abstract in content and some people are impatient to learn new things. For example, Jack pointed out that: “I would say might be difficult for some people, I think there are people that just maybe don’t take it seriously. I think that, when people think about things that are more abstract, and unusual, let’s say they tend to counteract that. I don’t think they have the patience to, to try and learn a new skill.”

vii. Severity of anxiety Jack stated in the post-interview that another situation that may hinder learning and practising mindfulness was the degree of anxiety. In this regard,

he mentioned that it may be difficult for people with high anxiety to prepare themselves for that mindset, even for relaxation: “I wonder for those people that maybe have anxiety, will they be able to relax themselves enough to experience mindfulness is the real question... I think it was maybe a 'severity' thing. Maybe those who are most severely anxious find it harder to relax. And you do need to relax to take advantage of the exercises. If you just have such a strong inability to keep calm, it might be a problem.”

In summary, the factors affecting mindfulness practices in sessions and home practices can be summarised as the physical environment, the need for guided practice, the length of practice, the participant's patience and openness to learning something new, intolerance of uncertainty in the practice, the participant's severity of anxiety.

Skills Development from the MBI

Through session notes, home practice interviews, and the post-interview, Jack frequently mentioned positive developments in being present and non-judgmental, calming, relaxation, cognitive fusion, and self-confidence. Figure 4 illustrates the general framework of Jack's skill development from the MBI.

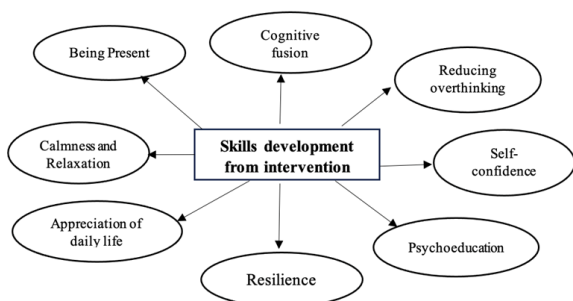


Figure 4. Skills Development from the Intervention

i. Calmness and relaxation According to Jack's statements in the session notes, the most obvious achievements gained through the practices were stated as calmness and relaxation: “Overall, there are times in meditations, you just feel this sort of sense of calm, which is very unfamiliar to me and when I get into that state, I realise how naturally, how high my anxiety is constantly. But it makes me realise that I just need to try to feel that state of calmness because it's nice when you're not stressing about the situation.”

Jack described formal practices like breathing space, sitting meditation, and short body scans as relaxing: “I have been doing a body scan this morning before I came in. And then the breathing exercise I tried to do every night and I can say that they both definitely made me relaxed.”

ii. Being present In the interviews related to home practices, Jack stated that those practices reduced the sleep problems accompanying his anxiety and reported that: “With the breathing exercises I tried to do...some nights before I go to sleep. You know, I have found it slightly easier to be more relaxed to before I sleep. So yeah, I would say predominantly, it's just being more aware of surroundings in a way that helped me.”

iii. Cognitive fusion When it comes to informal practices including being more mindful during daily routines, Jack stated that those practices helped him by improving his

mood and self-confidence and decreasing intrusive thoughts: “While going somewhere crowded, you think everybody's looking at you. Actually, when trying to be present at the moment and truly observing what's going on, I have got a little bit more confident about my posture, and my body language is a bit more open because I'm not thinking, like, I am being intruded. And it's like, okay, if I'm walking around doing my thing, everybody else is doing their thing”.

