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TARTIL QUR'AN IN THE PERSPECTIVE OF NEUROSCIENCE
Integration of Tajwid, Tadabbur, and Neurocognition

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Abstract
This research examines the neurocognitive and psychological effects of Tajwid al-Qur'an, the combined practice of Tajwid (Precise Recitation) and Tadabbur (Deep Contemplation), through a systematic review of neuroscience research. The findings demonstrate that Qur'anic recitation enhances brain function by increasing Alpha Waves (Associated with Relaxation) and Delta Waves (Linked to Deep Focus), while improving memory, emotional regulation, and neural connectivity. Contemplative reflection activates Pre-Frontal Cortex (PFC) functions, boosting critical thinking and spiritual awareness while significantly reducing stress biomarkers. The synergy of these practices provides empirical evidence for the Islamic concept of Qalb (Heart-Mind) as a trainable cognitive-emotional system. These results position Tajwid as both a spiritual practice and evidence-based cognitive therapy, offering groundbreaking insights for Islamic psychology, Qur'anic education methodologies, and spiritually-integrated mental health interventions. The research bridges traditional Islamic knowledge with contemporary neuroscience, suggesting practical applications for enhancing both religious and cognitive development.

Keywords: *Tartil, Qur'an, Tajwid, Tadabbur, Neurocognitive*

TARTIL QUR'AN DALAM PERSPEKTIF NEUROSAINS:
Integrasi Tajwid, Tadabbur, dan Neurokognisi

Abstrak

Penelitian ini mengkaji efek neurokognitif dan psikologis dari Tajwid al-Qur'an, yaitu praktik gabungan antara Tajwid (Pembacaan yang Tepat) dan Tadabbur (Kontemplasi Mendalam), melalui tinjauan sistematis penelitian neurosains. Temuan penelitian menunjukkan bahwa pembacaan al-Qur'an meningkatkan fungsi otak dengan meningkatkan Gelombang Alpha (Terkait dengan Relaksasi) dan Gelombang Delta (Terkait dengan Fokus Mendalam), sekaligus memperbaiki memori, regulasi emosi, dan konektivitas neural. Refleksi kontemplatif mengaktifkan fungsi Pre-Frontal Cortex (PFC), meningkatkan kemampuan berpikir kritis dan

kesadaran spiritual dan pada saat yang bersamaan, secara signifikan mengurangi biomarker stres. Sinergi dari praktik-praktik ini memberikan bukti empiris terhadap konsep Islam tentang Qalb (Hati-Pikiran) sebagai sistem kognitif emosional yang dapat dilatih. Hasil penelitian ini menempatkan Tajwid tidak hanya sebagai praktik spiritual tetapi juga terapi kognitif berbasis bukti, yang menawarkan wawasan revolusioner untuk psikologi Islam, metodologi pendidikan al-Qur'an, dan intervensi kesehatan mental yang terintegrasi spiritual. Penelitian ini menjembatani pengetahuan Islam tradisional dengan neurosains kontemporer, serta menyarankan aplikasi praktis untuk meningkatkan perkembangan religius dan kognitif

Kata kunci: Tartil, Qur'an, Tajwid, Tadabbur, Neurocognitive

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A. Introduction

The Quran stands as the primary spiritual and ethical guide for Muslims, with its correct recitation being a fundamental religious duty. This obligation emphasizes both the accurate pronunciation of its verses and the internalization of their meanings. As Ibn Kasir *tafsīr* explains, *Tartīl* specifically denotes a deliberate, measured pace of Qur'anic recitation designed to enable deep understanding and contemplative reflection. This method transforms recitation from mere vocalization into an act of spiritual and intellectual engagement.[1] *Tartil* also encompasses adhering to the rights of the letters, including their *Makhraj* (*Place of Articulation*) and *S}ifah* (*Characteristics*), and reading in a subdued manner while reflecting on the meaning, in accordance with the principles of *Tajwid* (*Precise Recitation*). Reading the Qur'an with *Tartil* is considered sunnah, as it aligns with the practices of the Prophet Muh{ammad (Peace Be Upon Him) and fosters a deeper connection to the text, enhancing comprehension of its meanings.[2]

The hermeneutic processes of *Tadabbur* (*Deep Contemplation*) and *Ta'wīl* (*Esoteric Interpretation*) engage complex cognitive mechanisms in

[1] Ibn Kasir, Ismail, *Tafsir al-Qur'an al-'Azhim,* (Dar Ibn H{azm, 2000). P. 1930.
[2] Sharifah Nurshahida et al., "Kesan Bacaan Tartil (Tajwid dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography dan NeuroFeedback Training: Suatu Sorotan," *Jurnal Pengajian Islam* 16, no. 2 (2023): 19–32, https://doi.org/10.53840/jpi.v16i2.176.

