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AN INTELLECTUAL APPROACH TO THE USE OF NEUROMARKETING IN PHYSICAL THERAPY AND REHABILITATION

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Abstract:
This study examines in depth the potential use of neuromarketing in the field of physical therapy and rehabilitation and the possible effects of this use. Neuromarketing is an approach to analyze the conscious and unconscious decisions of individuals and aims to shape marketing strategies using psychological and neuroscientific data. In this context, the study focuses on developing various strategies for more effective delivery of services by taking advantage of the potential of neuromarketing in the health sector, especially in the field of physical therapy and rehabilitation. The article states that neuromarketing applications in this field can play an important role in terms of increasing individuals' commitment to treatment processes, accelerating recovery times and making treatment processes personalized. For example, by using neuromarketing techniques, patients' psychological states, attitudes towards treatment and motivation levels can be better understood. This understanding allows for more effective personalization of the treatment process and a stronger commitment to treatment can be created. In addition, treatment methods can be made more efficient by taking individual differences into account during the recovery process. However, the article emphasizes that this potential of neuromarketing should be used within an ethical framework and based on scientific foundations. Since the use of neuromarketing in the health field can target the unconscious processes of individuals, such an intervention should be implemented carefully and responsibly. It is stated that neuromarketing methods used in the treatment process should be implemented with transparency and ethical boundaries in order not to have a negative impact on the emotional and psychological well-being of patients. In conclusion, it is emphasized that neuromarketing has significant potential in the field of physical therapy and rehabilitation, but this potential should be used with ethical responsibilities, based on scientific foundations and considering the psychological and physiological well-being of individuals. Such an approach will both allow health professionals to provide more effective treatment and increase patients' commitment to the treatment process, helping them to achieve a faster and more efficient recovery process.

Keywords: Neuromarketing; physical therapy; rehabilitation; health.

I. Introduction

In the world today, traditional boundaries have largely dissolved. Communication channels are now ubiquitous, operating across various fields, which results in greater competition. Consumers have become more informed, and their awareness levels have skyrocketed, which makes it significantly

more difficult for businesses to influence purchasing decisions. With the rise of electronic transactions and quicker purchasing decisions, the way consumers engage with products and services has fundamentally shifted. In such an environment, marketers must rethink their strategies. Digital sales and marketing, where products and services are marketed and sold, require customer-focused approaches. With information being so readily available to consumers, they are now making quicker, more informed decisions. Traditional methods of marketing that relied on intuition or basic consumer surveys no longer suffice. Instead, marketers are looking for deeper insights into what drives consumer choices, especially given that decisions are now often made faster and with more information at hand than ever before [1]. One significant development in this context is the emergence of neuromarketing as a tool for understanding and influencing consumer behavior. Neuromarketing leverages insights from neuroscience to better understand how consumers' brains process information, make decisions, and ultimately decide whether to purchase a product or service. This interdisciplinary approach focuses on the brain functions that drive human behavior, particularly in the context of decision-making and purchasing. The rapid rise of neuroscience over the past few decades has given birth to a number of related fields that explore the relationship between brain function and different aspects of human experience. These fields include neuroeconomics, which studies how the brain makes financial decisions, neuroaesthetics, which investigates how the brain perceives beauty and art, and neuropsychoanalysis, which combines neurological and psychoanalytic theories to understand the human mind. Neuromarketing falls squarely in this tradition, focusing specifically on how the brain responds to marketing stimuli and how this can influence consumer behavior.

