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Effects of Mindfulness Based Tinnitus Stress Reduction on Individuals with Chronic Tinnitus

by

Joanna Bihler

A thesis submitted in partial fulfillment

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PSYCHOLOGICAL EFFECTS OF MINDFULNESS ON TINNITUS

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Committee Approval

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Abstract

Purpose: The purpose of the present study was to investigate the effects of a non-traditional online intervention approach, Mindfulness Based Tinnitus Stress Reduction (MBTSR) and its ability to ameliorate the psychological symptomology often associated with chronic tinnitus. **Methods:** An assortment of pre- and post-assessment self-report instruments were analyzed to determine whether an 8-week online MBTSR course provided the tools necessary to mitigate the psychological effects of tinnitus, such as tinnitus annoyance, psychological distress, and changes in mood, and instead bolster perceived impact on daily living. This study focused on participants' perception of self regarding the five-facets of mindfulness (observing, describing, acting with awareness, non-judging of inner experiences, and non-reactivity to inner experience). Three participants, two of which identified as male, both 51 years of age, and a third unidentified participant, all diagnosed with chronic tinnitus, independently registered for the online course and followed the same protocol. Results for this study were evaluated using pre- and post- self-report questionnaires.

Results: Following treatment, results revealed that mindfulness, quality of life, and positive affect increased as a result of the MBTSR treatment. Marked differences were found within the five facets of mindfulness, particularly among the facets of observing, describing, acting with awareness, non-judging of inner experiences, and non-reactivity to inner experience. **Conclusion:** A non-traditional 8-week online MBTSR course promotes a shift from struggle to acceptance, while enhancing quality of life for individuals with chronic tinnitus.

Chapter 1: Review of Literature

Introduction

Tinnitus, known colloquially as “ringing in the ears,” is a nondiscriminatory, complex, and exasperating symptom experienced by myriad individuals. Chances are a loved one, neighbor, or friend has been affected by this auditory phenomenon. Jastreboff (2011) describes it as “a phantom auditory perception, namely perception of sound without corresponding vibratory, mechanical activity in the cochlea” (p. 576). According to the American Speech-Language Hearing Association (2016), tinnitus is generally explained as “ringing in the ears” when no other sound is present (para. 1). Occurring uni- or bilaterally, tinnitus has been described as sounding like hissing, roaring, pulsing, whooshing, chirping, whistling, or clicking. Often, it is “accompanied by hyperacusis (lowered tolerance for sound), misphonia (dislike of certain sounds), and phonophobia (fear of certain sounds)” (Møller, 2011, p. 29). To the sufferer’s lament, a known cure remains elusive, and still no treatment or intervention has been found to effectively assuage the symptomology of tinnitus.

This undermining condition, often described as debilitating, has diverse causes. Consequently, its mysterious nature makes it difficult to treat and leaves the myriad people affected worldwide feeling powerless and hopeless. The American Tinnitus Association extrapolated findings from the 2011-2012 National Health and Nutrition Examination Survey conducted by the U.S. Center for Disease Control, stating that “nearly 15% of the general public — over 50 million Americans — experience some form of tinnitus. Roughly 20 million people struggle with burdensome chronic tinnitus, while 2 million have extreme and debilitating cases” (Understanding the Facts, para. 2). It

is estimated that nearly one third of all adults experience tinnitus at some point in their lives, and according to the American Speech-Language Hearing Association, “10%-15% of adults who have prolonged tinnitus require medical evaluation” (Tinnitus, para 2, 2016).

Types of Tinnitus

Tinnitus is differentiated by location, intensity, and character. The American Tinnitus Association (2016) distinguishes between two different types: objective and subjective. Objective tinnitus, an extremely rare variation, represents less than 1% of tinnitus cases. It is characterized by ear or head noises that are audible to the patient, as well as other people, and can be physically measured. Often objective tinnitus is caused by sound generated in the body, possibly due to turbulent flow of blood in a constricted artery that reaches the ear through conduction in body tissues (Láinez, Ponz, & Piera, 2011). Subjective tinnitus, on the other hand, makes up more than 99% of all reported cases and refers to ear or head noises that are only perceivable to the specific patient. As referred to earlier, subjective tinnitus frequently sounds like hissing, roaring, pulsing, whooshing, chirping, whistling, or clicking, and cannot be directly measured.

According to Møller (2011), subjective tinnitus has been classified according to the following factors: whether it has manifested in one or both ears, its character (low frequency to high frequency, tonal, pulsatile, constant, or intermittent), and its intensity (measured by using loudness matching or a visual analogue scale). A visual analogue scale (VAS) is a simple technique for measuring subjective experience and is one of the most commonly used measures of pain intensity in pain research today (Jensen, Chen, & Brugger, 2003).

Suspected Origins and Risk Factors of Tinnitus

Tinnitus is not a disease; it is a symptom of another problem. Although the symptomology affects a substantial number of people worldwide, there has been no conclusive evidence found on its nature or origin, and etiological theories remain varied. That said, it is common knowledge that certain environmental factors (noise trauma and medication side effects) have been found to contribute to an individual's susceptibility to tinnitus. However, others, such as Sand (2010), propose that "while its etiology remains incompletely understood, there is a growing awareness of genetic factors that predispose to, or aggravate chronic tinnitus" (p. 23). Ultimately, the most frequent diagnosis of tinnitus is due to "unknown" causes (Stouffer & Tyler, 1990).

Although an overwhelming number of claims attribute tinnitus manifestation to the "unknown," Shargorodsky, Curhan, and Farwell (2010) attempt to identify high-risk groups that are more vulnerable to acquiring this condition. They have recognized: senior citizens, active military personnel and veterans, people employed in loud workplace environments, musicians, motorsport and hunting enthusiasts, and people with prior behavioral health issues. Likewise, Caucasian males are reported to have a higher prevalence of tinnitus over any other racial or ethnic group.

It is important to keep in mind that the analysis of Shargorodsky, Curhan, and Farwell (2010) is an attempt to make sense of this enigmatic neurological and audiological condition. At this time, there are few concrete suggestive causes, conditions, or hallmark circumstances that contribute to the underlying manifestation of tinnitus, and a limited number of tinnitus risk factors have been determined despite the endless

research studies seeking to demystify it. Consequently, audiologists suggest trying to find an underlying cause in order to begin remedying the associated symptomology.

Suspected Underlying Causes of Tinnitus

According to the Mayo Clinic (2016), there is a correlation between age-related hearing loss, termed Presbycusis, and the prevalence of tinnitus. Individuals 60 years of age and older are at greater risk for developing tinnitus, and it has been estimated that 17.5% of individuals in this age bracket have been diagnosed as having chronic tinnitus (Malouff, 2011). However, the most compelling suggestive cause for tinnitus is effects of loud noise exposure on inner and outer hair cell and acoustic nerve function. Important risk factors include loud noise exposure from occupational, firearm, or leisure time noise. These behaviors that expose individuals to extremely loud noises may make them more vulnerable and susceptible to developing tinnitus (Shargorodsky, Curhan, & Farwell, 2010).

Impact Factors Associated with Tinnitus

Physiological Impact Factors of Tinnitus

There are two major impact factors that have been associated with tinnitus: physiological and psychological. A couple of physical factors include fatigue and sleep difficulties. According to Khedr, Ahmed and Shawky (2010), sleep deprivation is one of the primary effects of tinnitus. Their research supports that disturbances in sleep can lead to physical and mental health problems. Likewise, Malouff (2011) reports that tinnitus causes substantial distress that manifests as sleep disturbances, difficulty with concentration, perceived anxiety, annoyance, and depression. Other common physiological conditions associated with tinnitus include ear infection, earwax blockage,

and ossicular changes. If too much earwax accumulates, it can harden and lead to irritation of the eardrum. This irritation may lead to partial or total hearing loss, thus exacerbating the individual's susceptibility to developing tinnitus. Additionally, reports of otosclerosis, a stiffening of the bones in the middle ear drum caused by abnormal bone growth, has also been shown to engender tinnitus. Less common physiological risk factors of tinnitus include Meniere's disease, Temporomandibular joint (TMJ) syndrome, head or neck injuries, and acoustic neuroma, also known as vestibular schwannoma.

According to Danseshi, Hadizadeh, Mahmoudian, Sahebjam, and Jalesi (2004), various blood vessel disorders may cause what is referred to as pulsatile tinnitus, when the tinnitus is rhythmic and synchronous with the heartbeat and can be perceived by the patient; however, this cause is rare. In healthy individuals, major blood vessels in the middle and inner ear have the ability to flex or expand slightly with each heartbeat. If a buildup of cholesterol and other deposits have formed in those blood vessels, they begin to lose elasticity. This medical condition, referred to as atherosclerosis, causes the blood flow to become more forceful, essentially making it easier for both ears to detect the beats. Typically, this type of tinnitus manifests bilaterally. Additional types of pulsatile tinnitus can result from head and neck tumors pressing on blood vessels (vascular neoplasm), turbulent blood flowing in either the carotid artery or jugular vein, malformations of capillaries (arteriovenous malformation), and hypertension. Significant associations have been found between tinnitus, smoking, and hypertension. Shargorodsky, Curhan, and Farwell (2010) propose that "vascular disease might have a greater contribution to the etiology of tinnitus than previously reported" (p. 716).

Psychological Impact Factors of Tinnitus

Psychological impact factors frequently include feeling withdrawn, helpless, nervous, scared, angry, tense, and/or irritable. According to Langguth, Landgrebe, Kleinjung, Sand, and Hajak (2011), the most common psychological implications reported by individuals with chronic tinnitus are an increased perceived level of psychological stress, anxiety, and major depression. Langguth et al. (2011) state that “although many individuals’ tinnitus sensation is transient, 5-15% of the general population are not so lucky; instead, experiencing tinnitus as an unremitting sensation” (p. 1). This incessant auditory perception can severely affect quality of life and may be the catalyst to symptoms of depression. Consequently, it has been demonstrated that these individuals with tinnitus are diagnosed more with clinical depression due to perceived levels of distress and subjective characteristics of tinnitus which often exacerbate and aggravate their psychological and emotional wellbeing (Langguth et al., 2011).

Tinnitus Symptomology and Effects on Quality of Life

Tinnitus symptomology adversely impacts the quality of life for individuals with this chronic condition. Erlandsson and Hallberg (2000) found that tinnitus can impede the possibility of making commitments leading to personal growth and the ability to maintain a socially meaningful life. Likewise, quality of life for patients with tinnitus is affected by multiple predictor variables. These include: audiological (better or worse average pure tone hearing threshold, hypersensitivity to sound), psychological (impaired concentration, feeling depressed, perceived negative attitudes, social support), psychosomatic (headache, vertigo), and tinnitus- specific variables (tinnitus duration, localizations, and fluctuations). However, the psychological components of impaired concentration,

symptoms of depression, and emotional problems, negatively impact quality of life the most (Erlandsson & Hallberg, 2000).

Traditional Treatment Methods

Endless time and money have been spent investigating ways to lessen the physical and psychological symptomology associated with chronic tinnitus. According to the American Speech-Language Hearing Association (2016), a variety of traditional treatment methods are available. In hope of making the sounds more tolerable, sound generators are often recommended. Worn in the ear, similar to a hearing aid, sound generators produce a continuous, low-level white noise that covers up or “masks” the distracting sound. The type of device depends on pitch, loudness, and location of the tinnitus. Sound machines are another option; however, they are usually reserved for the evening, during sleep, or used in a quiet place. The sound of the machine provides a steady background of comforting noise (ASHA, 2016).

Occasionally, medication is prescribed in an attempt to reduce the severity of symptoms; although medications alone cannot completely eliminate the characteristics of tinnitus and are usually accompanied by myriad side effects (The Mayo Clinic, 2016). Tinnitus Retraining Therapy (TRT) is another traditional method that has gained in popularity over the years. According to Jasterboff (2011), “TRT is a specific implementation of the Tinnitus Habituation Therapy, which utilizes teaching/counseling to reclassify tinnitus into the category of neural stimuli, and sound therapy to decrease the tinnitus-related neuronal activity within the brain” (p. 591). In terms of psychological treatment, the most widely used psychological strategies for coping with tinnitus are cognitive behavioral interventions. Cognitive behavioral therapy (CBT) is an approach

that focuses on exploring relationships between a person's feelings, thoughts, and behaviors. CBT aims to alter maladaptive cognitive, emotional, and behavioral responses to tinnitus, as opposed to abolishing the sound itself (Greimel & Kröner-Herwig, 2011). However, traditional treatment options have not been particularly effective for everyone with tinnitus. Consequently, Meikle et al. (2007) reaffirms that traditional interventions have provided minimal success in lessening the symptomology associated with tinnitus. Accordingly, they support that alternative treatment options may warrant further investigation.

Non-Traditional Treatment Methods

Meikle et al. (2007) suggests that a Mindfulness Based Stress Reduction (MBSR) model of intervention might be beneficial to assuage characteristics of subjective tinnitus. The University of Massachusetts Center for Mindfulness (2016) describes MBSR as an 8-week program bringing together mindfulness meditation techniques and yoga to help individuals learn how to calm the body and mind simultaneously by using innate resources and abilities, to help cope with illness, pain, and stress.

Inspired by the favorable results an MBSR course has generated for patients with chronic conditions, Gans (2010) has modified MBSR into a similar technique specifically used for individuals with chronic tinnitus, called Mindfulness Based Tinnitus Stress Reduction (MBTSR). Her research suggests that MBTSR intervention provides benefits for patients with chronic tinnitus through cultivating a deeper awareness. Its aim is to create a shift from struggle to acceptance for a person living with the undesirable symptoms that frequently accompany tinnitus (Gans, 2010).

Mindfulness and MBSR: Background Information

Mindfulness, a term closely associated with awareness, can trace its roots back thousands of years before the advent of Buddhism, to the yogic practices described in the Upanishads (Miller, Fletcher, & Kabat-Zinn, 1995). Eastern and Western interpretations tend to view mindfulness as an exercise in cultivating awareness and non-judgment, a practice that requires suspension in reaction and expectation of the present moment. Furthermore, Bond et al. (2007) regards mindfulness as a means of encouraging an attitude of curiosity, openness, expanded perspective, and acceptance towards one's unique experiences. Correspondingly, mindfulness can be universally conceptualized as a particular way of paying attention.

The Beginning of MBSR

Often included in the category of mindfulness is MBSR; also, the foundational underpinnings of MBTSR intervention. According to the University of Alberta Evidence-Based Practice Center (EPC), the MBSR program was designed by Dr. Jon Kabat-Zinn at the University of Massachusetts Medical Center in 1979 to integrate Buddhist mindfulness meditation into mainstream clinical medicine and psychology (Bond et al., 2007). Its nascence was a group-based program designed to treat patients with chronic pain. Since then, it has been used to reduce morbidities associated with chronic illnesses and to treat behavioral and emotional disorders (Bond et al., 2007). Research by Carlson, Speca, Faris, and Patel (2007) illustrates that "MBSR is rooted in contemplative spiritual traditions in which the experience of conscious awareness is actively cultivated in specific ways" (p. 1038). Since the onset of MBSR, it has been recognized as a valuable tool in the treatment of many psychological and physical conditions (Miller, Fletcher, &

Kabat-Zinn, 1995). According to Miller, Fletcher, and Kabat-Zinn (1995), “the emphasis in the program is to encourage each individual to explore his or her own ‘inner resources’ for growth, learning, and healing, and to systematically cultivate mindfulness in all areas of daily life, including those times in which they find themselves confronting distressing symptoms and problems” (p. 197).

Physiological Effects of Mindfulness Based Stress Reduction

A mindfulness based practice, such as MBSR, has been demonstrated to be an effective and practical intervention for certain physical and psychological conditions; overwhelmingly, it has been shown to bolster immunological functioning. A study, supported by the National Cancer Institute and conducted by Witek-Janusek et al. (2008), investigated the effect of MBSR on immune function, quality of life, and coping in women newly diagnosed with early stage breast cancer. Results found that when compared to a control group of women not enrolled in MBSR, women in the MBSR group had reduced cortisol levels and returned to immune homeostasis more rapidly. This was demonstrated by re-established Natural Killer Cell Activity (NKCA), expressed as lytic units, and cytokine production levels (expressed as interferons, IFN), in contrast to cancer patients in the non-MBSR group who instead exhibited continued reductions in NKCA and IFN gamma production. According to Platanias (2005), “Interferons (IFNs) are widely expressed cytokines that have potent antiviral and growth-inhibitory effects ... they are the first line of defense against viral infections and have important roles in immunosurveillance for malignant cells” (p. 375). Subsequently, multiple studies support that a mindfulness based practice can heighten immunological functioning.

Lerner, Kibler, and Zeichner (2013) report that an 8-week MBSR course can be an effective intervention strategy for treating patients with cancer and HIV/AIDS. Their findings support a positive relationship between MBSR intervention and beneficial immunological outcomes; such as, an increase in interleukin (IL), an anti-inflammatory cytokine previously described, which is also involved in atherosclerosis, diabetes, certain types of cancer, and rheumatoid arthritis. Fang et al. (2010) found that participants who had committed to an 8-week MBSR intervention demonstrated changes in psychosocial well-being, which has been associated with changes in immunologic measures. Blood tests revealed that patients who reported improvement in overall mental well-being showed increased levels of natural killer (NK) cell cytolytic activity. Likewise, patients who reported decreased anxiety and distress levels exhibited reduced C-reactive protein (CRP). Consequently, there is convincing evidence in support of a mindfulness based practice and its ability to strengthen immunological functioning.

Psychological Effects of Mindfulness Based Stress Reduction

It has been noted that symptoms of depression, characteristics of a hallmark psychological condition associated with chronic tinnitus, can reciprocally interact with physical symptoms to decrease quality of life. However, numerous studies support that patients who participate in MBSR report a marked reduction of depressive symptoms that often persist for months after the intervention (Kabat-Zinn et al., 1992). Psychological effects of MBSR intervention have been identified in regard to lessening an individual's feelings of hopelessness, stress, anxiety, and depression. Miller, Fletcher, and Kabat-Zinn (1995) found strong evidence to support that medical patients who also have anxiety disorders, as defined by the DSM-III- R, benefit from intensive MBSR intervention. An

8-week course has shown to be clinically effective in reducing anxiety levels and increasing positive affect.

Specia, Carlson, Goodey, and Angen (2000) studied the effects of an MBSR program on mood and symptoms of stress in cancer outpatients during a randomized, waitlist controlled clinical trial. Participants included both male and female patients with a wide variety of cancer diagnoses, stages of illness, and ages. Results overwhelmingly revealed significantly lower scores on the Total Mood Disturbance questionnaire and subscales of depression, anxiety, anger, and confusion, and increased vigor compared to control subjects on the wait-list. Additionally, the treatment group had “fewer overall symptoms of stress; fewer cardiopulmonary and gastrointestinal symptoms; and less emotional irritability, depression, and cognitive disorganization” (Specia, Carlson, Goodey, & Angen, 2000, p. 613).

According to Sephton et al. (2007), “the MBSR intervention appears to be a promising adjunctive treatment for depressive symptoms in patients with chronic pain” (p. 82). In their randomized controlled trial, Sephton et al. examined effects of the 8-week MBSR intervention on depressive symptoms in patients with fibromyalgia, a chronic pain disorder marked by joint and soft tissue pain, tenderness, and non-restorative sleep patterns. The results revealed that the MBSR intervention significantly reduced depressive symptoms and somatic symptom scores in treatment versus control participants at the immediate post-program assessment.

The Advent of Mindfulness Based Tinnitus Stress Reduction

Due to the promising effects MBSR has shown to have on chronic conditions, MBTSR, an awareness technique modified by Gans (2010), is tailored towards individuals with subjective chronic tinnitus. It follows in the footsteps of Kabat-Zinn's MBSR model. Gans's intention was to develop a nontraditional intervention tool that could help mitigate the frequent and accompanying psychological symptoms of tinnitus. Gans (2010) suggests that MBTSR provides benefits for patients with chronic tinnitus and creates a shift from struggle to acceptance for a person living with its unwelcome and accompanying symptoms.

Mindfulness Based Tinnitus Stress Reduction and Evidence Based Practice

Currently, there is scant data available on MBTSR as an intervention for tinnitus. However, demonstrated through a randomized recruitment process, Gans's pilot study assessed participants' changes in perception of tinnitus, depression, anxiety, sleep difficulty, quality of life, and mindfulness after completing an 8-week in-house MBTSR training course. There was no control group in this study. The trial focused on the effects MBTSR had on mitigating clinical symptoms of tinnitus, if present, or creating a shift in attitude towards their tinnitus symptomology (Gans, 2014).

An assortment of surveys was used as part of Gans's pre- and post-clinical assessment process for her pilot study (Gans, 2014). The *Tinnitus Visual Analogue Scale*, administered both pre- and post assessment, was composed of two questions: how much annoyance do you experience from your tinnitus and how loud would you rate your tinnitus? (Gans, 2014). The *Tinnitus Intake Questionnaire*, specific to the pre-assessment, regarded severity, type, location, and characteristics of tinnitus (Gans, 2014). Other

assessments included the *Tinnitus Handicap Inventory (THI)*, which aimed to identify, qualify, and evaluate the difficulties an individual may have been experiencing; the *Pittsburgh Sleep Quality Index (PSQI)*, an instrument used to measure the quality and patterns of sleep in adults through the measurement of seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month; the *5-Facet Mindfulness Questionnaire*, a psychological measurement intended to explore the degrees of mindfulness, including: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience; and lastly, a self-report instrument called the *Personal Growth Initiative Scale*, which yields a person's active and intentional involvement in changing and developing as a person (Gans, 2014).

The findings overwhelmingly revealed that a consistent practice of MBTSR contributed to a decrease in tinnitus annoyance, psychological distress, and bolstered perceived impact on daily living. Improvements were shown in the participants' shift in attitude, general functioning, and overall quality of life. Results suggest MBTSR can be a promising and optimistic treatment option for individuals with this condition.

However, to validate MBTSR as an effective tinnitus intervention tool and to expound upon the study's promising findings, particularly those that demonstrate a lasting shift in tinnitus perception and a decrease in psychological distress, results need to be replicated among a larger group of participants and data needs to be collected and analyzed with a randomized controlled trial (Gans, 2014). With further research, MBTSR may one day be considered an effective adjunct treatment for chronic tinnitus.

Due to the success of Gans's research findings, an experimental online program of study has since been developed and includes pre- and post data for a subsequent group of participants. Analysis of results from this course is the focus of this study.

Summary

The origin and underlying cause of tinnitus has yet to be demystified. To mitigate the physiological and psychological symptomology, various traditional treatment methods have been suggested; unfortunately, many have provided minimal relief. Regarding clinical relevance, MBSR has demonstrated efficacy in reducing various ailments and accompanying symptoms commonly associated with tinnitus, and has shown to enhance immunological functioning in an assortment of chronic conditions. For that reason, it is likely that with further exploration an alternative treatment option such as MBTSR has the potential to become mainstream in a patient's treatment process and has the possibility to be considered an effective adjunct intervention for individuals with chronic tinnitus. However, data from the 8-week online MBTSR course still needs to be organized and analyzed; additionally, further research is warranted to determine whether MBTSR is clinically reliable and relevant.

Chapter 2: Methodology

This study is being conducted to investigate the effects of a non-traditional 8-week online intervention approach aimed at ameliorating the symptomology of chronic tinnitus.

Research Hypothesis:

H_{0a}: No marked differences exist among a pre- and post-treatment therapy when treating patients with chronic tinnitus, as measured by the Tinnitus Handicap Inventory (THI), the Pittsburgh Sleep Quality Index (PSQI), the 5-Facet Mindfulness Questionnaire, and the Personal Growth Initiative Scale.

H_{1a}: A marked difference exists in pre- and post-treatment therapy for individuals with chronic tinnitus when being treated with the non-traditional intervention approach, Mindfulness Based Tinnitus Stress Reduction, as measured by the Tinnitus Handicap Inventory (THI), the Pittsburgh Sleep Quality Index (PSQI), the 5-Facet Mindfulness Questionnaire, and the Personal Growth Initiative Scale.

Participants

The study consisted of three subjects who identified as having chronic tinnitus for at least 6-months. The participants, recruited through Dr. Gans's website, <http://www.mindfultinnitusrelief.com>, self-registered for an 8-week online Mindfulness Based Tinnitus Stress Reduction (MBTSR) course. Each participant completed a *Pre-Assessment Tinnitus Intake Questionnaire* to determine their eligibility for the study. Detailed demographics are reported for each subject in Chapter 3.

Instruments:

An assortment of surveys was used as part of Gans's pre- and post-clinical assessment process. Prior to beginning the 8-week online Mindfulness Based Tinnitus Stress Reduction course, interested participants completed the self-report, *Pre-Assessment Tinnitus Intake Questionnaire* (Appendix A). This 9-page survey was completed to assess hopeful participants' eligibility and commitment to taking part in this course. The survey included general background questions and idiosyncratic questions concerning the characteristics of the participants' tinnitus, such as ranking symptom activity and discomfort.

The pre- and post-assessment tool, *Tinnitus Handicap Inventory* (Appendix B), measured tinnitus symptom severity and aimed to identify, qualify, and evaluate the difficulties an individual may have been experiencing.

The *Tinnitus Visual Analogue Scale* (Appendix C), which was administered both pre- and post-assessment, measured treatment-induced changes in tinnitus loudness and annoyance and was composed of two questions: how much annoyance do you experience from your tinnitus and how loud would you rate your tinnitus? The *Five Factor Mindfulness Questionnaire* (Appendix D), was a psychological measurement intended to explore the degrees of mindfulness, including: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience.

Table 1

Hypotheses Variables of Interest: FFMQ

Variable	Measurement
Facet of Mindfulness: (1) Observing	Measured by FFMQ questions, “Generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing,” “I notice the smells and aromas of things,” and “I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.” This was coded with a “1” equal to “never or very rarely true,” to “6” equal to “very often or always true.”
Facet of Mindfulness: (2) Describing	Measured by FFMQ questions, “I’m good at finding words to describe my feelings,” “I can easily put my beliefs, opinions, and expectations into words,” “It’s hard for me to find the words to describe what I’m thinking,” “When I feel something in my body, it’s hard for me to find the right words to describe it,” and “When I’m feeling terribly upset, I can find a way to put it into words.” This was coded with a “1” equal to “never or very rarely true,” to “6” equal to “very often or always true.”
Facet of Mindfulness: (3) Acting with Awareness	Measured by FFMQ questions, “I find it difficult to stay focused on what’s happening in the present,” “It seems I am running on automatic without much awareness of

	<p>what I'm doing," "I rush through activities without being really attentive to them," "I do jobs or tasks automatically without being aware of what I'm doing," and "I find myself doing things without paying attention." This was coded with a "1" equal to "never or very rarely true," to "6" equal to "very often or always true."</p>
<p>Facet of Mindfulness: (4) Nonjudging of Inner Experiences</p>	<p>Measured by FFMQ questions, "I tell myself I shouldn't be feeling the way I'm feeling," "I make judgements about whether my thoughts are good or bad," "I tell myself that I shouldn't be thinking the way I'm thinking," "I think some of my emotions are bad or inappropriate and I shouldn't feel them," "When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/or image is about," and "I disapprove of myself when I have irrational ideas." This was coded with a "1" equal to "never or very rarely true," to "6" equal to "very often or always true."</p>
<p>Facet of Mindfulness: (5) Nonreactivity to Inner Experiences</p>	<p>Measured by FFMQ questions, "When I have distressing thoughts or images, I don't let myself be carried away by them," "When I have distressing thoughts or images, I feel calm soon after," "When I have distressing thoughts or images I am able to just notice them without reacting," and "When I have distressing thoughts or images, I just</p>

	notice them and let them go.” This was coded with a “1” equal to “never or very rarely true,” to “6” equal to “very often or always true.”
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Additional instruments included the *Pittsburgh Sleep Quality Index* (Appendix E), an instrument used to measure the quality and patterns of sleep in adults through the measurement of seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month; and furthermore, a self-report instrument called the *Personal Growth Initiative Scale* (Appendix F), which yields a person’s active and intentional involvement in changing and developing as a person.

Reliability

Inter-judge reliability: The researcher and graduate clinicians involved in the data analysis of the various instruments examined all subjects’ self-report questionnaires. To safeguard intra-judge reliability, the researcher and graduate clinicians independently examined data entry for the surveys, and subsequently resolved any conflicts between the two entries.

It has been concluded that the *Five Facet Mindfulness Questionnaire*, currently considered the most frequently studied mindfulness questionnaire, and its corresponding psychometric properties, is a reliable and valid instrument for use in adults with clinically relevant symptoms of depression and anxiety. “Accumulating data suggest that the five-factor structure of the FFMQ is robust for various types of samples, and consistent

evidence has underscored its construct validity” (de Bruin, Topper, Muskens, Bögels, & Kamphuis, 2012, p.188)

Additionally, the *Scale Tinnitus Intake Questionnaire*, the *Tinnitus Handicap Inventory (THI)*, the *Tinnitus Visual Analogue Scale (TVAS)*, the *Hospital Anxiety and Depression Scale (HADS)*, the *Pittsburgh Sleep Quality Index (PSQI)*, and the *Personal Growth Initiative Scale* have all been deemed as valid and appropriate measures, indicative of the subjects’ severity of tinnitus and its affect upon their quality of life.

Procedure

Gans assessed participants’ changes in tinnitus perception, changes in mood, anxiety, sleep difficulty, quality of life, and mindfulness after completing an 8-week online MBTSR course. Based on the perceived debilitating effects, individuals self-registered for Dr. Gans’s 8-week Mindfulness Based Tinnitus Stress Reduction (MBTSR) course, offered through her clinical website <http://www.mindfultinnitusrelief.com>. Eligibility to participate in this alternative and adjunctive treatment required prospective subjects to identify with chronic tinnitus, having experienced associated symptomology for at least 6 months prior to the onset of the course.

Prior to beginning the 8-week online mindfulness course, the qualified subjects completed a series of pre- questionnaires regarding the severity of their condition, and furthermore they were required to disclose how tinnitus affected their quality of sleep, mood, and overall quality of life.

In contrast to the pilot study, where mindfulness meditation and psychosocial discussions were facilitated in person, the online participants alternatively began a therapy which consisted of 8-weekly, 2.5-3.5-hour mindfulness based webinars,

facilitated by Gans, discussing “formal” mindfulness meditation methods. The protocol for the program included a Body Scan Meditation, a gentle Hatha Yoga practice, and the commitment to a 45-minute minimum daily home based mindfulness based sitting meditation practice. Furthermore, the participants engaged in “informal” mindfulness meditation practices, such as a 5-15-minute sitting meditation at least 6 days each week for the duration of the course, awareness of pleasant and unpleasant events and sensations, awareness of breathing, and deliberate awareness of routine activities and events like eating, weather, driving, walking, and interpersonal communication. Additional activities included: daily journaling exercises, an online community support forum regarding weekly home assignments, an all-day silent retreat during the sixth week of the program (7.5 hours), and frequent check-ins with Gans.

