**Internet-based cognitive behavioral therapy positively influences the social representations of tinnitus**

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**Abstract**

**Introduction:** The aim of the current study was to examine changes in social representations of tinnitus as a result of Internet-based cognitive behavioral therapy (ICBT).

**Methods:** The study used a pre-post design. A total of 106 individuals with tinnitus (mean age 57.5 years) completed a series of questionnaires before and after undertaking ICBT. A free association task was used to collect data. The data were analyzed using qualitative content analysis and also series of quantitative analyses using the IraMuTeQ software.

**Results:** The most common categories reported by individuals with tinnitus before and after ICBT intervention varied. Examination of valance showed that the negative associations decreased from 81% to 56% and the positive and neutral connotations were increased after the intervention. Examination of the frequency of responses and similarities analysis did not reveal major changes following the intervention. However, the prototypical analysis, which considers both frequency of categories as well as their ranking, showed that more positive and less negative categories appeared in the central zone and in the first periphery following the ICBT intervention.

**Discussion:** The study suggests that ICBT reduces the negativity associated with tinnitus and increases positivity. The results are consistent with what is seen in patient-reported outcome measures in clinical trials.

**Key Words**

Tinnitus, Social representations, Attitude, Free association, Intervention outcome

1. **Introduction**

Tinnitus is a frequently occurring condition in adults with prevalence of 10-15% in the general population (e.g., McCormack et al, 2016; Shargorodsky, et al., 2010). There is however no known cure for tinnitus. While there is a large variety of interventions available (Langguth, 2015), Cognitive Behavioral Therapy (CBT) has the most consistent research evidence for the management of tinnitus (for review see – Fuller et al., 2020). Due to lack of trained professionals to deliver the CBT, it was converted to an internet-based self-help format requiring minimal input from trained professionals (Andersson et al., 2002). Since the first study in Sweden, several controlled studies have been performed across the globe and the efficacy and effectiveness of ICBT for tinnitus management has been established (for review see – Beukes et al., 2019).

The outcome of interventions in clinical trials are generally measures using standardized patient-reported outcome measures (PROMs). For example, measures of tinnitus distress such as Tinnitus Functional Index (TFI; Meikle et al., 2012) or the Tinnitus Handicap Inventory (THI; Newman et al., 1996) are often used as the primary outcome measures. The key benefit of using the PROMs is that they are standardized so that the results between the individuals as well as between time-points can be easily compared. However, one of the key limitations of this approach is that not all items in the structured and standardized measures are applicable to all individuals. Some individuals may not have the problems addressed in some questions but are still forced to answer these questions. Moreover, what individual patients think are most important when it comes to their treatment outcomes vary (Rademaker et al., 2021). Another way of measuring outcomes of an intervention is to use open-ended questions which may elicit more relevant responses. However, the main challenge in this approach is to analyze the open text data and compare them. In the past such data were generally analyzed using qualitative analysis techniques such as content analysis or thematic analysis. In a recent study, we used an automated linguistic analysis approach to analyze the response to open-ended questions and compared that with the PROMs (Manchaiah et al., 2021). The study results suggested that open-ended questions provide some additional information that was not captured in the PROMs and could be complement standard PROMs. Such an approach may serve as a new way to measure outcomes in clinical trials.