Qur'anic exegesis. This multivalent textual approach incorporating both exoteric (*ẓāhir*) and esoteric (*bāṭin*) dimensions of meaning necessitates advanced cognitive faculties for profound comprehension and layered interpretation.[3] Intertextual polysemy in Qur'anic interpretation emphasizes the multifaceted meanings embedded within the text, paralleling the creative thought process of the Prophet Muhammad in revealing deeper insights. This paradigm encourages readers to engage in *Tadabbur* (*Deep Contemplation*) to uncover hidden meanings and symbolism beyond the literal interpretation of verses.[4]

Despite advancements in modern science, a gap remains in the understanding between religious education and scientific inquiry. The limited engagement of some Muslims with the Qur'an may reflect a lack of deep textual exploration, potentially indicating reduced motivation or opportunity to critically engage with its teachings. Moreover, the integration of technological knowledge can enhance comprehension of the Qur'an's contents. Furthermore, scientific evidence can reinforce the faith of believers by affirming the truths found within religious revelations.[5] Neuroscience as a branch of science that studies the nervous system, especially the brain, as well as consciousness, perception, memory, and their relationship to learning.[6] This framework offers insights into the impact of religious practices, such as Qur'anic *Tartil*. The goal is to understand how neurons and synapses contribute to the complex behaviors of organisms and how neuronal

[3] Seyyed Hossein Nasr, ed., *The Study Quran: A New Translation and Commentary*, First edition (HarperOne, an imprint of Collins Publishers, 2015).

[4] Abdulla Galadari, "Qurʾanic Hermeneutics : Between Science, History, and the Bible," in *Qurʾanic Hermeneutics : Between Science, History, and the Bible*, 1st ed., ed. Abdulla Galadari (Bloomsbury Academic, 2016), https://www.bloomsburycollections.com/monograph?docid=b-9781350070059.

[5] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[6] Anis Luthfiyani et al., "Neuroscience In Islamic Religious Education Learning," *JMKSP (Jurnal Manajemen, Kepemimpinan, Dan Supervisi Pendidikan)* 9, no. 1 (2024): 153–66, https://doi.org/10.31851/jmksp.v9i1.13904.

interactions enable the integrated functioning of the brain.[7] A balanced brain fosters a certain level of creativity, as harmonious functioning enhances creative thinking and supports optimal imaginative output. When the brain operates in equilibrium, it promotes a natural flow of ideas, allowing for consistent and measured creative expression. This stability ensures that creativity remains steady and sustainable rather than erratic or overwhelming.[8] The balanced functioning of the brain facilitates optimal creative cognition, suggesting that structured auditory and contemplative practices may enhance neurocognitive harmony, Therefore, it is essential to investigate how the integration of *Tajwīd* (*Precise Recitation*) and *Tadabbur* (*Deep Contemplation*) in Quranic *Tartīl* influences human neurocognitive activity from a neuroscience perspective, potentially revealing mechanisms by which disciplined recitation and deep reflection promote cognitive equilibrium and creative processing.

This research examines the neurocognitive dimensions of *Qur'anic Tartil* an integrative practice combining *Tajwid* and *Tadabbur* investigating how *Tajwīd* and *Tadabbur* influence brain function and mental well-being. This interdisciplinary approach bridges Islamic scholarship with contemporary neuroscience to elucidate the Qur'an's therapeutic mechanisms. *Tajwid* recitation induces Alpha Wave Activity (Associated with Relaxed Focus), Theta Waves (accessing the limbic system), and Delta Waves (Linked to Neural Regeneration), while its structured breathing techniques *Mad* (Elongation) and *Waqf* (Pausing) enhance Heart Rate Variability (HRV). These effects collectively promote brain plasticity and cognitive enhancement. *Tadabbur* practice activates Pre-Frontal Cortex (PFC) functions, facilitating higher-order thinking and spiritual intelligence. It demonstrates significant stress-reduction effects through Theta Wave Stimulation and Cortisol Reduction. Regular *Tartil* practice strengthens

[7] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[8] Anis Luthfiyani et al., "Neuroscience In Islamic Religious Education Learning."

neural connectivity between limbic and frontal cortical systems, providing empirical validation for the Islamic concept of *Qalb* (Heart-Mind) while demonstrating the Qur'an's role in mental health through measurable neuroplastic changes.

This research systematically reviews Scopus-Indexed Literature on Qur'anic practices (*Tartil*, *Tajwid*, *Tadabbur*) and their neurocognitive, psychological, and therapeutic impacts using qualitative methodology. Keywords such as "Tartil "Qur'an," "Tajwid," "Tadabbur," and "Neurocognition" were used to search databases (Scopus, Google Scholar), followed by rigorous screening, full-text evaluation, and data extraction of key findings and methodologies. Extracted data underwent thematic analysis, including coding such as "Alpha Wave Activation," "Stress Reduction" and theme identification such as "Tajwid's Neural Effects," "Tadabbur's Mental Health Benefits", ensuring alignment with research objectives. The synthesis bridges traditional Islamic scholarship with empirical science, validating Qur'anic practices through neuroscientific evidence while expanding tafsir studies into neurocognitive and therapeutic dimensions.

