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Neuro - Integral Adaptive Neuro - Sciences Experiments (Case Study – 6)

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ABSTRACT: This paper proposes that neuro - integral methodology based on adapted neurosciences is the mental health management protocol. To manage mental health, it is recommended to make use of physiological and psychological bio - markers in an integrated manner. The case study in this paper is based on an explanation concerning tribulations of emotional, job loss, financial problems and hypertension. Paper calls for integration of heterogeneous neuroscience information to develop a holistic mental health management protocol.

KEYWORDS: Mental Health, Physiological Bio - Markers, Psychological Bio – Markers and Heterogeneous Neuroscience.

I. INTRODUCTION

A scan through Wikipedia reveals; How is information encoded by neurons? What is the nature of neuro-scientific explanation? How to integrate heterogeneous neuroscience information? Who will make the integration? Who stands to benefit from the integrative revolution in neuroscience? Will integrative engram technologies provide new treatments? How are different types of brain cells formed in the correct place at a specific time? How do different cells process the information they receive? How do the brain cells connect with each other? What are the roles of neurons and how can they change function? How can we support people to stay healthy? What can we learn about the healthy brain that will improve treatment for patients? How are patients affected by diseases and disorders? What can we do to improve their treatment? What is the neural basis of neurological and psychiatric diseases? How do we ensure discoveries in laboratories make a real difference to patients with brain and nervous system disorders? How exactly does the mind function (or how does the brain interpret and represent information about the world)? What is the neural basis of subjective experience, cognition, wakefulness, alertness, arousal, and attention? What counts as an explanation of how the brain works? And, which disciplines would be needed to provide it? How to integrate heterogeneous neuroscience information? Where might we expect philosophical work on mental disorder to go from here? How to relinquish evaluative thinking in view of liberal traditions around responsibility and self-identity? No brain-process theory can answer the “hard” question: Why should that particular brain process give rise to that particular conscious experience? Do all developments have the same way of occurring quite independently of what is coming about? Are objects ontologically dependent on events? Which of the competing approaches to process philosophy can count as the currently most promising? What is the most interesting question?

II. CASE SUBJECT

This is the case of a 37-Year-old Subject with tribulations of emotional, job loss and financial problems. Hypertension stands out in his family. At age of 24 he presented with consecutive symptoms of pain and recurrent hospitalizations. At age 28 Subject was diagnosed with multiple sclerosis; from 2013 to 2015 he was in a wheelchair. Subject’s history highlights bilateral hip replacement, due to congenital hip dysplasia; His relatives had no physical symptoms, but they did show emotional effects due to illness. With no personal medical history, as a result of his long battle with his medical diagnosis of multiple sclerosis, the change of environments and variant of daily life, Subject presented mixed anxious-depressive symptoms, manifested repetitive states of sadness, pessimism, dissatisfaction, ideas of suicide, tendency to crying, irritability and social isolation. Subject indicates that sometimes he cannot resist the pain even with medication. His reasons for consultation were depression, anxiety, suicidal tendencies. It is important to note that

Subjects who suffer from multiple sclerosis constantly change pre-existing states of anxiety, and having tools and techniques that allow them to control these anxious conditions gives them great relief and reduces the worry of whether they will be a burden on their loved ones.

III. EXPERIMENTAL SESSIONS

The Subject was treated to a series of tests towards ascertaining his situation and establishing bases for treatment. These activities included: Initial conversation: An initial conversation was held with Subject to establish relationship of trust. More detailed assessment: Standardized assessment instruments were used to measure level of depression and anxiety Subject was experiencing. Neurofeedback and biofeedback tools were introduced as part of future treatment plan. This treatment plan was designed specifically to meet Subject's needs and address emotional challenges. Initial evaluation confirmed significant presence of depression and anxiety in Subject. Subject showed interest and curiosity in neurofeedback and biofeedback tools, indicating positive disposition towards his treatment. Diagnosis revealed; Mood disorder due to medical condition (multiple sclerosis), with depressive symptoms, generalized anxiety disorder. Signs and symptoms included; sadness, apathy, tingling and numbness of the body, pain and spasms. And, Consequences noted were; suicidal tendency, social isolation and moderate persistent depression.

Session No. 2 was dedicated to observe mindfulness through VR. Activities included initial conversation to establish solid foundation and understand Subject's unique experiences and needs, Throughout the session, Subject seemed receptive and motivated to explore mindfulness as tool to improve well-being. VR mindfulness experience turned out to be effective for Subject, allowing deeply relaxing and connecting with space of inner peace. Subject expressed commitment to continue practicing mindfulness independently and incorporating it into his daily life, indicating strong determination in continuous improvement process.