Neuromarketing's focus is on uncovering the unconscious and emotional processes that govern consumer decision-making. Traditionally, marketers would gather data through surveys, focus groups, and observations of consumer behavior. While these methods are useful, they are limited because consumers often struggle to articulate or even fully understand the subconscious responses behind their choices. Neuromarketing provides a more direct insight into the underlying mental processes, allowing marketers to craft strategies that align more closely with the brain's natural decision-making patterns. For instance, by using neuroscientific tools such as fMRI (functional Magnetic Resonance Imaging), EEG (electroencephalography), and eye-tracking, marketers can directly observe the brain's response to advertising, branding, product design, and even price points. This enables a much richer, more precise understanding of what works and what doesn't in terms of consumer engagement. By identifying patterns in neural activity, neuromarketing helps uncover the emotional and cognitive triggers that drive purchasing behavior, allowing brands to create more effective, personalized marketing campaigns. The field of healthcare is undergoing a transformation similar to the broader consumer market [2]. As societies demand higher quality healthcare services, competition within the sector has intensified. At the same time, the cost of healthcare has risen, making it more critical than ever for healthcare providers to deliver services that meet both patient expectations and institutional standards.

Neuromarketing can play a significant role here by helping healthcare providers understand how patients and potential patients perceive healthcare services. The increasing interest in quality management in healthcare is not just about meeting regulatory standards but also about fulfilling patient expectations. Neuromarketing can be used to assess how healthcare services, from the

aesthetic design of healthcare facilities to the communication of service quality, are perceived by patients at a neurological level. This insight can then be used to refine patient experiences, improve service delivery, and ultimately enhance patient satisfaction. Historically, healthcare providers determined the demands and needs of patients through direct inquiry (such as surveys) or through observational data (such as patient feedback and behavioral observations). However, these methods have their limitations. For example, patients might not always be able to articulate their true needs, or they might be influenced by social desirability bias when answering questions. Neuromarketing adds a new dimension by using scientific methods to uncover unconscious preferences, emotional responses, and decision-making processes that patients may not be fully aware of themselves. For example, in a healthcare context, neuromarketing can help identify how patients respond to various aspects of the service experience, such as waiting times, staff interactions, or the physical environment of a healthcare facility. By understanding these neurological responses, healthcare providers can optimize their services in ways that not only meet patient needs but also exceed their expectations, improving patient outcomes and overall satisfaction. As healthcare providers face increasing pressure to provide higher-quality services while controlling costs, neuromarketing offers valuable tools for improving both patient care and business strategy. Institutional pressures, new regulations, and changing consumer expectations have made it clear that effective quality management is essential for healthcare providers. By incorporating neuromarketing strategies, healthcare managers can gain a deeper understanding of patient psychology, optimize the patient journey, and ultimately create a more patient-centered healthcare environment [3, 4]. Neuromarketing allows for the development of customer-centric strategies that can help healthcare institutions deliver a more personalized, effective service. This can lead to enhanced patient engagement, improved health outcomes, and stronger brand loyalty in an increasingly competitive healthcare market.

II. Neuromarketıng technıques

Neuromarketing is a field that integrates the principles of neuroscience and psychology into marketing strategies to understand consumer behavior. Unlike traditional marketing, neuromarketing aims to discover how people make purchasing decisions, often unconsciously. Various techniques have been developed in this direction. The most common neuromarketing techniques are as follows.

A. Functional Magnetic Resonance Imaging (fMRI)

Functional Magnetic Resonance Imaging (fMRI) is an advanced imaging method that measures which areas of the brain are active during which tasks. Its main purpose is to track brain activity through blood flow changes.

fMRI is widely used in areas such as neuroscience, psychology, medicine, and, in recent years, neuromarketing.

B. Positron Emission Tomography (PET)

Positron Emission Tomography (PET) is an advanced medical imaging method used to view metabolic and biochemical activities in the body. It has an important place especially in brain, heart and cancer research. PET shows not only the structure of organs but also how they work. With this feature, it provides a great advantage in early diagnosis of diseases and functional research.

C. Magnetoencephalography (MEG)

Magnetoencephalography (MEG) is a high-tech imaging method that directly measures the magnetic fields generated by the brain's electrical activity. When nerve cells (neurons) in the brain communicate, they produce electrical signals. These electrical currents create very weak magnetic fields. The MEG device precisely measures these fields, revealing which parts of the brain are working, when, and how.

