

# **Mind and Mend Program: A Pilot Study Combining Binaural Beats with Self-Actualization Techniques to Develop a Therapy Protocol**

## **Abstract**

**Background:** When two tones with different frequencies are presented to the left and right ears, the listener will hear only a single tone with a different amplitude and frequency. Recent studies show evidence that binaural beats can influence behavior and thinking through brainwave entrainment. Combining brain entrainment with other therapy approaches is vital in utilizing and increasing the positive impact of this neural process, and in developing a therapy protocol to address disorders like anxiety and depression.

**Primary Study Objective:** To gain a deeper understanding of the effects of brainwave entrainment combined with self-regulation procedures in order to develop a therapy protocol using binaural beats.

**Methods/Design:** Twenty participants aged between 29 to 62 years of age and showing symptoms of anxiety and depression participated in the Mind and Mend Program. They received coaching for self-regulation while listening to binaural beats. The HDRS and MDI methods were used to analyze the participants before and after the treatment..

**Intervention:** The Mind and Mend Program utilizes binaural-beat as stimuli and a coaching procedure that enhances the effects of brainwave entrainment and self-regulation.

**Results:** Statistical analysis of the HDRS and MDI evaluation showed a high success rate for the treatment of anxiety and depression. All participants showed a significant decrease in their HDRS and MDI score  $p < 0,001$ .

**Conclusion:** The combination of binaural beats for brainwave entrainment and an increase in self-regulation protocol provides an efficient therapy approach to treat anxiety and depression. More research is required to evaluate the long-term benefit of this process.

## Introduction

Not long ago, clinical bias toward treating psychiatric disorders was only based on the assertion that interventions required direct effects on the brain through medications that modulate neurotransmitters, which can show several side effects. This, however, does not work for everyone.

Because of new research and the latest treatment options, the knowledge of the brain function is now deeper, and new treatment methods, which challenge existing approaches, have been revealed. Brain entrainment, which is one of the new methods, shows a big potential in the treatment of conditions like anxiety and stress, and the improvement of cognitive functioning and behavior, by helping the mind regulate itself (1).

Brain entrainment refers to the use of rhythmic stimuli to create a brain response similar to the wave that results from synchronous electrical activity among brain areas, but which is not related to hearing. In practice, the stimuli are usually either visual or altering auditory tones.

The binaural beat was first discovered by Dove in 1939 (1) and occurs when the brain creates a third tone after altering two tones that are generated separately into the right and left ear. This third tone is an auditory illusion perceived when two different pure tone sine waves, both with frequencies lower than 1500 Hz and with less than a 40 Hz difference in between, are presented to a listener dichotically, that is one through each ear (2).

Up to now only a few practical results been recorded and showed the potential of brain entrainment. Oster was the first biophysicist who seriously investigated binaural beats in 1973 (3). He described the properties of binaural beats and, in his succeeding research, focused on the effects of brain entrainment on pain, stress meditation, memory, premenstrual syndrome, and learning abilities, among others.

All research showed that brain entrainment has an effect on the brain and can positively change the status of the patient. However, these effects are small and the discovery of a breakthrough that would substitute medicamentation is still steps away (1, 4, 5, 6).

In this study, a new method called the Mind and Mend Program ((MMP) or Processing Inner Strength Towards Actualization (PISTA) is described to utilize the former results of brain

entrainment. This approach uses stimuli like Transcranial Magnetic Stimulation (TMS), binaural beats with the PISTA sound file, rhythm, drumming, and art to address conditions like anxiety and stress, and to improve cognitive functioning and behavior. This study will focus on the use of binaural beats in the PISTA sound file only.

## **Materials and Methods**

### *Subjects*

A sample of 20 participants with varied ages was used to investigate the possible differences in the self-questioning process due to varied experiences. The same sample was also used to evaluate differences in the rate of anxiety and depression scored by Hamilton rating and Major Depression Inventory scale for depression.

All participants have been under MMP and were coached by the same therapist who previously administered the procedure. Before the therapy started, the therapist introduced the nature of PISTA to all the participants. If possible, medicamentation was stopped before the MMP session started to avoid side effects.

All therapists were trained and supported by a PISTA facilitator to ensure that the procedure was correctly administered before and during the study.

### *Neuropsychological data and data analysis*

Neuro-psychological data on anxiety and depression of each patient was collected using the Hamilton rating scale for depression HMD – 21 (HDRS) and the Major Depression Inventory - DSM-IV (MDI) (7) before and after the PISTA protocol was performed.