Following the course, MBTSR participants were asked to complete a series of post-assessment measures, filled out at home, to gauge what level of physiological and psychological gains had been made, if at all. Pre- and post-data were examined descriptively rather than through inferential statistics. Furthermore, the relationship between the total scores of the *Five Facet Mindfulness Questionnaire* and complimentary instrumental measures were analyzed and compared.

Analysis of Data

Pre- and post-treatment data regarding the psychological effects of the non-traditional online intervention approach, Mindfulness Based Tinnitus Stress Reduction, were collected for all participants. The data of this single-subject design were examined descriptively rather than through inferential statistics, due to under-sized sample of three

participants. It was predicted that there would be an increase in mindfulness, enhanced quality of life, enriched positive affect, and improved quality of sleep for all participants.

Chapter 3: Results

This study examines the psychological effects of Mindfulness Based Tinnitus Stress Reduction (MBTSR), an 8-week online non-traditional therapeutic approach, on individuals with chronic tinnitus. This intervention approach aims to lessen the psychological symptomology often associated with chronic tinnitus. Self-report questionnaires were analyzed to determine whether significant differences exist pre- and post-assessment for individuals with tinnitus when enrolled in a MBTSR course, as measured by the: *Tinnitus Handicap Inventory (THI)*, the *Tinnitus Visual Analogue Scale (TVAS)*, the *5-Facet Mindfulness Questionnaire (FFMQ)*, the *Pittsburgh Sleep Quality Index (PSQI)*, and the *Personal Growth Initiative Scale (PGIS)*.

Due to an under-sized sample of three participants, the data were examined descriptively rather than through inferential statistics. Although the original study began with nearly 400 participants, merely three individuals completed both pre- and post-questionnaires necessary to determine psychological benefits gained, if any, from an MBTSR intervention.

Self-report questionnaires were examined to compare the frequencies and mean scores of pre- and post-treatment data without using the benefit of inferential statistics. That having been said, the single-subject results provide an indication of the effects of the treatment and its ability to mitigate the psychological symptomology that frequently accompanies chronic tinnitus.

Participants

Demographic information included age and gender. Three subjects (two males, both 51-years of age and one individual, gender and age unidentified) participated in the study. Of the three subjects, ethnicity and socioeconomic status were unknown. To participate in the 8-week online MBTSR program, participants were required to pay a standard price of \$325. Other required materials included computer access, a copy of Jon Kabat-Zinn's book *Full Catastrophe Living*, and a yoga mat. With consideration of financial commitment, the study's participants most likely identified socioeconomically as middle- to upper class.

Of the three participants, only two completed the initial pre-assessment *Tinnitus Intake Questionnaire (TIQ)* (Appendix A), used to determine hopeful participants' eligibility and commitment to taking part in this course. The case history for each participant, gathered from the *TIQ*, includes general background, as well as idiosyncratic information concerning characteristics of the participants' tinnitus; such as, location of tinnitus, the ranking of symptom activity and discomfort, severity of both pitch and loudness, and qualitative aspects of the tinnitus. For tinnitus pitch, the participants were given a severity rating scale; 1-very low, similar to a fog horn, and 10-extremely high pitch, reminiscent of a whistle. Similarly, the loudness rating scale registered as 0-very faint to 10-very loud. Additionally, the participants provided information regarding: percent of time their tinnitus is present during periods of non-sleep, whether many everyday sounds are unbearably loud, whether sounds that others believe are moderately loud are too loud, whether they hear very soft sounds that others with normal hearing do not hear, how many days per month they are bothered by their tinnitus, and how long

they have been afflicted with their condition. Subsequently, the participants were asked to choose from a list of options and describe: what makes their tinnitus worse, what reduces their tinnitus, if the presence of loud noise makes their tinnitus worse, and what they think originally caused their tinnitus. Lastly, the participants disclosed whether they wore hearing aids, and whether they had any legal action or compensation claims pending in relation to their tinnitus, or were in the process of planning legal action.

Participant 1

Participant 1 (P1), a 51-year-old male, presented with chronic tinnitus spanning 7 months. Unaware of what originally caused his tinnitus, P1 identifies as having tinnitus solely in the left ear, and describes the pitch as an eight (nearing that of a whistle) and the loudness as a 10 (very loud), both varying day-to-day. When asked to pick a quality that best described his tinnitus, P1 chose “a sequence of many sounds and rhythms that repeat cyclically every 10 hours or so.” Furthermore, P1’s tinnitus is present 100% of the time, other than periods of sleep, and bothers him an average of 30 days each month. P1 reported that many everyday sounds are unbearably loud and sounds that others believe are moderately loud are also too loud; however, P1 is not affected by hearing very soft sounds that others with normal hearing do not hear. Additionally, nothing makes the tinnitus worse, including loud noise, whereas sound therapy or white noise can help mitigate the tinnitus. P1 does not wear hearing aids, and has no legal action or compensation claim pending in relation to their tinnitus, nor are planning legal action of any kind.

Participant 2

Participant 2 (P2), a 51-year-old male, has been affected by chronic tinnitus for three years and attributes his condition to noise. P2 reveals both pitch and loudness are unwavering and do not vary from day-to-day. Pitch is identified as a nine (almost a whistle), loudness as a 10 (very loud), and qualitatively, P2 describes his tinnitus as sounding like “hissing.” P2’s tinnitus occurs, on average, three days each month, and is present 100% of the time. P2 strongly concurs that many everyday sounds are unbearably loud; however, strongly disagrees that sounds that others believe are moderately loud are too loud. Likewise, P2 does not report hearing very soft sounds that others with normal hearing do not hear. Moreover, P2 reports that being in a quiet place, as well as loud noise, both make his tinnitus worse; although, waking up first thing in the morning welcomes a brief respite, described as a momentary sense of relief. P2 does not wear hearing aids, and he has no legal action or compensation claim pending in relation to his tinnitus, nor is he planning legal action of any kind. Case history regarding Participant-3 is unaccounted for because the individual failed to complete the Tinnitus Intake Questionnaire in detail. Data regarding the participants’ subjective measures of pitch, loudness of sounds, and loudness of tinnitus, generated from the Tinnitus Intake Questionnaire, are listed below in Figure 1, Figure 2, and Figure 3.

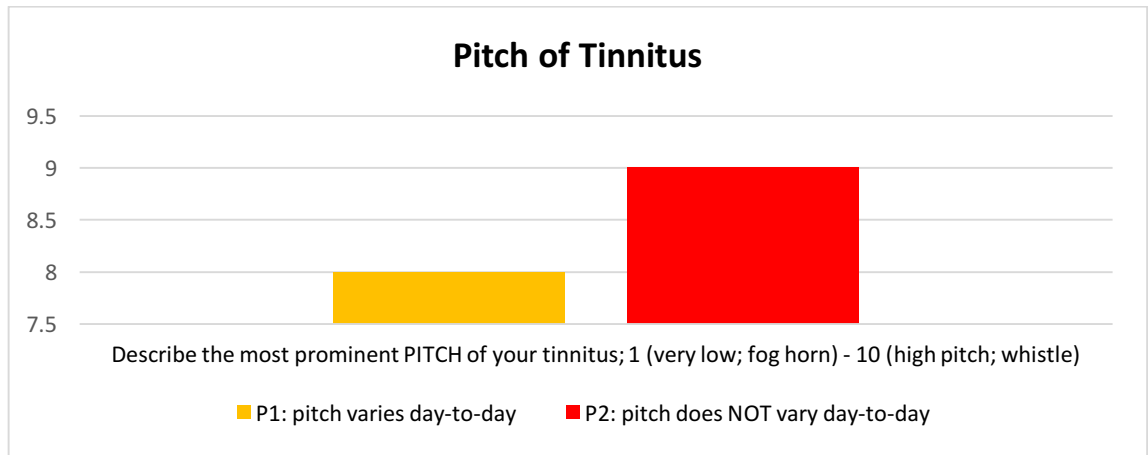
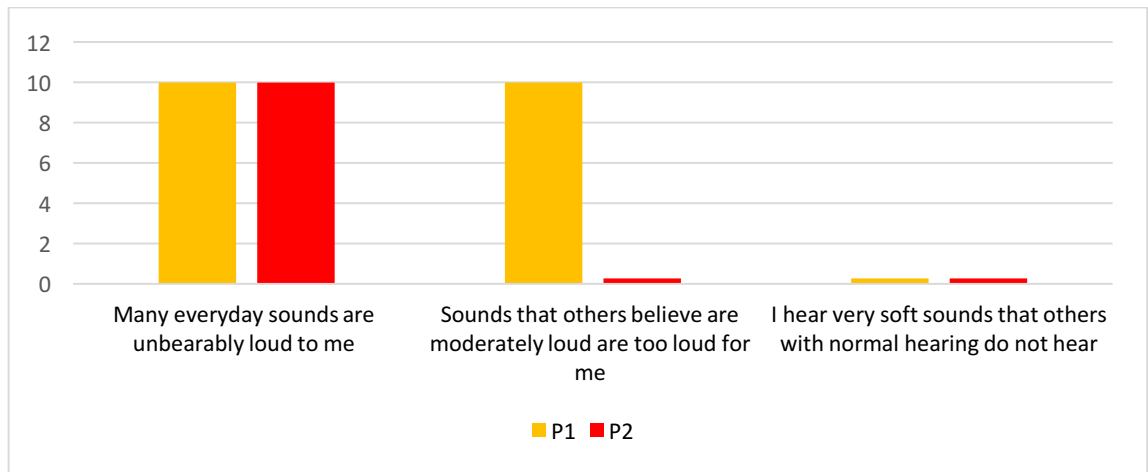


Figure 1. Responses by participants to Tinnitus Intake Questionnaire (TIQ): Questions concerning pitch.



0 = strongly disagree; 10 = strongly agree

Figure 2. Responses by participants to Tinnitus Intake Questionnaire (TIQ): Questions concerning loudness of sounds.

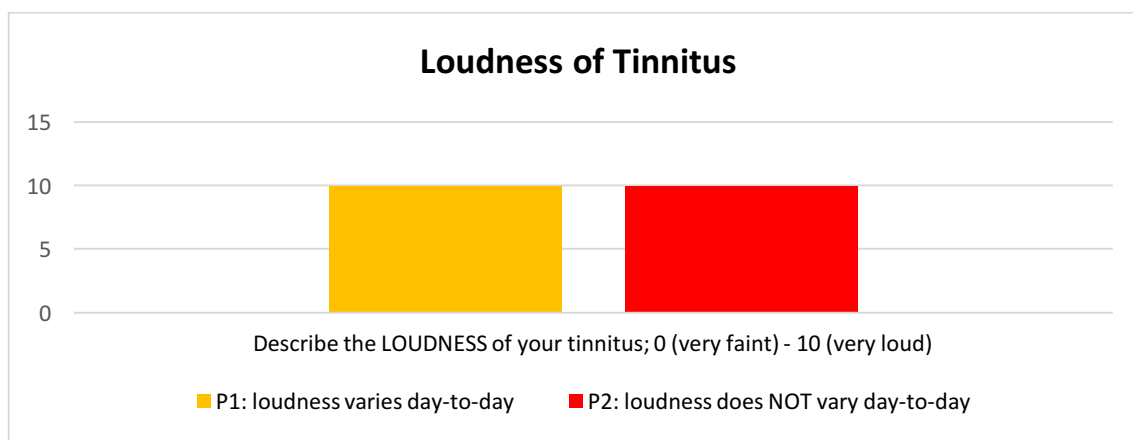


Figure 3. Responses by participants to Tinnitus Intake Questionnaire (TIQ): Questions concerning loudness of tinnitus

Additional Assessment Instruments

Tinnitus Handicap Inventory

The pre- and post-assessment tool, *Tinnitus Handicap Inventory* (Appendix B), measured tinnitus symptom severity and aimed to identify, qualify, and evaluate the difficulties an individual may have been experiencing. See Appendix G for participant responses to the Tinnitus Handicap Inventory. According to *THI* post-intervention results, the participants' responses either revealed minimal growth or stayed the same when compared to pre-intervention responses.

Participant 1

Pre-intervention, P1 did not feel angry as a result of his tinnitus and did not feel that the loudness made it difficult to hear others. Post-intervention, these responses stayed the same. Notwithstanding P1's course participation, his attitude towards his tinnitus exhibited minimal change. He still strongly considers his tinnitus a terrible disease. He still sometimes feels upset, confused, desperate, depressed, and anxious as a result of the tinnitus; feeling as if sometimes he can no longer cope with his condition, and he

continues to complain. Post-intervention, P1 feels tired, and a good night's sleep is still hard to come by. Also, he finds it difficult to concentrate and focus his attention away from tinnitus and onto other things. He reports the tinnitus still gets worse when under stress.

While the tinnitus effects are essentially unchanged, the attitudes and emotions have changed markedly. Initially, P1 felt as if he could not escape his tinnitus. He viewed it as interfering with his ability to enjoy social activities, engage in meaningful relationships with family members and friends, and perform job or household duties. Consequently, he felt frustrated and insecure as a result of his tinnitus, as it left him feeling powerless and out-of-control. After completing the 8-week course in MBTSR, P1 showed marked growth in these areas and demonstrated a positive shift in attitude towards his tinnitus and quality of life. No longer feeling out-of-control or trapped by his tinnitus, P1 is able to participate more fully in social activities, engage with family members and friends more freely, and perform job and household duties more enjoyably. Post-intervention, results reveal P1 stayed the same in 68% of his responses, showed 32% growth and 0% decline.

Participant 2

Prior to participating in the MBTRS course, P2 was not angered or desperate as a result of his tinnitus. He never complained, felt confused, or viewed his tinnitus as a terrible disease. He did not view his condition as interfering with job or household duties, he did not have trouble falling asleep at night or reading during the day, and felt like he could cope despite his condition. None of these responses changed post-intervention.

However, despite 8-weeks of mindfulness based therapy, P2 continued to feel upset by his tinnitus, as feelings of depression, anxiety, and insecurity persisted. P2 still felt powerless, as though he lacked control over his tinnitus, and continued to feel trapped and tired. He, too, reported that his tinnitus still sometimes got worse under stress. Furthermore, results revealed minimal unexpected outcomes: post-intervention, P2 sometimes felt more confused by his tinnitus and sometimes more desperate because of his tinnitus than before enrolling in the program.

Prior to intervention, P2 viewed his tinnitus as making it hard to enjoy life and often felt irritable and frustrated. He described the loudness of his tinnitus as sometimes making it difficult to hear others and sometimes found that it made concentrating difficult. However, P2 exhibited growth, although minimal, after completing the MBTSR course. This was demonstrated by a shift in attitude towards his tinnitus, as he now reported to have decreased feelings of irritability, an easier time concentrating, and considered life to be more enjoyable. Overall, P2 showed 20% growth, 12% decline, and stayed the same in 68% of his responses.

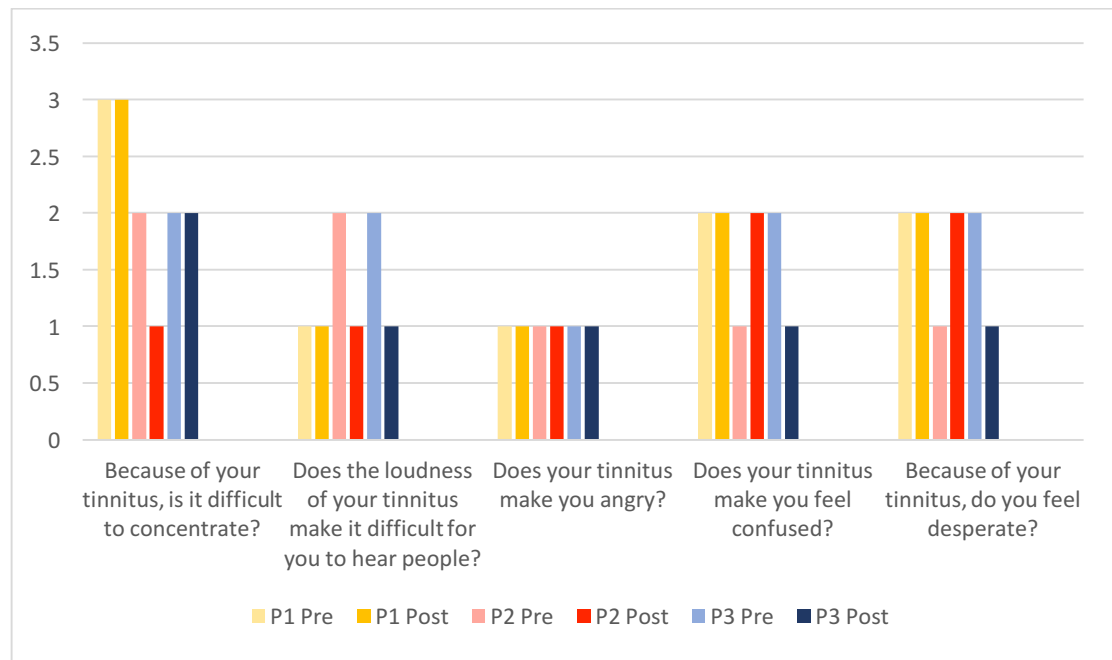
Participant 3

According to the *THI*, P3 neither felt angry nor irritable as a result of the tinnitus. This individual did not consider it a terrible disease, and felt as they could still cope despite their condition. The participant did not consider the tinnitus as interfering with the ability to enjoy social activities or participate fully with a job or household duties, and did not feel that the tinnitus placed stress on relationships with others. Although, P3 sometimes had trouble falling asleep at night, this individual did not feel tired because of the tinnitus. None of these responses changed pre- to post-assessment.

Unexpectedly, P3 did not experience the anticipated shift in attitude towards their tinnitus regarding a handful of areas, despite participating in the 8-week online MBTSR course. Post-intervention, P3 reported that the tinnitus still made it difficult to enjoy life, and the participant still sometimes felt depressed and upset by it. Additionally, P3's tinnitus still significantly worsened when under stress. Further, an unexpected revelation occurred; prior to MBTSR, P3 did not report complaining about his or her tinnitus, however post-intervention the participant began to "sometimes" complain.

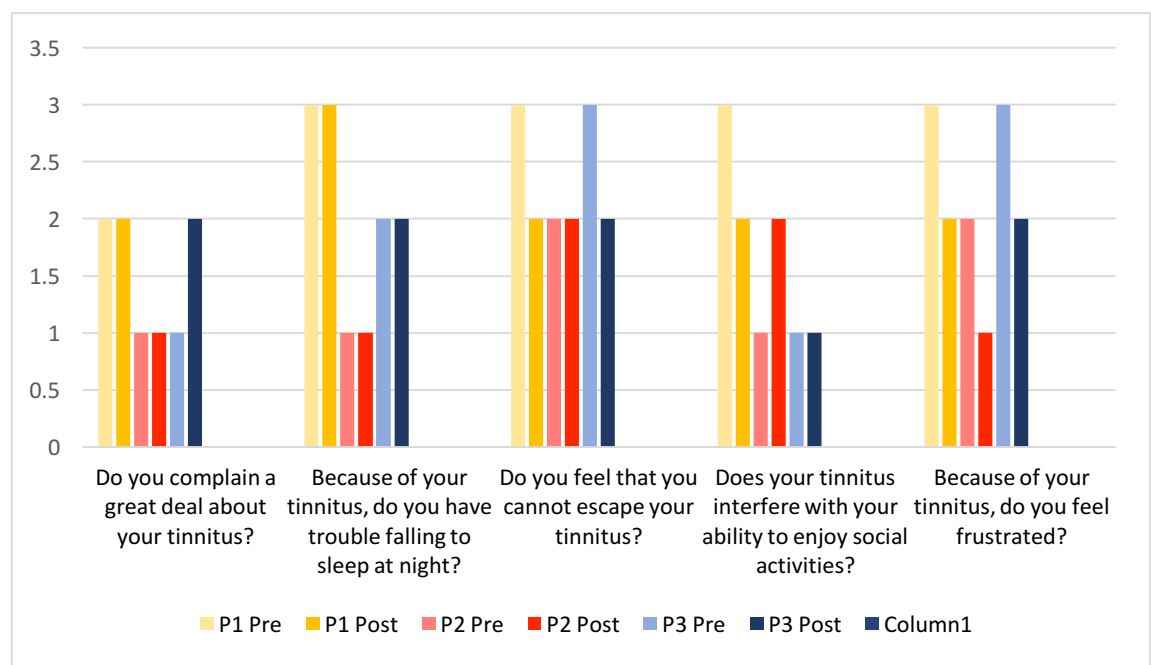
Participant 3 felt a range of emotions toward the tinnitus prior to the 8-week course in mindfulness. Initially, the participant felt confused, insecure, desperate, frustrated, and sometimes felt powerless. The ability to concentrate, hear other people, read, and focus attention on other things all proved too difficult. Additionally, P3 described feeling as if they could not escape the tinnitus. Post-intervention, however, P3 exhibited significant psychological growth, shifting in attitude and mindset towards emotions, ostensibly due to the MBTSR program. Results reveal that P3 exhibited 36% growth, 4% decline, and stayed the same in 60% of his or her answers.

Figures 4 through 8 present data regarding participants' responses to questions on the Tinnitus Handicap Inventory. Table 2 lists questions from the Tinnitus Handicap Inventory and pre- and post-assessment responses. Rows highlighted in dark gray represent an increase in participants' attitude towards their tinnitus.



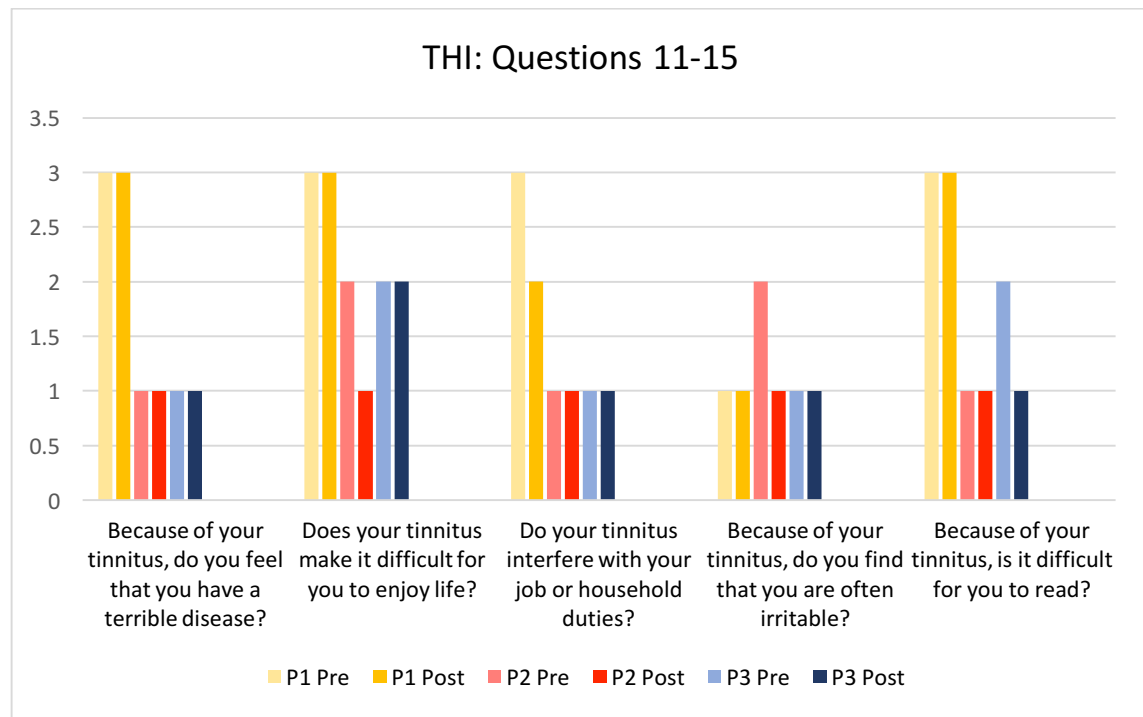
3= yes, 2= sometimes, 1= no

Figure 4. Responses by participants to Tinnitus Handicap Inventory (THI)



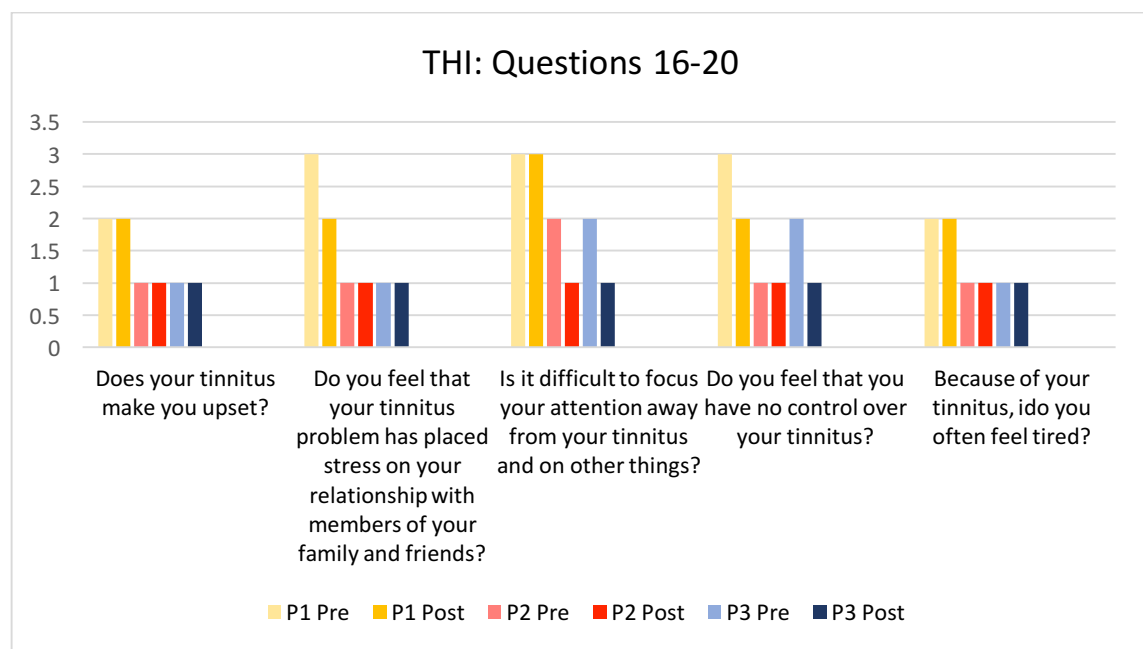
3= yes, 2= sometimes, 1= no

Figure 5. Responses by participants to Tinnitus Handicap Inventory (THI)



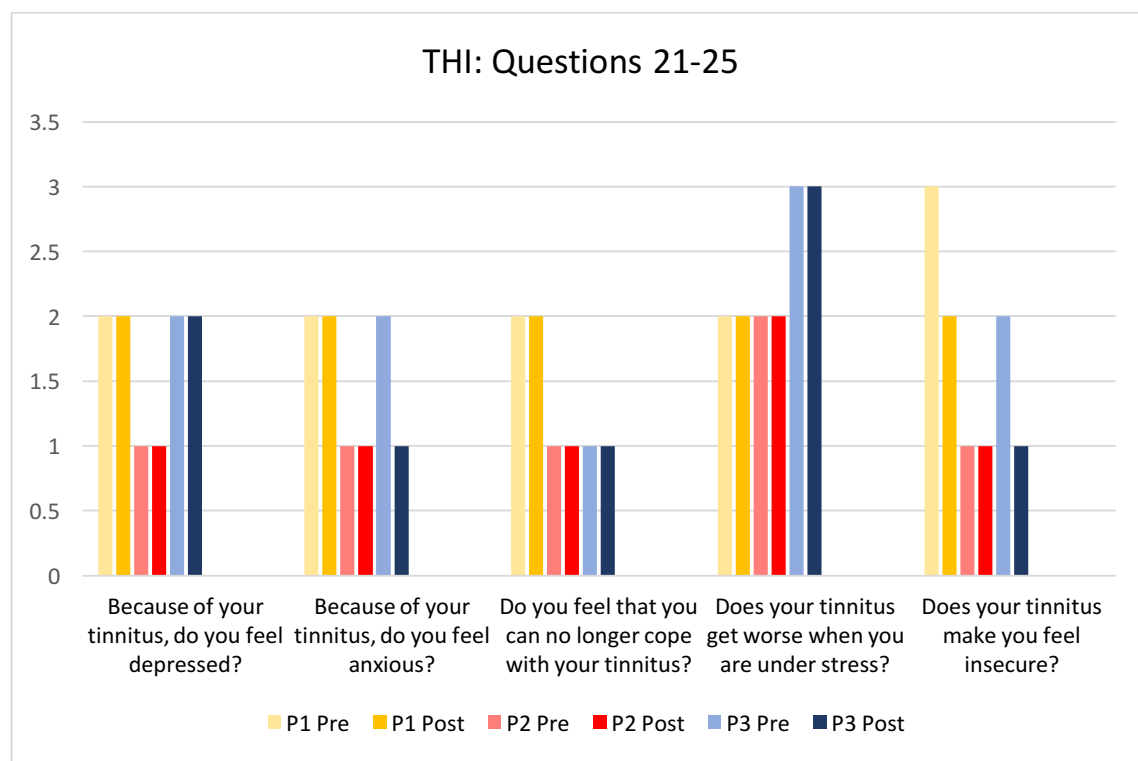
3= yes, 2= sometimes, 1= no

Figure 6. Responses by participants to Tinnitus Handicap Inventory (THI)



3= yes, 2= sometimes, 1= no

Figure 7. Responses by participants to Tinnitus Handicap Inventory (THI)



3= yes, 2= sometimes, 1= no

Figure 8. Responses by participants to Tinnitus Handicap Inventory (THI)

Table 2

Participants' pre- and post-assessment responses to Tinnitus Handicap Inventory

	Pre-Assessment Participant Responses	Post-Assessment Participant Responses
Because of your tinnitus, is it difficult to concentrate?		
P1	YES	YES
P2	Sometimes	NO
P3	Sometimes	Sometimes
Does the loudness of your tinnitus make it difficult for you to hear people?		
P1	NO	NO
P2	Sometimes	NO
P3	Sometimes	NO
Does your tinnitus make you angry?		
P1	NO	NO
P2	NO	NO

P3	NO	NO
Does your tinnitus make you feel confused?		
P1	Sometimes	Sometimes
P2	NO	Sometimes
P3	Sometimes	NO
Because of your tinnitus, do you feel desperate?		
P1	Sometimes	Sometimes
P2	NO	Sometimes
P3	Sometimes	NO
Do you complain a great deal about your tinnitus?		
P1	Sometimes	Sometimes
P2	NO	NO
P3	NO	Sometimes
Because of your tinnitus, do you have trouble falling to sleep at night?		
P1	YES	YES
P2	NO	NO
P3	Sometimes	Sometimes
Do you feel that you cannot escape your tinnitus?		
P1	YES	Sometimes
P2	Sometimes	Sometimes
P3	YES	Sometimes
Does your tinnitus interfere with your ability to enjoy social activities?		
P1	YES	Sometimes
P2	NO	Sometimes
P3	NO	NO
Because of your tinnitus, do you feel frustrated?		
P1	YES	Sometimes
P2	Sometimes	NO
P3	YES	Sometimes
Because of your tinnitus, do you feel that you have a terrible disease?		
P1	YES	YES
P2	NO	NO

P3	NO	NO
Does your tinnitus make it difficult for you to enjoy life?		
P1	YES	Sometimes
P2	NO	NO
P3	NO	NO
Does your tinnitus interfere with your job or household responsibilities?		
P1	YES	SOMETIMES
P2	NO	NO
P2	NO	NO
Because of your tinnitus, do you find that you are often irritable?		
P1	NO	NO
P2	Sometimes	NO
P3	NO	NO
Because of your tinnitus, is it difficult to read?		
P1	YES	YES
P2	NO	NO
P3	Sometimes	NO
Does your tinnitus make you upset?		
P1	Sometimes	Sometimes
P2	NO	NO
P3	NO	NO
Do you feel that your tinnitus problem has placed stress on your relationship with members of your family and friends?		
P1	YES	Sometimes
P2	NO	NO
P3	NO	NO
Is it difficult to focus your attention away from your tinnitus and on other things?		
P1	YES	YES
P2	Sometimes	NO
P3	Sometimes	NO

Do you feel that you have no control over your tinnitus?		
P1	YES	Sometimes
P2	NO	NO
P3	Sometimes	NO
Because of your tinnitus, do you often feel tired?		
P1	Sometimes	Sometimes
P2	NO	NO
P3	NO	NO
Because of your tinnitus, do you feel depressed?		
P1	Sometimes	Sometimes
P2	NO	NO
P3	Sometimes	Sometimes
Because of your tinnitus, do you feel anxious?		
P1	Sometimes	Sometimes
P2	NO	NO
P3	Sometimes	NO
Do you feel that you can no longer cope with your tinnitus?		
P1	Sometimes	Sometimes
P2	NO	NO
P3	NO	NO
Does your tinnitus get worse when you are under stress?		
P1	Sometimes	Sometimes
P2	Sometimes	Sometimes
P3	YES	YES
Does your tinnitus make you feel insecure?		
P1	YES	Sometimes
P2	NO	NO
P3	Sometimes	NO

Results from the *Tinnitus Handicap Inventory* reveal that 65% of participants' responses stayed the same (demonstrating neither growth nor decline), 29% showed growth, and 5% declined in attitude or perception towards tinnitus or quality of life. This

was demonstrated by the following information: P1 showed growth in 8/25 questions (32%), P2 in 5/25 (20%), and P3 in 9/25 questions (36%). To summarize, three participants multiplied by 25 questions presents with a total of 75 opportunities; therefore, 22/75 (29%) demonstrated growth, 4/75 (5%) showed decline, and 49/75 responses (65%) stayed the same. Overall, while there were improvements in some questionnaire items, no evidence of a relationship was found between an 8-week online MBTSR intervention and its ability to ameliorate psychological effects of tinnitus or improve quality of life for individuals with tinnitus. Due to small participant size, the null hypothesis cannot be rejected at this time. Further research is warranted in order to investigate the psychological effects of MBTSR on individuals with chronic tinnitus as assessed by the THI. A comparison of overall results including participant growth, decline, and no change can be found in Figure 9. Data from the study can be found in Appendix G.