In the post-intervention interview, the participant stated that mindfulness practices helped him recognise his thinking errors, which he believed contributed to his anxiety: “It [mindfulness practice] kind of helps me recognise the way that I approach my life generally is very faulty, and it contributes heavily to my anxiety. If you're thinking about things every moment of every day, of course, that's going to affect your body and how your body responds to stress”.

iv. Appreciation of daily life Jack stated that he especially benefited from mindful walking exercises. He shared a memory from his recent mindful walking experiences: “Recognizing my surroundings objectively while walking has helped me appreciate what I have. I remember reading about mindfulness walking, which emphasizes appreciating even the ability to walk. It was funny because as I was thinking about that, I saw a girl in front of me using two crutches due to a chronic condition, and her struggle highlighted my own fortune.”

v. Self-confidence During the interviews related to the home practices, Jack believed that repeating these mindful walking and other mindful exercises positively affected his interaction with people: “I have had a lot more positive interactions with people because of how I've been engaging with the outside world more recently. I've had a lot more positive exchanges, even if it's something as simple as a smile from somebody else. I was not really meeting people at eye level. I was just sort of looking at the ground, and I think when you convey that body language, you do automatically become less approachable.... I am holding my head up and my body language sort of represents somebody who is just trying to get on with life. I started to feel more connected with the world.”

vi. Reducing overthinking In the post-interview, when it came to sleep problems, Jack reported the home practices he applied improved his relaxation and enabled him to fall asleep more easily: “In terms of what I have applied, some of these sort of breathing techniques before sleeping, it has kind of helped me sort of get into the mindset of ready to be to sleep more readily. I think it's kind of calmed my mind and my nerves a bit when I usually climb into bed.”

vii. Increasing resilience While describing the contributions of the programme to him in post-interview, Jack remarked that if he encountered a difficulty, being mindful would be an advantage for him: “If any upcoming challenges came up I would have less of a reaction because of mindfulness. I have built up somewhat of a resilience. To sort of understand how my mind works and accept that I do have these faults. So, for example, I know my major concern probably at the moment is my family... I know my real fear is what's causing some anxieties for me is the thought of being alone and what that leads to be...but if I am mindful, in that scenario, I would say, I have friends here in, I have friends across the world.”

Views on Sustaining the MBI

This theme captures Jack's satisfaction with the MBI and his views on its future use, based on data from home practice interviews, feedback forms, and the post-interview. Figure 5 highlights key concepts related to the intervention's sustainability. Detailed findings are presented under two headings: Future Uses of Mindfulness Practice and Participant Satisfaction with the MBI.

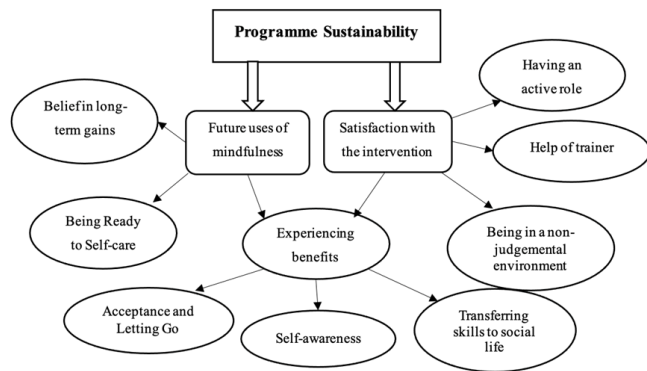


Figure 5. Factors That Might Affect the Programme's Sustainability

i. Future uses of mindfulness practice In this part, Jack's willingness to continue both formal and informal mindfulness practices after the intervention was evaluated. His inclination was supported by several factors: experiencing benefits, belief in long-term impact, and readiness for self-care.

Experiencing Benefits: Jack noted that the practices were worth continuing due to the progress he made weekly: *"I've started walking around a bit more comfortably. The only time I struggled was at [shopping centre]—it was so busy that it was harder to manage the anxiety. But I was trying hard to remind myself that people aren't judging me, just to get to the point of walking around freely. I can't remember the last time I walked without caring... even felt like I could smile at a stranger, which is rare these days. If I can keep this mindset, maybe I'll be surprised to get it in return."*