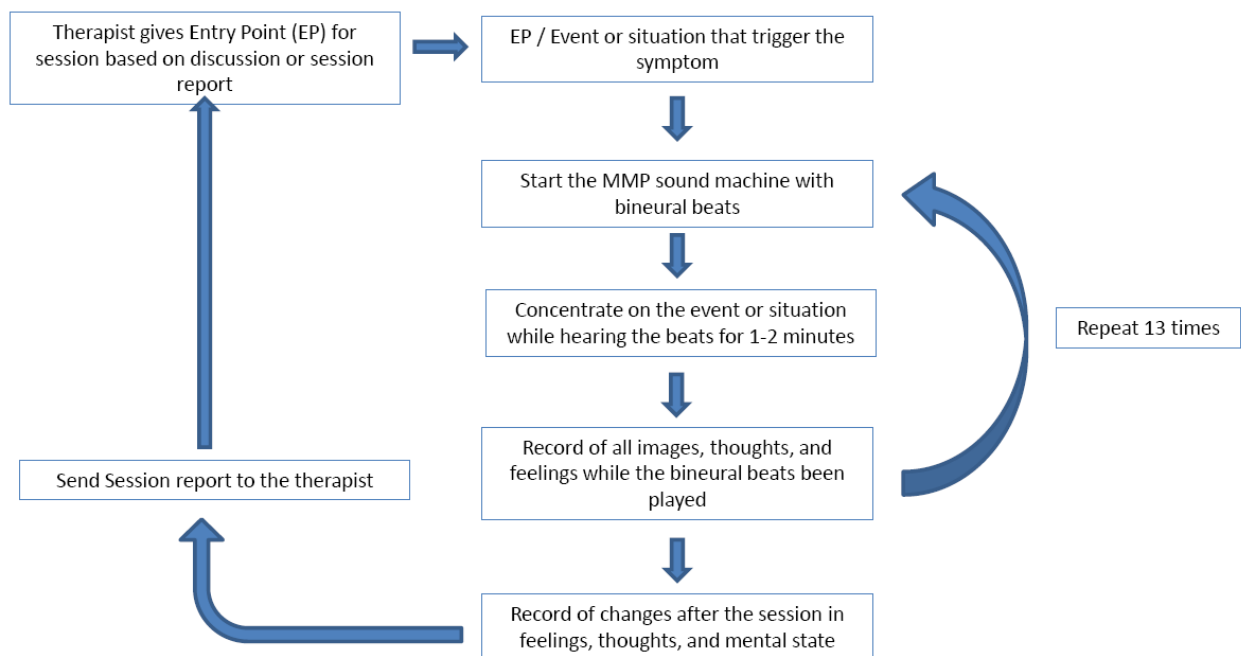
Developed in 1960, the Hamilton Depression Rating Scale (HRDS) is an interview scale that measures the severity of depression. The HDRS contains a large number of somatic symptoms and a few cognitive or affective symptoms (7). The 21 items assess psychic and somatic anxiety, depressed mood, insomnia, and loss of weight, for example. Meanwhile, the Major Depression Inventory (MDI) is a self-rating scale used for the diagnosis or measurement of depression.

Each neuropsychological test was administered, coded, scored, and analyzed using a paired t-test after testing for normality distribution. In addition, a one-tailed test was used to maximize statistical power from the study's sample.

### *MMP - PISTA protocol*

MMP uses various techniques including brainwave feedback, brain stimulation, and self-regulation procedures to optimize brain function and to help correct inefficient mental activities. It utilizes a complete system of healing that incorporates mechanical, psychological, bio-force, and biochemical aspects into its modalities.

Using the PISTA Sound Tool, MMP employs the science of brainwave entrainment to activate and deactivate the thinking system during the participants' self-questioning process. This technique is used to achieve desired brain states that facilitate self-actualization (See Figure 1).



**Figure 1 shows that MMP is a process that combines brain stimulation and self-regulation procedures.**

### *Procedure*

After introducing the nature of PISTA, HDRS, and MDI, the facilitator assigned an entry point (EP) for the first session of MMP (See Figure 1). An entry point is a thought or an image to which the client focuses on throughout the program session. The entry point can also be a scenario or a past experience which an individual continues to feel strongly about. The mental vision of the entry point may change as the sessions continue, depending on the progress of the user.