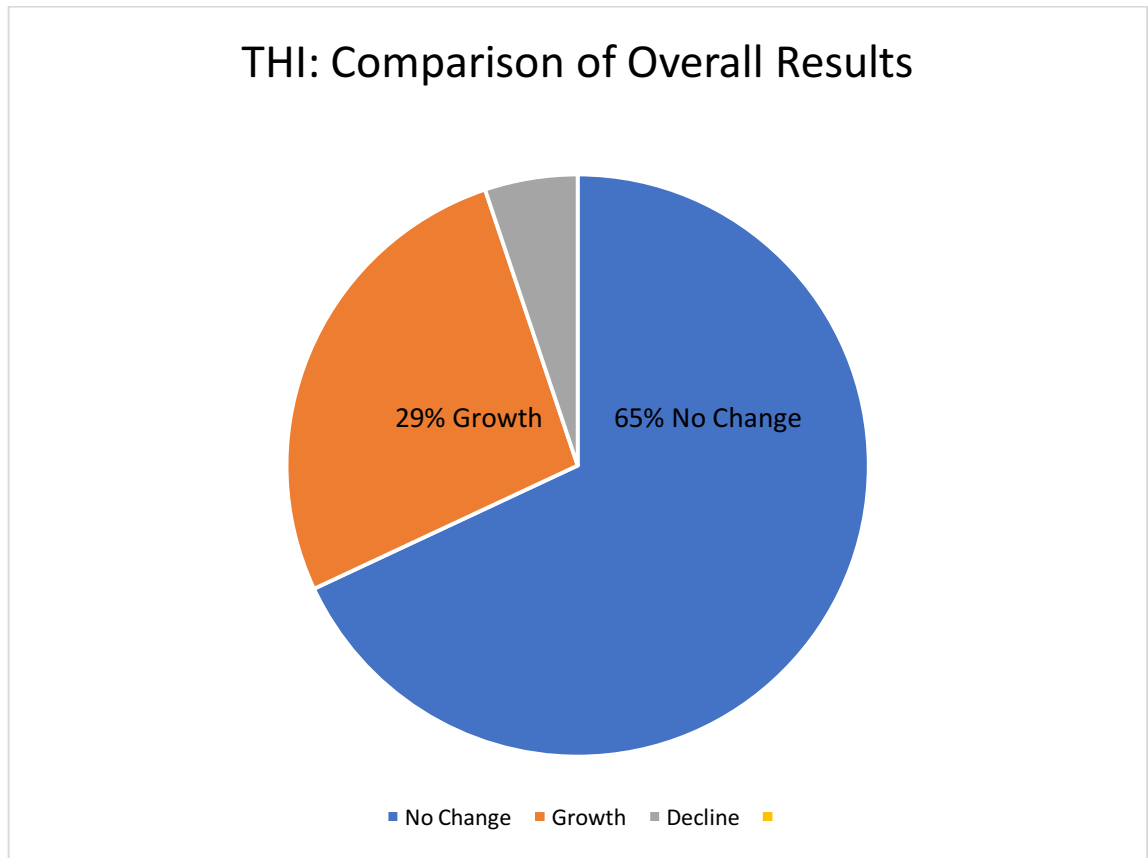


Figure 9. THI: Comparison of Overall Results

Tinnitus Visual Analogue Scale

The Tinnitus Visual Analogue Scale (TVAS), was administered both pre- and post-intervention. According to Adamchic, Langguth, Hauptmann and Tass (2012), the *TVAS* is considered “a sensitive and clinically responsive tool to measure treatment-induced changes in tinnitus loudness and annoyance” (p. 215). Participants were given two rating scales; one in regard to annoyance level, rated 0-10 (0= no annoyance to 10=extreme annoyance) and the other in regard to subjective loudness, rate 0-10 (undetectable to extremely loud). See Appendix C for full list of survey questions with types of responses available to participants in this study and Appendix H for participant responses.

Participant 1

Prior to the MBSTR intervention, P1 rated his annoyance as a 7 out of 10. Post-intervention, his response reduced to a 6 out of 10. Regarding loudness, pre-MBTSR, P1 responded with a 6 out of 10. Post-MBTSR, P1 reported a 5 out of 10. Both showed improvement.

Participant 2

Initially, P2 rated his annoyance as a 3 out of 10, indicating minimal annoyance. Post-intervention, he indicated a 2 out of 10, approaching no annoyance at all. In terms of loudness, P2 first gave a rating of 3 out of 10. Likewise, his response decreased to a 2 out of 10, nearly undetectable. P2 exhibited treatment-induced changes as well.

Participant 3

Participant 3 exhibited the most marked improvement of all three participants. Prior to intervention, P3 rated the annoyance level as a 7 out of 10, nearing extreme annoyance. Post intervention, his or her response reduced to a 5 out of 10. When rating tinnitus loudness, P3 indicated a 7 out of 10, approaching extreme loudness; however, at the end of the 8-weeks, P3 showed noteworthy improvement responding with a 4 out of 10, more so resembling undetectable loudness rather than extreme loudness. Summary data for all participants are shown in Figures 10 and 11 Table 3 lists questions from the Tinnitus Visual Analogue Scale and participants' pre- and post-assessment responses. All three participants demonstrate a decrease in tinnitus annoyance and tinnitus loudness after completing the 8-week online MBTSR program.

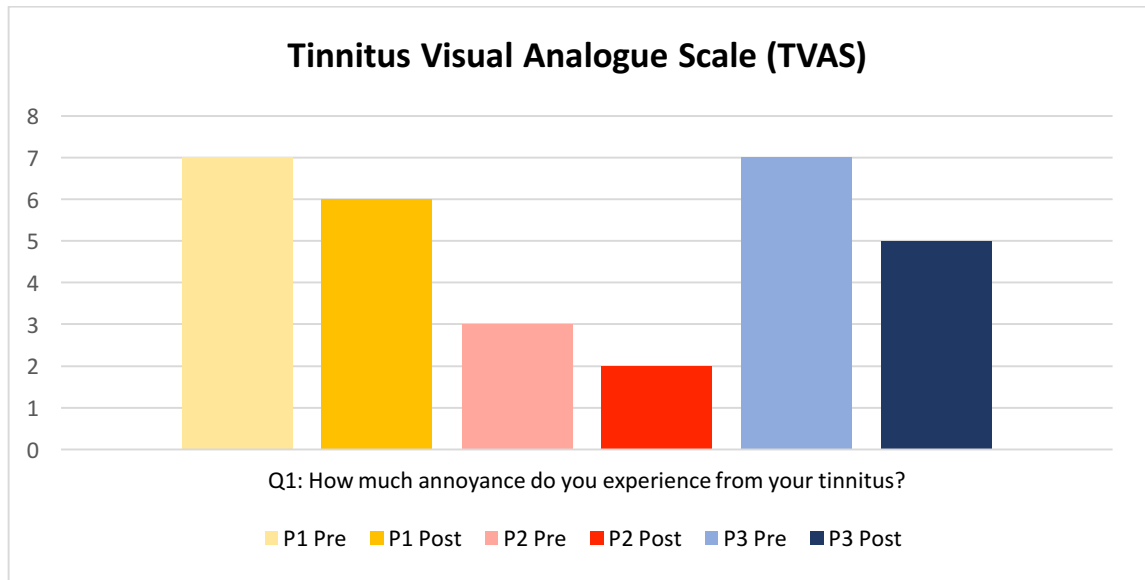


Figure 10. Participant responses for Tinnitus Visual Analogue Scale (TVAS)

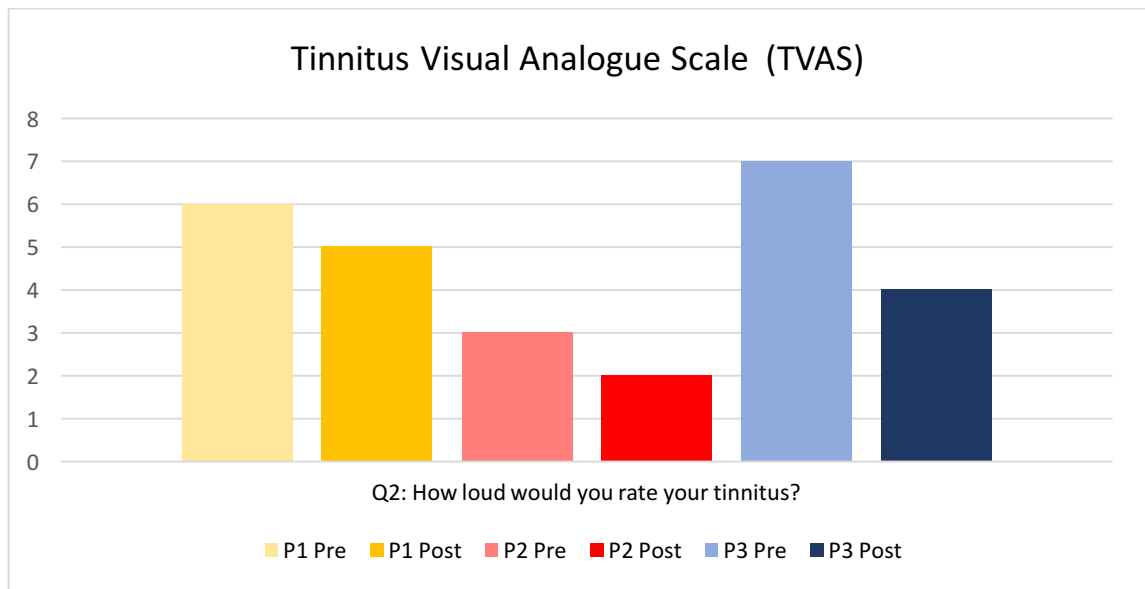


Figure 11. Participant responses for Tinnitus Visual Analogue Scale (TVAS)

Table 3

Participant responses for Tinnitus Visual Analogue Scale (TVAS)

	Pre-Assessment Participant Responses	Post-Assessment Participant Responses
How much annoyance do you experience from your tinnitus?		
P1	7	6
P2	3	2
P3	7	5
How loud would you rate your tinnitus?		
P1	6	5
P2	3	2
P3	7	4

Five Facet Mindfulness Questionnaire

The Five Facet Mindfulness Questionnaire (Appendix D), is a psychological measurement intended to explore the degrees of mindfulness, including: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Furthermore, the FFMQ contributed the most striking findings to this study regarding the psychological effects of a mindfulness based tinnitus stress reduction practice on individuals with chronic tinnitus. Refer to Table 3 for FFMQ variables of interest.

Subscales of the Five Facets of Mindfulness Questionnaire included observing, describing, acting with awareness, nonjudging of inner experiences, and nonreactivity to inner experiences, all of which were rated by participants using a scale of 1 (never or very rarely true) to 6 (very often or always true). Table 4 shows a summary of participants' responses for each of the five subscale scores on the FFMQ.

Table 4

Summary of subscale scores for FFMQ for all participants

	Observing	Describing	Acting with Inner Awareness	Nonjudging of Inner Experiences	Nonreactivity to Inner Experiences
P1					
Growth	0%	60%	40%	33%	50%
No Change	100%	-	60%	33%	50%
Decline	-	40%	-	33%	-
P2					
Growth	33%	40%	80%	83%	75%
No Change	66%	60%	20%	-	25%
Decline	-	-	-	17%	-
P3					
Growth	66%	80%	40%	66%	75%
No Change	33%	20%	60%	16%	25%
Decline	-	-	-	18%	-

There were several interesting and significant relationships that occurred as a result of a MBTSR intervention and the five facets of mindfulness.

Facet 1: Observing

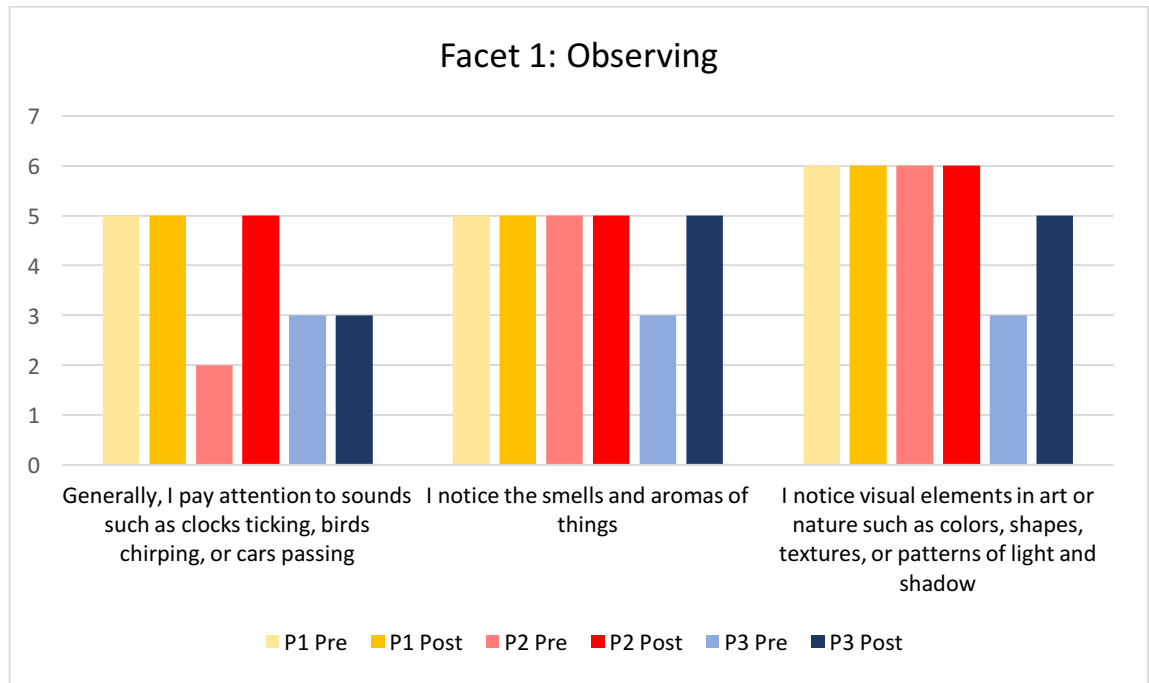
According to the participants' responses on the FFMQ, the first facet of mindfulness, *observing*, showed minimal change between MBTSR and participants' pre- and post-course administration of the questionnaire. Questions included "Generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing," "I notice the smells and aromas of things," and "I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow." Out of three questions pertaining to Observing on the FFMQ, participants showed an overall growth in mindfulness by 33%. This was demonstrated by the following information: P1 showed

growth in 0/3 questions (0%), P2 in 1/3 (33%), and P3 in 2/3 questions (66%). To summarize, three participants multiplied by three questions presents with a total of nine opportunities; therefore, Facet 1 shows participant improvement in 3 out of 9 responses for 33% overall growth. Accordingly, 6 out of 9 responses (66%) remain the same, and 0 out of 9 responses (0%) show a decline. Table 5 lists questions that pertain to Facet 1 Observing and includes participants' pre- and post-assessment responses. Figure 12 shows the relationship between participant's responses for Facet 1.

Table 5

Questions Probed and Participants' Pre- and Post-Responses to Facet 1 Observing

	P1 Pre	P1 Post	P2 Pre	P2 Post	P3 Pre	P3 Post
Generally, I pay attention to sounds such as clocks ticking, birds chirping, or cars passing	5	5	2	5	3	3
I notice the smells and aromas of things	5	5	5	5	3	5
I notice visual elements in art or nature such as colors, shapes, textures, or patterns of light and shadow	6	6	6	6	3	5



1 - never or very rarely true 2 - not often true 3 - sometimes true, sometimes not true
 4 - sometimes true 5 - often true 6 - very often or always true

Figure 12. Participant responses to Five Facets of Mindfulness Questionnaire: Observing

Facet 2: Describing

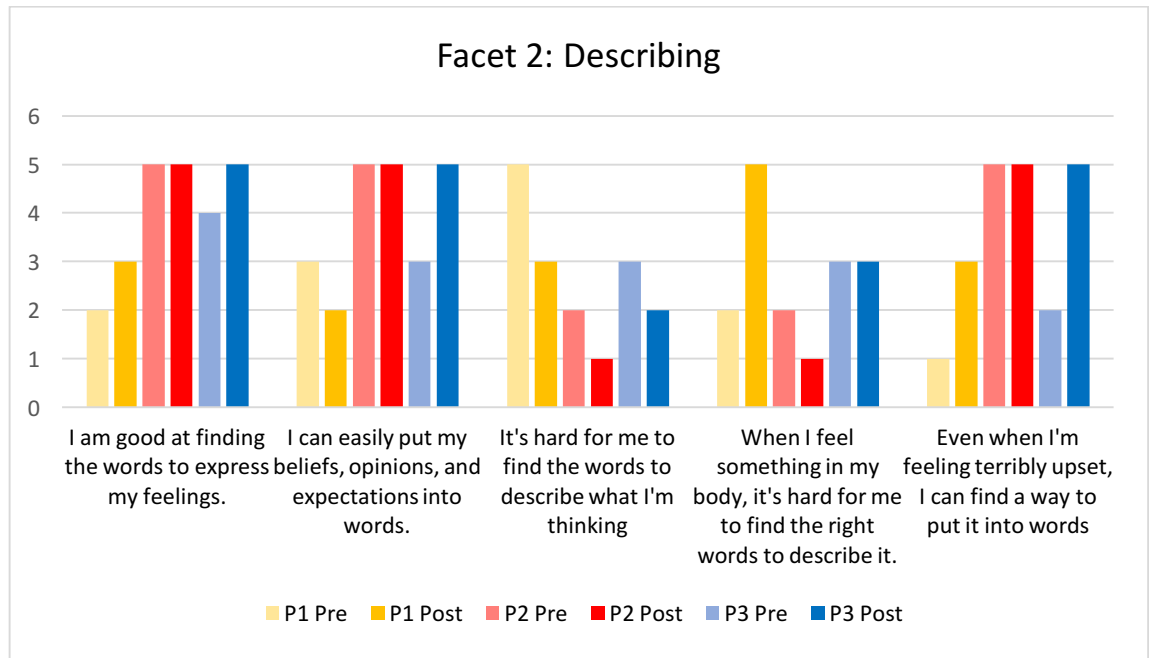
The second facet of mindfulness, *describing*, revealed overall positive changes across participants after completing an MBTSR online course, according to the participants' FFMQ responses. The "Describing" subscale probed participants with the questions, "I'm good at finding words to describe my feelings," "I can easily put my beliefs, opinions, and expectations into words," "It's hard for me to find the words to describe what I'm thinking," "When I feel something in my body, it's hard for me to find the right words to describe it," and "When I'm feeling terribly upset, I can find a way to put it into words." Out of five questions pertaining to Describing on the FFMQ, participants showed an overall growth in mindfulness by 60%. This was demonstrated by the following information: P1 showed growth in 3/5 questions (60%), P2 in 2/5 (40%),

and P3 in 4/5 questions (80%). To summarize, three participants multiplied by five questions presents with a total of 15 opportunities; therefore, Facet 2 shows participant improvement in 9 out of 15 responses for 60% growth overall, while 4 out of 15 responses (26%) remained the same, and 2 out of 15 responses (13%) showed a decline. Table 6 lists questions that pertain to Facet 2 Describing and includes participants' pre- and post-assessment responses and Figure 13 shows the relationship between participant's responses for Facet 2.

Table 6

Questions Probed and Participants' Pre- and Post-Responses to Facet 2 Describing

	P1 Pre	P1 Post	P2 Pre	P2 Post	P3 Pre	P3 Post
I am good at finding the words to express my feelings	2	3	5	5	4	5
I can easily put my beliefs, opinions, and expectations into words	3	2	5	5	3	5
It's hard for me to find the words to describe what I'm thinking	5	3	2	1	3	2
When I feel something in my body, it's hard for me to find the right words to describe it	2	5	2	1	3	3
Even when I'm feeling terribly upset, I can find a way to put it into words	1	3	5	5	2	5



1 - never or very rarely true 2 - not often true 3 - sometimes true, sometimes not true
 4 - sometimes true 5 - often true 6 - very often or always true

Figure 13. Participant responses to Five Facets of Mindfulness Questionnaire: Describing

Facet 3: Acting with Awareness

The third facet of mindfulness exhibited modest changes in participants' ability to *act with increased awareness* in activities of daily living. The questions include, "I find it difficult to stay focused on what's happening in the present," "It seems I am running on automatic without much awareness of what I'm doing," "I rush through activities without being really attentive to them," "I do jobs or tasks automatically without being aware of what I'm doing," and "I find myself doing things without paying attention." Out of five questions pertaining to Acting with Awareness on the FFMQ, participants showed an overall growth in mindfulness by 53%. This was demonstrated by the following information: P1 showed growth in 2/5 questions (40%), P2 in 3/5 (60%), and P3 in 2/5 questions (40%). To summarize, three participants multiplied by five questions presents

with a total of 15 opportunities; therefore, Facet 3 shows participant improvement in 7 out of 15 responses for 46% overall growth, while 8 out of 15 responses (53%) remain the same, and 0 out of 15 responses (0%) show a decline. Table 7 lists questions that pertain to Facet 3 Acting with Awareness and includes participants' pre- and post-assessment responses. Figure 14 shows the relationship between participant's responses for Facet 3.

Table 7

Questions Probed and Participants' Pre- and Post-Responses to Facet 3 Acting with Awareness

	P1 Pre	P1 Post	P2 Pre	P2 Post	P3 Pre	P3 Post
I find it difficult to stay focused on what's happening in the present	3	2	5	5	3	3
It seems I am "running on automatic" without much awareness of what I'm doing.	3	2	5	5	5	2
I rush through activities without being really attentive to them	3	3	5	3	2	2
I do jobs or tasks automatically without being aware of what I'm doing	2	2	6	3	2	2
I find myself doing things without paying attention	2	2	5	3	3	2

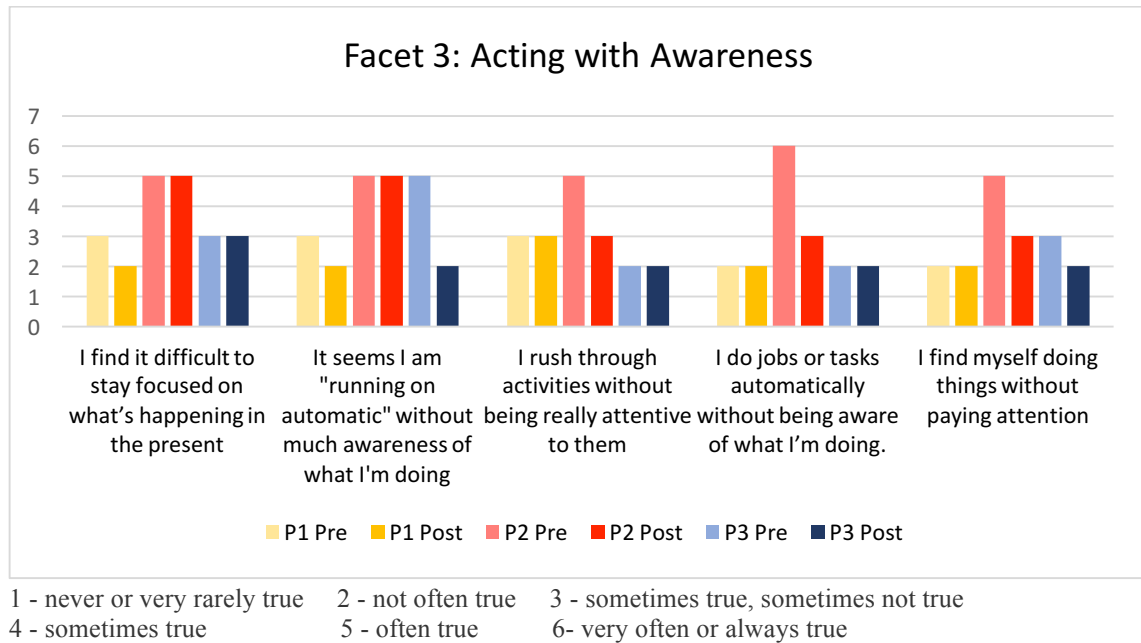


Figure 14. Participant responses to Five Facets of Mindfulness Questionnaire: Acting with Awareness

Facet 4: Nonjudging of Inner Experiences

There were marked increases in ability to withhold or neutralize judgments of inner experiences by the three participants, as measured by Facet 4 of the FFMQ. The questions included, “I tell myself I shouldn’t be feeling the way I’m feeling,” “I make judgements about whether my thoughts are good or bad,” “I tell myself that I shouldn’t be thinking the way I’m thinking,” “I think some of my emotions are bad or inappropriate and I shouldn’t feel them,” “When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/or image is about,” and “I disapprove of myself when I have irrational ideas.” Out of six questions pertaining to Nonjudging of Inner Experiences on the FFMQ, participants showed an overall growth in mindfulness by 61%. This was demonstrated by the following information: P1 showed growth in 2/6 questions (33%), P2 in 5/6 (83%), and P3 in 4/6 questions (66%). To summarize, three participants multiplied by six questions presents with a total of 18 opportunities;

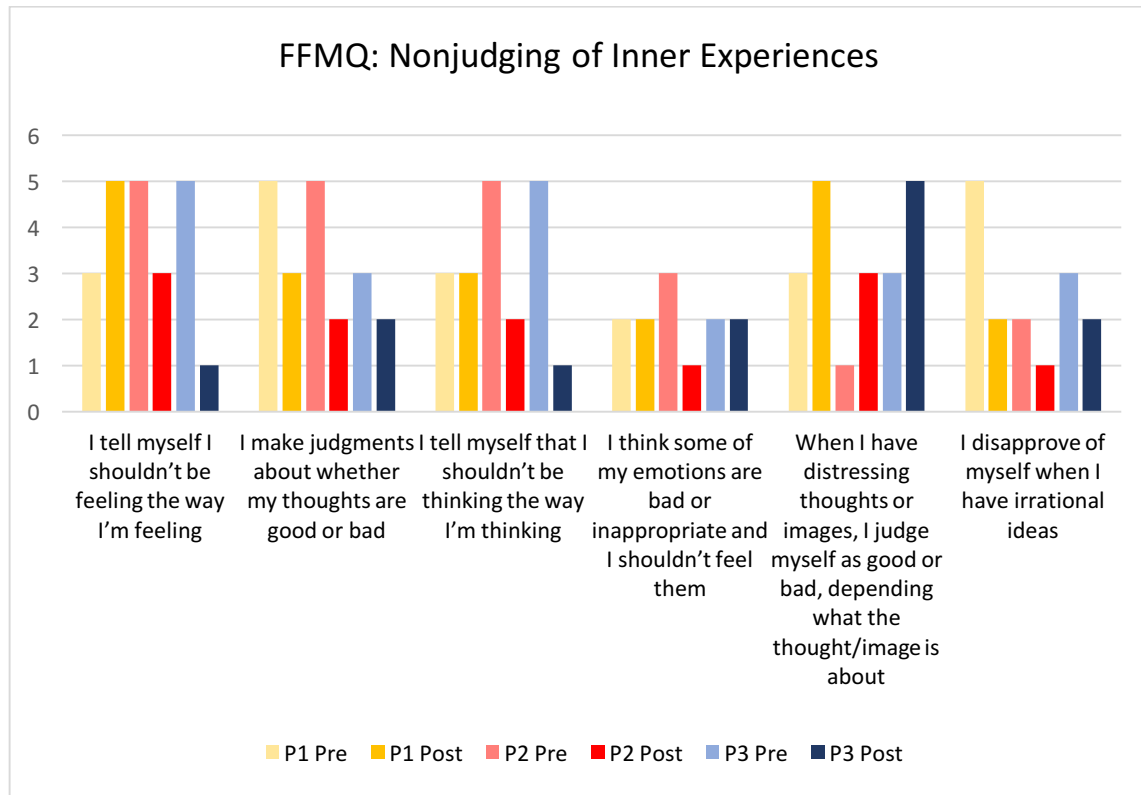
therefore, Facet 4 shows participant improvement in 11 out of 16 responses for 61% overall growth, while 3 out of 18 responses (16%) remain the same, and 4 out of 18 responses (22%) show a decline. Table 8 lists questions that pertain to Facet 4

Nonjudging of Inner Experiences and includes participants' pre- and post-assessment responses. Figure 15 shows the relationship between participant's responses for Facet 4.