The use of open-ended question is not tied to any specific theoretical framework. The question is posed in such a way that no prompt is given. For example, make a list of difficulties, which you have as a result of your tinnitus. Write down as many as you can think of. Moreover, some respondents may provide responses that are more socially desirable which may not reflect their attitudes or behaviors (Edwards, 1957). In recent years, the use of Social Representations Theory (SRT) has become increasingly popular in research on health and disability (Manchaiah et al., 2019). Several recent studies have applied SRT in audiology to examine representations in the general population as well as people with hearing loss about hearing loss and hearing aids (Chundu et al., 2020, 2021; Manchaiah et al., 2015a, 2015b, 2023). Moreover, in our recent study we applied this approach to examine the social representations of ‘tinnitus’ and ‘health’ among individuals with tinnitus (n=399) who are seeking online psychological interventions for bothersome tinnitus (Manchaiah et al., 2023). The most commonly occurring categories for tinnitus included: descriptions of tinnitus (18%), annoying (13.5%), persistent (8%), distracting (5%), and distressing (4%). The most commonly occurring categories for health included: content (12%), conditions (8%), active (7%), take control (6%), overweight (5%), and distressing (4%). Moreover, the responses to tinnitus had predominantly negative connotations (i.e., 76.9%) whereas a high percentage of responses towards their health was related to positive connotations (i.e., 46.4%). In this study, we used a free association task in which participants are prompted to think about tinnitus and come up with four to five words or phrases that came to their mind spontaneously. They were also asked to consider each word and rate each expression with positive, negative or neutral valance (or connotation). Considering the spontaneous nature of this task, it is assumed that the method helps examine semantic universe of participants and minimize social desirability bias (Hovardas & Korfiatis, 2006). This approach could potentially solve the problem of just using open-ended questions without the theoretical perspective as well as help overcome the social desirability bias to some degree.

Social representations are generally referred to as “social psychological approach articulating individual thinking and feeling with collective interaction and communication” (Wagner, 2020). Unlike attitude theories, SRT helps understand the collective attitude considering their social environment and norms (Bidjari, 2011). According to Moscovici, social representations are: (i) “a system of values, ideas, metaphors, beliefs, and practices” that help to create a “social order” and allows the members of the society to have a better understanding of the community they live in, and (ii) allows for exchange of information and ideas among the members of the community regarding a particular object (Moscovici, 1988). It is believed that social representations are hard to change. Without a strong intervention it may take several decades for noticing social representations. However, strong influence of media and/or intervention can change the social representation of an object in a specific group (Jodelet, 2012). However, we are not aware of any studies that have examined the change in social representations about health or disability following an intervention. If proven effective, this approach could add to the medical research methodology especially for the way in which we measure outcomes in clinical trials.

We have reported social representations of tinnitus before the ICBT in our recent publications (Beukes et al., 2022; Manchaiah et al., 2023). The aim of the current study was to examine changes in social representation of tinnitus among individuals with tinnitus following undertaking ICBT.

1. **Methods**

**2.1 Study Design**

The study used a pre-post design nested in three separate clinical trials of ICBT for tinnitus (Beukes et al., 2021a; 2021b, 2021c). Ethical approval (IRB-FY17-209 and IRB-FY20-200-1) was obtained from the Institutional Review Board at Lamar University, Beaumont, Texas, United States.

**2.2 Data Collection**

All the data were collected online using the ePlatform using a series of structured as well as open-ended questionnaires before and after the intervention. The structured outcome measures included the TFI (Meikle et al., 2012), as a measure of tinnitus distress, Generalized Anxiety Disorder – 7 (GAD7; Spitzer et al., 2006) as a measure of anxiety, Patient Health Questionnaire-9 (PHQ9; Kroenke et al., 2001) as a measure of depression, Insomnia Severity Index (ISI) as a measure of insomnia, and the EQ-5D-5L Visual Analogue Scale (VAS) as a measure of health-related quality of life. The social representation data were gathered using the free association task as used in several previous studies (Chundu et al., 2020, 2021; Germundsson et al., 2018; Manchaiah et al., 2015a, 2015b, 2017a, 2017b, 2019, 2023). This was done in two stages. First, participants were asked to think of 5 words or phrases that comes to their mind spontaneously when they think about tinnitus and type them in the order of importance (i.e., most important word/phrase in the beginning). In the second stage, participants were asked to consider each of the word or phrase and determine if they had positive, neutral or negative valance (or connotation).