Belief in Long-Term Gains: Jack compared mindfulness with CBT, noting that while CBT was beneficial, its effects often diminished after therapy ended. In contrast, he believed mindfulness could provide lasting well-being by reinforcing lifelong gains: *"Mindfulness is something that it's very natural for me to think that way now and when you tackle it in therapy, it's reassuring because you have somebody that validated you and I think that's where I'm going wrong. With a therapy session, such as CBT, I feel better because it's the validation that they're listening to me and that they understand me because people don't usually listen to me. When that's taken away, that context that supports us, you just tend to slip back very easily. Whereas in mindfulness, it's somehow very different because it really questions your way of thinking in a way. I know that CBT does as well, but I think somehow just acknowledging the fact that there is this way of looking at things without critiquing it, in a sense without really being harsh."*

Readiness for Self-Care: An important aspect in success if an intervention is whether the participant is ready to engage in their own self-care. Being open to change and having a desire to improve oneself seem to be linked to how

well the intervention works. Session notes and relevant interview transcripts suggested that the participant's willingness to learn new things such as mindfulness and his awareness of what he wanted to change about himself made it easier to adapt to the intervention.

ii. Participant's satisfaction with the MBI Jack expressed general satisfaction with the program, citing several benefits such as improving acceptance, letting go of unhelpful thoughts, gaining self-awareness, and applying learned skills to social life: *"I had a basic understanding of what mindfulness was before the sessions, however, after working through six sessions, I have been able to apply many of the mindful practices in my daily life, which have helped me feel more confident in social situations, where I am not evaluating situations so critically of myself. Being able to see things neutrally has helped me see how much I apply positive and negative filters to all events when many do not need to be evaluated as good or bad."*

Jack also valued learning mindfulness in a non-judgmental environment and appreciated the trainer's passion, willingness, and skill in managing the practices, which helped reduce his anxiety: *"Trainer [the researcher] demonstrates excellent knowledge of mindfulness and comes across as caring and compassionate, which helps me feel comfortable during mindfulness exercises and in confiding in her about my anxious thoughts."*

Further information is provided in Table 6 below through the feedback form filled in weekly by the participant.

Quantitative Data

Response Feedback Forms

Quantitative data from response feedback forms support the qualitative data discussed earlier. Table 7 presents the weekly quantitative evaluations of satisfaction criteria, showing that scores either remained stable or improved. Additionally, the participant rated their experience with mindfulness practices on a Likert scale (1 to 5, with 5 being excellent and 1 being very poor) for each session.

Psychometric Scales

This section compares pre-test and post-test results from scales measuring resilience, mindfulness, anxiety, and IU. Table 8 below presents the total scores before and after the intervention.

The scores reveal a decrease in DASS-21 sub-factors (stress, anxiety, depression) and IUS-12 after the intervention, and an increase in mindfulness (MAAS-15) and resilience (CD-RISC-25) scores. Notably, anxiety and stress levels on the DASS-21 decreased from "extremely severe" to "severe," indicating a clinically meaningful improvement (Lovibond & Lovibond, 1995).

The IUS-12, known for its high test-retest reliability ($r = 0.74$ to 0.91) (Carleton, 2016), showed a significant 6-point decrease, reflecting an improvement in the participant's daily functioning and psychological well-being. However, the post-test IUS-12 scores remained high compared to non-clinical samples, which typically average around 27-29 (Carleton, 2012). Despite this, the combined

Table 6. Qualitative Data from the Response Feedback Form (Benefits and Improvements)