Table 8

Questions Probed and Participants' Pre- and Post-Responses to Facet 4 Nonjudging of Inner Experiences

	P1 Pre	P1 Post	P2 Pre	P2 Post	P3 Pre	P3 Post
I tell myself I shouldn't be feeling the way I'm feeling	3	5	5	3	5	1
I make judgements about whether my thoughts are good or bad	5	3	5	2	3	2
I tell myself that I shouldn't be thinking the way I'm thinking	3	3	5	2	5	1
I think some of my emotions are bad or inappropriate and I shouldn't feel them	2	2	3	1	2	2
When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about	3	5	1	3	3	5
I disapprove of myself when I have irrational ideas	5	2	2	1	3	2



1 - never or very rarely true 2 - not often true 3 - sometimes true, sometimes not true
 4 - sometimes true 5 - often true 6- very often or always true

Figure 15. Participant responses to Five Facets of Mindfulness Questionnaire: Nonjudging of Inner Experiences

Facet 5: Nonreactivity to Inner Experiences

The fifth facet of mindfulness examined participants' ability to be *nonreactive towards inner experiences*. The facet included the questions, "When I have distressing thoughts or images, I don't let myself be carried away by them," "When I have distressing thoughts or images, I feel calm soon after," "When I have distressing thoughts or images I am able to just notice them without reacting," and "When I have distressing thoughts or images, I just notice them and let them go." Pre- and post-assessment responses revealed marked growth in mindfulness. Out of four questions pertaining to Nonreactivity to Inner

Experiences on the FFMQ, participants overall showed a 75% growth in mindfulness. This was demonstrated by the following information: P1 improved with 2/4 questions (50%), P2 with 4/4 (100%), and P3 with 3/4 questions (75%). To summarize, three participants multiplied by four questions presents with a total of 12 opportunities; therefore, Facet 5 shows participant improvement in 9 out of 12 responses for 75% growth. The remaining 25% of participants' responses stayed the same (neither showing growth nor decline). Table 9 lists questions that pertain to Facet 5 Nonreactivity to Inner Experiences and includes participants' pre- and post-assessment responses. Figure 16 shows the relationship between participant's responses for Facet 5.

Table 9

Questions Probed and Participants' Pre- and Post-Responses to Facet 5 Nonreactivity to Inner Experiences

	P1 Pre	P1 Post	P2 Pre	P2 Post	P3 Pre	P3 Post
When I have distressing thoughts or images, I don't let myself be carried away by them.	5	5	2	3	3	5
When I have distressing thoughts or images, I feel calm soon after	3	5	1	3	3	5
When I have distressing thoughts or images, I am able to just notice them without reacting	5	5	2	5	3	3
When I have distressing thoughts or images, I just notice them and let them go	3	5	1	3	3	5

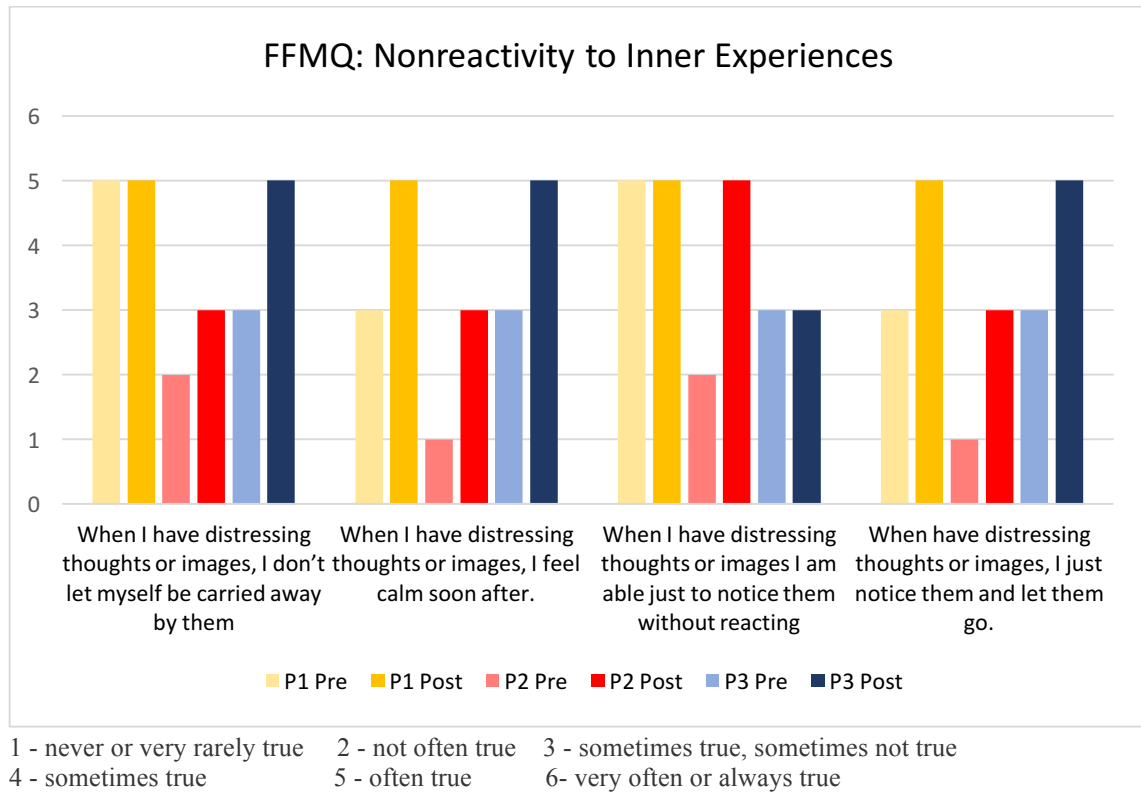


Figure 16. Participant responses to Five Facets of Mindfulness Questionnaire: Nonreactivity to inner experiences

To summarize psychological effects of the MBTSR course in relation to participants' responses on the FFMQ, 3 out of the 5 facets of mindfulness demonstrated marked growth, including the facets of describing, nonjudging of inner experiences, and nonreactivity to inner experiences. Observing and Acting with Awareness were the only facets of mindfulness to exhibit minimal growth. Figure 17 presents a comparison of participant responses among the five facets of mindfulness. Figure 18 presents an overall evaluation between the FFMQ subscales and portrays whether growth, decline, or consistency in participants' responses was generated. Refer to Appendix J for participant responses to the FFMQ.

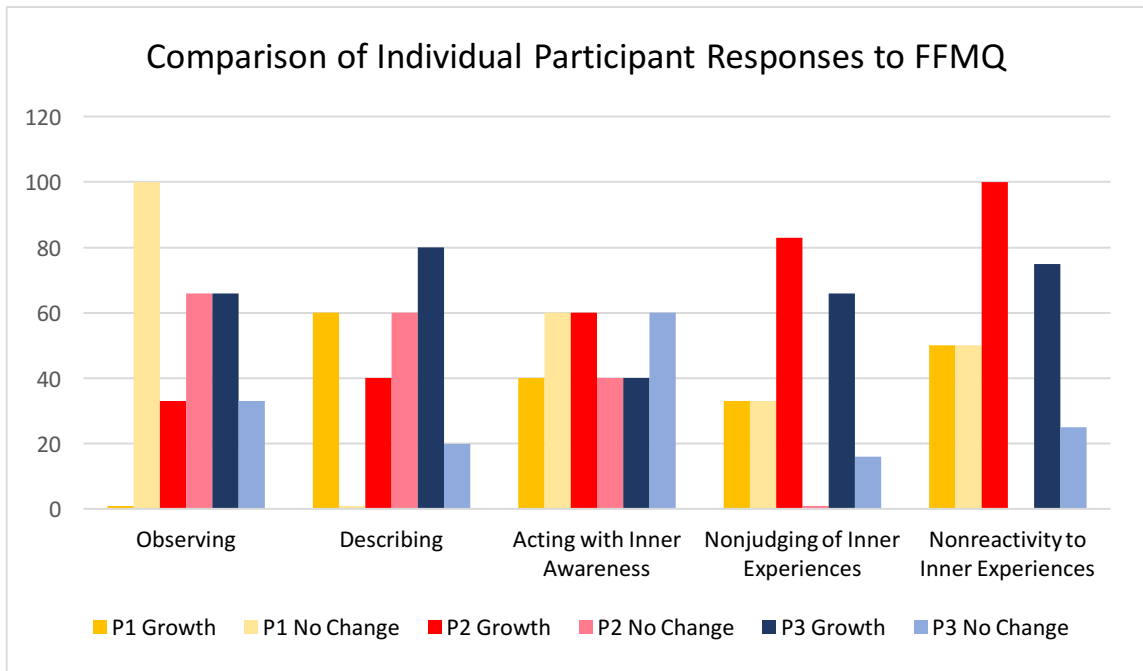


Figure 17. Participant Response Comparisons for Each of the Five Facets of Mindfulness Questionnaire

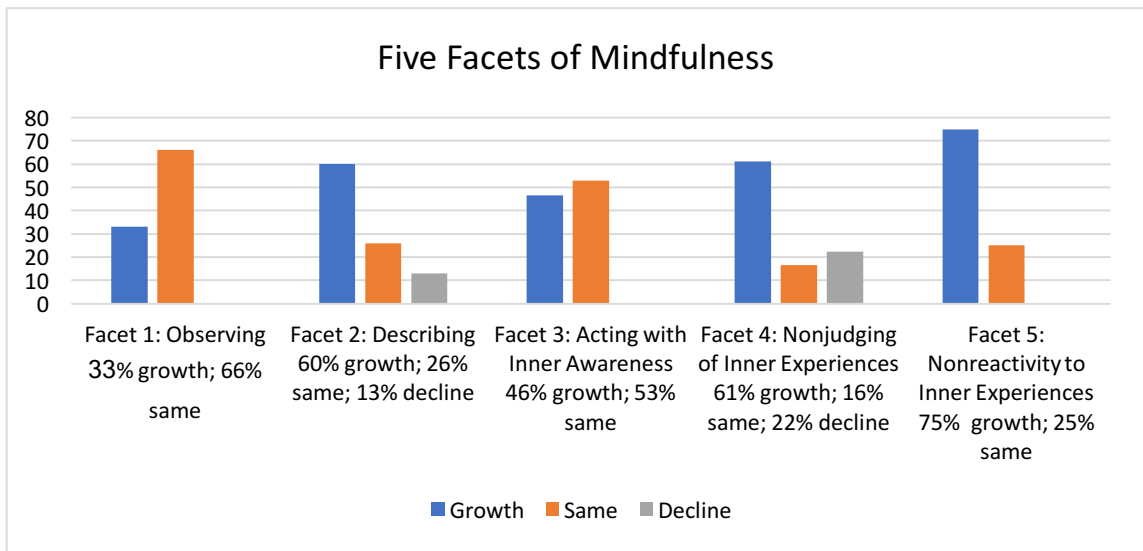


Figure 18. Subscale Comparisons for the Five Facets of Mindfulness Questionnaire

The results minimally support the alternate hypothesis that a marked difference exists in pre- and post-treatment therapy for individuals with chronic tinnitus when being treated with MBTSR, a non-traditional intervention approach. Although the results reveal positive growth among participants in regard to three of the five facets, including: *describing, nonjudging of inner experiences*, and *nonreactivity to inner experiences*, all measures would be strengthened through further research with a more robust sample size.

Pittsburgh Sleep Quality Index (PQSI)

Additional measurements included the *Pittsburgh Sleep Quality Index* (Appendix E), an instrument used to measure the quality and patterns of sleep in the participants through seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month.

Participant 1

Prior to enrolling in the MBTSR course, P1 reported on the *Pittsburgh Sleep Quality Index* that he went to bed and awoke at the same time every morning, though he reported taking prescribed or “over the counter” medication to help him sleep three or more times a week. The bed partner or roommate of P1 recounted that although P1 does not have leg twitching or jerking, he has extreme restlessness while sleeping, three or more times a week. He does not have episodes of disorientation or confusion, feelings of being cold, difficulty breathing, nor does he experience pain, or snore or cough during sleep. Despite the sleep medication at bedtime, P1 does not have trouble staying awake while driving, eating meals, or engaging in social activities during the day, however he does still have somewhat of a problem keeping up enough enthusiasm to get things done

as it was prior to intervention. None of these responses changed post-intervention revealing neither growth nor decline in 65% of overall responses.

Nonetheless, post-intervention, comments on the PSQI revealed 30% growth in sleep quality (7 out of 23 questions revealed growth). He now requires less time to fall asleep each night, has less trouble falling asleep because of feeling too hot, and has significantly less trouble sleeping overall, particularly due to more infrequent bad dreams. Interestingly, post-assessment, P1 now reports fewer hours of actual sleep each night by one hour and yet reports higher quality.

Participant 2

Participant 2 unwavered from his sleep patterns in 73% of *PSQI* responses. He goes to bed and rises at the same time each morning; consequently, he gets the same amount of sleep each night and falls asleep within a consistent timeframe. He does not exhibit episodes of disorientation or confusion, leg twitching or jerking, or restlessness while sleeping. During the past month that included the intervention period, P2 did not have difficulty sleeping because of being either too hot or too cold, snoring or coughing loudly, experiencing pain, or from being unable to breath.

Prior to intervention, P2 reported having a bed partner or roommate who slept in another room. Post-intervention, he no longer had a roommate. The researchers can only speculate whether this is positive or negative. Post-intervention, P2 exhibited 21% growth (5 out of 23 questions) in sleep patterns and habits. P2 reported getting one more hour of actual sleep each night, snoring less, having less trouble falling asleep each night, and he reported having less trouble staying awake while driving, eating meals, or engaging in social activities. Additionally, he reported having more enthusiasm to get

things done than prior to the MBTSR intervention.

Participant 3

According to P3's bed partner or roommate, P3 has maintained consistent sleep behaviors throughout the duration of the MBTSR course. Results reveal neither growth nor decline in 60% of responses. P3 upholds a routine bedtime. Similarly, he does not exhibit episodes of disorientation or confusion, or restlessness during sleep. Nor does not experience difficulty sleeping because of being too cold or too hot, from pain, being unable to breathe, bad dreams, and does not require any sort of sleeping aid or medication to fall asleep each night. However, P3 does snore loudly once or twice a week, which occasionally contributes to difficult nights of sleeping.

Post-intervention, P3 exhibited 39% growth in sleep patterns (9 out of 23 questions). Not only did his reliance on sleep medication decrease from three or more times a week to once or twice a week, but he required less time to fall asleep each night, reported less trouble falling asleep, and noticed less leg twitching or jerking while sleeping. Most significantly, he reported having an easier time staying awake while driving, eating meals, or engaging in social activities and instead having more enthusiasm to get things done.

In summary, after taking part in the 8-week online MBTSR intervention, participants showed growth in 30% of responses, however neither showed growth nor decline, but maintained consistency, in 66% *PSQI* responses. This was demonstrated by the following information: P1 showed growth in 7/23 questions (30%), P2 in 5/23 (21%), and P3 in 9/23 questions (39%). Accordingly, three participants multiplied by 23 questions offers a total of 69 opportunities. Therefore, the *PSQI* shows participant total

growth in 21 out of 69 responses for 30%, and no change in 46 out of 69 responses (66%). Refer to Figure 19 for comparison of overall results. Participant pre- and post-assessment responses can be found in Appendix K.

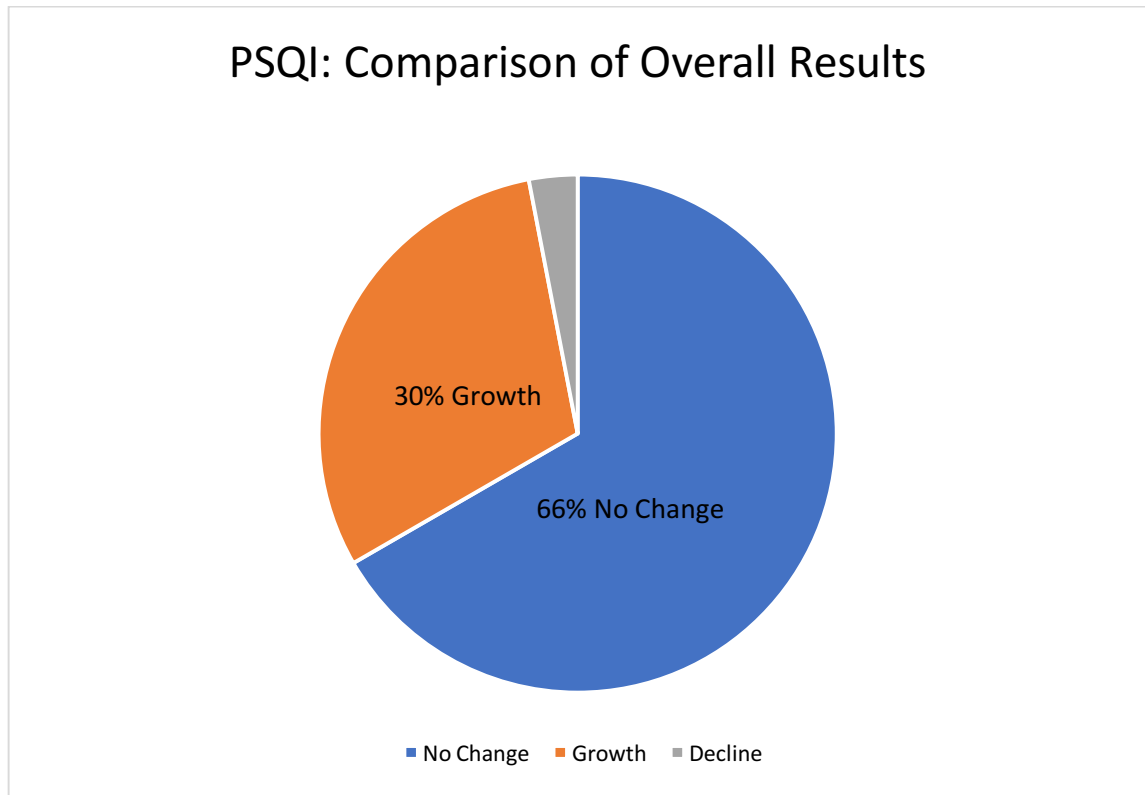


Figure 19. Pittsburgh Sleep Quality Index Comparison of Overall Results

The Personal Growth Initiative Scale (PGIS)

Lastly, a self-report instrument called the *Personal Growth Initiative Scale (PGIS)* (Appendix F), was used to yield participants active and intentional involvement in changing and developing as a person. Refer to Appendix L for participant responses.

Participant 1

P1 neither showed growth nor decline in 66% of his responses. He has a good sense of where he is headed in life and if he wants to change something, he has no qualms about initiating the process. Regarding personal goals, he creates a specific action plan to help him reach them. Often, he chooses the role he wants to have in a group. None of these personal characteristics changed after participating in the MBTSR program.

Prior to enrollment in the mindfulness course, P1 only “somewhat agreed” that he actively took charge of his life and that he had a plan for making his life more balanced. Post-intervention, this attitude shifted to “mostly agreeing.” Overall, he exhibited 22% growth. However, contrary to expectation, post-assessment P1 shifted from “somewhat agreeing” to “mostly disagreeing” regarding knowing what his unique contribution to the world is, demonstrating 11% decline.

Participant 2

P2 showed neither growth nor decline in 66% of responses. He “somewhat agreed” that he had a good sense of where he was headed in life. He could tell when he was ready to make specific changes in himself and knew that if he wanted to change something in life, he initiated the transition process. Also, he “mostly agreed” he was in-charge of his own life; he had a plan for making life more balanced and a plan to help him reach his goals. These responses stayed the same.

Post-assessment, P2 showed decline in 33% of his responses. Initially, P2 “mostly agreed” he chose the role to have in a group, knew how to changes specific things about his life, and knew what his unique contribution to the world might be. After intervention,

his responses revealed a decline to “somewhat agreeing.” P2 failed to demonstrate any growth on the *PGIS*.

Participant 3

Participant 3 exhibited 66% growth according to the *PGIS*; the most significant growth out of all three participants. Initially, P3 “mostly agreed” he was self-aware in regard to making personal life changes. Following the MBTSR course, this attitude shifted to “definitely agreeing.” Likewise, he transitioned from “mostly agreeing” to “definitely agreeing” for the following questions: I have a good sense of where I am headed in my life, I can choose the role that I want to have in a group, I have a specific action plan to help me reach my goals, and I have a plan for making my life more balanced. P3 also showed growth from “somewhat agreeing” to “mostly agreeing” in how to change specific things in his life.

Thirty-three percent of P3’s responses neither showed growth nor decline, but rather stayed the same. The participant continued to “somewhat agree” that if they want to change something in life, the participant initiates the transition process, and “somewhat agrees” that they know what his unique contribution to the world might be. Furthermore, P3 continues to “mostly agree” that they take charge of their life.

To summarize results from the *PGIS*, pre- and post-assessment data reveal 29% increase in participants’ overall perception of personal growth. This was demonstrated by the following information: three participants multiplied by nine questions offers a total of 27 opportunities. P1 showed growth in 2/9 questions (22%), P2 in 0/9 (0%), and P3 in 6/9 questions (66%). Accordingly, the *PGIS* shows participant improvement in 8 out of 27 responses for 29% personal growth, while 15 out of 27 responses (55%) remain the same,

and 4 out of 27 responses (14%) show a decline.

In conclusion, while P3 demonstrated marked growth in the PGIS, minimal evidence of a relationship was found between participants' ability to actively and intentionally change and development as a person during the 8-week online MBTSR intervention. Due to small participant size, the null hypothesis cannot be rejected at this time. Further research is warranted in order to investigate the psychological effects of MBTSR on individuals with chronic tinnitus as assessed by the PGIS. Refer to Figure 20 for comparison of overall results.

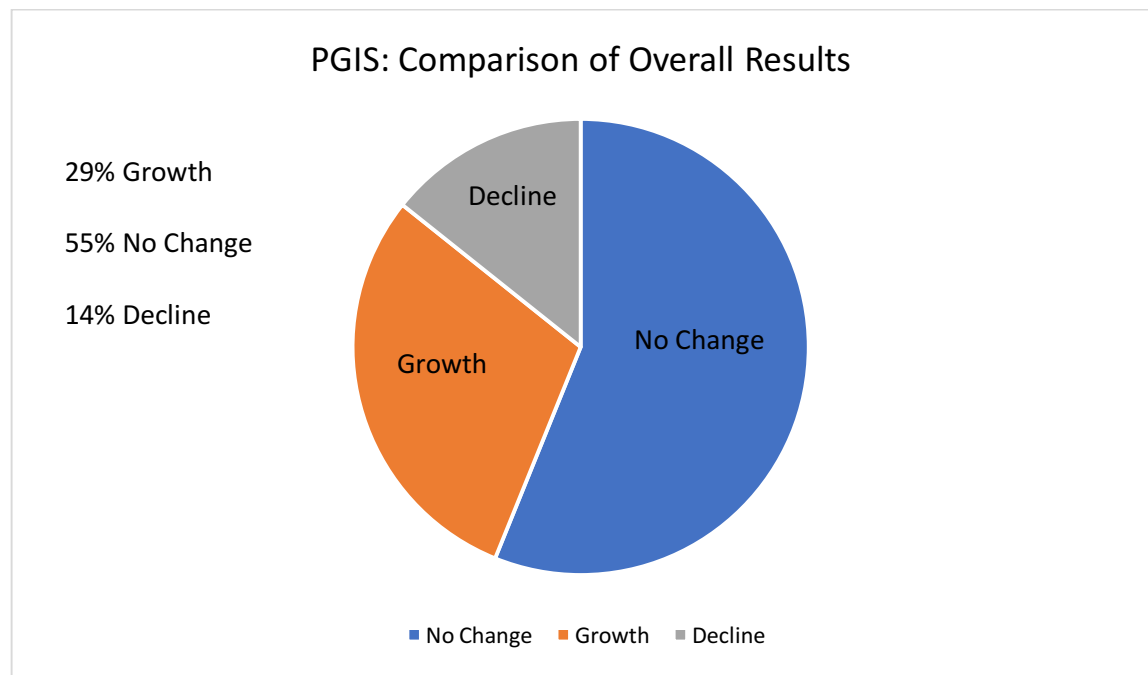


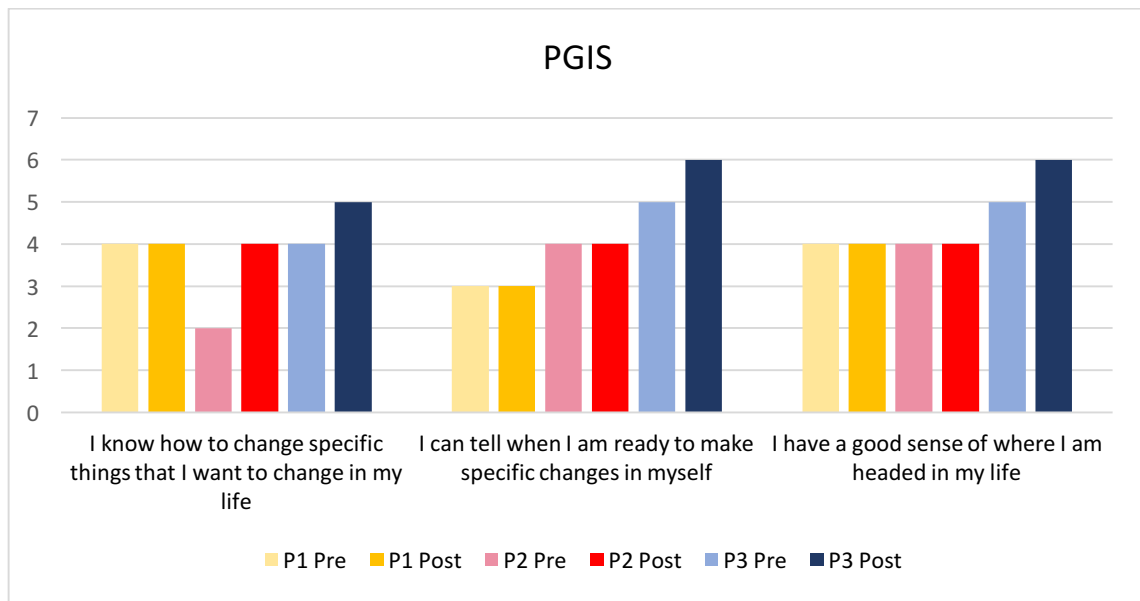
Figure 20. Personal Growth Initiative Scale Comparison of Overall Results

Table 10 lists questions that pertain to the Personal Growth Initiative Scale and includes participants' pre- and post-assessment responses. Figure 21 through Figure 23 show the relationship between participant's responses for the PGIS.