**2.3 Participants**

Of the 311 participants who received ICBT, 106 participants (34.1% with mean age 57.5 years) provided both pre- and post-data in the current study. The participants were recruited using a verity of recruitment methods including the advertising through a television broadcast, promoting the study via tinnitus support groups in Texas and the American Tinnitus Association, and contracting the company TrialFacts (Beukes et al., 2021b, 2021c). Tables 1 and 2 provide the demographic as well as clinical variables for the study participants. The mean age and duration of tinnitus was 57.7 years and 13.3 years, respectively. Of the participants 60% were female and 65% of had obtained a university degree. The mean tinnitus severity measured using the Tinnitus Functional Index (TFI) was 53/100 before undertaking the intervention and 26.2 after completing the 8-week ICBT intervention. Changes were noted in terms of anxiety, depression, insomnia, and quality of life postintervention as seen in Table 2.

**<Table 1 here>**

**<Table 2 here>**

**2.4 Data Analysis**

The data were analyzed using a series of qualitative (content analysis) and quantitative (i.e., Chi square analysis, similarities analysis, and prototypical analysis) analyses which are commonly used in previous social representation studies in the area of health and disability (Chundu et al., 2020, 2021; Germundsson et al., 2018; Manchaiah et al., 2015a, 2015b, 2017a, 2017b, 2019, 2023). The quantitative analyses were conducted using the text analysis software IraMuTeQ. Generally, multiple analyses methods are used in social representation studies to have multidimensional understanding of the data (Manchaiah et al., 2019).

***Content analysis:*** The qualitative content analysis as described by Graneheim & Lundman (2004) was used to analyze the response to free-association task. This involved the grouping of similar words (e.g., annoying, irritation, nuisance) into a category (e.g., annoying).

***Chi square analysis:*** The frequency of positive, neutral, and negative valance for the words/phrases were counted and the associations between valance and pre-post responses were analysed using the 3 x 2 Chi square analysis (3 x 2).

***Similarities analysis:*** This analysis is also referred to as co-occurrence analysis that involves examining the most frequent categories as well as their interrelation to each other. The analysis conducted using the IraMuTeQ software and is based on the mathematical graph theory (Flament, 1965). The software output results in a two-dimensional with nodes and connections to each other nodes. The nodes in the graph represent the categories. The size of the nodes represents its frequency of occurrence (i.e., larger the node higher frequency of the category). The lines in between the nodes show the interconnections (links) between the categories. The thickness of lines represents the strength of connection. This analysis considers the categories and its associations but fails to consider the ranking of each word/phrase listed.

***Prototypical analysis:*** Unlike the similarities analysis, the prototypical analysis considers both frequency as well as ranking (i.e., importance of ratings) of words/phrases for free association task. This analysis helps understand both the content as well as structure of social representation and is considered as most important among all the analyses discussed above. The output of prototypical analysis are presented in 2 x 2 matrix as indicated in Table 3 (Abric, 1994). The four zones include central zone, first peripheral zone, second peripheral zone and contrasted elements are in its order of important. In other words, the categories in the central zone are considered as the core social representations and are very stable (Abric, 2003). They are created from shared practices and memories of a particular community. On the other hand, the peripheral elements are considered less stable as they vary across people and environments. The contrasted elements highlight sub-group of populations that has a different priority than the general (majority) of the population (Abric, 2003).

**<Table 3 here>**

1. **Results**

**3.1 Content Analysis**

The key categories that emerged from content analysis of responses to the free association task about tinnitus before and after ICBT are provided in Table 4. The most common categories pre-intervention were: description of tinnitus (15.7%), annoying (15%), persistent (7.8%), frustrating (4.7%), hearing difficulties (4.7%), distressing (4.5%), and distracting (4.1%). The most frequently occurring categories following the ICBT were: description of tinnitus (21%), annoying (11.7%), persistent (10.7%), accepting (6.9%), manageable (4%), and distracting (4%). Several categories that were present in pre-intervention were absent in post-intervention responses (i.e., calming, determination, disturbing, life. Also, several new categories were emerged during post-intervention (i.e., changing condition, hearing health, manageable, mental wellness, and take control).