In Session No. 3, diaphragmatic breathing training was administered with focus on teaching and practicing diaphragmatic breathing technique. Activities included; diaphragmatic breathing exercises, highlighting the importance of deep, abdominal breathing and reflections on sensations and emotions experienced during the session. Subject demonstrated receptivity and high motivation throughout the session, which facilitated his active participation in the diaphragmatic breathing exercises.

Session No. 4, on progressive visualization began with initial connection and conversation to establish environment of trust and understand how Subject feels at that moment. Subject was able to express emotions and concerns, which provided solid foundation for imagination of calm and beautiful place. Subject was asked him to focus on details of place, such as sounds, colors, and textures, in order to disconnect his mind from stress and pain he was experiencing. Subject demonstrated receptivity and motivation which facilitated ability to deeply relax and experience pain relief through progressive visualization.

Session No. 5 was devoted to brain gymnastics and Chi Kung training to improve mental and physical well-being. This challenged his mind in a fun and stimulating way, with purpose of strengthening memory, concentration and mental agility. Subject performed fluid, controlled movements while focusing on breathing and the feeling of energy flowing through. This experience allowed to relax deeply and experience a sense of relief from pain. Subject enjoyed cognitive challenges presented during brain gymnastics. Subject experienced deep relaxation and pain relief during chi kung practice.

Session No. 6 was to examine impact of active listening and chi kung reinforcement. Active listening was essential to thoroughly understand Subject and evolution in terms of relationship with pain and emotional well-being. Observations were that Subject was receptive and opened during session, was able to identify significant progress in relationship with pain and emotional well-being, demonstrating encouraging progress.

Session No. 7 was dedicated towards Virtual reality mindfulness and reiki. Attempt was to establish solid foundation and understand Subject's specific needs. Subject immersed in virtual environment through use of virtual reality glasses. Subject focused on breathing and sensations experiencing in that virtual environment. Subject began to feel a deep sense of calm and tranquility. Subject shared that he could feel sensation of warmth and energy while experiencing reiki through virtual reality. Activities included, initial connection and conversation, virtual reality experience, mindfulness, reiki, reflection on the experience, and planning for home practice. Observations were that

Subject was receptive and enthusiastic throughout, Subject was able to experience benefits of virtual reality, mindfulness and Reiki on emotional and physical well-being.

Session No. 8 was towards observing impact of active listening and mindfulness reinforcement. Attention was on Subject's experiences and reflections on progress with mindfulness. Subject focused on breathing and consciously observing thoughts and emotions. Subject experienced a sense of tranquility and calm. Afterwards, Subject shared that he felt calmer and more centered after meditation. Subject was receptive and open to active listening, which is essential for therapeutic progress. Subject identified significant gains in mindfulness practice.

Session No. 9 was to observe Jacobson technique and yoga training. Subject shared that he had reduction in muscle tension and improvement in ability to deal with stress and anxiety. At the end of session, Subject shared how he had begun to incorporate these exercises into daily routine, experiencing feeling of calm and balance. As part of the session, Subject was receptive and committed throughout the session. Significant advances were identified in Subject's practice.

Session No. 10 was to introduce reinforcement progressive visualization exercises. Subject shared significant improvements in managing depression and anxiety, as well as greater emotional balance. Subject shared positive experiences with progressive visualization practice to manage physical pain due to multiple sclerosis and maintain positive mindset. Subject shared that he felt relaxed and centered. Subject was receptive and committed throughout the session. Significant advances were identified in their progressive visualization practice.

Session No. 11 was dedicated towards briefing on brain and behavior in the face of pain. During the session, Subject was presented an overview of how brain interprets and processes pain, and how this response can be affected by emotional and psychological factors. Subject and I discussed how anxiety, depression, and stress can intensify the perception of pain, as well as the crucial role mental training plays in pain relief. Subject shared his experiences when applying techniques such as mindfulness and progressive visualization, highlighting a decrease in pain intensity and an improvement in his quality of life. Subject was receptive and committed throughout the session. Subject was able to identify significant advances in understanding of the relationship between mind and pain.