Table 10

Questions Probed and Participants' Pre- and Post-Responses to the Personal Growth Initiative Scale

	P1 Pre	P1 Post	P2 Pre	P2 Post	P3 Pre	P3 Post
I know how to change specific things that I want to change in my life	4	4	2	4	4	5
I can tell when I am ready to make specific changes in myself	3	3	4	4	5	6
I have a good sense of where I am headed in life	4	4	4	4	5	6
If I want to change something in my life, I initiate the transition process	4	4	4	4	5	5
I can choose the role that I want to have in a group	3	3	2	4	4	5
I have a specific action plan to help me reach my goals	4	4	5	5	4	5
I take charge of my life	4	5	5	5	5	5
I know what my unique contribution to the world might be	4	2	2	4	4	4
I have a plan for making my life more balanced	4	5	5	5	5	6



1- Definitely disagree

2- Mostly disagree

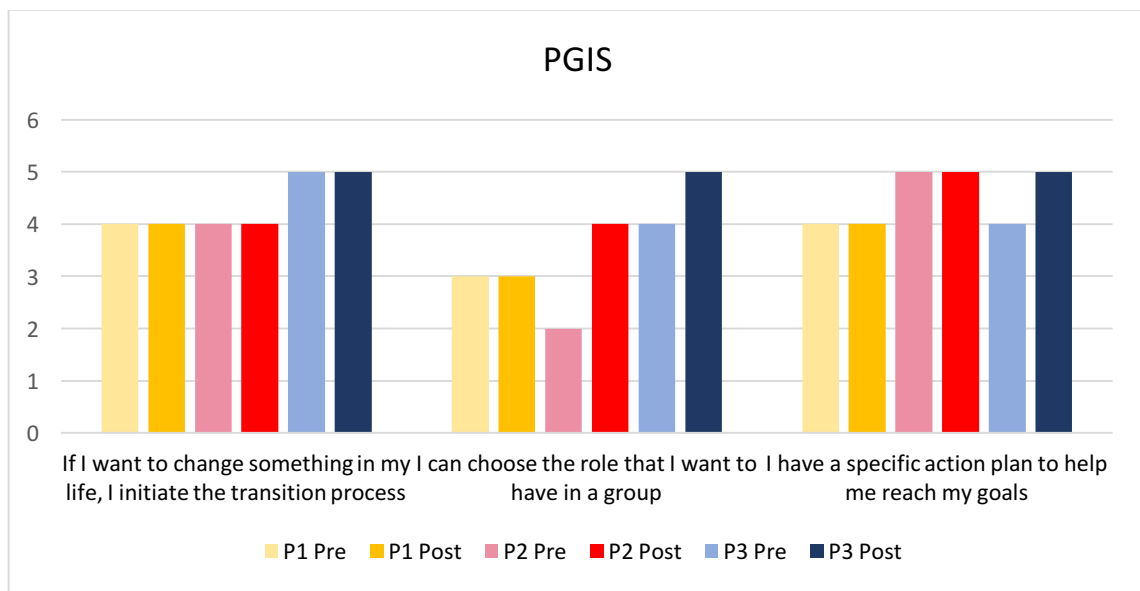
3- Somewhat disagree

4- Somewhat agree

5- Mostly agree

6- Definitely agree

Figure 21. Participant responses to the Personal Growth Initiative Scale



1- Definitely disagree

2- Mostly disagree

3- Somewhat disagree

4- Somewhat agree

5- Mostly agree

6- Definitely agree

Figure 22. Participant responses to the Personal Growth Initiative Scale

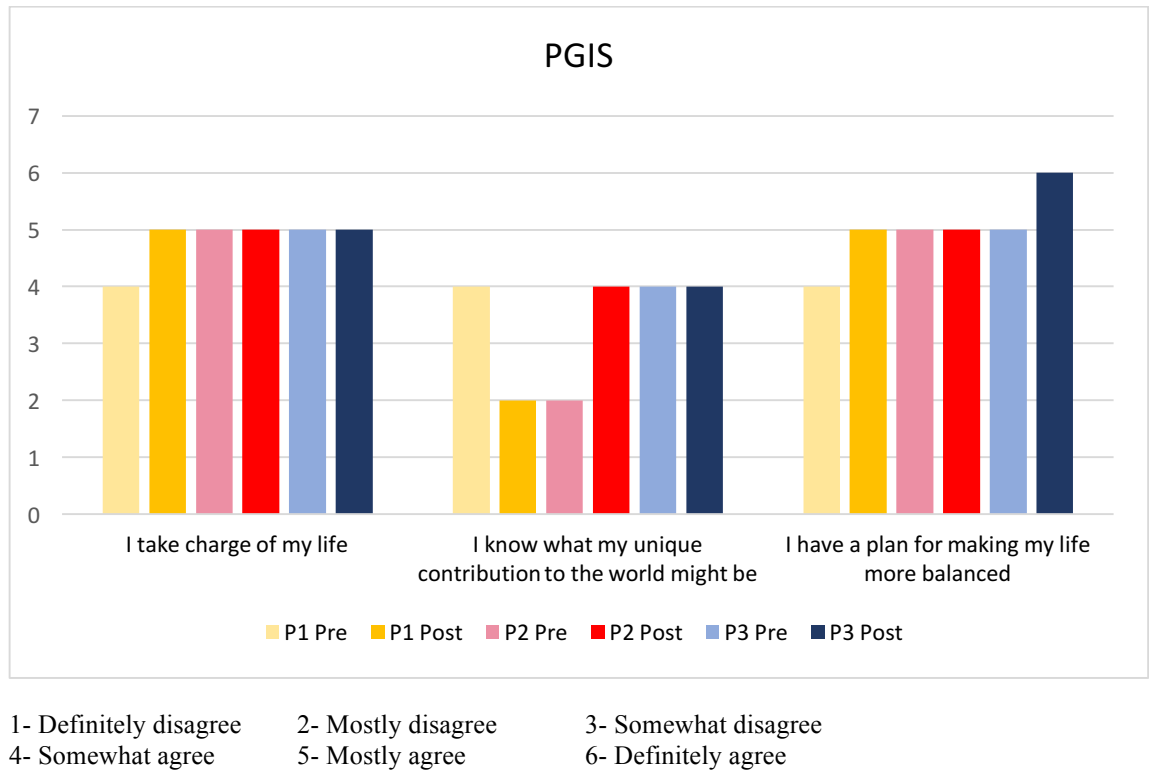


Figure 23. Participant responses to the Personal Growth Initiative Scale

Summary

To investigate the effects of MBTSR, a non-traditional online intervention approach, and its ability to produce constructive psychological changes in individuals with chronic tinnitus, pre- and post-assessments were administered to three participants. Mindfulness, quality of life, positive affect, and quality of sleep were expected to improve as a result of the 8-week online MBTSR treatment. The five assessments which were administered include: The *Tinnitus Handicap Inventory*, the *Tinnitus Visual Analogue Scale*, the *Five Factor Mindfulness Questionnaire*, the *Pittsburgh Sleep Quality Index*, and the *Personal Growth Initiative Scale*.

The *Tinnitus Handicap Inventory*, considered the primary outcome measure, analyzed tinnitus symptom severity and aimed to identify, qualify, and evaluate the

difficulties an individual may have been experiencing. Overall, none of the participants experienced growth, although all three-remained consistent in their responses, neither showing growth nor decline. It can be inferred that 8-weeks of an MBTSR course was not enough time to produce constructive changes in participants' attitudes regarding the difficulties they might experience as a result of their tinnitus.

One of the secondary outcome measures, *the Tinnitus Visual Analogue Scale*, was used to measure treatment-induced changes in tinnitus loudness and annoyance. Post-intervention, all three participants exhibited 100% growth. This suggests that an MBTSR course has the potential to evoke changes in perceptual loudness and annoyance level in individuals with tinnitus. The other secondary outcome measures, the *Five Factor Mindfulness Questionnaire*, was used as a psychological measurement intended to explore the degrees of mindfulness, including: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience.

The first facet of *Observing* demonstrated the least amount of growth among participants. Between the three subjects, P1 showed zero growth, P2 presented with 33% growth, and P3 demonstrated 66% growth. In the third facet, *Acting with Awareness*, P2 revealed marked growth in 3 out of 5 questions, demonstrating 80% growth, while the other two participants showed growth in 2 out of 5 questions (40%). However, the remaining facets, *Describing*, *Nonjudging of Inner Experience*, and *Nonreactivity to Inner Experiences*, exhibited striking growth among all participants. The second facet, *Describing*, showed growth in 2 of the 3 participants: P1 with 60% and P2 with 80%. Facet four, *Nonjudging of Inner Experiences*, P2 presented with 83% marked growth, while P3 showed 66% growth. Facet five, *Nonreactivity to Inner Experiences*, exhibited

the most striking growth among facets. P2 exhibited growth in 100% of responses and P3 exhibited growth in 75% of responses. Overall, the results reveal marked growth among participants with regard to three of the five facets, including: *describing*, *nonjudging of inner experiences*, and *nonreactivity to inner experiences*. Among participants, P3 and P2 presented with the most substantial growth; P3 in 4 of the 5 facets and P2 in 3 of the 5 facets.

The *Pittsburgh Sleep Quality Index*, was an instrument used to measure the quality and patterns of sleep in adults through the measurement of seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. Largely, all participants neither demonstrated growth nor decline with their responses.

Lastly, the *Personal Growth Initiative Scale*, was used to yield a person's active and intentional involvement in changing and developing as a person. Only one of the three participants, P3, exhibited growth after completing the MBTSR course, the other two neither showed growth nor decline. P3 presented with 66% growth. It is difficult to speculate whether an 8-week course in mindfulness is enough time to warrant constructive changes in someone's ability to evolve and transform as a person.

Although quality of sleep and personal growth remained more or less the same as pre-assessment suggested, it can be inferred through the five self-report questionnaires that participants exhibited less overall annoyance from their tinnitus, experienced enhanced quality of life, developed an enriched positive affect, and ultimately presented with an increase among four of the five facets of mindfulness, including *describing*, *acting with awareness*, *non-judging of inner experience*, and *non-reactivity to inner*

experience. However, due to an under-sized sample of three participants, the results of this study are unreliable, as they are unable to reveal scientific as well as statistical significance. Consequently, the alternate hypothesis cannot be accepted and the null hypothesis cannot be rejected at this time. All measures would be strengthened by further research with a significantly more robust sample size. Moreover, further speculations are warranted regarding the low post-intervention participant reporting. These conjectures will be discussed in greater detail in Chapter 4.

Chapter 4: Discussion

The purpose of this study was to assess participants' changes in perception of tinnitus, symptoms of mood, anxiety, sleep difficulty, quality of life, and mindfulness after completing an 8-week online MBTSR online training course. Data were gathered on three subjects (two males, both 51-years of age and one, sex and age unidentified), using self-report questionnaires. Five-facets of mindfulness, including *observing, describing, acting with inner awareness, nonjudging of inner experiences, and nonreactivity to inner experiences* were examined for individuals with chronic tinnitus.

Data Analysis

The hypotheses posed by this study were as follows:

H_{0a}: No marked differences exist among a pre- and post-treatment therapy when treating patients with chronic tinnitus, as measured by the Tinnitus Handicap Inventory (THI), the Pittsburgh Sleep Quality Index (PSQI), the 5-Facet Mindfulness Questionnaire, and the Personal Growth Initiative Scale.

H_{1a}: A marked difference exists in pre- and post-treatment therapy for individuals with chronic tinnitus when being treated with the non-traditional intervention approach, Mindfulness Based Tinnitus Stress Reduction, as measured by the 5-Facet Mindfulness Questionnaire, Tinnitus Handicap Inventory (THI), the Pittsburgh Sleep Quality Index (PSQI), and the Personal Growth Initiative Scale (PGIS).

Research Findings

The alternate hypothesis (H_{1a}) was confirmed by the data analysis conducted on each questionnaire. According to the self-report questionnaire responses, the pre- versus post-test difference between MBTSR and the psychological effects of tinnitus was weak,

yet marked and positive. This pre- versus post-test difference was established for *5-Facet Mindfulness Questionnaire (FFMQ)*, *Tinnitus Handicap Inventory (THI)*, *the Pittsburgh Sleep Quality Index (PSQI)*, and *the Personal Growth Initiative Scale (PGIS)*. The findings indicate that a committed practice of a non-traditional, 8-week online MBTSR-intervention may help to ameliorate the psychological symptomology frequently associated with chronic tinnitus, including an individual's feelings of hopelessness, stress, anxiety, and changes in mood; in turn, MBTSR may increase qualities of mindfulness, enhance quality of life, and enrich positive affect.

Offering MBTSR as an online program provides myriad benefits to individuals unable to access nearby tinnitus support. This accessibility is filled with unlimited potential for people living in remote areas who either do not have the means of transportation or the convenience of commuting to distant city centers where the program is more likely to be offered. Moving beyond urban versus rural, an online MBTSR program has the capability to reach individuals worldwide, especially in places where healthcare and tinnitus therapies are harder to come by. Additionally, an online course provides accessibility for those with physical limitations. Individuals for whom mobility is a challenge, including those who are physically or mentally disabled, housebound, or primary caregivers can also benefit from therapeutic online services. Likewise, the possibility of an effective online adjunct intervention for individuals with chronic tinnitus has the potential for lower-cost courses, making it a more financially feasible alternative to often costly in-person courses of similar nature.

Further Speculations:

The poor completion rate of the post-treatment self-report questionnaires make it impossible for one to speculate on the psychological effects of an MBTSR intervention for individuals with chronic tinnitus. Consequently, the data are inconclusive. There are several explanations for this issue.

The most likely explanation for the low completion rates of post-treatment questionnaires is that participants achieved so much benefit from the 8-week online MBTSR course that they no longer felt the need to follow through and fill out the assessments. This phenomenon is often observed in a medical setting when the patient's health has improved so much that they no longer feel obliged to show up to the advised medical appointment. Consequently, due to the marked improvement in the patient's health status, they simply neglect to notify medical personnel of their decision to abandon the check-up.

Another possible reason for the low completion rates of post-treatment questionnaires is discouragement among participants. People with tinnitus may have tried multiple treatments or therapies and have become discouraged due to the lack of results. This study may have seemed like just another failed attempt at finding relief from tinnitus. Due to the nature of mindfulness, the practitioner must have patience with the process and put aside doubt and eagerness in order to be impacted by the subtle and elusive benefits that may be provided by this type of practice.

Also, although a less likely explanation for low-participant completion rate, is the skepticism that may be associated with a therapy seeped in mindfulness, such as MBTSR. It is possible that the practice of mindfulness itself is still a very foreign concept to the

majority of people. Although the participants voluntarily self-registered for the program, it is probable that they had different expectations for the level of commitment it entailed, and the lack of immediacy of the anticipated course outcome. Perhaps, the psychological effects, including shift in attitude, was not strong enough for the participants to feel successful in the program. A mindfulness based practice, like MBTSR, requires participants to put faith in an unfamiliar process that might be too abstract for some people to fully commit to. Participants must suspend judgement in order to cultivate the tools necessary for mindfulness to be effective. The difficulty of suspending one's judgement and cynicism might have created disillusionment in MBSRT being an effective tool for those suffering with tinnitus. This may have led to participants abandoning the regimen and failing to complete the post-treatment self-report questionnaires.

Furthermore, it is questionable whether an 8-week program was long enough to provide the participants the necessary tools to create a shift in attitude, promote emotional well-being, and feel any psychological effects of the MBTSR course. This having been said, Gans (2014) found positive effects on participants in an in-person presentation of MBTSR. It may be that due to the nature, severity, and location of tinnitus, participants may have benefited from either an extended course or an adapted course which emphasized more moving meditations, such as walking meditations, tai chi, or stationary biking. Although purely a conjecture, it is also worth considering that there may be something specific to the nature of tinnitus itself that makes it harder to overcome, or makes the shift in attitude towards it more difficult than other chronic medical conditions. Because tinnitus is a sensory perception (albeit, internally generated), which is likely

processed by the same basic neural networks as other auditory phenomena, it may be as difficult to work with as verbal phenomena during mindful meditation. Incorporating more movement and motion (such as increased opportunities for walking meditation) into the mindfulness based tinnitus stress reduction program may be more conducive for individuals with tinnitus to stay committed to the practice and to be able to fully experience the psychological effects intended by such a practice. These questions are worth future exploration.

One final, and simple explanation for the poor terminal assessment rate is the tendency for people to not complete assessments after the course is completed. As Guder & Maleris (2013) note, online course evaluation has a traditionally poor response rate, although there are methods that can be utilized to improve the return rate. Notably, none of the methods introduced by the authors were used in the present course, although the instructor of the course has altered her timing on the evaluation so that they are requested in the 7th week instead of after completion of the course, and response rates are reportedly increasing (J. Gans, personal communication, January 2017).

Gans had success in collecting post-assessment measures for all 8 participants who met with the course facilitator in person during the pilot study. This was likely due to the bond forged between the participant and mentor during the weekly mindfulness training and psychoeducation. This face-to-face interaction between the course facilitator and corresponding participant may have attributed to participants following through with the post-assessment expectations.

Ninety-nine percent of the initial participants that were enrolled in the online MBTSR course did not follow through with the post-assessment expectations. This may

be because they did not develop the same degree of closeness and allegiance with a cyber facilitator; consequently, it may be the reason for the low response rate. This poses the question of whether an online intervention is truly an effective way to promote the type of relationship needed to encourage participant self-report follow through. An in-house MBTSR intervention may be the preferred method for promoting greater psychological benefits for individuals with tinnitus and generating the desired level of commitment needed for future studies to engender statistically significant data on the effectiveness of MBTSR for individuals with chronic tinnitus. Although an online forum was provided to foster a sense of interaction between teacher and student, perhaps a more direct, regular interaction would have developed a greater sense of bonding between teacher and participant.

Limitations of the Study

A confounding factor and limitation of the study was the relatively low completion rate of the post-treatment self-report questionnaires. Initially, the study began with nearly 400 participants, however only 3 completed post-treatment assessments. Consequently, due to the small participant size and poor response rate, the limited amount of data is too low and weak for an in-depth and conclusive statistical analysis to be performed. Additionally, only two of the three participants completed the initial *Tinnitus Intake Questionnaire*. Research from this study indicates further support is needed to confirm whether a mindfulness based practice is an effective intervention to ameliorate psychological effects of chronic tinnitus. Until then, no conclusions can be drawn from such limited data.

Participation Compliance

As discussed earlier, because of distance and isolation inherent in online courses, completion of post-course surveys is particularly vulnerable (Guder & Maleris, 2013). Following are some possible solutions to address factors that might contribute to the reduced completion rate of post-course surveys. For future studies, instructors of the online course might consider incorporating various compliance mechanisms that would support continued participation after termination of the course. These may include a participant daily check-in, such as an online survey; monetary or coupon-based incentives; and a weekly Skype meeting including a group meditation and discussion.

Often, participants involved in an online program struggle to hold themselves accountable with daily protocol and follow-through. This dilemma could be reduced by the addition of a quick and easy online check-in, such as a survey, that sent notifications to both the course facilitator and participant that the requirements for that day had been fulfilled. Next, a monetary or coupon-based incentive could be utilized to reinforce completion and timely return of pre-, mid-, and post-treatment questionnaire items. Lastly, participants involved in an online program frequently feel alone in the process and miss out on the opportunity to exchange thoughts and discuss any progress made. One potential solution to this would be to utilize weekly small-group Skype meetings with students. The weekly online meetings could include an initial 10-15-minute group-sit meditation followed by discussion with an opportunity for questions and answers. The weekly online gathering could increase course enthusiasm by providing an event to look forward to. Moreover, a weekly Skype meeting could foster a deeper sense of community and create a more robust emotional bond to other course members, the course facilitator,

and especially deepen participant dedication and buy-in to the course outcome. Overall, adding a variety of participant compliance mechanisms to future online MBTSR courses could help to reduce the chance of poor completion rate of the post-treatment self-report questionnaires.

Implications for Future Research

There have been no studies thus far that have investigated the psychological effects of a mindfulness based practice on individuals with chronic tinnitus. Every year more people are diagnosed with this often psychologically debilitating condition. In a time when conventional therapies don't do enough, alternative, non-traditional interventions, such as MBTSR, might be the answer we are looking for to help ameliorate symptomology of tinnitus. Although subjectively, this 8-week online adjunctive course seemed to have a meaningful impact on individuals with chronic tinnitus, the low participation makes it impossible to draw statistically significant conclusions. Therefore, further research is warranted to confirm whether MBTSR may be a beneficial intervention tool for individuals with this condition. Consequently, this study is clinically relevant to the future of tinnitus healthcare in that the research provides insight into the wants and needs of tinnitus sufferers. The hope is that one day, an alternative treatment option such as MBTSR, may be considered an adjunct intervention to conventional tinnitus treatment, and might be considered commonplace among healthcare providers.

Conclusion

This study explored the psychological effects of a non-traditional intervention on individuals with chronic tinnitus. Pre- and post-intervention data for three individuals,

two participants 51-years of age, and the third unknown, was analyzed to determine if emotional wellbeing and quality of life was improved as a consequence of enhanced mindfulness garnered from an MBTSR course. The findings indicated that an 8-week online MBTSR course provided differences, although not significant, among a pre- and post-assessment of individuals with chronic tinnitus.

This study provides insight into ways MBTSR can begin to mitigate chronic tinnitus. The research collected so far, paves the way for future researchers to strengthen the conversation that a shift in attitude from struggle to acceptance for a person living with chronic tinnitus is possible. Likewise, the psychological effects of a mindfulness based practice are significant enough to be incorporated as an adjunct intervention plan with the hope of eventually being accepted as commonplace in the industry of tinnitus healthcare. To strengthen the understanding of how a mindfulness based practice can help improve quality of life and emotional and psychological wellbeing in individuals with tinnitus, further research is warranted.

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Appendix A
Tinnitus Intake Questionnaire



Tinnitus Intake Questionnaire
Pre-Assessment

1. Number:

2. What is your gender?

- ☐ Female
☐ Male

3. Please tell us how you heard about the study (check all that apply):

- ☐ Friend/Family Recommendation
☐ I was contacted directly by the investigators
☐ Internet Search
☐ Doctor Referral (please type your doctor's name in the box below):
☐ Other (please specify):

4. What is your age?

5. (0 = strongly disagree; 100 = strongly agree)

Many everyday sounds are unbearably loud to me.

Please list sounds that are unbearably loud to you.

6. (0 = strongly disagree; 100 = strongly agree)

Sounds that others believe are moderately loud are too loud to me.

Please list sounds that are too loud to you.

7. (0 = strongly disagree; 100 = strongly agree)

I hear very soft sounds that others with normal hearing do not hear.

8. Where is your tinnitus? (Please choose only ONE answer.)

- ☐ Left ear
- ☐ Right ear
- ☐ Both ears, equally
- ☐ Both ears, but worse in left ear
- ☐ Both ears, but worse in right ear
- ☐ In the head, but no exact place.
- ☐ More in the right side of head
- ☐ More in the left side of head
- ☐ Outside of head
- ☐ Middle of head

9. Describe the most prominent PITCH of your tinnitus by choosing ONE of the numbers below: Number 1 is like a VERY LOW pitched fog horn, and Number 10 is like a VERY HIGH pitched whistle.

- ☐ 1 (Very low)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10 (Very high)

10. Does the PITCH of the tinnitus vary from day to day?

- ☐ No
- ☐ Yes

11. Describe the LOUDNESS of your tinnitus using a scale from 0-100. (0 = VERY FAINT; 100 = VERY LOUD)

12. Does the LOUDNESS of the tinnitus vary from day to day?

☐ No

☐ Yes

13. Which of all these qualities BEST describes your tinnitus? (Please circle only ONE.)

☐ Buzzing

☐ Clanging

☐ Clicking

☐ Crackling

☐ Cricket-like

☐ Hissing

☐ Humming

☐ Musical note

☐ Popping

☐ Pounding

☐ Pulsing

☐ Ringing

☐ Roaring

☐ Rushing

☐ Steam whistle

☐ Throbbing

☐ Whistling

☐ Whooshing

Other (please specify)

14. During the time you are awake, what percentage of the time is your tinnitus present?
For example, 100% would indicate that your tinnitus was present all the time, and 25%
would indicate that your tinnitus was present $\frac{1}{4}$ of the time.

15. On the average, how many days per month are you bothered by your tinnitus?

16. How long have you had tinnitus? (Please specify months or years)

17. When you have your tinnitus, which of the following makes it WORSE?

- ☐ Alcohol
- ☐ Being in a noisy place
- ☐ Being in a quiet place
- ☐ Changing head position
- ☐ Coffee/tea
- ☐ Constipation
- ☐ During your menstrual period
- ☐ Drugs/medicine
- ☐ When you first wake up in the morning
- ☐ Having just recently been in a noisy place
- ☐ Having just recently worn a hearing aid
- ☐ While you are wearing a hearing aid
- ☐ When you are tired from doing physical work
- ☐ Shooting guns, rifles, etc.
- ☐ Smoking
- ☐ Sudden physical activity
- ☐ When you are excited
- ☐ Relaxation
- ☐ Lack of sleep
- ☐ Emotional or mental stress
- ☐ Food (please specify under "other")
- ☐ Nothing makes it worse
- ☐ Not sure

Other (please specify)

18. Which of the following REDUCES your tinnitus?

- ☐ Alcohol
- ☐ Being in a noisy place
- ☐ Being in a quiet place
- ☐ Changing head position
- ☐ Coffee/tea
- ☐ Constipation
- ☐ During your menstrual period
- ☐ Drugs/medicine
- ☐ When you first wake up in the morning
- ☐ Having just recently been in a noisy place
- ☐ Having just recently worn a hearing aid
- ☐ While you are wearing a hearing aid
- ☐ When you are tired from doing physical work
- ☐ Shooting guns, rifles, etc.
- ☐ Smoking
- ☐ Sudden physical activity
- ☐ When you are excited
- ☐ Relaxation
- ☐ Lack of sleep
- ☐ Emotional or mental stress
- ☐ Food (please specif under "other")
- ☐ Nothing makes it better
- ☐ Not sure

Other (please specify)

19. Does any head and neck movement, or having your arms/hands or head touched, affect your tinnitus?

☐ No

☐ Yes

Describe the effect, if any.

20. Does the presence of loud noise make your tinnitus worse?

☐ No

☐ Yes

21. What do you think originally caused your tinnitus? Select ONE only.

☐ Accident (please specify under "other")

☐ Alcohol

☐ Drugs/medicine

☐ Food (please specify under "other")

☐ Hearing Loss

☐ Illness (please specify under "other")

☐ Noise

☐ Smoking

☐ Surgery

☐ I have no idea.

Other (please specify)

22. In which ear do you wear hearing aids?

- ☐ Left
- ☐ Right
- ☐ Both
- ☐ None

23. Do you have any legal action or compensation claim pending in relation to your tinnitus, or are you planning legal action?

- ☐ No
- ☐ Yes

Appendix B

Tinnitus Handicap Inventory

TINNITUS HANDICAP INVENTORY

Patient Name: _____ Date: _____

INSTRUCTIONS: The purpose of this questionnaire is to identify difficulties that you may be experiencing because of your tinnitus. Please answer every question. Please do not skip any questions.

1. Because of your tinnitus, is it difficult for you to concentrate?	Yes	Sometimes	No
2. Does the loudness of your tinnitus make it difficult for you to hear people?	Yes	Sometimes	No
3. Does your tinnitus make you angry?	Yes	Sometimes	No
4. Does your tinnitus make you feel confused?	Yes	Sometimes	No
5. Because of your tinnitus, do you feel desperate?	Yes	Sometimes	No
6. Do you complain a great deal about your tinnitus?	Yes	Sometimes	No
7. Because of your tinnitus, do you have trouble falling to sleep at night?	Yes	Sometimes	No
8. Do you feel as though you cannot escape your tinnitus?	Yes	Sometimes	No
9. Does your tinnitus interfere with your ability to enjoy your social activities (such as going out to dinner, to the movies)?	Yes	Sometimes	No
10. Because of your tinnitus, do you feel frustrated?	Yes	Sometimes	No
11. Because of your tinnitus, do you feel that you have a terrible disease?	Yes	Sometimes	No
12. Does your tinnitus make it difficult for you to enjoy life?	Yes	Sometimes	No
13. Does your tinnitus interfere with your job or household responsibilities?	Yes	Sometimes	No
14. Because of your tinnitus, do you find that you are often irritable?	Yes	Sometimes	No
15. Because of your tinnitus, is it difficult for you to read?	Yes	Sometimes	No
16. Does your tinnitus make you upset?	Yes	Sometimes	No
17. Do you feel that your tinnitus problem has placed stress on your relationships with members of your family and friends?	Yes	Sometimes	No
18. Do you find it difficult to focus your attention away from your tinnitus and on other things?	Yes	Sometimes	No
19. Do you feel that you have no control over your tinnitus?	Yes	Sometimes	No
20. Because of your tinnitus, do you often feel tired?	Yes	Sometimes	No
21. Because of your tinnitus, do you feel depressed?	Yes	Sometimes	No
22. Does your tinnitus make you feel anxious?	Yes	Sometimes	No
23. Do you feel that you can no longer cope with your tinnitus?	Yes	Sometimes	No
24. Does your tinnitus get worse when you are under stress?	Yes	Sometimes	No
25. Does your tinnitus make you feel insecure?	Yes	Sometimes	No

FOR CLINICIAN USE ONLY

Total Per Column

x4	x2	x0

Total Score

	+		+		=	
--	---	--	---	--	---	--

Newman, C.W., Jacobson, G.P., Spitzer, J.B. (1996). Development of the Tinnitus Handicap Inventory. Arch Otolaryngol Head Neck Surg, 122, 143-8.

To interpret the score please refer to the Tinnitus Handicap Severity Scale shown on the reverse side.

Appendix D

*The Five Facet Mindfulness Questionnaire***Five Facet Mindfulness Questionnaire****Description:**

This instrument is based on a factor analytic study of five independently developed mindfulness questionnaires. The analysis yielded five factors that appear to represent elements of mindfulness as it is currently conceptualized. The five facets are observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. More information is available in:

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1	2	3	4	5
never or very	rarely	sometimes	often	very often or
rarely true	true	true	true	always true

- _____ 1. When I'm walking, I deliberately notice the sensations of my body moving.
- _____ 2. I'm good at finding words to describe my feelings.
- _____ 3. I criticize myself for having irrational or inappropriate emotions.
- _____ 4. I perceive my feelings and emotions without having to react to them.
- _____ 5. When I do things, my mind wanders off and I'm easily distracted.
- _____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
- _____ 7. I can easily put my beliefs, opinions, and expectations into words.
- _____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- _____ 9. I watch my feelings without getting lost in them.
- _____ 10. I tell myself I shouldn't be feeling the way I'm feeling.
- _____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
- _____ 12. It's hard for me to find the words to describe what I'm thinking.
- _____ 13. I am easily distracted.
- _____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

Appendix E
Pittsburgh Sleep Quality Index



Pittsburgh Sleep Quality Index (PSQI)
Pre-Assessment

INSTRUCTIONS:

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. Please Print in Your Name:

2. During the past month, what time have you usually gone to sleep at night?

3. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

4. During the past month, what time have you usually gotten up in the morning?

5. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

Appendix F

The Personal Growth Initiative

Personal Growth Initiative Scale – II (PGIS-II)
By Christine Robitschek, Ph.D.
Pre-Assessment

INSTRUCTIONS: Using the scale below, click the number which best describes the extent to which you agree or disagree with each statement.