**<Table 4 here>**

**3.2 Connotations Associated with Free Association Responses**

Figure 1 shows the positive, neutral, and negative valance of free association task responses about tinnitus before or after the ICBT. The negative associations decreased from 81% to 56% after the intervention. Also, the positive and neutral connotations were increased from 8% and 11% to 22% and 22%, respectively after the intervention. The Chi square analysis showed a significant association (Chi square value = 77.3; *p* < .00001) between connotations and the timing of responses (i.e., pre vs post intervention).

**<Figure 1 here>**

**3.3 Similarities Analysis**

The results of similarities analysis of responses to social representation before and after the intervention are presented in Figures 2 and 3, respectively. Both pre- and post-intervention similarities have three common dominant nodes which include the categories description of tinnitus, annoying, and persistent. However, the post-intervention similarities analysis has a new node representing the category accepting which is linked to categories such as hoping and coping strategies.

**<Figure 2 here>**

**<Figure 3 here>**

**3.4 Prototypical Analysis**

In earlier sections we discussed the content analysis in terms of key categories as well as its frequency. The similarities analysis considers both frequency of categories as well as its interconnectedness. However, the prototypical analysis presented in these sections considers both frequency as well as ranking. Tables 5 and 6 presents the results of prototypical analysis before and after the intervention, respectively. The central zone of both pre- and post-intervention includes categories description of tinnitus, annoying, and persistent. The categories frustrating, bothersome and debilitating that were present in pre-intervention were absent at post-intervention. The pre-intervention categories in first periphery were generally negative (i.e., hearing difficulties, distressing, distracting, helplessness, and exhausting). However, more positive categories (i.e., manageable, distracting, mental wellness, take control) were emerged in first periphery of post-intervention. Some changes were also noted in second periphery and contrasted elements in post-intervention when compared to pre-intervention results.

**<Table 5 here>**

**<Table 6 here>**

1. **Discussion**

The current study examined the change in social representations of tinnitus following ICBT. This study used a new theoretical perspective as well as a methodology to examine the outcomes of ICBT. The data were analyzed using various approaches used in SRT and the key findings in relations to broader tinnitus literature are discussed below.

Examining the categories and frequencies (see Table 4) highlight some commonalities and differences in responses during pre- and post-intervention. The description of tinnitus increased post-intervention from 15.7% to 21%. This could be related to the focus of the intervention regarding accepting the tinnitus, being able to focus on it and listen to the sound (Beukes et al., 2020). Tinnitus was less commonly annoying (15% before and 11.7% after), however described as persistent more frequently (7.8% before and 10.7% after). This may again reflect participants indicating acceptance despite the nature of the tinnitus. It was encouraging that the most frequently occurring categories pre-intervention frustrating (4.7%), hearing difficulties (4.7%), distressing (4.5%), and distracting (4.1%), were less reported frequently at post-intervention. Also, categories accepting (6.9%), manageable (4%), and distracting (4%) were the most frequently reported at post-intervention. This reflects the effective nature of the intervention in achieving its goal in helping people accept and better manage their tinnitus (Beukes et al., 2021d). Moreover, examination of similarities highlighted three common nodes (i.e., description of tinnitus, annoying, and persistent) during both pre- and post-intervention whereas the node accepting appeared in the post-intervention similarities analysis. These two analyses did not reveal any major changes in the kind of things that comes to mind when people think about their tinnitus and are consistent with main problems reported by individuals with tinnitus (Beukes et al., 2018a; Manchaiah et al., 2018; Watt et al., 2018).