The participants were asked to focus on the assigned EP as soon as the MMP sound machine was started. After 90 seconds, the participants were asked to record all images, feelings, body reaction, and other sensations, which they visualized or experienced during the 90-second session. This procedure was repeated 13 times, after which the participants were asked to write down any observed change from their state or how they felt at the beginning of the therapy. Then, the facilitator reviewed the session notes and assigned the EP for the next set. These steps were repeated until the participant no longer showed signs of depression and anxiety. After the last session, the HDRS and MDI score was again evaluated.

#### *MMP sound file*

The MMP sound file was presented via headphones to enable each patient to concentrate and avoid distraction from the environment. Auditory stimulus consisted of 90 seconds of binaural beats, which were presented stereophonically. The participants listened to the stimuli in a dimly lit room and with their eyes closed,. They were asked to sit and listen to the sounds coming from the headphones. After being subject to the stimulus, they were asked to record all images, feelings and body reactions experienced during the process.

## **Results**

#### *Neuropsychological data analysis*

The results for the pre-evaluation and post-evaluation of the neurophysiological tests are listed in Table 1, where all of the participants showed significant decrease in the HDRS and MDI scores after doing 6 to 20 sessions  $p \leq 0,0001$ . Six of the 20 participants did not reach the HDRS cut-off score of 7 or below, but did not show symptoms of depression or anxiety. Using the MDI scale all patients showed a score below 26, which is the cut-off score of major -- that is, moderate to severe depression (See Figure 2).

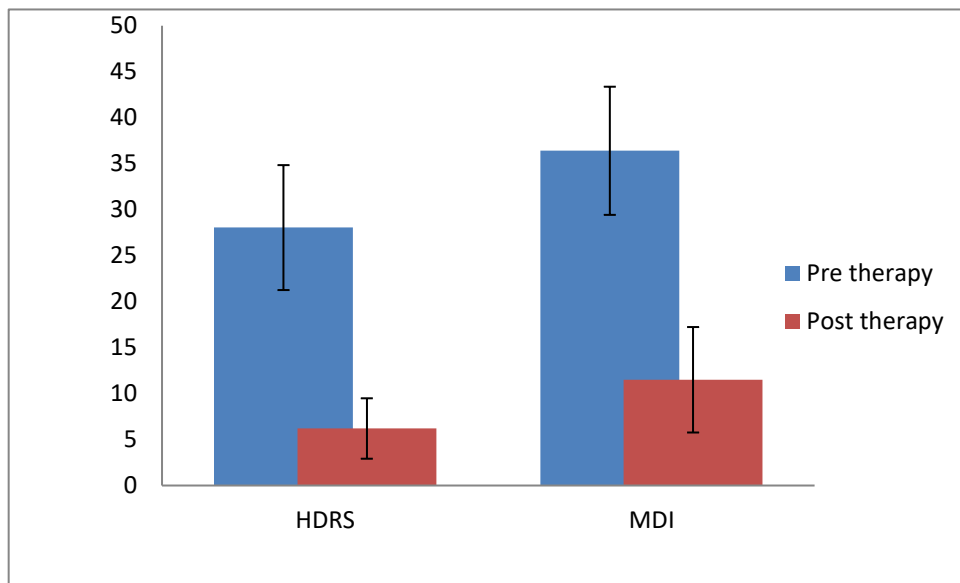


Figure 2 shows the difference of the HDRS and MDI score before and after therapy. The mean and the standard deviation are shown.

Patient	Gender	Age	Pre therapy		Post therapy		Change		Statistic		Count of Sessions	Medicamentation during PISTA
			HDRS Score	MDI Score	HDRS Score	MDI Score	HDRS Score	MDI Score	HDRS Score	MDI Score		
1	femle	29	27	35	7	12	-20	-23			12	yes
2	femle	29	19	31	2	8	-17	-23			10	yes
3	femle	30	25	29	8	7	-17	-22			12	no
4	femle	31	21	35	2	21	-19	-14			16	yes
5	femle	34	29	32	5	14	-24	-18			15	yes
6	femle	36	22	37	6	11	-16	-26			20	no
7	femle	37	40	48	10	20	-30	-28			11	yes
8	male	38	20	29	8	18	-12	-11			15	no
9	femle	40	31	41	7	6	-24	-35			11	yes
10	male	41	25	46	11	14	-14	-32			17	yes
11	femle	42	27	39	4	11	-23	-28			14	yes
12	male	42	41	42	12	12	-29	-26			10	no
13	femle	44	24	34	6	9	-18	-25			12	no
14	femle	47	31	42	3	3	-28	-39			12	yes
15	male	48	30	41	4	21	-26	-20			8	yes
16	femle	51	23	26	3	7	-20	-19			6	yes
17	male	53	26	21	5	2	-21	-19			6	no
18	femle	55	39	44	11	8	-28	-36			7	yes
19	femle	60	23	36	1	7	-22	-29			12	yes
20	femle	62	38	40	9	15	-29	-25			10	no
<b>mean</b>		42,45	28,05	36,4	6,2	11,5	-21,85	-24,9				
<b>standard deviation</b>			6,79	6,97	3,29	5,74	5,34	7,19	1,61245E-13	3,1192E-12	11,8	3,65