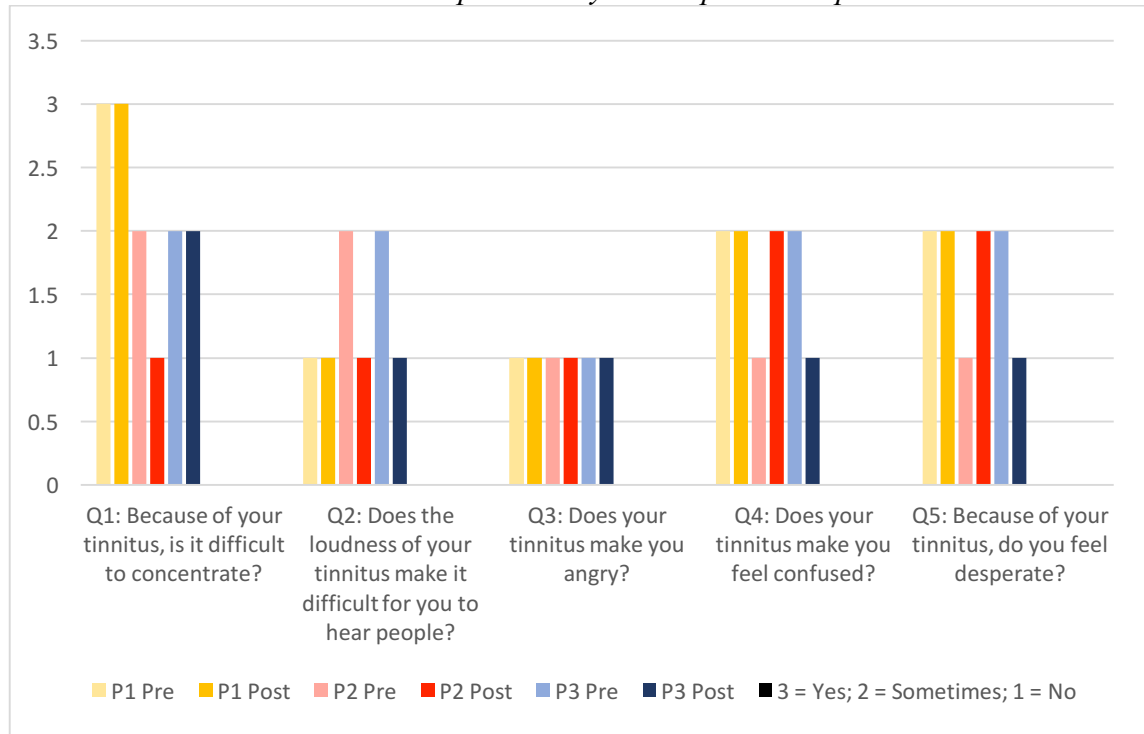
- 1 = Definitely disagree
- 2 = Mostly disagree
- 3 = Somewhat disagree
- 4 = Somewhat agree
- 5 = Mostly agree
- 6 = Definitely agree

1. Please Print in Your Name:

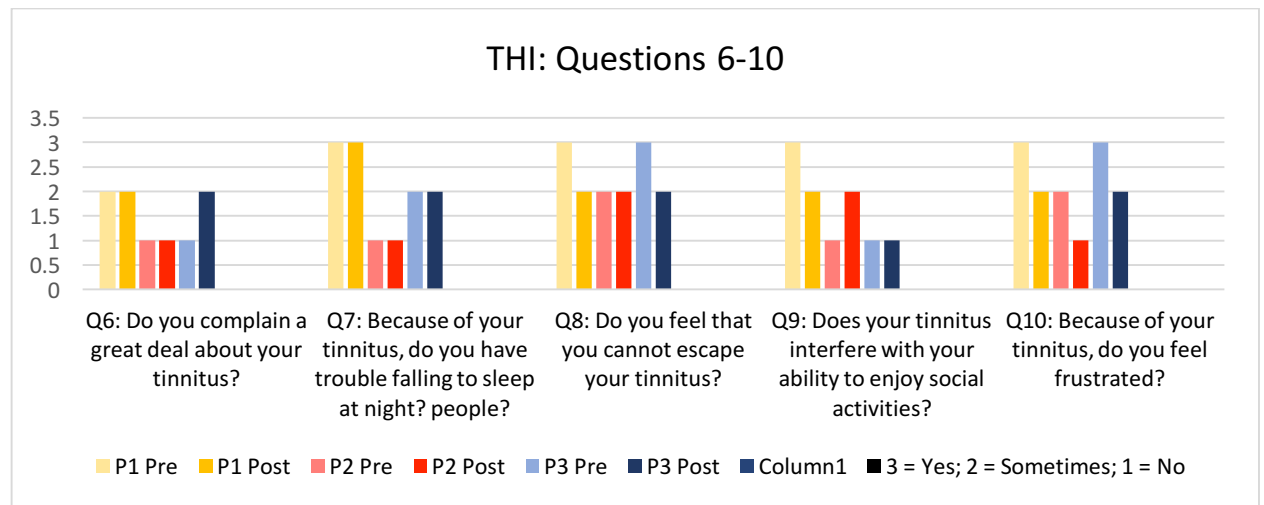
2. I know how to change specific things that I want to change in my life.

- ☐ 1 = Definitely disagree
- ☐ 2 = Mostly disagree
- ☐ 3 = Somewhat disagree
- ☐ 4 = Somewhat agree
- ☐ 5 = Mostly agree
- ☐ 6 = Definitely agree

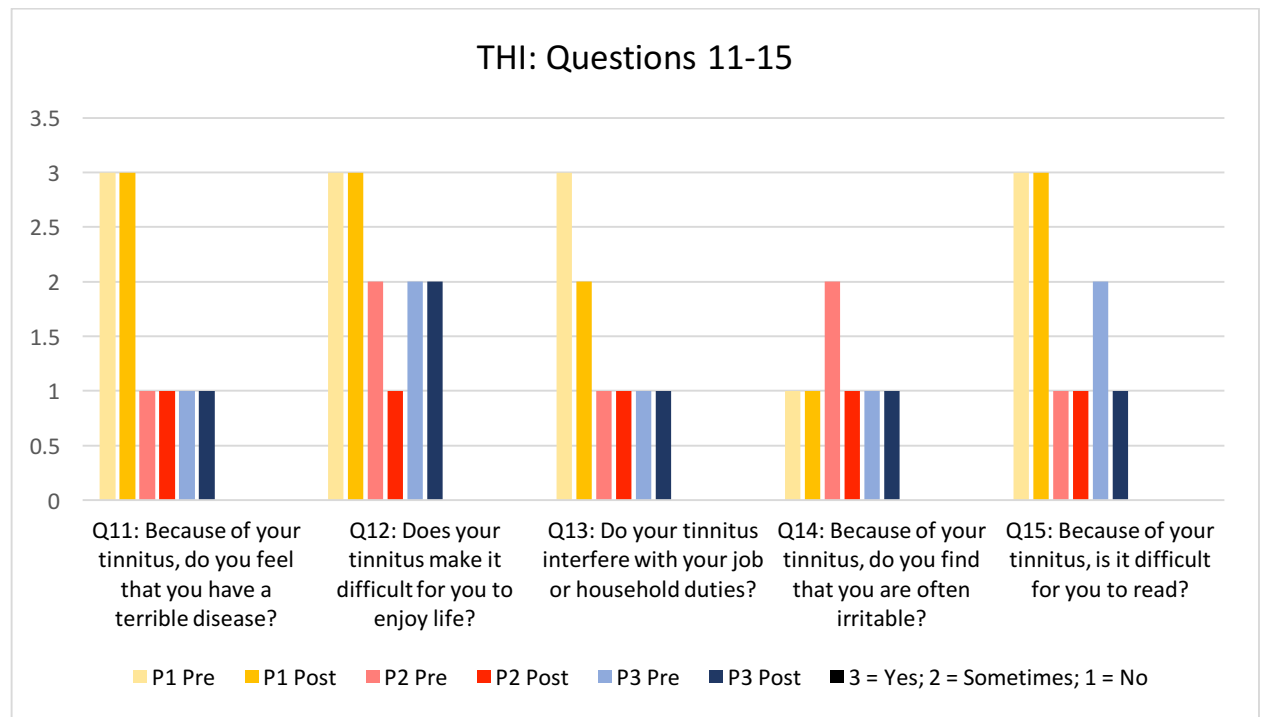
Appendix G
Tinnitus Handicap Inventory Participants' Responses



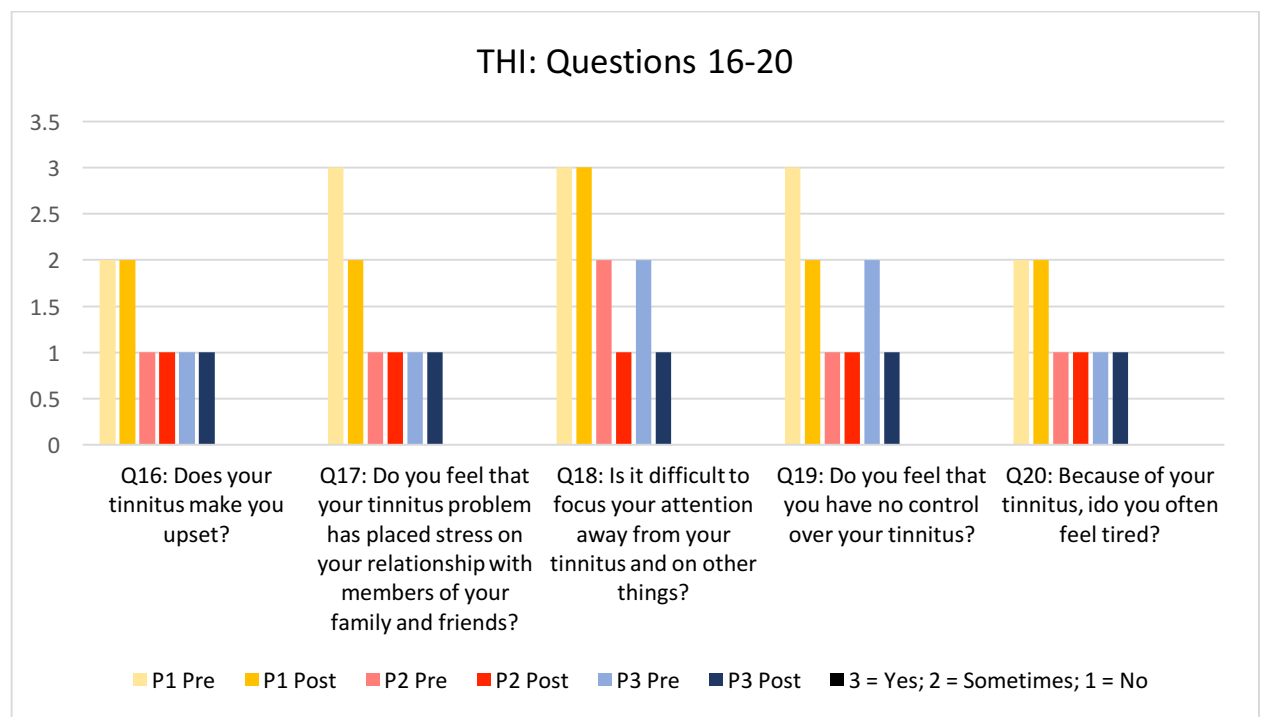
1= no; 2 = sometimes; 3 = yes



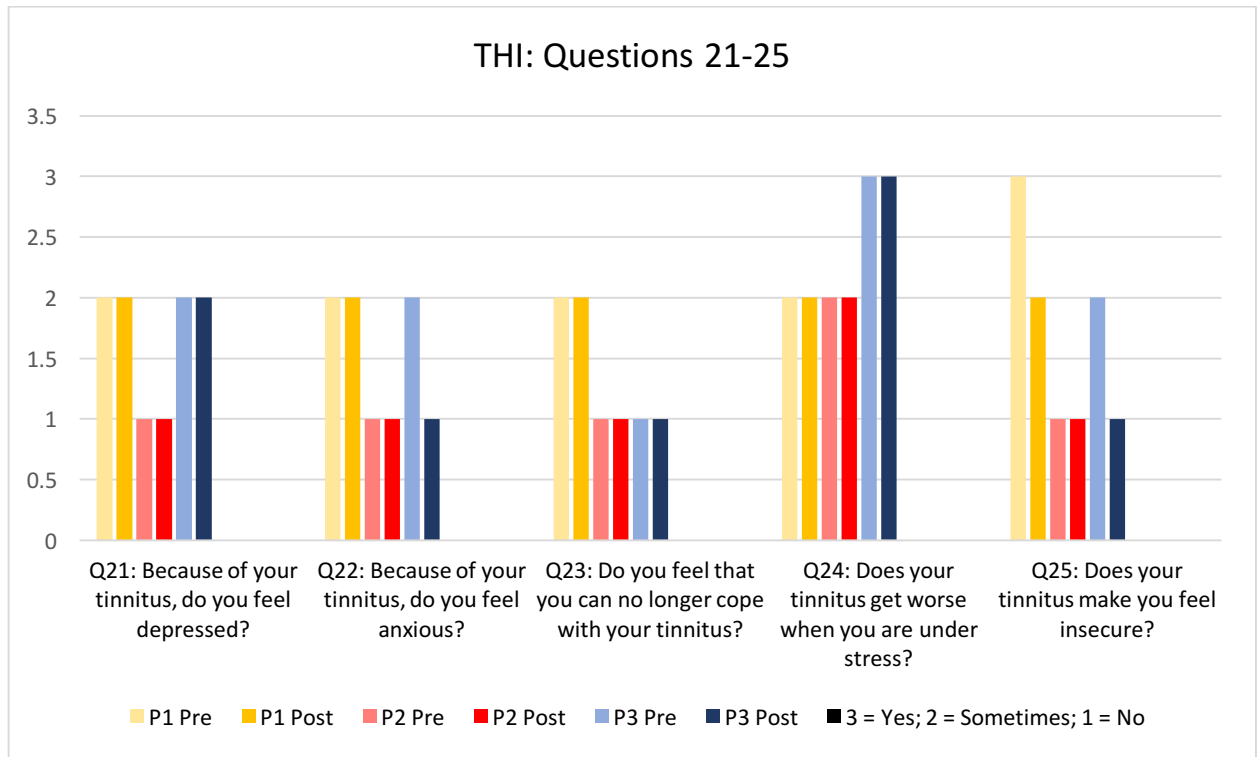
1= no; 2 = sometimes; 3 = yes



1 = no; 2 = sometimes; 3 = yes

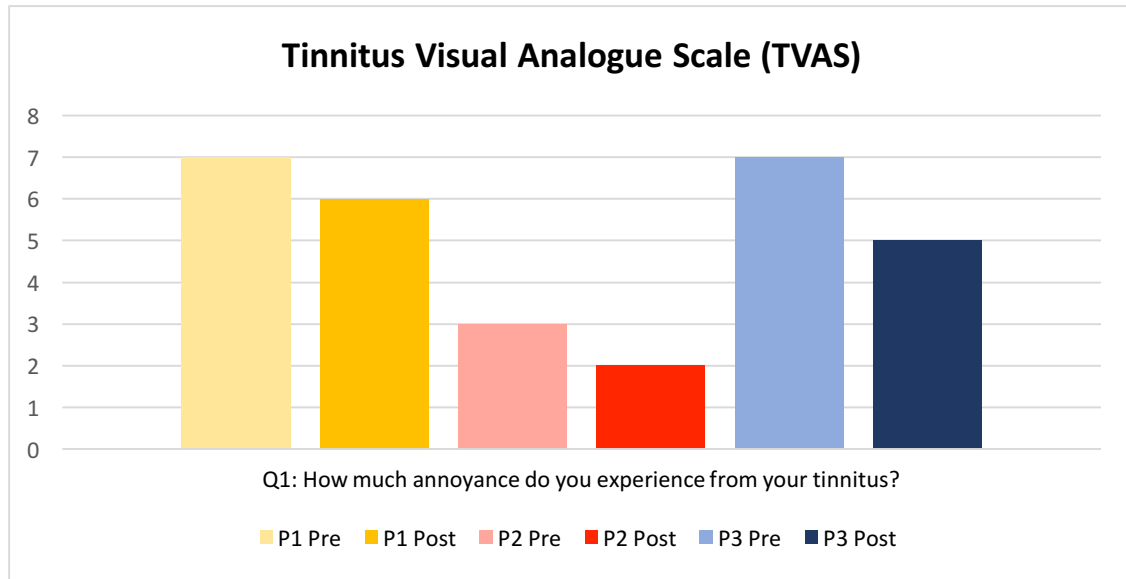


1 = no; 2 = sometimes; 3 = yes

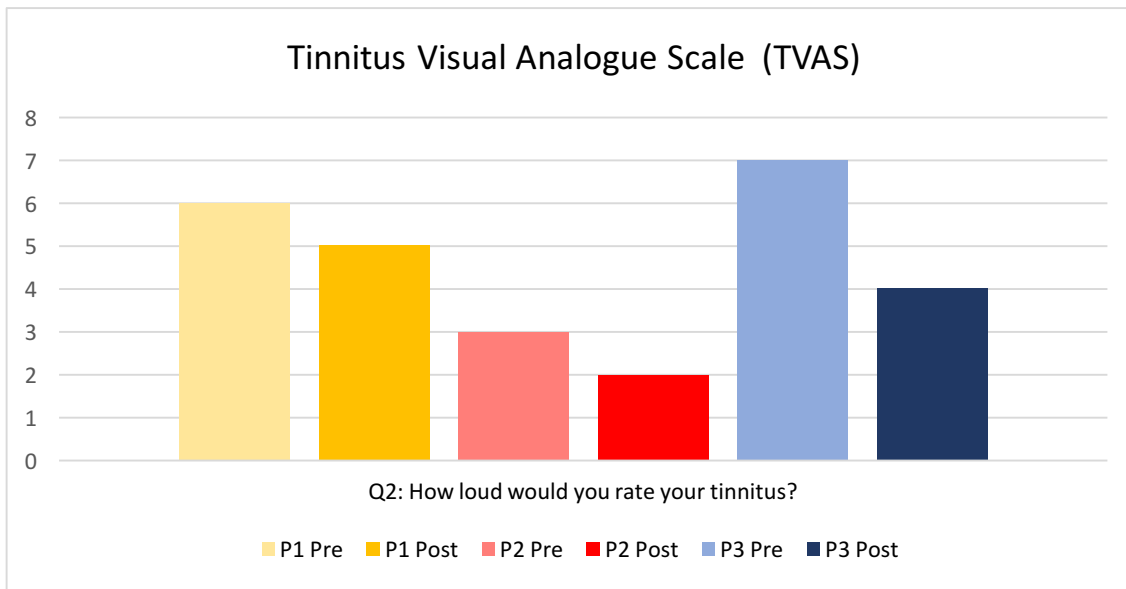


1 = no; 2 = sometimes; 3 = yes

Appendix H
Tinnitus Visual Analogue Scale Participants' Responses



Q1: How much annoyance do you experience from your tinnitus?



Q2: How loud would you rate your tinnitus?

Appendix I
*Standardized Five Facet Mindfulness Questionnaire (FFMQ)*¹

Factor 1 Observing

FFMQ 1 When I'm walking, I deliberately notice the sensations of my body moving.
FFMQ 6 When I take a shower or bath, I stay alert to the sensations of water on my body.
FFMQ 11 I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
FFMQ 15 I pay attention to sensations, such as the wind in my hair or sun on my face.
FFMQ 20 I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
FFMQ 26 I notice the smells and aromas of things.
FFMQ 31 I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow
FFMQ 36 I pay attention to how my emotions affect my thoughts and behavior.

Factor 2 Describing

FFMQ 2 I'm good at finding words to describe my feelings.
FFMQ 7 I can easily put my beliefs, opinions, and expectations into words.
FFMQ 12 It's hard for me to find the words to describe what I'm thinking.
FFMQ 16 I have trouble thinking of the right words to express how I feel about things.
FFMQ 22 When I have a sensation in my body, it's difficult for me to describe it because
I can't find the right words.
FFMQ 27 Even when I'm feeling terribly upset, I can find a way to put it into words.
FFMQ 32 My natural tendency is to put my experiences into words.
FFMQ 37 I can usually describe how I feel at the moment in considerable detail.

Factor 3 Acting with Awareness

FFMQ 5 When I do things, my mind wanders off and I'm easily distracted.
FFMQ 8 I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
FFMQ 13 I am easily distracted.
FFMQ 18 I find it difficult to stay focused on what's happening in the present.
FFMQ 23 It seems I am "running on automatic" without much awareness of what I'm doing.
FFMQ 28 I rush through activities without being really attentive to them.
FFMQ 34 I do jobs or tasks automatically without being aware of what I'm doing.
FFMQ 38 I find myself doing things without paying attention.

¹ Neuser, N. (2010). *Examining the factors of mindfulness: A confirmatory factor analysis of the five facet mindfulness questionnaire* (Doctoral dissertation). Retrieved from <http://commons.pacificu.edu/spp/128/>

Factor 4 Nonjudging

FFMQ 3 I criticize myself for having irrational or inappropriate emotions.

FFMQ 10 I tell myself I shouldn't be feeling the way I'm feeling.

FFMQ 14 I believe some of my thoughts are abnormal or bad and I shouldn't think that way. FFMQ 17 I make judgments about whether my thoughts are good or bad.

FFMQ 25 I tell myself that I shouldn't be thinking the way I'm thinking.

FFMQ 30 I think some of my emotions are bad or inappropriate and I shouldn't feel them. FFMQ 35 When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

FFMQ 39 I disapprove of myself when I have irrational ideas.

Factor 5 Nonreactivity

FFMQ 4 I perceive my feelings and emotions without having to react to them.

FFMQ 9 I watch my feelings without getting lost in them.

FFMQ 19 When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

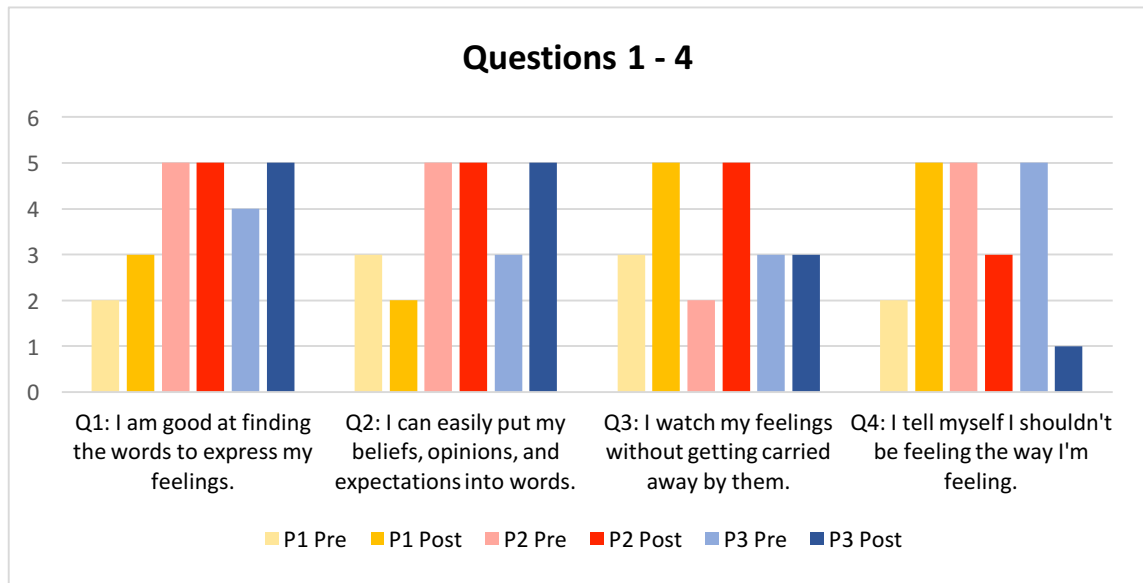
FFMQ 21 In difficult situations, I can pause without immediately reacting.

FFMQ 24 When I have distressing thoughts or images, I feel calm soon after.

FFMQ 29 When I have distressing thoughts or images I am able just to notice them without reacting.

FFMQ 33 When I have distressing thoughts or images, I just notice them and let them go.

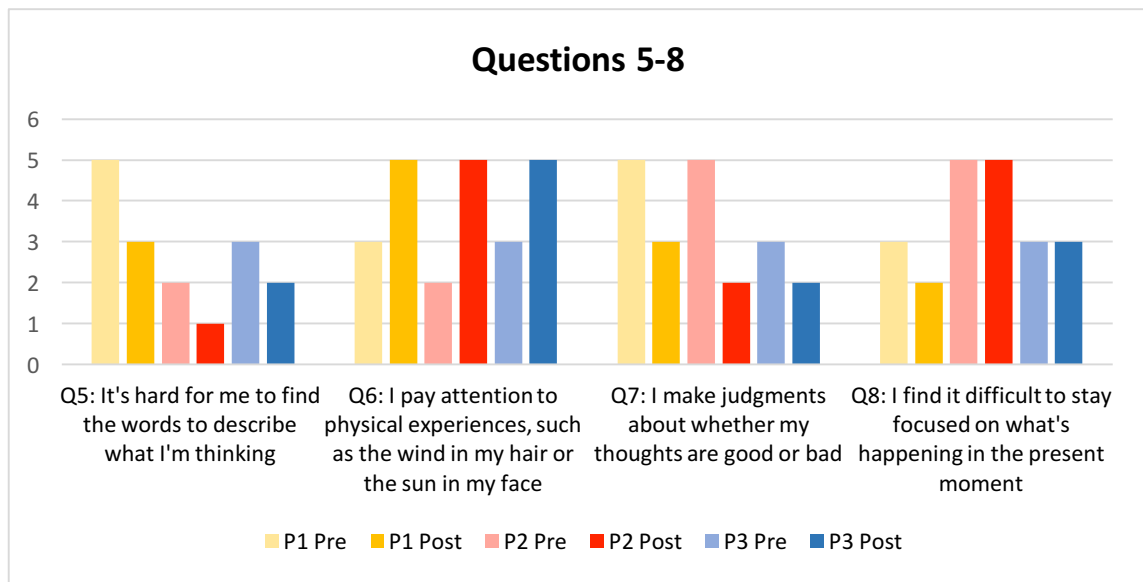
Appendix J

Five Facet Mindfulness Questionnaire Pre/Post Assessment Data

1 - never or very rarely true
4 - sometimes true

2 - not often true
5 - often true

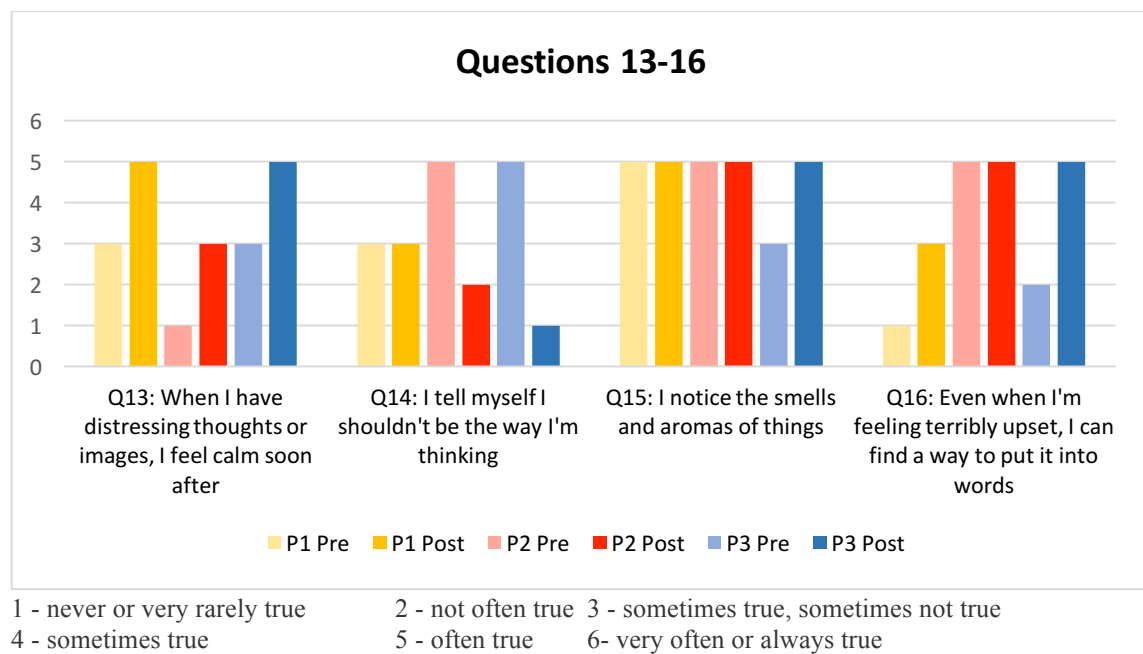
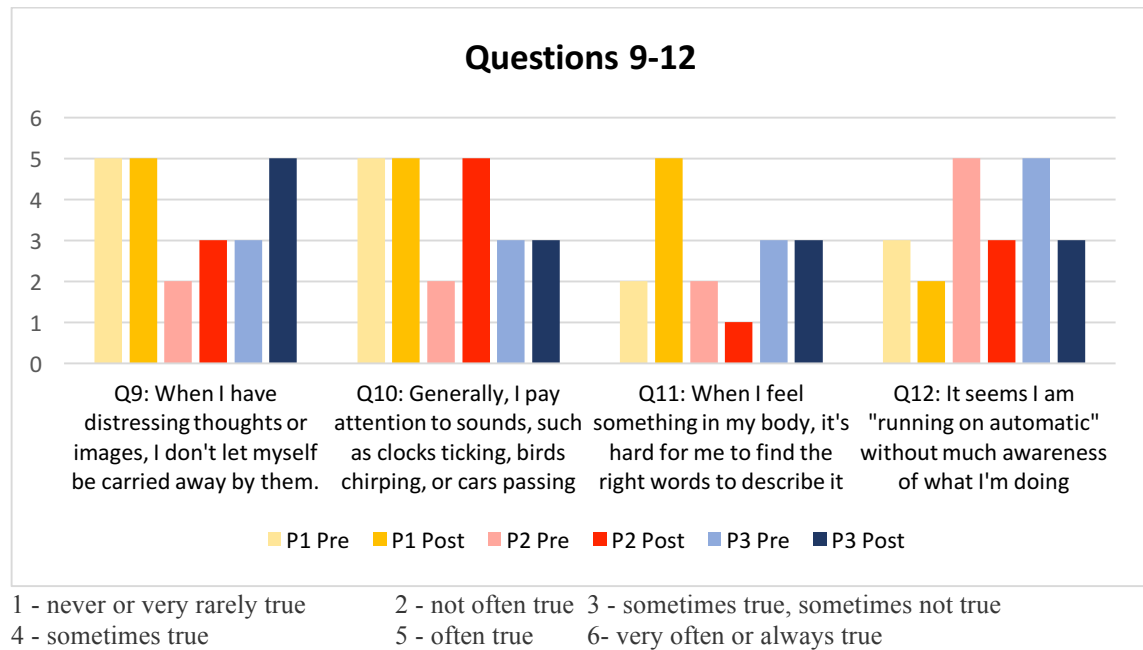
3 - sometimes true, sometimes not true
6 - very often or always true