D. Electroencephalography (MEG)

Electroencephalography (EEG) is a safe and effective neuroimaging method that has been used for many years and directly measures the electrical activity of the brain. Neurons in the brain produce electrical signals when they communicate with each other. The EEG device records and analyzes these electrical signals through electrodes placed on the scalp.

E. Steady State Topography (SST)

Steady State Topography (SST) is an advanced electroencephalography (EEG) technique that measures the electrical activity of the brain, specifically analyzing the distribution of responses over time across brain regions. SST works by measuring the electrical responses of the brain at a constant frequency to a constant and constant stimulus (usually visual or auditory). This method allows for high-precision mapping of how the brain responds in different regions and over time. Thus, both instantaneous and regional brain activity can be analyzed in detail.

F. Transcranial Magnetic Stimulation (TMS)

Transcranial Magnetic Stimulation (TMS) is a non-invasive (non-surgical) neuromodulation technique that focuses on the surface of the brain and uses magnetic fields to generate electrical stimulation in nerve cells. TMS can temporarily increase or decrease the activity of specific brain regions and is used in both research and clinical applications.

G. Eye Tracking

Eye tracking is a technology that measures where individuals look, how their gaze moves, and how long they focus on certain points. Thanks to eye tracking, it is possible to obtain direct information about people's attention, interest, and cognitive processes. It is widely used in many fields, especially neuromarketing, psychology, user experience (UX) design, education, sports sciences, and neuroscience.

H. Facial Coding

Facial Coding is a method that measures the emotional reactions of individuals by analyzing their facial expressions. Based on specific movements of the facial muscles, the basic emotions a person feels are objectively determined. Facial Coding is of great importance, especially in the fields of neuromarketing, consumer research, psychology and human-computer interaction.

I. **Galvanic Skin Response (GSR)**

Galvanic Skin Response (GSR) is a physiological monitoring method that measures changes in the electrical conductivity of the skin. GSR is used to understand a person's level of emotional and physiological arousal. Human skin, especially in the palms and soles of the feet, responds to a mild electric current through sweat glands. Emotional changes (such as stress, excitement, fear, joy) affect the amount of sweating, changing skin resistance and conductivity.

III. USE OF NEUROMARKETING IN PHYSICAL THERAPY AND REHABILITATION

The potential uses of neuromarketing in physical therapy and rehabilitation enable more effective, personalized and rapid recovery processes in healthcare services. In this context, the various tools and techniques offered by neuromarketing have the potential to have a major impact on treatment processes. In the physical therapy and rehabilitation process, motivation is an important factor in terms of treatment adherence and participation. The use of neuromarketing in this area is very effective in understanding and increasing the unconscious motivations of patients.

Increasing Patients' Motivation Unconscious Incentives

The brain's reward systems play a critical role in an individual's motivational processes and behavioral commitment. Particularly structures such as the ventral tegmental area (VTA) and nucleus accumbens are associated with dopamine release and play an active role in learning, enjoying, and sustaining goal-oriented behaviors. Research has shown that positive emotions can be unconsciously triggered through these reward centers and that this can increase the individual's general motivation level [5].

Dopamine-inducing practices, such as celebrating patients' small successes, providing positive feedback, and rewarding them by visualizing their progress, can increase dopamine levels and strengthen adherence to treatment.

Positive environmental elements such as unconscious positive stimuli, happy facial expressions, warm social interactions, and hopeful stories can increase patients' intrinsic motivation for the treatment process.

By giving patients an innate sense of worth and reward, a sense of meaning and purpose, and linking the course of treatment to personal objectives, promote long-term motivation.

Sensory stimuli, visual, auditory and tactile, can significantly shape patients' stress levels, relaxation capacity and attitudes towards treatment. Studies show that a properly structured therapeutic environment can positively affect treatment outcomes.

Visual elements, soft and warm color tones (e.g. blue, green, pastel tones) increase the feeling of peace and trust. Images of nature (forests, seascapes) reduce stress hormones and accelerate the healing process.