This research aims to bridge Islamic tradition and neuroscience by examining the neurocognitive effects of Qur'anic *Tartil* (Integrating *Tajwid* and *Tadabbur*), offering empirical evidence for its impact on brain function and mental well-being. Through a systematic review of Scopus-Indexed literature, this research identifies significant neurophysiological correlates, including enhanced neuroplasticity, Alpha-Delta Wave Synchronization, The Pre-Frontal Cortex (PFC) Activation, and improved Heart Rate Variability (HRV). These findings validate the Qur'an's therapeutic potential while advancing Islamic education through a neuroscience-informed framework. The research's novelty lies in its integrative analysis of *Tartil*'s dual components (*Tajwid* and *Tadabbur*) demonstrating their synergistic role in optimizing *Qalb* functions. By synthesizing Islamic epistemology with neuroscientific data, this research contributes to

contemporary *tafsir* scholarship and proposes actionable insights for spiritually grounded cognitive therapies.

B. Concept of Tartil Qur'an and Its Connection to Cognitive Function

Tartil Qur'an is a method of reciting the Qur'an with accurate and measured pronunciation, ensuring comprehension of its meanings, while adhering to the rules of *Tajwid* [9] as mentioned in the Holy Qur'an in QS al-Muzzammil/73: 4

اَوْ زِدْ عَلَيْهِ وَرَتِّلِ الْقُرْاٰنَ تَرْتِيْلًا ۝٤

Its translation:

Or a little more—and recite the Qur'an with measured recitation.[10]

Neurophysiological studies suggest that auditory exposure to Qur'anic recitation modulates brainwave activity, eliciting measurable psychophysiological relaxation responses.[11] Contemporary neuroscientific research demonstrates that the human brain exhibits remarkable neuroplasticity, enabling the efficient encoding, storage, and dynamic reorganization of information. This inherent adaptive capacity facilitates continuous cognitive restructuring, which serves as the foundation for creative ideation and innovative problem-solving. Such neural mechanisms underscore the brain's persistent ability to form novel synaptic connections throughout the lifespan, thereby supporting the emergence of original conceptual frameworks and solutions.[12]

[9] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[10] Tim IT Lajnah Pentashihan Mushaf Al-Qur'an, Terjemahan Al-Qur'an Edisi Penyempurnaan Tahun 2019, Kementerian Agama RI, n.d., Ayah Detector-Website, https://quran.kemenag.go.id/quran/per-ayat/surah/73?from=1&to=20.

[11] Sri Tanti, "Terapi Penyakit Jiwa Perspektif Al-Qur'ab (Elaborasi Ayat-Ayat tentang Syifa dalam Al-Qur'an)" (Program Pascaarjana Institut PTIQ Jakarta, 2017).

[12] Anis Luthfiyani et al., "Neuroscience In Islamic Religious Education Learning."

The practice of Tartīl, through its combined engagement of focused attention and positive affective states, has been shown to activate particular neural circuits associated with cognitive and emotional processing. This targeted cerebral stimulation contributes to both increased subjective learning satisfaction and objectively measurable improvements in knowledge acquisition and retention.[13] The Reptilian Brain, responsible for regulating reflexes and balance, activates under conditions of fear or stress. The Limbic Brain, which serves as the center of emotions and long-term memory, functions to regulate feelings. Meanwhile, The Neocortex, the center of higher-level intelligence, processes positive information.[14] Research indicates that coordinated activity among these three brain regions is essential for effective stress regulation and cognitive enhancement. Their synergistic interaction supports both adaptive stress responses and improved executive functioning through integrated neural processing. Studies further demonstrate that stronger functional connectivity between these areas correlates with greater psychological resilience and superior cognitive performance. [15]

The practice of *Tartil* engages concentration and positive emotions, stimulating specific brain regions. This enhances both the enjoyment and effectiveness of learning while facilitating information storage and reorganization, which fosters the development of new ideas. These findings align closely with research showing that memorization is a key component of human cognitive processes. Cognition, which minimally consists of five stages perception, recall, idea generation, evaluation, and reasoning is directly linked to an individual's intelligence level. Thus, when individuals engage

[13] Muh. Fathul Mubin, "Karakteristik Materi Pembelajaran Tahsinul Qur'an Berbasis Neurosains," *EDUSOSHUM: Journal of Islamic Education and Social Humanities* 1, no. 1 (2021): 26–44, https://doi.org/10.52366/edusoshum.v1i1.6.