Session No. 12 was devoted towards Conscious meditation. During the session, an overview of mindfulness meditation and can reduce anxiety, alleviate depression, and improve quality of life by focusing on present and cultivating mindfulness was presented. Subject accepted meditation with an open and receptive disposition, absorbing each moment with full attention. Subject shared that he felt calm and relaxed after the meditation. Subject was receptive and engaged throughout the session. Subject was able to identify significant advances in understanding of mindfulness meditation.

Session No. 13 was to examine the impact of neurofeedback and biofeedback. First, team proceeded with neurofeedback training. Subject settled with sensors to measure physiological responses. Team used neurofeedback program to show in real time how brain activity responded to different stimuli. Subject experienced how he could influence brain activity through mindfulness and relaxation. Team carried out biofeedback training session to show in real time how physiological responses, such as heart rate and breathing, responded to different stimuli. Subject shared that he felt surprised and empowered to discover how he could influence his physical and emotional responses. Subject was receptive and engaged throughout the session. Subject was able to identify significant advances in understanding of neurofeedback and biofeedback.

Session No. 14 was to examine on training healthy habits. Subject shared how, as his mental health improved, he felt motivated to take better care of himself. Subject explored how to plan nutritious, tasty meals, and how to start an exercise program tailored to his physical abilities. Subject expressed that stress had been a major trigger for anxiety and depression in the past. Subject seemed receptive and committed to the idea of incorporating these healthy habits into his daily life. Subject identified significant advances in his understanding of their importance and committed to continuing to work on them to promote his overall well-being.

Session No. 15 was dedicated towards Laughter Yoga. Objective was to address importance of laughter and positivity in emotional well-being. Attention was on deep breathing exercises, laughter exercises, and play techniques and play activities. There was receptivity and commitment throughout the session. Significant gains were demonstrated in ability to laugh and enjoy life.

Session No. 16 was to re – introduce reinforce chi kung training; ancient Chinese discipline that combines gentle movements, conscious breathing techniques and meditation to encourage the flow of vital energy (Qi) and balance in the body and mind. Subject showed remarkable mastery of this technique, indicating increasing ability to use conscious breathing as a tool to manage stress and anxiety. Gentle and fluid Chi Kung movements included stretches, twists, and specific postures designed to promote flow of vital energy (Qi) through the body. Subject executed each movement with precision and grace, demonstrating a high degree of concentration and balance. Subject demonstrated receptive attitude and continued commitment to improvement process throughout the session. Notable advances in practice of Chi Kung reflected his growing physical and emotional well-being, evidencing the benefits of this technique in his life. **Session No. 17** was initiated to reinforce advanced progressive visualization. Subject shared positive experiences and expressed how neurointegral methodology had profound impact on physical and emotional well-being. This technique had the main objective of taking the Subject's visualization skills and emotional control to a more advanced level. Unlike previous visualizations, this one was more detailed and complex, designed to strengthen his ability to manage his emotions, especially in relation to pain and depression.

Advances in performing advanced progressive visualizations indicated significant growth in his ability to manage his emotions and improve his mental well-being. Subject expressed his commitment to continue practicing advanced progressive visualizations in his daily life, recognizing its value in his recovery process.

Session No. 18 was on Cognitive training. Subject expressed feeling more optimistic and hopeful, grateful for the progress in his treatment. Series of cognitive exercises were presented designed to identify negative thinking patterns and transform them into more realistic and positive thoughts. These exercises focused on cognitive restructuring, seeking to help Subject challenge their limiting beliefs and change their perspective. Hypothetical scenarios related to the Subject's common concerns were explored. The recognition of cognitive distortions and replacement with balanced and positive affirmations was practiced. Subject demonstrated receptivity and commitment throughout the session. Subject was able to identify negative thought patterns and replace them with more realistic and positive thoughts.

Session No. 19 was devoted to brain gymnastics and laughter yoga training. This was to assess Subject's emotional and mental state with deep breathing exercises to relax the Subject and prepare for laughter session. Deep breathing helped create an environment conducive to laughter. Session incorporated play techniques and playful activities to encourage genuine laughter. Subject was treated to Advanced Brain Gym exercises designed to challenge Subject's cognitive ability and improve motor coordination. The combination of Laughter Yoga and Brain Gym exercises provided Subject with a holistic therapeutic experience that addressed both their emotional and cognitive well-being. Subject actively participated and enjoyed the activities, indicating progress willingness to participate in unconventional therapeutic interventions. Subject displayed positive and empowered attitude, which reflected effectiveness of these techniques in improving emotional and mental well-being.