Clinical studies as well as the examination of posts of individuals with tinnitus online have shown that they have negative emotions (Handscomb et al., 2017; Kimball et al., 2019). On the contrary, some studies have also revealed that some individuals with tinnitus report positive experiences (Beukes et al., 2018b; Manchaiah et al., 2015b). As there is no cure for tinnitus, the key question when planning rehabilitation is how to reduce negativity and increase positivity with acceptance and coping strategies to live well with tinnitus. Examination of valence associated with free association task in the current study suggested that negative associations decreased from 81% to 56% and the positive and neutral connotations increased after the intervention. Moreover, when looking at the prototypical analysis that considers both frequency of categories as well as its ranking showed that negative categories (i.e., frustrating, bothersome, debilitating) were not part of the central zone and more positive categories were added to first periphery (i.e., manageable, distracting, mental wellness, take control) following the intervention. These phenomenon of reducing negative thinking and strengthening positive thinking is important component of effective rehabilitation (Handscomb et al., 2017), echoing the results of clinical trials (Beukes et al., 2021a; 2021b, 2021c). Overall, the current study demonstrates that the ICBT may not change the type of things that comes to mind but rather influences the way in which they think about these aspects (i.e., more positive attitude towards them).

The study provides a new theoretical and methodological framework for examining treatment outcomes. However, it is noteworthy that the results can only be analyzed on a group level and not at the individual level (Bidjari, 2011). The change in social representations does not mean any change in biological status of the individual. Rather the change is likely to have occurred in terms how the group collectively thinks and feels about their condition influencing their values and norms. This is precisely what the psychological approaches such as ICBT intends to achieve by changing the thought patterns and eventually behavior. In this context, the current study - which used the free association task that elicits the free-flowing thoughts - is likely to give clearer understanding of the changes in thought patterns as a result of intervention (Hovardas & Korfiatis, 2006). Overall, the study as well as another recent study (Manchaiah et al., 2021) suggest that open-ended questions can supplement the PROMs when measuring outcomes of clinical trials offering methodological triangulation.

**4.1 Study Limitations and Future Directions**

The study is to our knowledge the first to apply SRT and the free association task to examine the outcomes of health intervention. ICBT is not a preferred management options for all individuals with tinnitus. As a results, only those who are looking for psychological interventions were included resulting in sampling bias. In addition, only one third of the study participants who started the clinical trial completed the outcome measures and provided the data for free association task. Therefore, the results should be viewed as preliminary. The study examined changes in social representations as a result of 8-week intense intervention on a small population. Future studies should aim to examine the effect of brief public health interventions on social representations in large populations. Moreover, the SRT is not without controversies (Voelklein & Howarth, 2005) and is likely to supplement the existing disabilities theories rather than replacing them (Manchaiah et al., 2019).

**Data Availability Statement**

The data that support the findings of this study are openly available in Figshare at <http://doi.org/10.6084/m9.figshare.15062733>

**Ethics Statement**

Ethical approval (IRB-FY17-209 and IRB-FY20-200-1) was obtained from the Institutional Review Board at Lamar University, Beaumont, Texas, United States.

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**Author Contributions**

VM, PR, GA and EWB conceptualized the study. VM and EWB collected data. VM, SC and PR performed analyses. VM wrote the draft manuscript. All authors contributed to the manuscript and agree the final content.

**Conflict of Interest**

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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**Figures**

**Figure 1: Percentages of associations ranked positive, neutral and negative for responses to free association task about tinnitus pre- and post-intervention**

**Figure 2: Similarities analysis for tinnitus responses pre treatment**

A diagram of a network

Description automatically generated

**Figure 3: Similarities analysis for tinnitus responses post treatment**

A network diagram of a network

Description automatically generated with medium confidence

**Tables**

**Table 1: Demographic details (n=106)**

|  |  |  |
| --- | --- | --- |
| **Variable** | **N (%)** | **Mean (SD); Range** |
| Age (in years) |  | 57.7 (11.9); 23 to 84 |
| Tinnitus duration (in years) |  | 13.3 (16.0); 0.08 to 70 |
| Gender   * Female * Male | 64 (60.4%)  42 (39.6%) |  |
| Education   * High school * Some college but not a degree * A university degree | 10 (9.4%)  27 (25.5%)  69 (65.1%) |  |
| Work status   * Entry level or unskilled * Skilled or professional work * Retired * Not working | 2 (1.9%)  63 (59.4%)  36 (34%)  5 (4.7%) |  |