| Questions | Factors for satisfaction | What have you found particularly helpful? | What results/improvements do you attribute to your mindfulness practice? |
|------------------|---|--|--|
| Session Time | | Quotes from the Participant | Quotes from the Participant |
| Session 1 | Being in a non-judgmental environment | Being able to speak openly about what it means to be mindful, what I do wrong to increase my anxieties, and learning how I can apply mindfulness in events and situations I find myself in. | I was able to feel the release of anxiety and experience a noticeable difference between feeling anxious and not feeling anxious. It made me realize how much anxiety I am experiencing on a constant basis. |
| Session 2 | Learning that thoughts are not facts. (Letting unhelpful thoughts go) | Being able to develop my knowledge of mindfulness. This has helped me in utilizing a non-judgmental approach towards others' intentions towards me. Seeing their emotions as separate and irrelevant to my presence. | Being able to separate my own suspicions of other people judging me harshly, to recognize the way my low mood impacts the way I perceive others. If I feel someone is judging me harshly, I will likely fall into a negative cycle of thoughts that verify this. I have improved my posture, keeping my head up while walking outside and it naturally helps me feel more confident. |
| Session 3 | Transfer of learned skills to social life | Applying taught mindfulness techniques to combat intrusive thoughts when in social situations. Being able to look at other people and situations objectively without positive or negative feelings. | Being able to better recognize the objective reality of people and their intentions. More specifically, that people are not as interested and critically involved with my subjective reality as I perceive. This has largely manifested from growing up with ACEs, which has created a harmful self-perception on the nature of people in the world and subsequent avoidant behaviours, conflicting with a deep-rooted desire for approval, a place of belonging, and to feel loved. |
| Session 4 | Self-Awareness | The mountain mindfulness exercise. I was able to find a personal association between being in a negative mindset and how it could mean we are more likely to see others as constantly strong, like we do mountains. We neglect to think about the small disruptive changes going on beyond the surface of those around us and unrealistically feel that our worries and emotions are incomparable because of the strength and fortune we see in others. | Being able to recognize that resilience could be linked to perceived social support. My issues in overcoming past setbacks may be attributed to a perceived lack of social support. If I feel people listen to me, I have found it gives me the emotional strength to recognize distortions in my ways of thinking, which in turn develop an emotional resilience in regard to how I see myself and others around me. |
| Session 5 | Acceptance | Being able to recognize that difficult thoughts trigger my anxiety. The 'exploring difficulties' exercise brought about anxiety. And understanding that happiness is not an emotion to be experienced constantly to conclude that life is going well. | Being able to understand that happiness is something that cannot be experienced if we do not experience other emotions, even those that are negative. It seems to be a problem in the modern age to aspire to be happy all the time – this could not be appreciated if we do not have other emotions to compare them to. When I look at situations, I am always looking for an outcome that brings happiness, when this does not happen, negative thoughts, such as "life is so difficult", cause unnecessary anxiety. |
| Session 6 | Help of trainer in the practice | Being able to see how passionate the trainer was, her calming voice helped with feelings of anxiety during meditation. Her ability to listen and agree with my personal interpretations of mindfulness exercises and discussions. She seemed to genuinely care about me being able to live a better life. The loving-kindness mindful exercise to conclude the sessions helped me think about how much I do not feel I deserve kindness and fear that others are not kind and that this is a core contributor to my anxiety. | I had a basic understanding of what mindfulness was before the sessions, however, after working through six sessions, I have been able to apply many of the mindful practices in my daily life, which have helped me feel more confident in social situations, where I am not evaluating situations so critically of myself. Being able to see things neutrally has helped me see how much I apply positive and negative filters to all events when many do not need to be evaluated as good or bad. |

Table 7. Quantitative Data from Response Feedback Forms

| Session time | 1 st | 2 nd | 3 rd | 4 th | 5 th | 6 th |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| The Qualities | | | | | | |
| I feel less depressed, and my mood has lifted since beginning this mindfulness work | 3 | 3 | 4 | 4 | 4 | 4 |
| My mindfulness practice is helping me to deal with physical/emotional pain | 2 | 3 | 3 | 4 | 4 | 4 |
| My mindfulness practice is helping me to reduce my stress level | 3 | 3 | 3 | 3 | 4 | 4 |
| My mindfulness practice is helping me to feel more relaxed | 3 | 3 | 4 | 4 | 4 | 4 |
| The sessions with my mindfulness teacher have helped me to feel better | 4 | 4 | 5 | 5 | 5 | 5 |
| Overall, I have benefited through my mindfulness practice | 3 | 4 | 4 | 5 | 5 | 5 |
| Overall, on a scale of 1 -5 (where 5 is outstanding and 1 is very poor), how would you assess your mindfulness meditation experience to date? | 5 | 5 | 5 | 5 | 5 | 5 |
| <i>Total score</i> | 23 | 25 | 28 | 30 | 31 | 31 |

Note. Items were rated on a five-point Likert-type scale (5=strongly agree, 4=agree, 3=disagree, 2=disagree, 1=strongly disagree).