Lighting, soft lighting close to natural light, improves mood by balancing melatonin and serotonin levels. Warm-toned lighting should be preferred instead of intense white fluorescent lights.

Relaxing auditory elements such as auditory stimuli, light classical music, nature sounds (rain, bird sounds) reduce anxiety levels and help patients feel better.

Natural scents such as scent, lavender, orange blossom have an effect of reducing anxiety and increasing positive emotions.

Tactile elements, soft fabrics, comfortable seats and furniture designed with natural materials create a sense of comfort and security in patients. This multi-dimensional sensory design approach allows patients to be free from environmental stressors, increases positive emotions and thus strengthens their participation in treatment.

These strategies can help patients commit more strongly to their treatment processes, not only through their conscious decisions, but also through their automatic and emotional responses.

Developing Personalized Treatment Plans

Individualized approaches in the field of physical therapy and rehabilitation play a critical role in increasing the effectiveness of the treatment process and patients' adherence to treatment. Going beyond traditional methods, creating treatment plans that take into account both the physical and psychological characteristics of patients can significantly increase success rates. At this point, the use of neuromarketing techniques provides a new perspective in designing personalized treatment processes [6, 7].

Electroencephalography (EEG) and other biometric monitoring technologies allow objective measurement of patients' emotional responses to the treatment process. EEG analyzes the brain's responses to certain therapy practices to determine emotional states such as stress, relaxation, and attention. For example, if a patient shows high stress or anxiety symptoms during an exercise protocol, this may indicate that the exercise should be modified or presented with a different approach.

Studies on the subject have shown that it is possible to determine which treatment methods individuals respond more positively to by directly monitoring emotional reactions. Thanks to such data, therapy programs can be personalized to provide the most appropriate emotional environment for each patient.

Another valuable contribution offered by neuromarketing is the analysis of unconscious behaviors. Patients' attitudes towards therapy processes can be understood not only through verbal expressions, but also through indirect indicators such as eye movements, facial expressions, micro-mimics and body language. Various studies have shown that individuals' unconscious decision-making processes may differ from their surface behaviors. For example, although a patient may verbally express that they like an exercise, the micro-expressions on their face and avoidance behaviors in their eye movements may actually indicate that this exercise is causing discomfort. Such data allows therapists to more accurately assess the patient's true feelings and motivation levels. In this way, strategies can be developed that will reduce the patient's internal resistance and increase their commitment to the treatment process [8].

Adherence to Treatment and Acceleration of the Recovery Process

In physical therapy and rehabilitation processes, adherence to treatment is a factor that directly affects the speed and quality of recovery. Regular and motivated participation of patients in treatment programs is critical for optimizing treatment results. In this context, neuromarketing principles offer new strategies to ensure that patients are emotionally more attached to the treatment process and continue the process more effectively.

The emotional relationship between the patient and the therapist has a decisive effect on adherence to treatment. As studies have shown, emotional connection helps patients feel more confident in the treatment process, feel more valued, and increase their motivation for therapy.

Neuromarketing techniques suggest various ways to strengthen this emotional bond:

Empathic communication helps therapists understand the emotional states of patients and develop a language and approach appropriate for this, helping to build trust.

Personal attention, special attention to the patient's individual story, goals, and concerns during the treatment process, makes them feel more involved in the process.

Emotional storytelling can be presented as a "story" in the form of the treatment process, the patient's journey to achieve their goals. This technique helps patients see their own progress as a success story and become more committed to the process.

Such approaches contribute significantly to patients establishing a deeper emotional bond with their therapists and increasing their loyalty to the treatment.

Regular and conscious rewarding of small successes shown by patients during the treatment process strengthens commitment by increasing motivation. As defined in behavioral psychology studies, positive reinforcement increases the likelihood of a desired behavior being repeated.

Verbal appreciation is a simple but effective method. Patients' efforts, progress or participation are praised in a clear and sincere manner, supporting their motivation.

Tangible indicators, badges, certificates or small awards may be used to show progress in some clinics. These tangible awards make progress visible.