Session No. 20 -21 was towards examining Neurointegral workshops and ecology of emotions an introduction to key concepts of neurointegral methodology and how these can be applied to Subject's daily life was verbally discussed. Attempts were done to explore how emotions have a profound impact on physical and mental health. Session culminated with activity in which Subject was able to express goals and aspirations for his future. This helped solidify his commitment to his own emotional growth and well-being. Neurointegral Workshop incorporated Presentation of theoretical material: Introduction to neurointegral methodology, Practical exercises, Application of theoretical concepts to real life situations, Group discussion and Share experiences and learning. The ecology of emotions workshop incorporated; presentation of theoretical material, exploration of the influence of emotions on mental and physical health, practical exercises, development of strategies for managing difficult emotions, group discussion, sharing experiences and emotional challenges and activity for expressing goals and aspirations: reinforcement of commitment to emotional growth. Subject demonstrated high degree of commitment and active participation in both workshops. Subject's willingness to apply techniques and concepts learned in daily life underscores commitment to emotional well-being.

Session No. 22 was towards examining impact of meditation exercises. Subject was encouraged to focus on breathing and observe thoughts without judgment. The session was accompanied by soft background music that helped create a calm and relaxing atmosphere. Subject became immersed in present, releasing tensions and worries. Inhalations and exhalations became deeper and rhythmic. Subject described how during the session he was able to experience a sense of calm and mental clarity. He mentioned that meditation had helped him temporarily get away from worries related to

his medical condition and mental health. Subject was receptive and committed throughout the session. Subject was able to identify significant benefits of meditation.

Session No. 23 was programmed towards progress and experience. Subject was guided through mindfulness exercises, focusing on breathing and observing thoughts without judgment. Soft background music helped create a calm and relaxing atmosphere. Subject moved deeper and deeper into the present moment. His breathing became deeper and more rhythmic, indicating deep relaxation. Subject demonstrated receptivity and commitment throughout the entire session, which is essential to get the most out of the meditation. He was able to identify significant benefits of meditation, especially in terms of calmness and mental clarity.

Session No. 24 was designed to observe the influence of cognitive training. Subject shared challenging situations he had experienced since our last session, as well as the emotions associated with them. Together, we analyzed how his thoughts influenced his emotions and overall well-being. Team identified specific cognitive patterns that contributed to moments of anxiety and depression. Subject became aware of how certain automatic thoughts and cognitive distortions affected his perception of situations. Subject demonstrated receptivity and commitment throughout the entire session, which is essential for the success of cognitive training. Subject was able to identify specific cognitive patterns and develop effective coping strategies, indicating significant progress in his ability to manage his thoughts and emotions.

Session No. 25 was on virtual reality neurofeedback analysis. Subject experienced guided VR experience. During this activity, he was immersed in a serene virtual environment, such as a natural landscape, and encouraged to practice mindfulness techniques. While Subject was immersed in the VR experience, neurofeedback data was recorded to analyze his brain activity in response to the visual and auditory stimuli of the virtual environment. This involved the use of sensors and brain monitoring technology. The neurofeedback data was then carefully analyzed to understand Subject's specific brain response to VR therapy. This gave valuable information about how brain processed experience and how this relates to their emotional well-being. Subject was responsive and engaged throughout the session, which is critical to the success of VR therapy and neurofeedback data collection. Subject's ability to identify brain response patterns associated with his emotional state and stress levels indicates a high level of self-awareness and willingness to actively participate in his treatment. Subject expressed his continued commitment to VR therapy, suggesting that he finds value in this treatment modality and is willing to continue exploring it as part of his recovery process.

Session No. 26 was re – introduction of Jacobson technique. Subject reviewed the basic principles of the Jacobson Relaxation Technique, allowing him to remember how to apply it effectively. Subject performed series of muscle relaxation exercises using Jacobson technique. This helped him identify and release tension built up in different parts of his body. Subject was receptive and engaged throughout the session, which is essential to success of the Jacobson relaxation technique. Subject was able to identify areas of tension in his body and consciously release them, suggesting that this technique is proving beneficial for him. Subject expressed his continued commitment to practising the Jacobson relaxation technique, indicating his willingness to use this tool as part of his strategy for managing stress in his work life.

Session No. 27 was towards re-introduction of a Reiki session for relaxation. Subject experienced feeling of warmth and relaxation as session progressed. He was able to sense how energy flowed through his body, easing tension and releasing emotional blockages. Subject shared that he felt deeply relaxed and had an overall sense of well-being. Subject remained receptive and engaged throughout the session, which is essential to get the most out of the benefits of reiki therapy. Subject experienced a feeling of warmth and relaxation during the session, suggesting that Reiki therapy had a positive impact on his emotional and physical well-being. Subject expressed his desire to continue with Reiki as an integral part of his treatment, indicating his willingness to explore and adopt holistic approaches to his well-being.