Table 8. Psychometric measures with Pre and Post tests

| Scales | Pre-Intervention Total Scores | Severity for Pre-test | Post-Intervention Total Scores | Severity for Post-test |
|-----------------|-------------------------------|--------------------------------------|--------------------------------|--------------------------------------|
| DASS-Stress | 36 | Extremely Severe | 26 | Severe |
| DASS-Anxiety | 30 | Extremely severe | 18 | Severe |
| DASS-Depression | 38 | Extremely severe | 28 | Extremely severe |
| Resilience | 28 | <i>Does not measure the severity</i> | 36 | <i>Does not measure the severity</i> |
| Mindfulness | 42 | <i>Does not measure the severity</i> | 64 | <i>Does not measure the severity</i> |
| IUS | 48 | <i>Does not measure the severity</i> | 42 | <i>Does not measure the severity</i> |

Note. The scale descriptions are as follows: DASS-Stress= Depression Anxiety Stress Scale (21)-Stress subscale; DASS-anxiety= Depression Anxiety Stress Scale (21)-Anxiety subscale; DASS-Depression= Depression Anxiety Stress Scale (21)-Depression subscale, Resilience= Connor and Davidson Resilience Scale (25); Mindfulness= Mindfulness Attention and Awareness Scale 15; IUS= Intolerance of Uncertainty Scale (12).

qualitative and quantitative findings indicate a meaningful and positive change.

DISCUSSION

This single-case study aimed to examine the perceived effectiveness, benefits, and challenges associated with MBIs specifically tailored to address intolerance of uncertainty (IU) in an individual experiencing anxiety. To our knowledge, MBIs have previously been used to reduce IU in both clinical and non-clinical populations. For example, Alimehdi et al. (2016) implemented an 8-session MBSR program in Iran with high school students diagnosed with generalized anxiety disorder, while Kim et al. (2016) applied an 8-week MBCT intervention in South Korea with adults diagnosed with panic disorder. While both studies reported reductions in IU, it was not a central or explicitly targeted component of the interventions. In contrast, the present study introduces a novel adaptation that remains closely aligned with evidence-based MBSR and MBCT protocols, while placing a stronger and more explicit emphasis on IU as a core therapeutic target. This approach preserves the integrity of established models yet distinguishes itself by directly integrating IU into the structure of the intervention. Another key contribution is the case-based design, which provides detailed insights into the practical challenges of implementation and how they were addressed. In this way, the study met its aim of extending

existing mindfulness frameworks to more directly and effectively address intolerance of uncertainty.

The findings from this case indicated that the participant reported reductions in stress and anxiety, alongside improvements in overall well-being. The results of the scales applied before and after the intervention showed that the participant's stress and anxiety levels decreased from 'extremely severe' to 'severe', indicating that there was an improvement in anxiety and stress levels (Lovibond & Lovibond, 1995). Even though there was an improvement in the depression level, the sub-scale result in the measurement shows that it remained as extremely severe in the post-test as it was in the pre-test. The participant also mentioned sleep problems accompanying his anxiety at the beginning of the intervention and reported that there was a visible improvement in these problems.

The findings of this study identified factors that determined the effectiveness of the MBI. In this regard, certain circumstances appeared to make it harder for the participant to utilise the intervention or mitigate its impact. These can be categorised as participant-related factors, program-related factors, and environmental factors. Among the factors originating from the participant, the participant's severity of anxiety was found to be sabotaging the practices at times. In this context, the participant stated that it was difficult to focus when highly anxious. However, although the participant was found to be extremely anxious according to his psychometric measures

at pre-intervention, he found himself less anxious and more relaxed at the end of MBI, confirmed by his post-intervention scores. Other participant-related mediating factors include the participant's readiness for practice, being patient towards MBI, and changing habits by living a mindful life. All of this could be overcome by expanding the threshold of the participant. For example, although the participant found the mindful eating exercises challenging at first, progress was made towards the end of the intervention through the repetition with home practice.