Table 1 shows the results of the HDRS and MDI evaluation before and after therapy.

### How age influenced the results

The participants were grouped into two – those aged from 20 to 40, and 41 to 62 years. This made it possible to evaluate whether or not the experience level of the subjects influences the performance in the program. Table 2 shows that the group of 20 to 40 years generally have lower scores of  $p \leq 0,05$  for the HDRS and  $p \leq 0,1$  for the MDI.

At the end of the therapy, the two groups showed no big difference. However, the group of 41 to 62 years showed a possibility that fewer sessions are required to reach the expected results.

Age	Pre therapy		Post therapy		Change		Statistic		Count of Sessions
	HDRS	MDI	HDRS	MDI	HDRS	MDI	HDRS	MDI	
	Score	Score	Score	Score	Score	Score	Score	Score	
20 - 40	25,38	34,50	6,00	13,88	-19,38	-20,63	2,19547E-05	2,18883E-05	13,88
	6,86	6,19	2,88	5,33	5,50	5,85			3,27
40 - 62	29,83	37,67	6,33	9,92	-23,50	-27,75	2,83073E-09	1,90606E-08	10,42
	6,41	7,43	3,65	5,65	4,76	6,73			3,32

**Table 2 shows the results of the HDRS and MDI evaluation before and after therapy grouped by age.**

## Discussion

Standard treatments of disorders like anxiety and depression do not work for everyone and medication may have undesirable side effects (1). The Mind and Mend Program (MMP), which is a non-invasive approach using brain entrainment, fills this need for a safe and effective treatment. This study showed that all participants had a significant decrease in the MDI score while 30 % did not have a score below or equal to 7 in the HDRS scale. Therefore, the success rate of MMP can be calculated between 70 to 100%.

MMP is built on the assumption that learning is best achieved through the dialogue that results from a sound relationship between the MMP facilitator and the user. This relationship is imperative to the MMP method and creates an environment and context wherein the user feels safe and comfortable for self-assessment.

The premise of the MMP approach is that an individual, especially an adult, has enough life experiences to have a dialogue with the self about any subject and will learn new knowledge, attitudes, or skills relating to these experiences. This study hypothesizes that younger participants engaged in MMP show slower improvements compared to the older group. This hypothesis is supported by the fact that the older group aged of 41 to 62 years- old showed a smaller need for MMP session in overcoming their anxiety and depression. However, the number of cases used in this study might be small in order to see a significant difference. Further study is recommended.

In this self-directed learning process of the MMP treatment, the patients also take responsibility for their own education. They are enabled to develop the skills vital for learning and are

empowered as individual as they hear and respond to their own voice. Decisions are arrived more easily and independently.

Using the science of brain entrainment, the binaural stimuli activates and deactivates (8, 10) the thinking system during the self-questioning and self-directed learning process. This technique is used to successfully achieve desired brain states that will facilitate self-actualization.

Both the binaural beats and the self-actualization process are known to be effective in addressing several mental states and disorders. However, the positive effects of these methods do not last long or also show negative results (1, 10, 11, 12).

Combining these two methods with MMP showed desired results with a high success rate. With continuous and daily use, this combination also showed indications of a lasting positive effect. A larger sample size, however, is necessary to prove this supposition.

MMP combined with binaural beats and self-actualization, enables patients to independently address the problem they are suffering from. They are also able to autonomously find the causes of their emotional imbalance and how to overcome struggles through self-actualization with the guidance of the facilitator.

In conclusion, this study presented a new therapy protocol to address psychiatric disorders like anxiety and depression by utilizing binaural beats combined with self-actualization. The Mind and Mend Program presents a lasting and useful yet simple approach for patients who did not experience improvements after enlisting to standard psychological therapies and those who exhibited side effects of medicamentation without falling back into undesired patterns.



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