**Table 2: Demographic details of the outcome measures pre and post treatment. Lower scores indicate improve for all outcomes except for quality of life, where higher scores indicate improvements.**

|  |  |  |
| --- | --- | --- |
| **Clinical variables** | **Pre-intervention**  **Mean (SD), Range** | **Post-intervention**  **Mean (SD), Range** |
| Tinnitus severity (Tinnitus Functional Index; TFI) | 53 (20.7); 7.2 to 95.6 | 26.2 (19.7); 0.4 to 100 |
| Anxiety (Generalized Anxiety Disorder-7; GAD-7) | 6.9 (5.2); 0 to 20 | 3.9 (4.5); 0 to 21 |
| Depression (Patient Health Questionnaire-9; PHQ-9) | 7.0 (5.4); 0 to 24 | 3.9 (4.2); 0 to 27 |
| Insomnia (Insomnia Severity Index; ISI) | 11.0 (6.0); 1 to 27 | 6.7 (5.4); 0 to 28 |
| Quality of life (EQ-5D-5L VAS) | 78.0 (14.1) 30 to 100 | 81 (13); 20 to 99 |

**Table 3:** **Matrix of hierarchical structure of associations showing the four zones**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Rank** | |
| **Low** | **High** |
| **Frequency** | **High** | **Central nucleus zone:** Most frequently occurring and most important based on rank | **First peripheral zone:** Most frequently occurring categories but less important in terms of its ranking |
| **Low** | **Contrasted elements:** Low frequency categories but rated as most important in terms of its rankings | **Second peripheral zone:** Less frequent as well as less important in terms of ranking |