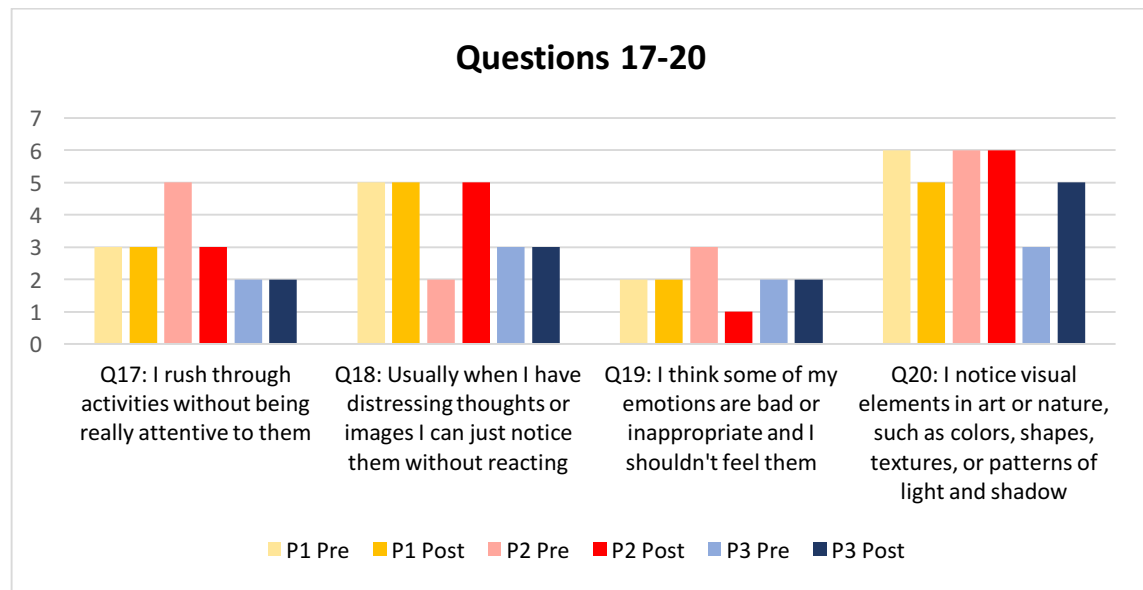


1 - never or very rarely true
4 - sometimes true

2 - not often true
5 - often true

3 - sometimes true, sometimes not true
6 - very often or always true





1 - never or very rarely true

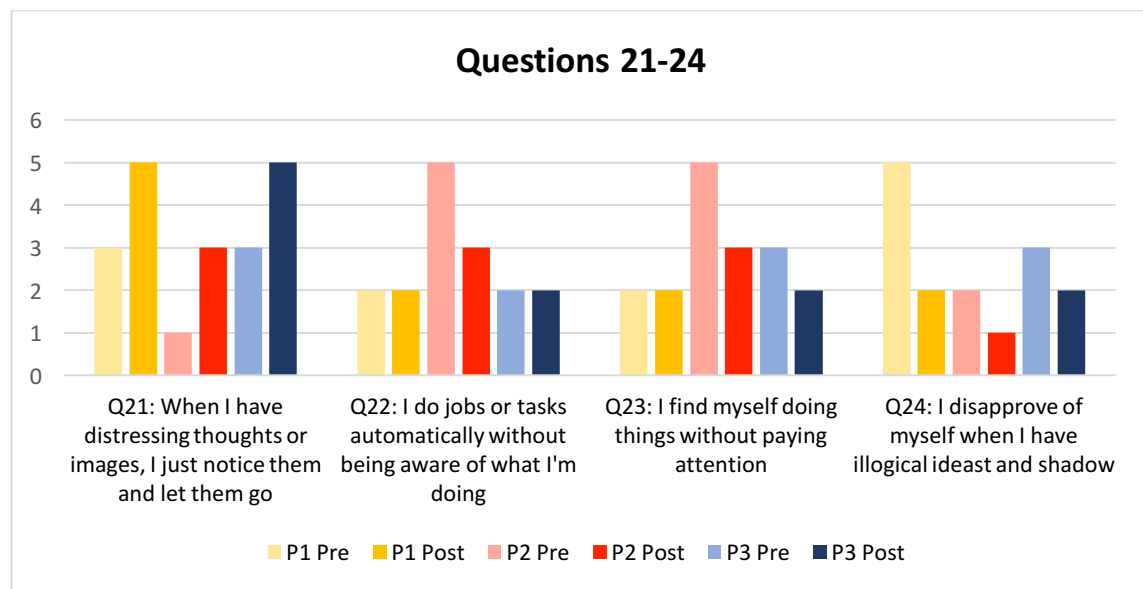
2 - not often true

3 - sometimes true, sometimes not true

4 - sometimes true

5 - often true

6- very often or always true



1 - never or very rarely true

2 - not often true

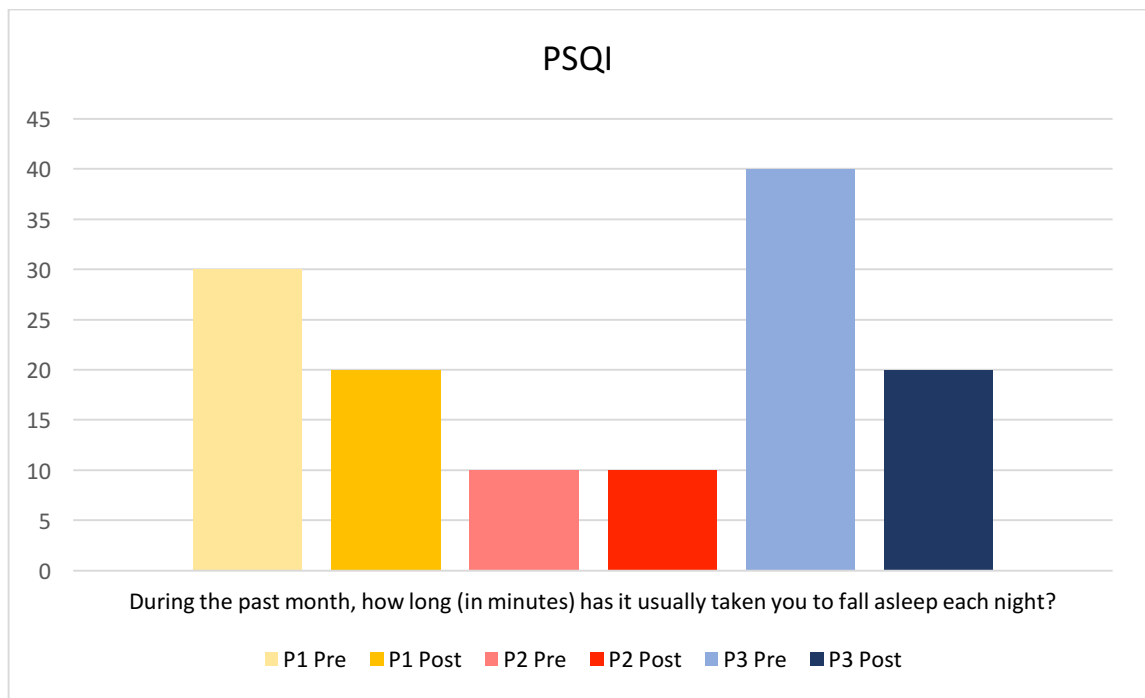
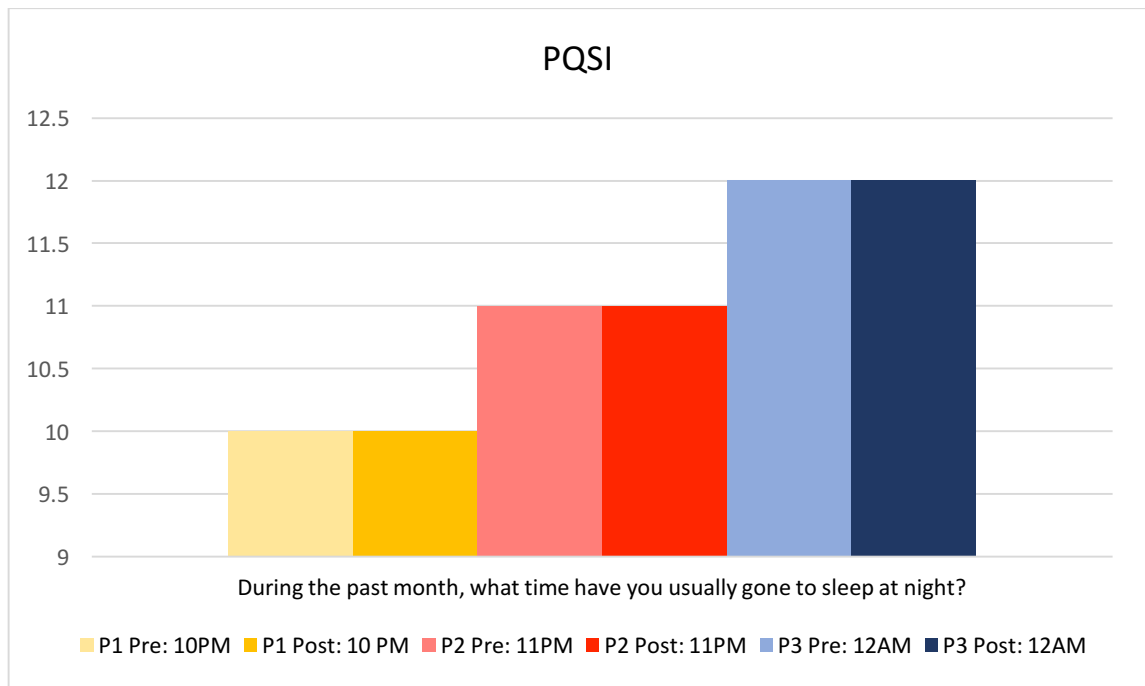
3 - sometimes true, sometimes not true

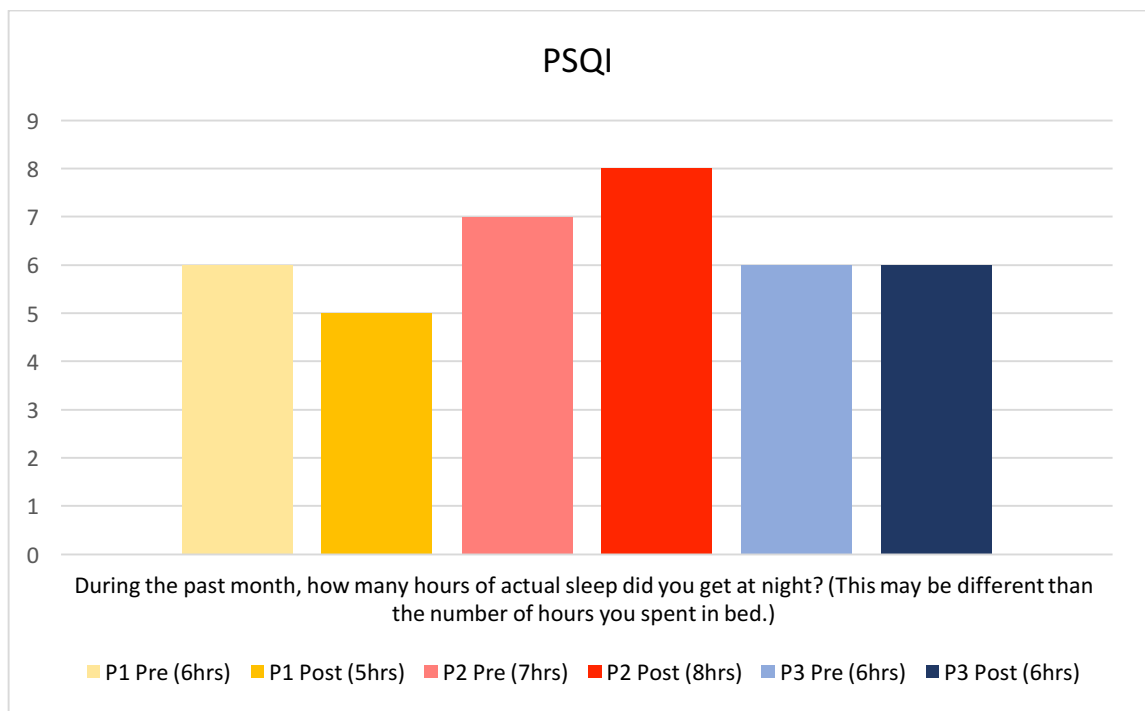
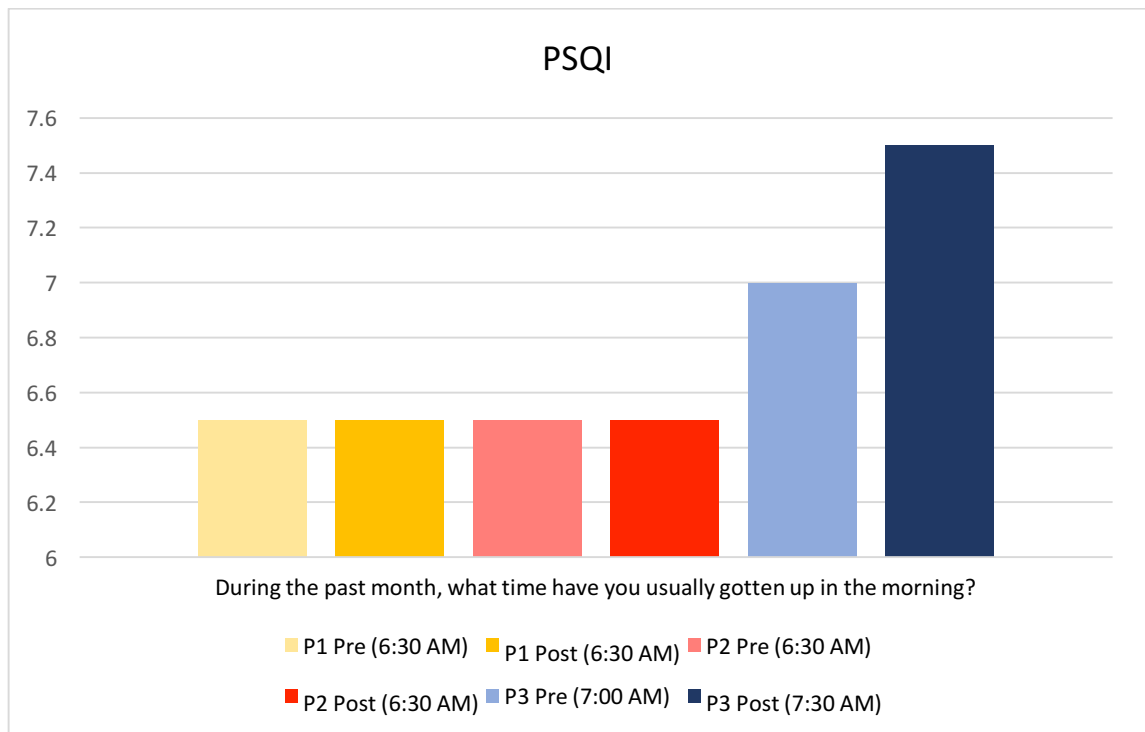
4 - sometimes true

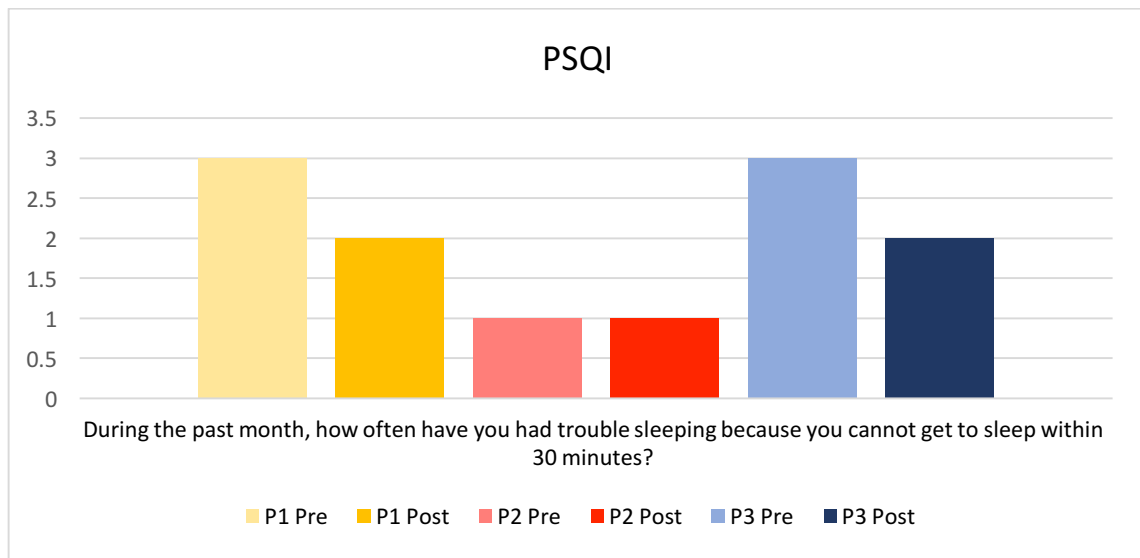
5 - often true

6- very often or always true

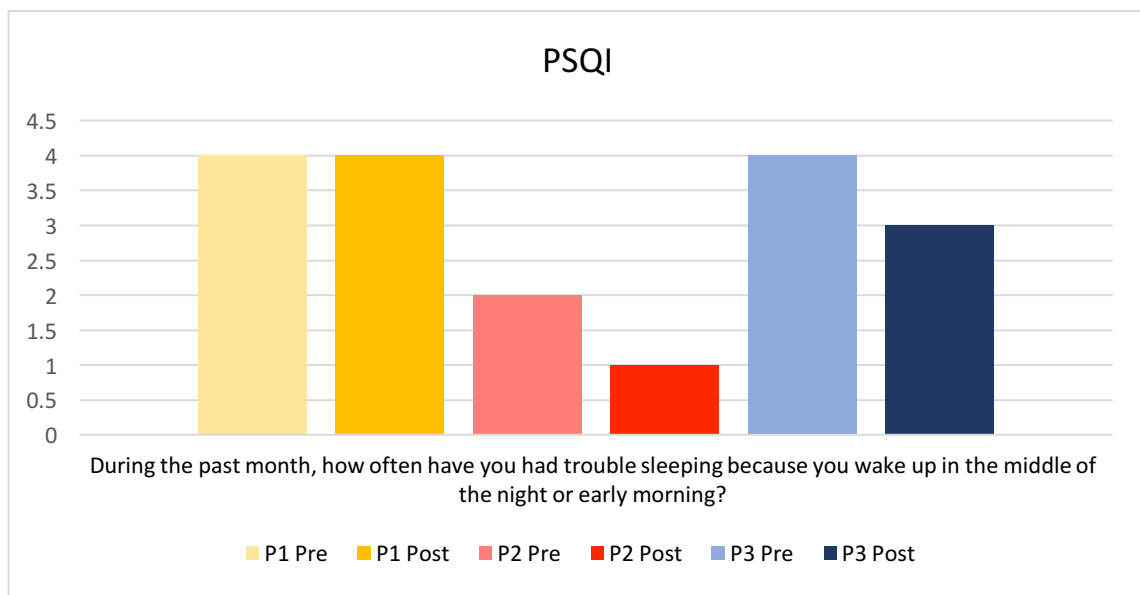
Appendix K

Pittsburgh Sleep Quality Index Pre/Post Assessment Data

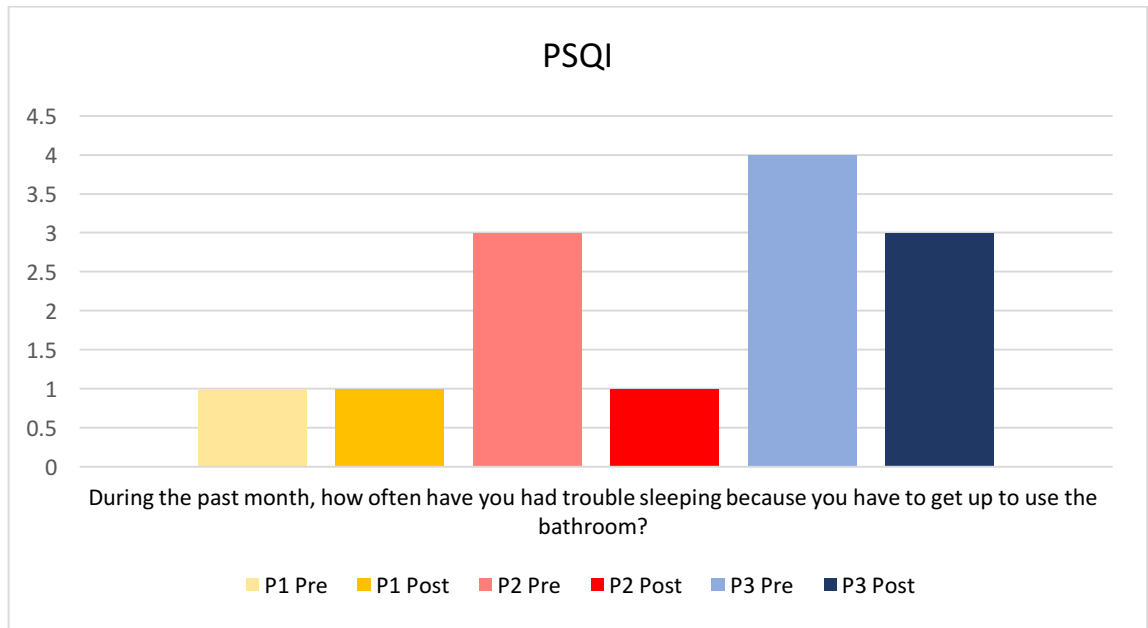




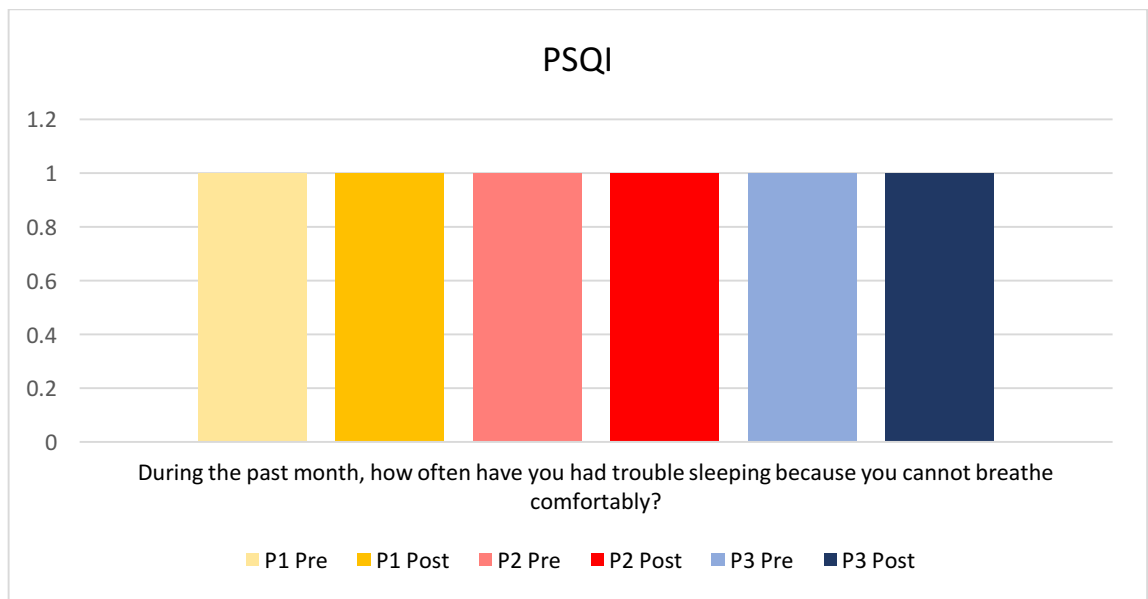
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



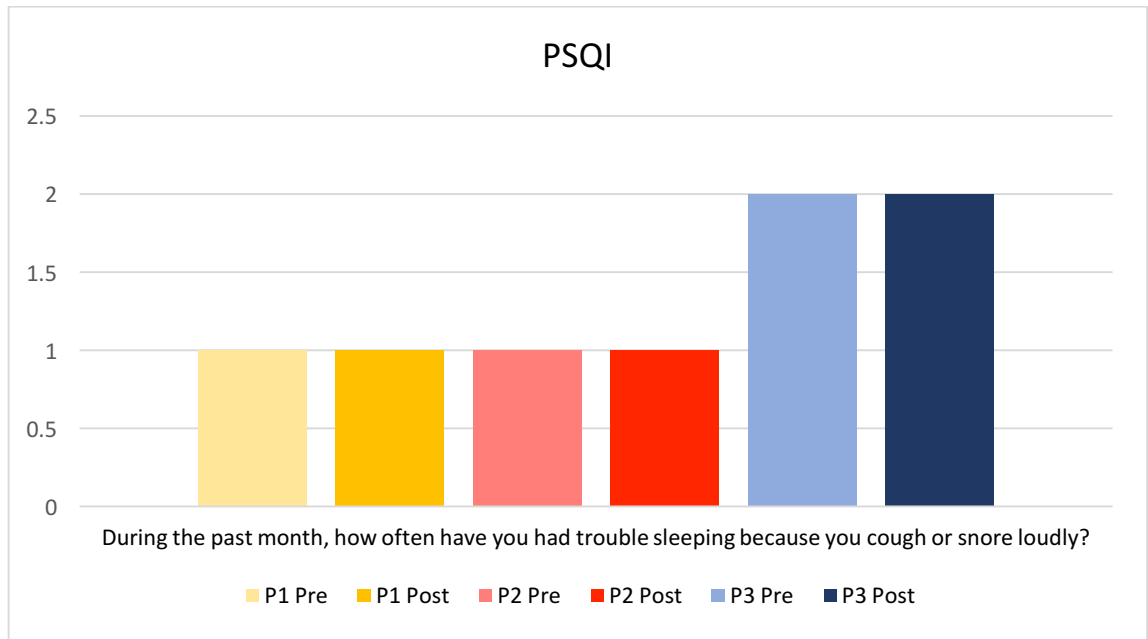
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



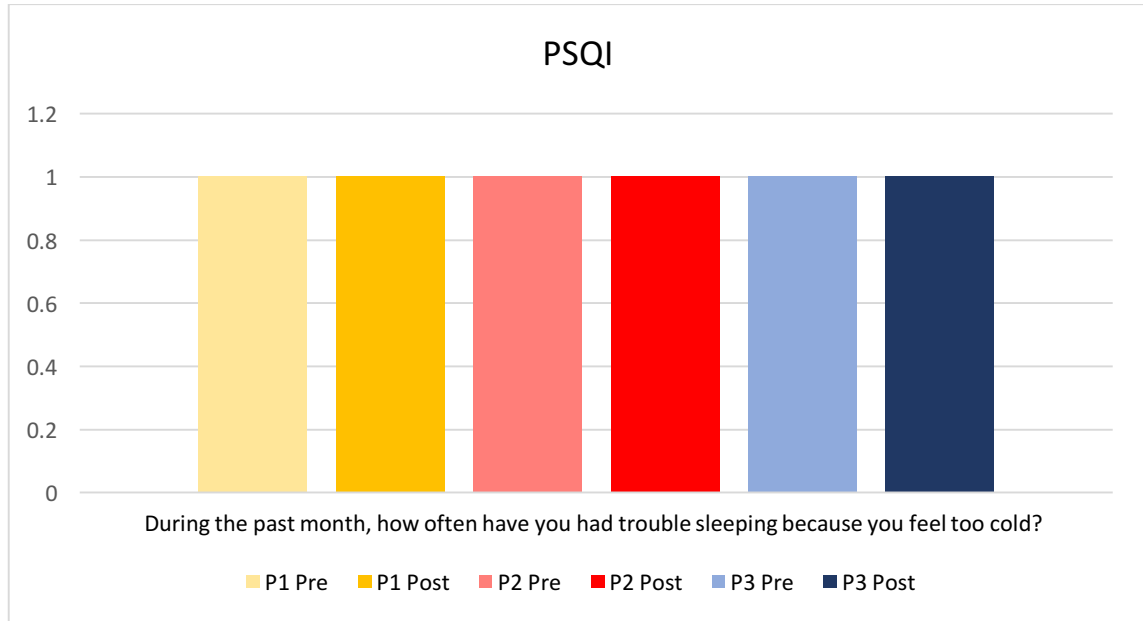
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



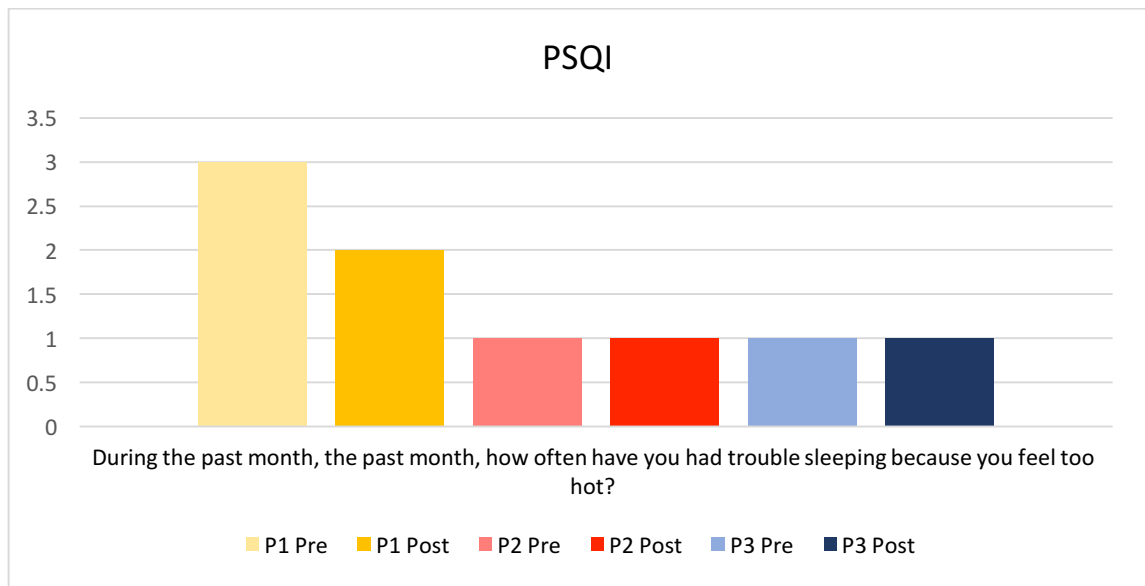
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



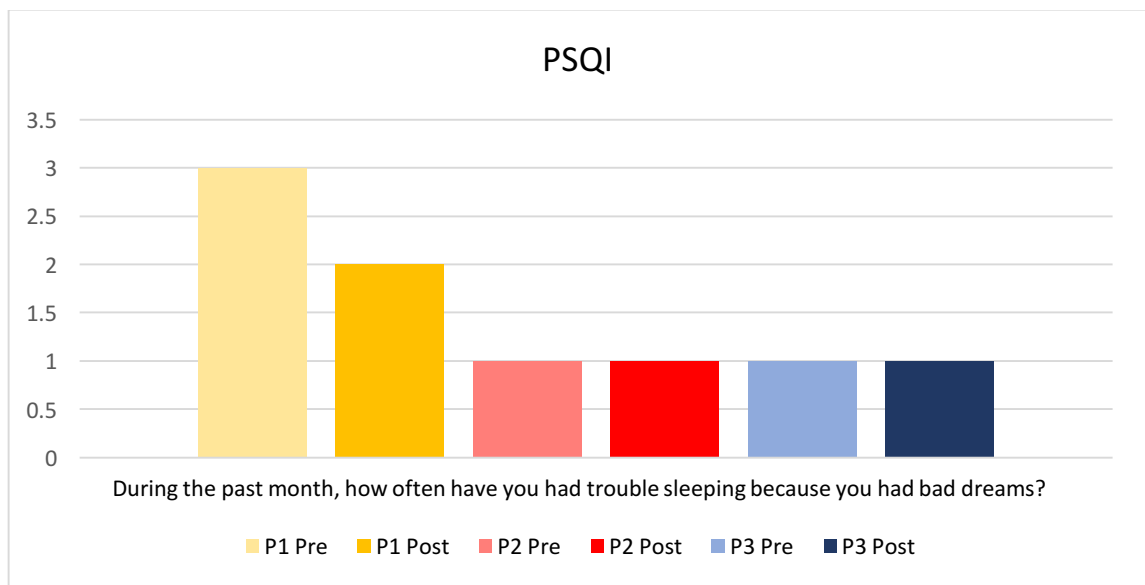
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