[14] Santi Mahmuda Urbaningkrum et al., "Manajemen Stres dalam Program Akselerasi Pendidikan Perspektif Neurosains," *Ganaya : Jurnal Ilmu Sosial dan Humaniora* 7, no. 2 (2024): 138–49, https://doi.org/10.37329/ganaya.v7i2.3187.

[15] Urbaningkrum et al., "Manajemen Stres dalam Program Akselerasi Pendidikan Perspektif Neurosains."

in *Tartil*, they inherently train and refine these cognitive stages. Understanding the meaning and deep reflection during *Tartil* directly integrate idea generation, evaluation, and reasoning, while the accelerated memorization and retention of information relate to the recall stage. The harmonious functioning of various brain regions (Reptilian, Limbic, and Neocortex) in *Tartil* which aids stress management and enhances cognitive performance supports the idea that impairments in intelligence can disrupt the entire cognitive process. This implies that honing cognition through *Tartil* contributes to overall improved brain function.[16]

Tartil practice, which integrates focused attention and positive emotions, may stimulate specific brain regions, potentially enhancing learning efficiency. This aligns with evidence suggesting that religious engagement, including scripture research, can bolster cognitive capacity and support healthy cognitive aging. Furthermore, *Tartil* 's ability to induce calming effects and foster positive emotions corroborates findings that Qur'anic recitation serves as an adaptive stress-regulation strategy, improving mental well-being by mitigating symptoms of depression and anxiety.[17]

C. Integration of Tajwid into Neurocognitive Activities

Tajwīd refers to the scientific discipline of Quranic phonetics, ensuring precise articulation of Arabic letters through their designated points of articulation or *Makhārij* and inherent attributes or *Sifat*. *Tajwīd* system meticulously regulates the precise pronunciation, controlled elongation or *Madd*, and strategic pauses or *Waqf* essential for authentic Quranic recitation. Through strict adherence to its rules, reciters maintain both the linguistic purity and acoustic fidelity of the divine revelation as originally

[16] Syarif Maulidin and Muhammad Abdun Jamil, "Pengaruh Menghafal Al-Qur'an terhadap Peningkatan Aspek Kognitif (Studi Kasus SMA Bustanul Ulum Jayasakti Anak tuha Lampung Tengah)," *Al-Bustan: Jurnal Pendidikan Islam* 1, no. 2 (2024): 128–40, https://doi.org/10.62448/ajpi.v1i2.79.

[17] Nur Riviati and Bima Indra, "Reading Holy Quran Associated With Better Cognitive Function in Older Adults: A Systematic Review," *Gerontology and Geriatric Medicine* 10 (January 2024): 23337214241239219, https://doi.org/10.1177/23337214241239219.

transmitted. This discipline thus serves as a vital safeguard for the Quran's oral tradition, ensuring its accurate transmission across generations.[18] Cognitive and mental processes facilitate the analysis and understanding of speech, enabling the human mind to decode linguistic input and construct meaningful interpretations. These mechanisms are particularly vital for processing the Arabic language, with its rich morphological and syntactic structures. By engaging memory, attention, and pattern recognition, such processes allow for nuanced comprehension and contextual meaning-making in communication.[19] The application of *Tajwid* in Quran recitation is essential not only from a religious perspective but also has significant neurocognitive implications, namely:

1. *Impact on the Nervous System and Physiology*

Scientific evidence suggests that Quranic recitation following Tajwīd principles—particularly Madd (Lengthening) and *Waqf* (pausing) can influence (HRV), a key indicator of autonomic nervous system function. The controlled breathing patterns during *Madd* and cognitive processing during *Waqf* may enhance parasympathetic activity, leading to improved HRV metrics associated with relaxation and stress resilience. These findings highlight the potential physiological benefits of structured Quranic recitation, bridging spiritual practice with psychosomatic health outcomes.[20] Research shows that HRV coherence rises while average heart rate drops during initial readings, reflecting a physiological relaxation state. Lower heart rate

[18] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[19] Amal Othman Albureikan, "Navigating Contronyms: A Cognitive-Semantic Analysis of the Arabic Semi-Preposition /Warāʾa/," *F1000Research* 14 (January 2025): 12, https://doi.org/10.12688/f1000research.159405.1.

[20] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

typically indicates the body's relaxed condition. These changes demonstrate the onset of a calming physiological response.[21]

Reciting the Quran with *Tartil*, which includes *Tajwid* and *Tadabbur*, has a profound impact on neurocognitive function. Research indicates that this practice stimulates beneficial brainwave activity, such as Alpha and Delta Waves, which are associated with relaxation and cellular regeneration. The precise articulation and controlled breathing in *Tajwid* improve HRV and enhance neuroplasticity, boosting focus and strengthening neural connections. Meanwhile, *Tadabbur* encourages deep comprehension and emotional balance, activating PFC to lower stress and anxiety while fostering a state of calm attentiveness. By regularly practicing *Tartil*, individuals can achieve a balanced state of mental and physical well-being, optimizing brain function while nurturing spiritual growth.[22]