**Table 4: Key categories identified by content analysis for tinnitus pre- and post-intervention**

|  |  |  |
| --- | --- | --- |
| **Category (examples)** | **Frequency of occurrence in Percentage** | |
| **Pre-intervention** | **Post-intervention** |
| Accepting (e.g., just deal with it, it is what it is, don’t think much) | 3.3 | 6.9 |
| Angering (e.g., anger, rage, hate) | 1.4 | 0.8 |
| Annoying (e.g., annoying, irritation, nuisance) | 15 | 11.7 |
| Bothersome (e.g., bothersome, bothered, bothers me) | 3.3 | 1.8 |
| Calming (e.g., relax, relief, prayer) | 0.4 |  |
| Challenging (e.g., challenge, difficult, a struggle) | 1.8 | 1.8 |
| Conditions (e.g., lesion, brain health issue, condition) |  | 1.2 |
| Coping strategies (e.g., cope with it, sing a song, don’t think about it) | 0.6 | 1.8 |
| Debilitating (e.g., disability, illness, handicap, impairing) | 2.7 | 2.2 |
| Depressing (e.g., depression, depressing, suicide) | 1.2 | 1.0 |
| A term describing the tinnitus (e.g., ringing, high-pitched, noise, buzz, loud, piercing) | 15.7 | 21.0 |
| Determination (e.g., cope, beatable with right mindset, I can overcome this) | 1.2 |  |
| Distracting (e.g., distraction, hard to concentrate, focusing | 4.1 | 4.0 |
| Distressing (e.g., overwhelming, anxiety, panic) | 4.5 | 2.2 |
| Disturbing (e.g., noise in my head, noise really bad, screaming) | 0.4 |  |
| Exhausting (e.g., exhaustion, wearing, tiresome) | 2.7 | 2.2 |
| Frightening (e.g., worry some, claustrophobic, scary) | 2.1 | 0.6 |
| Frustrating (e.g., frustrated, frustrating, maddening) | 4.7 | 2.4 |
| Hearing difficulties (e.g., can’t hear, hard to hear, repeat) | 4.7 | 1.8 |
| Hearing health (e.g., ear health, ears, hearing) |  | 0.6 |
| Helplessness (e.g., helpless, no cure, incurable) | 2.9 | 1.0 |
| Hopeful (e.g., hope, coping, find improvement) | 1.2 | 1.2 |
| Horrible (e.g., crazy, horror, horrible disease) | 2.1 | 0.8 |
| Insomnia (e.g., lack of sleep, sleep less, no sleep) | 1.4 | 0.6 |
| Interfering (e.g., interfering, interruption, interference) | 1.6 | 0.8 |
| Isolating (e.g., isolated, no one understands, inhibitive) | 1.6 | 0.6 |
| Life changing (e.g., life changer, life ruined, reduced quality of life) | 1.2 |  |
| Loss of quiet (e.g., loss of silence, lack of peace, no quiet) | 1.0 | 1.4 |
| Manageable (e.g., bearable, manageable, beatable) |  | 4.0 |
| Mental wellness (e.g., relax, relaxation, breathing) |  | 3.0 |
| Miserable (e.g., sad, misery, bummer) | 1.6 | 1.0 |
| Natural process (e.g., aging, old age, old) | 1.2 | 0.4 |
| Need to stop (e.g., please stop, make it go away, when will it go away) | 0.4 | 0.8 |
| Persistent (e.g., constant, never ending, persistent) | 7.8 | 10.7 |
| Regret (e.g., regret not protecting hearing, poor choices, lesson learned) | 0.8 | 0.4 |
| Take control (e.g., in control of my emotions, it does not control me, proactive instead reactive) |  | 2.8 |
| Tormenting (e.g., torture, tormenting, a living hell) | 1.2 | 0.2 |
| Treatment (e.g., hearing aids, ear surgery, therapies that help | 1.0 | 1.2 |
| Unbearable (e.g., exasperating, unbearable, uncomfortable) | 0.8 | 1.4 |
| Uncontrollable (e.g., uncontrollable, lack of control, losing control) | 1.6 | 1.0 |
| Unfair (e.g., why me? unfair, not fair) | 0.8 | 0.8 |
| Unintruding (e.g., background noise masking, masked, in the background) | 0.8 | 1.6 |

**Table 5: Prototypical analysis of tinnitus responses pre-intervention**

|  |  |
| --- | --- |
| **Central Zone**  Description of tinnitus  Annoying  Persistent  Frustrating  Bothersome  Debilitating | **First periphery**  Hearing difficulties  Distressing  Distracting  Accepting  Helplessness  Exhausting |
| **Contrasted elements**  Angering  Tormenting  Loss of quiet  Unbearable | **Second periphery**  Horrible  Frightening  Challenging  Uncontrollable  Isolating  Interfering  Miserable  Insomnia  Helpful  Depression  Determination  Natural process  Life changing  Treatment  Unintruding  Regret  Unfair  Coping strategies  Calming  Need to stop  Disturbing |

**Table 6: Prototypical analysis of tinnitus responses post-intervention**

|  |  |
| --- | --- |
| **Central Zone**  Description of tinnitus  Annoying  Persistent | **First periphery**  Accepting  Manageable  Distracting  Mental wellness  Take control |
| **Contrasted elements**  Frustrating  Hearing difficulties  Bothersome  Unbearable  Uncontrollable  Miserable  Angering  Insomnia  Regret | **Second periphery**  Distressing  Debilitating  Exhausting  Coping strategies  Challenging  Unintruding  Loss of quiet  Hopeful  Treatment  Condition  Helplessness  Depressing  Horrible  Interfering  Need to stop  Unfair  Isolating  Hearing health  Frighting  Natural process |