Goal setting and celebration, setting short-term, achievable goals and making small celebrations when each goal is achieved increases the patient's commitment to the treatment process.

Neuromarketing research has also shown that the timing of rewards is also very important: When success is rewarded immediately, the brain's reward centers are activated more effectively, increasing the likelihood that the behavior will be repeated.

The systematic application of emotional bonding and positive reinforcement techniques together can increase patients' commitment to treatment, speeding up their recovery process and significantly increasing overall treatment satisfaction [9].

Improving the Patient Experience

The overall experience of patients in physical therapy and rehabilitation centers significantly affects not only their psychological well-being, but also their commitment to the treatment process and the results obtained. A well-designed patient experience can reduce patients' stress levels, increase their motivation and accelerate their recovery process. In this context, neuromarketing approaches offer effective strategies to optimize the patient experience [10, 11].

The physical environment in which the service is provided has a profound effect on perceived quality. The aesthetic and sensory characteristics of a therapeutic environment can have a direct impact on patients' mood, stress levels and overall satisfaction. Neuromarketing helps us understand how people respond to environmental cues, contributing to the development of more effective interior design principles.

Natural lighting positively affects mood by regulating melatonin production. Studies show that patients exposed to natural light recover faster.

Neuromarketing studies have shown that colors have strong effects on emotions. For example, light blue and green tones can evoke feelings of relaxation and peace, while overly bright or dark colors can increase anxiety.

Low-tempo music or nature sounds (wave sounds, birds chirping) reduce stress levels and make patients more open to therapy.

The softness, warmth and comfort of the furniture used are also important. Hard, cold or uncomfortable seating areas can create a negative emotional state in patients.

It is possible to make the environment more peaceful and inviting with light aromatherapy applications (for example, relaxing scents such as lavender).

These environmental arrangements can turn the time patients spend in the therapy center into a more positive experience and increase their commitment to treatment.

Experiential marketing approaches focus not only on the quality of the product and service, but also on the emotional dimension of the entire experience experienced by the customer. In physical therapy centers, every point that patients touch should be considered as a holistic experience, from greeting, to information, to the treatment process, to post-session support [12, 13].

These methods can transform the time patients spend in therapy centers from being just a "treatment" experience to a holistic healing journey.

Increasing Psychological Support During the Treatment Process

Physical therapy processes are not limited to improving the musculoskeletal system; psychological strengthening of patients is also critical to the success of the treatment. It is common for patients to encounter psychological obstacles such as loss of motivation, anxiety, resistance and hopelessness, especially in cases requiring long-term treatment. Neuromarketing techniques can help develop strategies that support the treatment process by understanding these psychological factors in more depth.

Self-determination theory emphasizes that intrinsic motivation plays a critical role in ensuring the long-term sustainability of individuals' behaviors. While individuals motivated by external rewards make short-term efforts, individuals based on intrinsic motivation exhibit permanent commitment and higher performance. Neuromarketing studies also focus on understanding which emotional triggers motivate individuals more deeply [14, 15].

Recommendations for Supporting Intrinsic Motivation in the Treatment Process:

Setting meaningful goals, setting personal and meaningful goals for the patient that they can achieve during the treatment process. For example, goals that carry emotional meaning, such as "going to the park with my children again".

Providing autonomy, allowing the patient to make choices during the treatment process (e.g. offering flexibility in exercise timing or session content).

Instilling a sense of accomplishment, making small gains apparent, ensuring that the patient feels constantly progressing.

Strengthening the sense of self-worth, appreciating not only the physical but also the personal achievements of the patient, and seeing them as an active participant in the treatment process.

Thanks to these approaches, patients can commit to treatment not only with external guidance, but also in line with their own wishes and goals.

Neuropsychological studies have shown that people are unconsciously sensitive to both positive and negative stimuli. In particular, health-related fears and treatment-related concerns often occur outside the conscious control of individuals and strongly affect behavior. Neuromarketing tools allow these unconscious perceptions to be detected and managed [16,17].