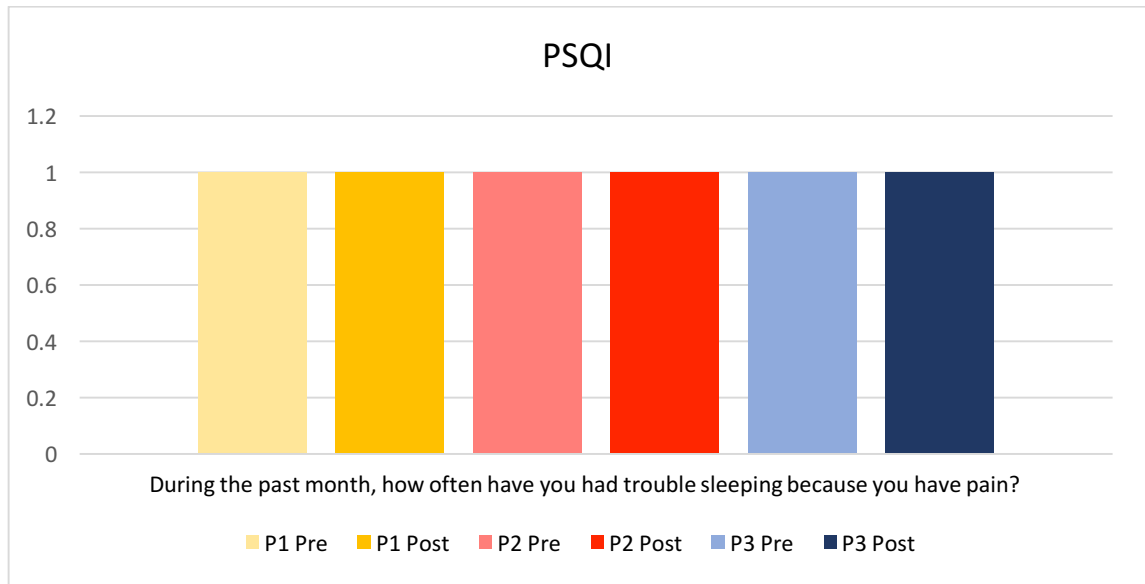
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



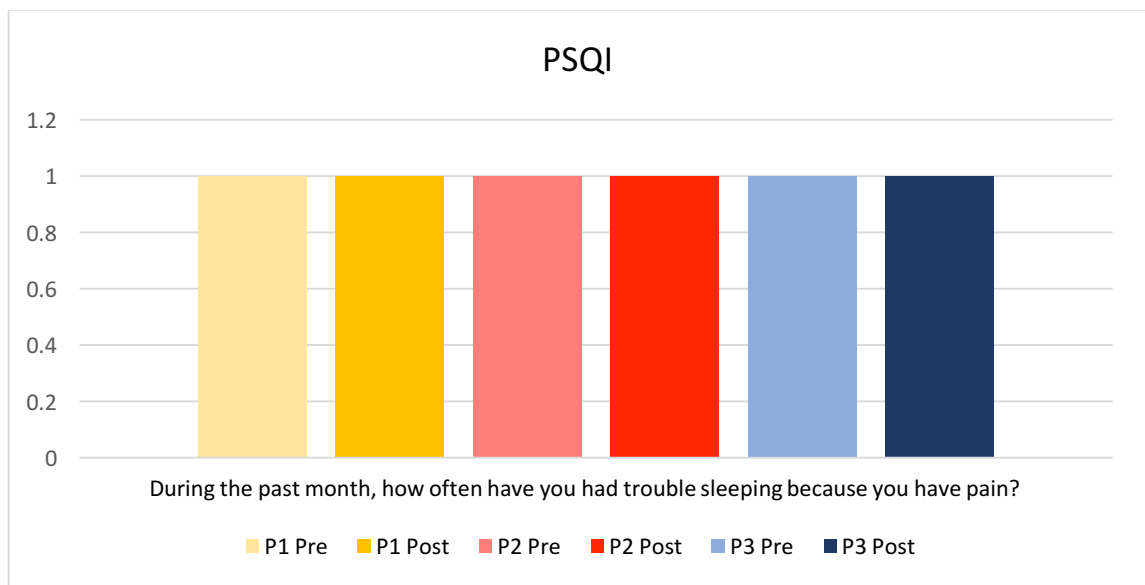
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



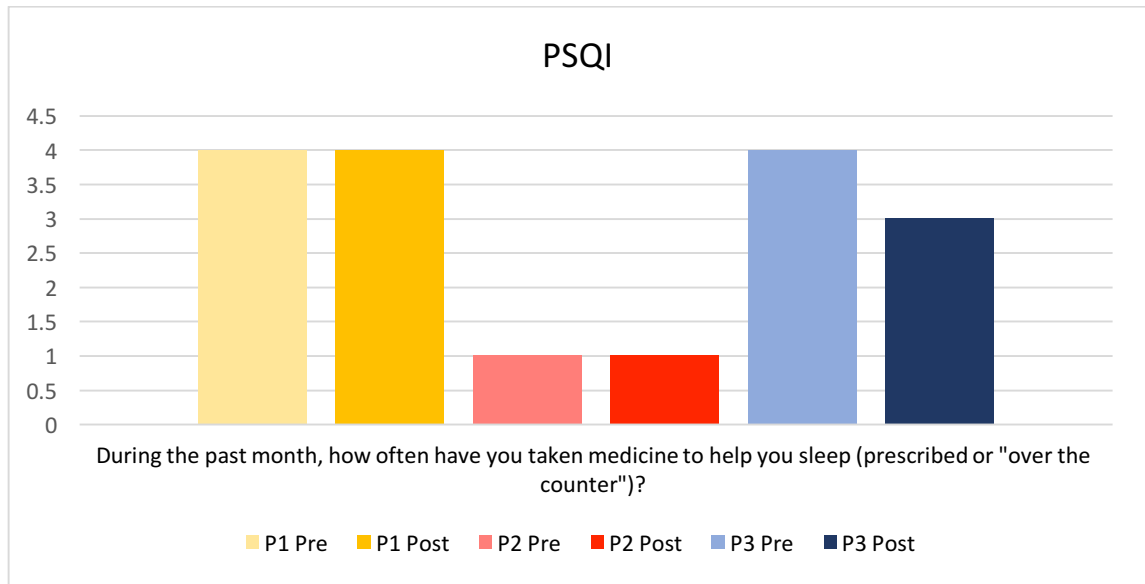
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



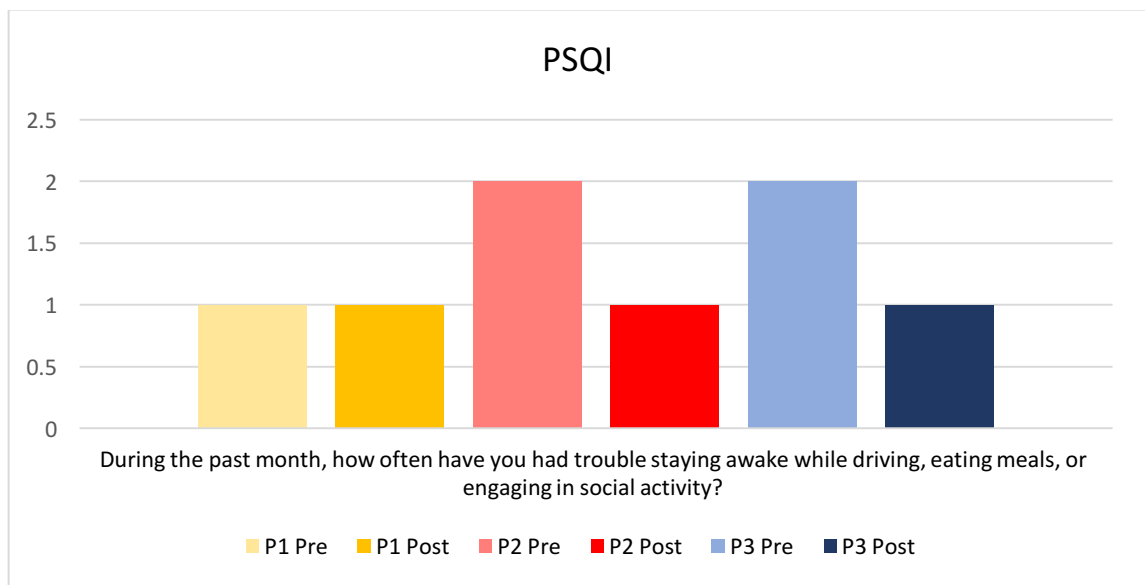
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



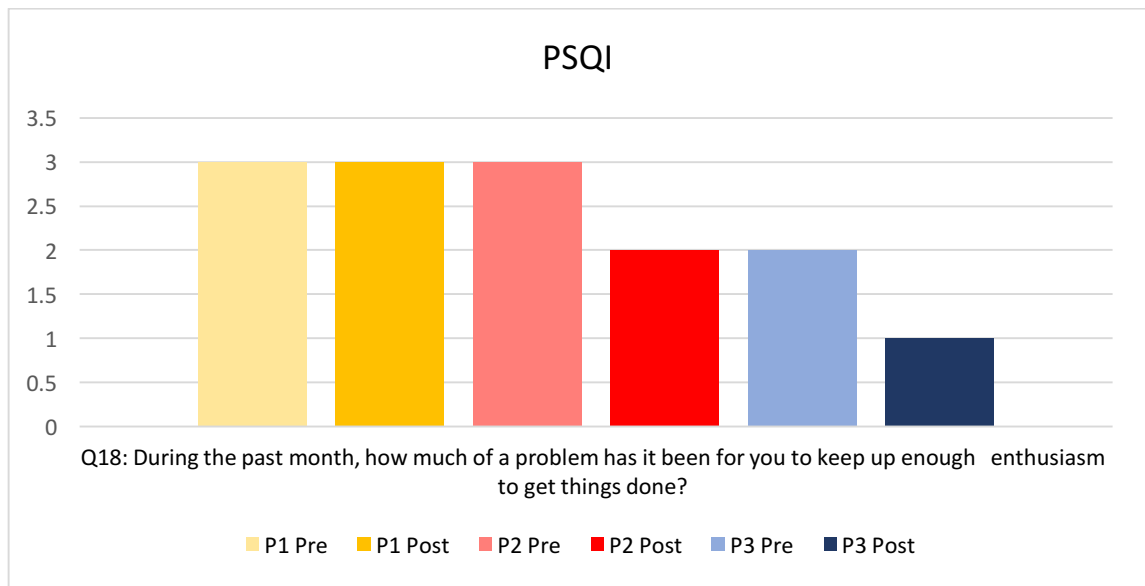
- 1- fairly bad
- 2- fairly good



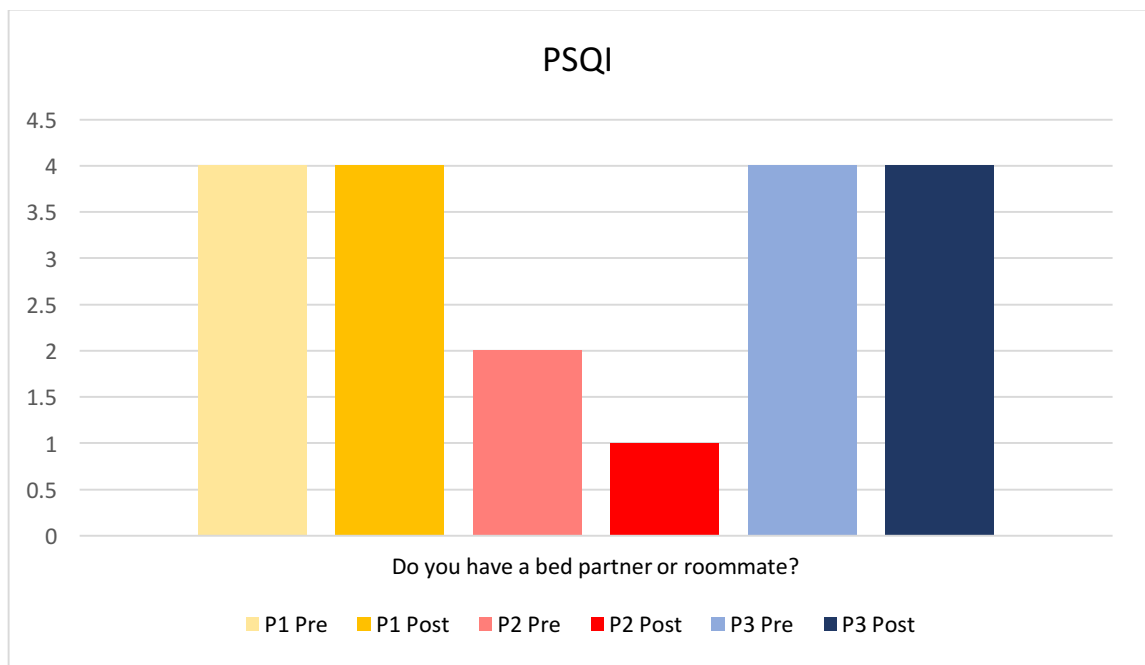
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



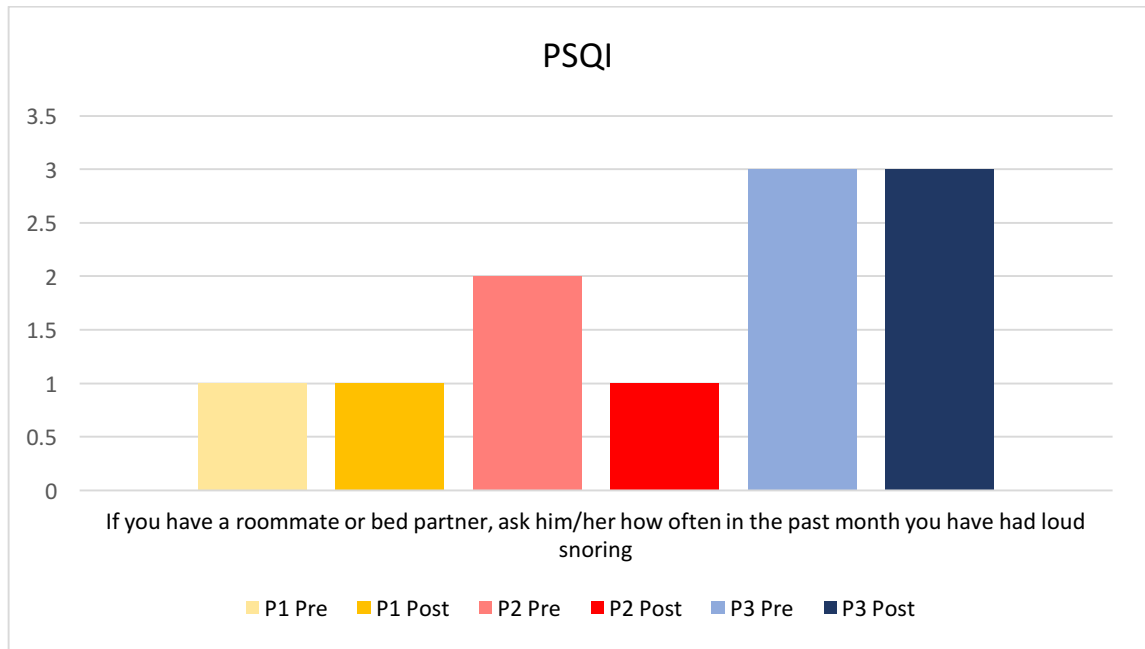
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



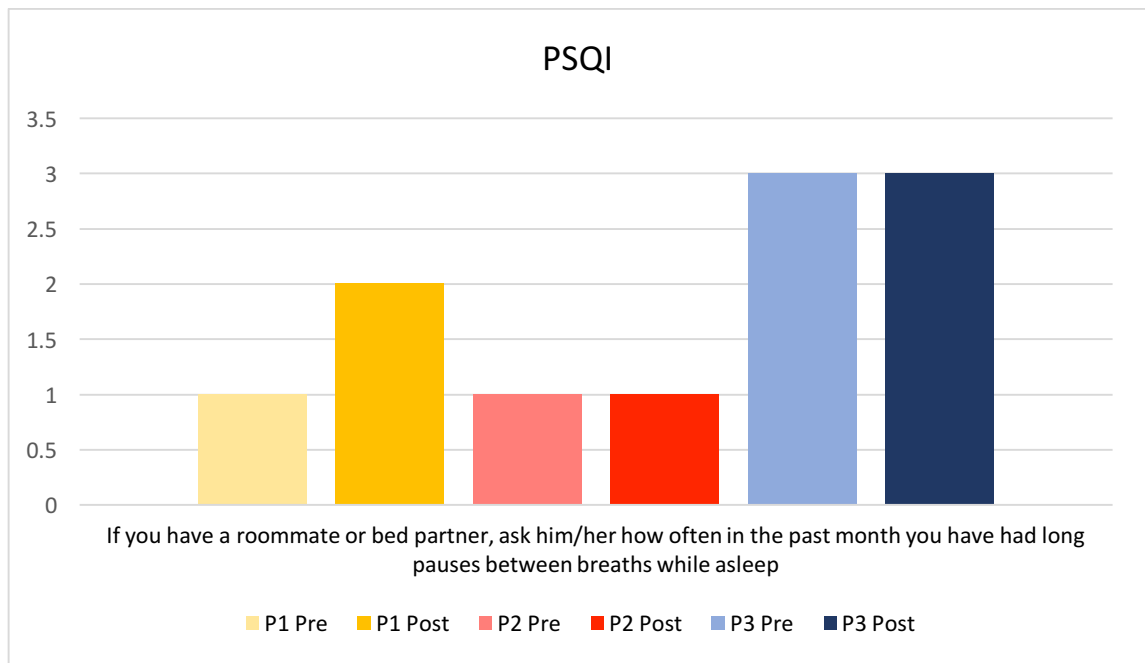
1- no problem at all
2- only a very slight problem
3- somewhat of a problem



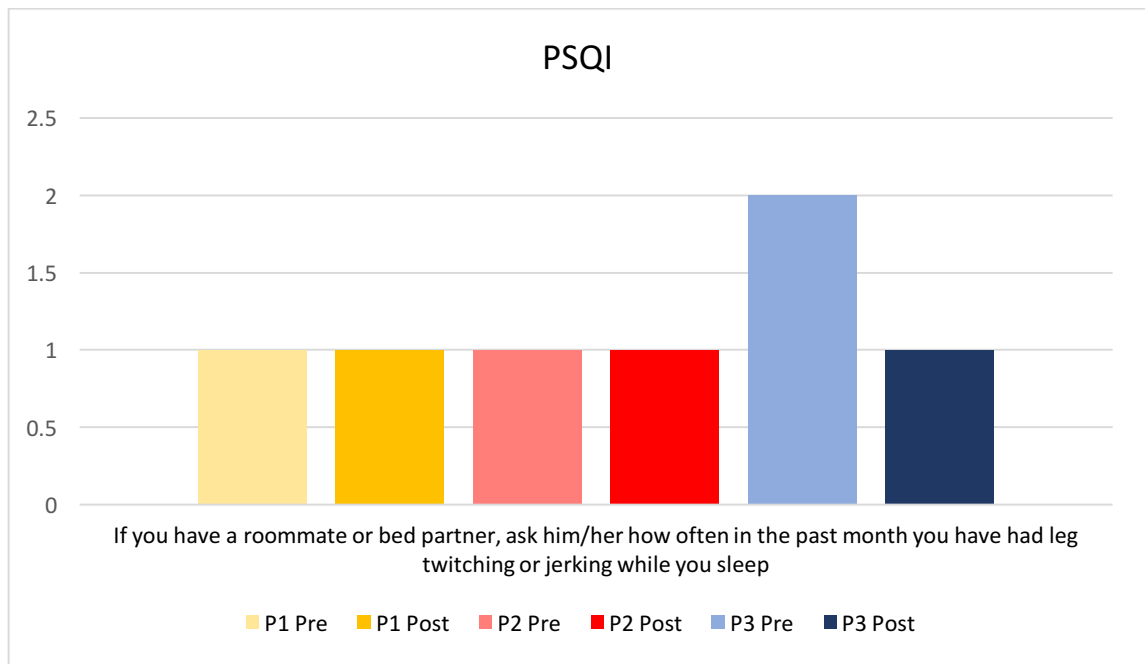
1- No bed partner or room mate
2- Partner/roommate in other room
3- Partner in same room, but not same bed
4- Partner in same bed



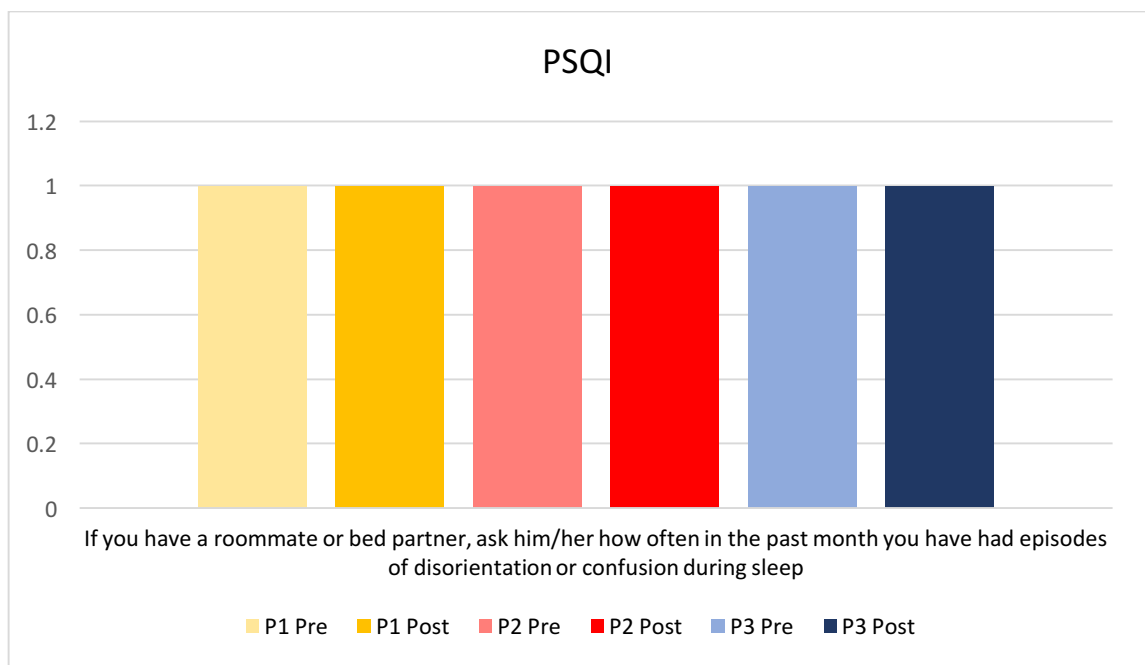
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



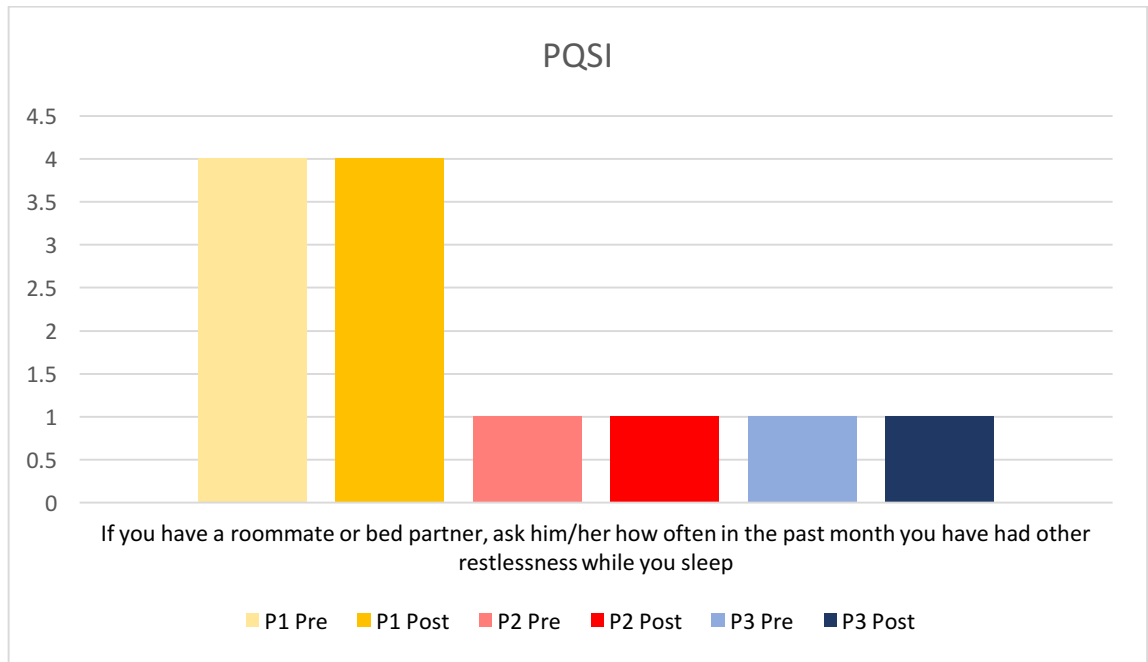
- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week

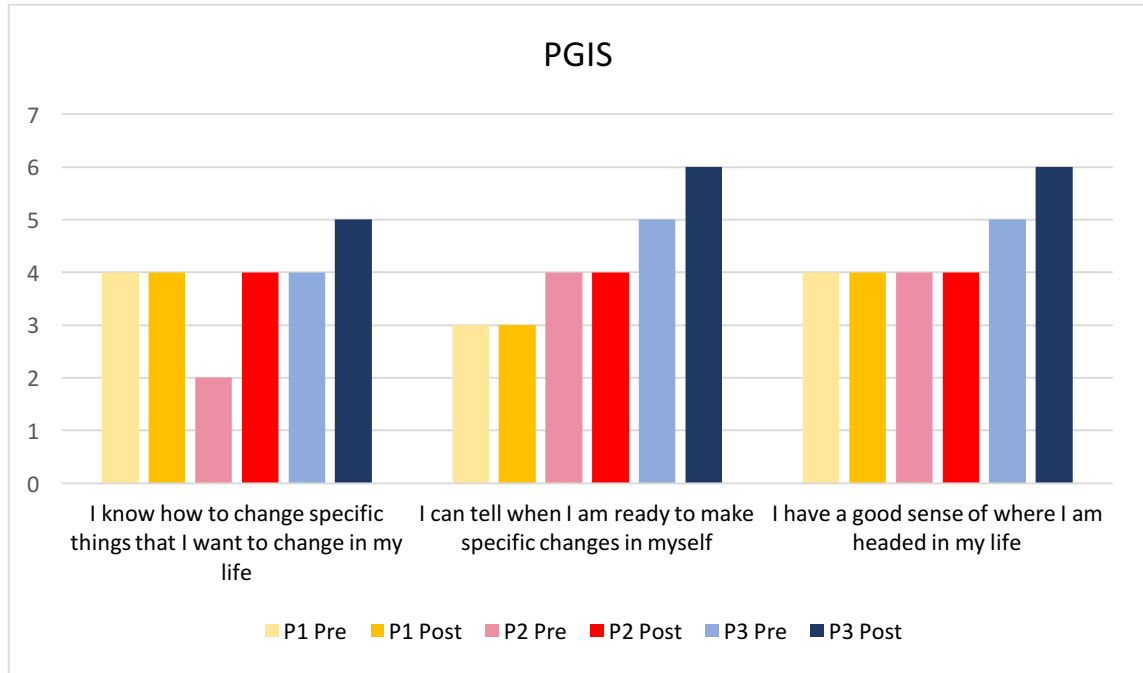


- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week



- 1- not during the past month
- 2- less than once a week
- 3- once or twice a week
- 4- three or more times a week

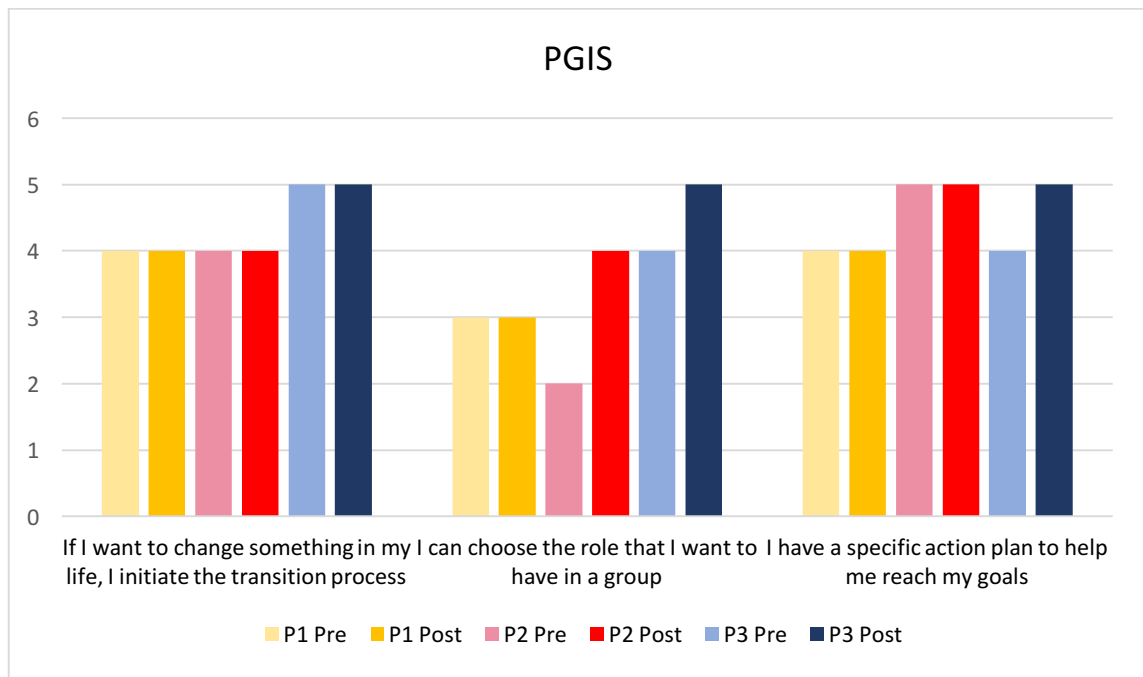
Appendix L

The Personal Growth Initiative Scale Pre/Post Assessment Data

1- Definitely disagree
4- Somewhat agree

2- Mostly disagree
5- Mostly agree

3- Somewhat disagree
6- Definitely agree



1- Definitely disagree
4- Somewhat agree

2- Mostly disagree
5- Mostly agree

3- Somewhat disagree
6- Definitely agree