Tajwid engages sophisticated cognitive processes that induce measurable neuropsychological effects. Electroencephalographic (EEG) analyses reveal enhanced alpha wave synchronization during *Tajwid* performance, indicating optimized selective attention and information filtering. Complementary Event Related Potential (ERP) measurements demonstrate shortened P3 latency (The Time Delay**)**, reflecting accelerated cognitive processing. These findings suggest *Tajwid* practice may improve executive functions including performance monitoring and error detection capacities frequently impaired in attention deficit disorders. The learning trajectory of *Tajwid*, progressing from conscious effort to automaticity, mirrors established memory consolidation patterns. Neuroimaging evidence

[21] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[22] Sumyah Abdullah Alnajashi et al., "The Impact of Attending Qur'an Memorization Programs on Psychological Wellbeing: A Study on Adult Females," *S. A.* 8, no. 2 (2025), https://doi.org/10.25217/0020258594900.

implicates the frontal lobe and posterior corticollimbic networks in this skill acquisition process, paralleling category learning mechanisms.[23]

2. *Brainwave Activation and Endorphin Regulation Strategies*

The recitation of the Qur'an, especially when executed at a slow and harmonious tempo (*Tartil*), has been demonstrated to stimulate Alpha Waves in the brain. These Alpha Waves Create a relaxed environment that enhances learning and information retention. Additionally, Alpha Waves can facilitate the natural release of endorphins, known for their analgesic (relieving pain without causing loss of consciousness**)** properties. Endorphins (The neurochemicals produced by the brain and nervous system**)** play a significant role in alleviating symptoms of depression, stress, and anxiety, while also contributing to improved self-esteem.[24] Research shows that clear improvements in body functions like heart health and energy levels. These changes come with better sleep, sharper thinking, and an overall boost in daily well-being. Together, these benefits show how better physical health leads to a happier, healthier life**.**[25] And when a person recites the Qur'an, The Power Spectral Density (PSD) of their brain waves is higher compared to reading a book. Additionally, listening to Qur'anic recitation leads to reduced brain activity and increased Alpha Wave Power, indicating a more relaxed and tranquil state of mind. This phenomenon suggests that reciting the Qur'an can induce a calming and soothing mental state.[26]

3. *Body and Brain Detoxification*

[23]ERP and EEG Markers of Brain Visual Attentional Processing (MDPI, 2020), https://doi.org/10.3390/books978-3-03936-753-5.

[24] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[25] Wan Nor Atikah Che Wan Mohd Rozali et al., "The Impact of Listening to, Reciting, or Memorizing the Quran on Physical and Mental Health of Muslims: Evidence From Systematic Review," *International Journal of Public Health* 67 (August 2022): 1604998, https://doi.org/10.3389/ijph.2022.1604998.

[26] Che Wan Mohd Rozali et al., "The Impact of Listening to, Reciting, or Memorizing the Quran on Physical and Mental Health of Muslims."

The correct pronunciation of specific letters, particularly the *Jahr* letters, can greatly improve the removal of carbon dioxide from the brain compared to other types of letters. Breathing techniques associated with *Tajwid*, especially the principles of *Waqf* and *Was}l*, can help regulate and prolong breathing, thereby facilitating the expulsion of excess air from the lungs.[27] Experimental evidence demonstrates that differential breathing techniques including natural, rapid, slow, and paced patterns elicit distinct neurophysiological and psychological responses, indicating that respiratory modulation directly influences brain activity and mental states. These findings underscore the mechanistic link between volitional breathing strategies and their specific neuromodulatory effects, suggesting targeted applications for cognitive or emotional regulation..[28]

4. *Neuroplasticity of the Brain*

The process of *Tajwid* is linked to the formation and alteration of brain activity. The brain is a highly adaptable organ that can reorganize itself, altering both its activity and the size of specific regions in response to usage. Consistent practice in the correct recitation of Quranic verses can lead to structural changes in the brain at the synaptic level, fostering the development of new neural circuits and contributing to cognitive enhancement.[29] The combination of sensory, motor, and language-related tasks with external stimuli has been shown to support key neurological processes, such as the creation of new neural connections (synaptogenesis), the development of myelin sheaths around nerve fibers (myelination), and the strengthening of communication between neurons.[30]

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[27] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[28] Josh Goheen et al., "From Lung to Brain - Respiration Modulates Neural and Mental Activity," preprint, PsyArXiv, September 20, 2022, https://doi.org/10.31234/osf.io/zyd8g.

[29] Mubin, "Karakteristik Materi Pembelajaran Tahsinul Qur'an Berbasis Neurosains."