Session No. 28 was devoted to observations on Mindfulness exercises and conscious eating. Team asked Subject to focus on his breathing and allow any worries or tension to fade with each exhale. The guided meditation helped him reduce any residual anxiety he might be experiencing, and his facial expression became more serene as we progressed. Subject shared how he had been paying more attention to what he ate and how he ate it in his daily life. We discuss the importance of this approach and how it can positively impact both digestion and his relationship with food. Subject was receptive and engaged throughout the session, which contributed to a positive therapeutic environment. Subject experienced a feeling of relaxation and well-being during the guided meditation, suggesting an improvement in his ability to practice mindfulness.

Treatment Conclusions

It is a 'Big Opportunity' to summarize the results of Subject's treatment over twenty-eight therapy sessions. During this period, Subject has made notable progress in his fight against anxiety and depression, and here are the main conclusions:

Identification of cognitive patterns: Subject developed ability to identify negative thinking patterns and cognitive distortions that contributed to anxiety and depression. This awareness has allowed him to challenge and change these patterns, which has been essential for his recovery.

Coping strategies: Subject has learned and practiced various coping strategies, such as cognitive restructuring, progressive muscle relaxation, and mindfulness. These techniques have helped him manage stress and reduce anxiety, giving him greater control over his emotions.

Relaxation techniques: Subject has experienced Reiki therapy and Jacobson muscle relaxation, both techniques that have contributed to his physical and mental relaxation. These practices have relieved tension and improved his overall sense of well-being.

Commitment to Wellbeing: Subject has demonstrated a strong commitment to his own well-being. His willingness to actively participate in each session and to apply the techniques learned in his daily life is a testament to his determination and desire to improve.

Mental Health: Subject has developed effective skills to identify and address negative thinking patterns and cognitive distortions that contributed to his anxiety and depression. This has led to a significant improvement in their mental health, with a reduction in symptoms of anxiety and depression.

Stress Management: Subject has learned and practiced relaxation techniques such as progressive muscle relaxation, reiki therapy, and mindfulness. These techniques have allowed him to manage stress effectively and reduce anxiety.

General Wellness: Thanks to his commitment to wellness practices, Subject has experienced an overall sense of well-being. His ability to relax physically and mentally has contributed to better emotional balance and a higher quality of life.

Factors that contributed to the success of the treatment:

Personal Commitment: Subject has demonstrated a solid commitment to his own recovery. His willingness to actively participate in the sessions and apply the techniques learned in his daily life has been essential to his success.

Diversity of Techniques: The variety of techniques used in treatment, including cognitive restructuring, meditation, muscle relaxation and reiki, has provided Subject with a comprehensive set of tools to address his emotional and mental challenges.

IV. FUTURE RECOMMENDATIONS

1. **Regular Maintenance:** It is important that Subject continues to practice the techniques and strategies he has learned in therapy sessions on a regular basis. Consistency in practice will strengthen his skills and ensure sustainable well-being.
2. **Social Support:** Subject can seek support from friends and family to strengthen his emotional support network. Sharing his experiences and progress with people he trusts can be beneficial.
3. **Goal Setting:** Subject can establish clear goals related to his emotional well-being and quality of life. Having specific, achievable goals can provide direction and motivation in his ongoing recovery journey.

V. CONCLUSION

To quote Aldijana Bunjak (2022), mindfulness is defined as the awareness that arises through the practice of paying attention in the present moment. Mindfulness-based interventions have been used in the last decades, mostly in the fields of psychiatry and clinical psychology, to treat a wide variety of mental disorders and in clinical contexts to help alleviate chronic pain. In recent years, practicing mindfulness in the form of meditation has also become increasingly popular among non-clinical populations who are looking to reduce stress and improve their wellbeing. During mindfulness practice, the individual directs their focus to internal (e.g., their thoughts, feelings, and bodily sensations) and external (e.g., visual events and sounds) experiences that are occurring, without automatically reacting to or judging them. In addition to reducing stress and improving psychological wellbeing, regular mindfulness practice has been shown to lead to positive outcomes such as increased life satisfaction, better sleep, and higher self-awareness. Mindfulness meditation also reduces anxiety and depression symptoms significantly.

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