In terms of program-related factors influencing MBI, the participant noted that the length of the practises can occasionally be a disadvantage, due to difficulties focusing because of an increase in intrusive thoughts or due to the presence of sleepiness. In this sense, avoiding long practices in early sessions may be appropriate when the participant is not very accustomed to practice. Hence, it might be important to start with short practices and extend the meditations as the participant raises the threshold for practice. Strohmaier et al. (2021), in a randomised controlled experiment, found that both longer and shorter practices significantly improved trait mindfulness, depression, anxiety, and stress compared to controls. In fact, it is reported that shorter practice had a significantly greater effect on trait mindfulness and stress than longer practice, with a trend in the same direction for depression and anxiety.

Given that loneliness was a significant challenge for the participant, the lack of a practitioner's physical presence during home practices was found to be demotivating. However, body scanning and breathing exercises using voice recordings were effective in reducing the participant's sleep problems and alleviating general anxiety. Since one of the main goals is to prepare the participant for self-administration without the need for a practitioner, and home practices are essential for developing this independence, it is crucial to encourage the repetition of these practices (Crane et al., 2014; Hawley et al., 2014; Parsons et al., 2017). Although participants completed, on average, only 64% of the home practices assigned to them, there was still a notable positive impact on the outcomes of the intervention (Parsons et al., 2017). A quiet environment free from distractions seems a fundamental requirement, as the focus is key in MBI. The importance of arranging the physical environment for the application by keeping it free from distractions such as sound and image is also emphasised in the literature (Motalebi & Vojdanzadeh, 2015; Reiling, 2008).

In this study, the adapted MBI not only supported calmness and relaxation but also enhanced mindfulness-related skills such as present-moment awareness, self-awareness, and appreciation of daily life. By explicitly targeting intolerance of uncertainty, the intervention may have also promoted greater cognitive flexibility, helping reduce overthinking, intrusive thoughts, and rigid thinking patterns. These changes suggest improvements not only in symptom reduction but also in adaptive functioning. Furthermore, the MBI contributed to overall well-being by increasing self-confidence and resilience. These findings are consistent with previous research highlighting the positive impact of mindfulness on resilience and well-being

(Bossi et al., 2022; Heath et al., 2020; McVeigh et al., 2021). Similarly, Oguntuase and Sun (2022) found that mindfulness enhances self-confidence, which aligns with the current results. Given these broader benefits, MBIs adapted to address IU may be effectively applied across both clinical and non-clinical populations, beyond targeting specific psychological symptoms.

To provide long-term gain, sustaining mindfulness practice is essential (Kabat-Zinn, 2013). Therefore, the tendency of the participant to use practice in the future and his satisfaction with MBI were evaluated as the sustainability of mindfulness, in a sense, which depends on the future use of the practice and the satisfaction with the MBI. It was seen that the participant had an intention to use the practice in the future and had overall satisfaction with the MBI. In this context, factors such as *experiencing benefits from MBI* for future use of these skills, *believing in MBI* and *being ready for self-care* have emerged. Considering the stages required for reinforcing mindfulness practices (Mashedi et al., 2020; experiencing benefits, belief in practice, readiness for self-care, and self-compassion), the findings of this study regarding future use were positive. The participant stated that he intended to continue the practices since he noticed an increase in his self-confidence and believed in the long-term effect of MBI. Given his willingness to use these practices in the future, readiness for self-care and self-compassion were also present. However, an assessment at follow-up was missing in this study making it difficult to conclude whether practice was maintained for the participant.

These findings suggest that the intervention not only reduced stress and anxiety but also improved sleep, self-confidence, and overall well-being. Key to the intervention's success were the participant's readiness, belief in MBI, and perceived benefits. Thus, motivating participants by ensuring they are prepared and believe in the practice is essential.