[30] Athanasios S. Drigas et al., "An Integrated Approach to Neuro-Development, Neuroplasticity and Cognitive Improvement," *International Journal of Recent Contributions*

D. Integration of Tadabbur in Neurocognitive Activities

Tadabbur refers to the practice of contemplation, involving a meticulous examination and profound attention to uncover the essence concealed within words and to explore the deeper meanings behind them. This process requires thoughtful engagement and a discerning perspective to grasp the intricate qualities that may not be readily apparent from a superficial reading of the Quranic recitation.[31] *Tartil* Quran, which integrates the precise articulation of *Tajwid* with the profound contemplation of Tadabbur, offers significant neurocognitive advantages. The Qur'an is described as*Syifa'* (healing) for mental illnesses, indicating its deep impact on mental well-being. Practices like *Zikr* (remembrance), closely related to Qur'anic recitation are shown to bring peace and tranquility to the heart, reduce anxiety, tension, and depression, and can shift brain waves toward a relaxed state. This holistic approach, combining accurate recitation with deep reflection, inherently stimulates beneficial brain activity. Such engagement contributes to improved concentration, emotional regulation, and stress reduction, highlighting the Qur'an's comprehensive therapeutic potential.[32] *Tadabbur* has significant effects on mental health and cognitive function, namely:

1. *Stress and Anxiety Management*

The patient's clinical improvement stems largely from biochemical responses triggered by *Zikr* (recitation), which modulates stress-related pathways in the body. Additionally, understanding the spiritual meaning behind these practices enhances their therapeutic effect by promoting psychological relaxation. Together, these mechanisms work synergistically to

from Engineering, Science & IT (iJES) 6, no. 3 (2018): 4, https://doi.org/10.3991/ijes.v6i3.9034.

[31] Sri Tanti, "Terapi Penyakit Jiwa Perspektif Al-Qur'ab (Elaborasi Ayat-Ayat tentang Syifa dalam Al-Qur'an)."

[32] Sri Tanti, "Terapi Penyakit Jiwa Perspektif Al-Qur'ab (Elaborasi Ayat-Ayat tentang Syifa dalam Al-Qur'an)."

reduce physiological and emotional tension.[33] Reflective engagement with Quranic verses or *Tadabbur* offers a spiritual framework that empowers individuals to navigate life's difficulties with resilience. Whether through structured contemplation or Quran-based counseling using uplifting verses, this practice functions as an effective intervention for stress and anxiety reduction. By fostering a deeper connection with divine wisdom, it promotes inner peace and sustained psychological well-being..[34]

2. *Enhanced Spiritual and Cognitive Intelligence*

The practice of Qur'anic *Tadabbur* significantly enhances participants' spiritual intelligence. Engaging in the recitation of the Qur'ān with a comprehensive understanding of its meanings activates more complex cognitive functions within PFC. This process facilitates interpretation and deep contemplation of the verses recited.[35] Research demonstrates that Quranic *tadabbur* (contemplative reflection), particularly on verses like *Surah al-Insyirah*, significantly alleviates academic stress among university students while concurrently reducing anxiety levels; these effects are attributed to the practice's capacity to induce cognitive-emotional regulation, as evidenced by both self-reported and physiological metrics. The intervention's efficacy is linked to its dual engagement of attentional focus (through verse analysis) and affective soothing (through spiritual connection), which collectively modulate stress-responsive neural pathways. Such findings position *tadabbur* as a culturally grounded, non-pharmacological tool for stress management in high-pressure academic settings.[36]

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[33] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[34] Maidahtus Sholihah et al., "Qur'anic Counseling with Motivational Guidance QS. Al-Baqarah Verses 155-156, in Overcoming Anxiety in One of the Students," *Dirasah International Journal of Islamic Studies* 2, no. 1 (2024): 87–95, https://doi.org/10.59373/drs.v2i1.32.

[35] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[36] Saifuddin Zuhri, Ahmad Zain Sarnoto, Nisa Amalia, "Pembelajaran Al Qur'an Pada Usia Dewasa Berdasarkan Psikologi Perkembangan dan Neurosains," *Andragogi: Jurnal*

Scientific studies indicate that consistent Quranic recitation strengthens core cognitive abilities associated with enhanced mental performance, including improvements in working memory and executive function. Furthermore, this practice elevates multiple dimensions of intelligence such as Intelligence Quotient (IQ) through analytical engagement, Emotional Quotient (EQ) via reflective empathy, and Spiritual Quotient (SQ) by fostering transcendent awareness collectively refining an individual's behavioral and ethical dispositions. These compounded benefits demonstrate how Qur'anic engagement serves as a holistic neurodevelopmental tool, simultaneously optimizing intellectual, emotional, and moral capacities.[37]

3. *Physiological Changes and Positive Behavioral Outcomes*

Tadabbur significantly lowers heart rate, promoting physiological relaxation and enhancing mental well-being. Those who practice *tadabbur* regularly demonstrate positive behavioral adaptations, such as improved resilience and problem-solving skills, enabling them to navigate life's challenges more effectively. These findings highlight *tadabbur* as a holistic practice that fosters both emotional stability and practical coping mechanisms.[38] And effective problem-solving ability plays a pivotal role in enabling the brain to analyze and synthesize information gained from life experiences, thereby enriching one's comprehension of Qur'anic verses. This cognitive process fosters a more profound engagement with the text, ultimately facilitating the attainment of *Tadabbur*. By bridging experiential knowledge with scriptural reflection,

Pendidikan Islam dan Manajemen Pendidikan Islam 2, no. 5 (2023): 131–52, https://doi.org/doi.org/10.36671/andragogi.v1i3.66.