Thanks to these methods, both the psychological resilience of patients can be increased and the treatment process can become a more enjoyable and productive experience.

Technological Methods and Innovations

Developing neuromarketing technologies offer great opportunities in terms of both increasing patient motivation and personalizing treatment protocols in physical therapy processes. Tools such as virtual reality (VR), augmented reality (AR) and biometric monitoring can make patients' treatment experiences more immersive and effective. Correct use of these technologies can accelerate both physical and psychological recovery processes [18, 19].

Studies show that VR and AR technologies offer promising results in the healthcare sector, especially in the field of rehabilitation. These technologies increase the level of patient participation in treatment and prevent problems such as monotony and loss of motivation.

Biometric monitoring systems offer the opportunity to analyze patients' psychological and physiological responses to treatment in real time. Biometric data can be collected especially through parameters such as stress level, heart rate, skin conductance and facial expressions.

These innovative technologies strengthen patients' commitment to treatment while also supporting them more effectively in physical and psychological aspects [20].

IV. Conclusıons

The use of neuromarketing techniques in physical therapy and rehabilitation processes provides significant contributions to traditional treatment methods, allowing this field to gain a more personalized, effective and holistic structure. Neuromarketing; offers powerful tools to increase patients' adherence to treatment, provide psychological support and accelerate general recovery processes with the methods it develops to understand individuals' unconscious motivations, emotional reactions and behavioral tendencies.

- First of all, thanks to the strategies such as establishing emotional bonds, positive reinforcement and increasing intrinsic motivation offered by neuromarketing, patients' voluntary and active participation in the treatment process can be ensured. Emotional bonds that strengthen the trust-based relationship between the therapist and the patient increase adherence to treatment, while rewarding successes through positive reinforcement encourages patients to continue making efforts.
- In addition, managing unconscious fears and anxieties helps to overcome psychological obstacles to the treatment process. Thanks to the unconscious perception management techniques offered by neuromarketing, patients' negative attitudes towards treatment can be reduced, their resistance can be broken and a more positive perception of treatment can be created.
- By using neuromarketing principles such as interior design, atmosphere optimization and conscious experience management, it is possible to create a more peaceful, safe and motivating

environment during the treatment process of patients in physical therapy centers. Many factors, from the psychological effects of colors to the use of natural light and therapeutic sound design, positively affect the patient's mood and support a more stress-free and efficient treatment process.

- However, optimizing service quality according to patient perception directly increases patients' trust and loyalty to healthcare services. When considered within the framework of experiential marketing theory, creating positive emotions at every point of contact strengthens patients' loyalty to both the treatment process and the healthcare institution.
- The technological innovations offered by neuromarketing take treatment processes to a further level. While virtual reality (VR) and augmented reality (AR) applications offer patients a more immersive, motivating and gamified treatment experience, biometric monitoring technologies enable the personalization of treatment by measuring the patients' current psychological and physiological states. Thus, a dynamic treatment process adapted to the patient's current needs and mood can be carried out.
- However, the use of neuromarketing techniques in the field of physical therapy also brings with it important ethical responsibilities. In particular, when intervening in the emotional and unconscious processes of patients, their free will and personal privacy should be respected. Within the framework of basic ethical principles such as the right to information, voluntary participation and open consent, it is of great importance that neuromarketing practices are carried out transparently.
- In addition, in order for these techniques to be applied effectively, scientifically based studies, clinical validations and multidisciplinary collaboration are needed. Thanks to the joint work of psychology, neuroscience, physiotherapy and ethics disciplines, neuromarketing practices can be integrated into physical therapy processes without compromising scientific accuracy.

As a result, when neuromarketing techniques are applied correctly and consciously, it is possible to create more motivated, more committed and faster-recovering patient profiles in the field of physical therapy. This approach not only improves individual patient outcomes, but also increases the quality of service and reputation of healthcare institutions. More comprehensive research and innovations at the intersection of neuromarketing and physical therapy in the future will further expand the potential of this field and pave the way for revolutionary developments in healthcare.

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