To improve MBI effectiveness, a two-stage implementation process is recommended. First, practitioners should understand participants' expectations and need to boost motivation. Comprehensive interviews can assess readiness and tailor the intervention. Pre-intervention activities, such as discussing mindfulness benefits, reviewing scientific literature, and practising short meditations, can set a positive tone for the training.

Adapting the intervention to participant characteristics is also crucial. MBI's flexibility allows customisation in session length, delivery mode (online or face-to-face), and meditation content. For example, impulsive or easily distracted participants might benefit from shorter sessions with more breaks initially. Studies indicate that online MBIs can be effective as well (Price-Blackshear et al., 2020; Witarto et al., 2022).

Participant satisfaction with MBI depended on active engagement in discussions, support from the trainer, and tangible benefits like increased self-confidence and self-awareness. Enhancing inquiry sessions where participants discuss their experiences can further motivate and provide realistic perspectives for future practices.

Given the limited resources in healthcare, especially mental health treatment (Coombs et al., 2021; Knapp et

al., 2006), MBI offers a low-cost, accessible intervention (Fazia et al., 2023). By equipping participants to practice independently, MBI can promote self-sufficiency without ongoing costs or reliance on specialist care.

Considering the benefits beyond anxiety reduction, such as increased self-confidence and reduced overthinking, expanding MBI practices can benefit various groups. Authorities should support extensive research on MBI and develop policies to promote its use. Lifelong skill development is vital, so applying these teachings in daily life post-intervention is crucial. Participants should be regularly supported with resources like reading lists or audio recordings to reinforce practices, leading to self-sufficiency and reducing the healthcare burden. Including a follow-up period in future evaluations is important to measure the long-term maintenance of skills and benefits.

The findings of this study have limited generalisability due to the single-case design. The reliance on self-reported measures is another limitation, as these are less precise than physiological indicators such as salivary cortisol or breath monitoring (Smit & Stavoulaki, 2021).

Additionally, the dual role of trainer and researcher may have introduced bias, particularly in qualitative data analysis. Although this was partially mitigated by involving a co-author in transcript analysis, potential bias cannot be fully excluded. Future research should involve larger, more diverse samples to improve generalisability and include follow-up assessments to evaluate the intervention's long-term effects.

Conclusions

This case study explored the impact of a 6-week MBI with an emphasis on IU for an individual with anxiety. The MBI was effective in reducing stress, anxiety and IU and improving sleep. It also helped develop mindfulness skills, including relaxation, calmness, appreciating daily life, living in the present moment, improved self-confidence, and decreased overthinking and intrusive thoughts.

The effectiveness of the intervention was influenced by various factors, including participant characteristics such as symptom severity and readiness for the practice, program-related aspects like session length and the absence of a practitioner during home practice, and environmental factors such as the need for a quiet, distraction-free space.

Sustaining mindfulness is essential for maintaining the skills developed during the sessions. While the adapted MBI showed promising results, ongoing support and tailored interventions might be necessary to preserve and enhance these benefits. Future research should explore strategies to further assist individuals with high anxiety and IU in maintaining mindfulness.

DECLARATIONS

Ethics Committee Approval: Ethical approval for this study was granted by the Ethics Committee of the University of Plymouth (Approval Number: 3030, dated 13 December 2021).

Conflict of Interest: The authors declare no conflict of interest.

Informed Consent: Written informed consent was obtained from the participant prior to participation in the study.

Project/Funding: This research was supported by the Turkish Ministry of National Education.

Data Sharing/Availability: The data supporting the findings of this study are not publicly available due to confidentiality and privacy concerns related to the case study participant.

Authors' Contributions: All authors contributed to the conception and design of the study. The entire implementation process was carried out by the first author. Data analysis, interpretation of the findings, and manuscript writing were conducted with contributions from all authors. All authors critically reviewed the manuscript and approved the final version.

Use of Artificial Intelligence: Artificial intelligence tools were used solely for language editing in certain sections of the manuscript.

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