[37] Dedek Noviyani and Elli Nur Hayati, "Reflections on Memorizing the Qur'an on the Spiritual Intelligence of Santri Ma'had Al-Mubarok Al-Islami Litahfidzil Qur'an Al-Karim," *Psikoborneo: Jurnal Ilmiah Psikologi* 11, no. 3 (2023): 427, https://doi.org/10.30872/psikoborneo.v11i3.11976.

[38] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

individuals cultivate a deeper, more meaningful connection with the Qur'an's teachings.[39]

The cognitive processes activated during *Tadabbur* with the Qur'an closely parallel core problem-solving skills, as both require systematic analysis, logical reasoning, and the application of contextual knowledge. By critically evaluating textual and conceptual layers, this practice cultivates deeper insight while resolving ambiguities inherent in complex scripture. Such mental rigor not only enhances spiritual comprehension but also sharpens analytical abilities transferable to broader intellectual challenges.[40]

4. *Brainwave Stimulation*

Neuroscientific studies reveal that meditation significantly elevates Alpha and Theta wave activity, which are associated with relaxed alertness and deep focus. Concurrently, Delta wave modulation during meditative states promotes profound relaxation while facilitating neural restoration and cellular repair processes. These findings collectively underscore meditation's dual role in enhancing cognitive states and supporting neurophysiological recovery.[41] The act of reciting the Quran, which involves *Tajwid* and *Tadabbur*, exerts a considerable impact on neurocognitive processes by inducing beneficial brain activity. Empirical studies show that participation in Quranic recitation increases the frequency of Alpha Waves, which are associated with a state of relaxation, and Delta Waves, which correlate with deep relaxation and cell rejuvenation. This engagement enhances neuroplasticity and activates the prefrontal cortex, resulting in improved focus, emotion regulation, and reduction of stress and anxiety.[42]

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[39] Saifuddin Zuhri, Ahmad Zain Sarnoto, Nisa Amalia, "Pembelajaran Al Qur'an pada Usia Dewasa Berdasarkan Psikologi Perkembangan dan Neurosains."

[40] Sonia Suarez Enciso et al., *Skills for Life Series: Problem-Solving*, August 2, 2024, https://doi.org/10.18235/0013098.

[41] Nurshahida et al., "Kesan Bacaan Tartil (Tajwid Dan Tadabur) Terhadap Fisiologi dan Aktiviti Neurosains Kognitif Menggunakan Electroencephalography Dan NeuroFeedback Training: Suatu Sorotan."

[42] Febri Yordan Dwi Nursyah and Denisa Apriliawati, "The Effectiveness of Koran Recitation to Reduce Academic Anxiety Among First Year Students: A Randomized Controlled Trial," *Journal of Psychological Perspective* 7, no. 1 (2025): 77–86, https://doi.org/10.47679/jopp.7110322025.

E. Convergence of Neuroscience and Spiritual Practices

The findings from these studies demonstrate a notable alignment between spiritual practices in Islam and insights from neuroscience. The practice of *Z{ikr* akin to the concentration involved in *Tadabbur* has the potential to create new neural pathways related to concentration, emotional regulation, and enhanced cognitive abilities. Regular engagement in *Z{ikr* has been shown to reinforce synaptic connections in the brain and optimize overall brain function through focused attention.[43]

These findings substantiate the neurophysiological basis of *'Aql* (rational cognition) and *Qalb* as interdependent brain functions, with the frontal cortex governing analytical reasoning and the limbic system modulating affective processing. Empirical evidence positions this cortical-subcortical integration as the neural substrate for holistic human cognition, where executive functions and spiritual awareness emerge from synchronized circuitry. Such a framework reconciles Islamic epistemological concepts with contemporary neuroscience by mapping metaphysical faculties to measurable neuroanatomical systems.[44]

Neuroscience recognizes the brain as an innate neurobiological structure that differentiates humans through its capacity for consciousness, emotional processing, and higher cognition. This framework reveals that human intellect and the Qalb (heart) are not separate entities but rather interconnected functions of the brain that can be enhanced through specific practices, particularly Quranic recitation or *Tartīl*. The rhythmic, contemplative nature of *Tartīl* engages multiple neural networks, optimizing both cognitive and emotional faculties through neuroplastic adaptation. This neuroscientific approach provides a unique lens to examine spiritual

[43] Rifqatul Husna et al., "Improving Brain Neuroplasticity In Concentration, Emotional Control, and Cognitive Power Through Dhikr," *Madinah: Jurnal Studi Islam* 12, no. 1 (2025): 29–41, https://doi.org/10.58518/madinah.v12i1.3399.

[44] Nurjannah and Suyadi, "Akal dan Qalb dalam Perspektif Al Quran dan Neurosains," *MANAZHIM* 4, no. 1 (2022): 53–65, https://doi.org/10.36088/manazhim.v4i1.1617.

phenomena, including the degree of faith (īmān) in the heart. The emerging field of neurotheology investigates this through the "neurobiology of God" hypothesis, which posits that the intellect functions as a biological interface for transcendent experiences. Such research suggests that Quranic engagement may neurologically facilitate the manifestation of divine connection, bridging spiritual and scientific understandings of human nature.[45]

The design of engaging, challenging, and accessible Qur'an learning materials aligns with neuroscience-based educational principles. By creating a positive and low-stress learning environment, these materials optimize the function of the limbic system (emotional regulation) and neocortex (higher-order thinking), which together enhance memory consolidation and recall. This approach leverages the brain's natural learning mechanisms to maximize retention and comprehension of Qur'anic content. Such neuroscience-informed strategies not only facilitate efficient knowledge acquisition but also support precise and fluent Qur'anic recitation. By reducing cognitive overload and emotional barriers, this method fosters deeper engagement with the text, ensuring both accuracy in narration and long-term mastery. These outcomes highlight the transformative potential of integrating neuroscientific insights with Islamic pedagogy.[46]

F. Conclusion

The integration of *Tajwid* into neurocognitive activities demonstrates a significant impact on the nervous system and physiology. Research reveals that reciting *Tajwid* can increase Heart Rate Variability (HRV) and lower heart rate, indicating a physiological relaxation response. Additionally, this practice stimulates Alpha and Delta Wave Activity associated with relaxed focus, neural regeneration, and cellular repair. Further Electroencephalography (EEG) analysis shows increased Alpha

[45] Urbaningkrum et al., "Manajemen Stres dalam Program Akselerasi Pendidikan Perspektif Neurosains."

[46] Mubin, "Karakteristik Materi Pembelajaran Tahsinul Qur'an Berbasis Neurosains."

Wave Synchronization, indicating optimized selective attention and information filtering, as well as shorter P3 latency, reflecting accelerated cognitive processing. This implies that *Tajwid* practice can enhance executive functions, including performance monitoring and error detection, and support carbon dioxide removal from the brain through proper pronunciation of the *Jahr* letters and regular breathing techniques. These aspects collectively enhance brain neuroplasticity, form new neural circuits, and strengthen neural connections.

Meanwhile, the integration of *Tadabbur* into neurocognitive activities has a profound effect on mental health and cognitive function. *Tadabbur* has been proven to activate the Pre-Frontal Cortex (PFC), which facilitates higher-level thinking and spiritual intelligence. This practice also shows significant stress-reducing effects, including reduced academic stress and anxiety, through the stimulation of Theta Waves and a decrease in cortisol levels. Furthermore, *Tadabbur* significantly enhances participants' spiritual, Intelligence Quotient (IQ), and Emotional Quotient (EQ) intelligence. Physiologically, *Tadabbur* has been shown to reduce heart rate and trigger constructive behavioral changes, as well as enhance problem solving capacity. The increased activity of Alpha, Theta, and Delta Waves associated with *Tadabbur* also contributes to deep relaxation and brain cell recovery.

Synergistically, the regular practice of *Tartil* (integrating *Tajwid* and *Tadabbur*) strengthens neural connectivity between the limbic system and the frontal cortex, providing empirical validation for the Islamic concept of the qalb as a brain function that can be optimized. This finding clearly demonstrates the role of the Qur'an in mental health through measurable neuroplastic changes. The Qur'an truly functions as *Syifa'* (healing) for mental illness, and the practice of *Tartil* facilitates mental and physical balance, optimizing brain function while fostering spiritual growth. The cognitive processes involved in *Tartil* from perception to reasoning are

trained and refined, enhancing overall brain function and aiding stress management.

This research establishes an integrative framework bridging Islamic epistemological traditions with contemporary neuroscientific evidence, making a substantial contribution to contemporary exegesis studies by expanding them into neurocognitive and therapeutic dimensions. It offers actionable insights for the development of spiritually-based cognitive therapy. The convergence of these findings also underscores how spiritual practices such as *Tartil* can create new neural pathways related to concentration, emotional regulation, and enhanced cognitive abilities, optimizing overall brain function. This supports a neuroscience-based approach to Qur'anic education, creating a positive learning environment for effective knowledge acquisition and accurate narration.

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