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From Neurons to Leaders: A Brain-Targeted Framework for Leadership Education

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Abstract

The rapidly evolving fields of neuroleadership and neuroeducation hold immense potential for transforming our understanding of effective leadership and learning. While neuroleadership delves into the neural underpinnings of leadership behaviors and decision-making processes (Rock & Schwartz, 2006), neuroeducation bridges the gap between neuroscience and education to optimize learning and cognitive performance (Hardiman, 2012). Despite their distinct origins and focal points, these two fields converge in their shared objective of translating neuroscience research into practical strategies for enhancing human performance and development. In this article, we propose a unified framework that synergizes insights from both domains, leveraging Dr. Mariale Hardiman's Brain-Targeted Teaching (BTT) model to optimize learning and leadership development across organizational and educational contexts.

We aim to represent a comprehensive approach to fostering environments that nurture continuous improvement and innovation in leadership by integrating principles from neuroleadership, such as emotional intelligence (Goleman, 1998), transformational leadership (Bass & Riggio, 2006), adaptive leadership (Heifetz et al., 2009), and authentic leadership (Avolio & Gardner, 2005),

Ultimately, this article seeks to arm leaders with a brain-targeted approach to leadership and learning, helping them to create impactful experiences that empower individuals to thrive and realize their full potential.

Aligning Neuroleadership and Neuroeducation: Integrating the Brain-Targeted Teaching Model for Optimal Learning and Development:

The fields of neuroleadership and neuroeducation have evolved independently, each offering unique insights into the application of neuroscience principles to leadership and education, respectively. Despite their distinct origins and areas of emphasis, these two fields share a common goal of translating neuroscience research into practical strategies for improving human performance and leadership development.

Introduction to Traditional Neuroleadership Literature:

Over the past two decades, the field of neuroleadership has emerged as an interdisciplinary area of study, integrating findings from neuroscience, psychology, and management to understand the neural basis of effective leadership (Rock & Schwartz, 2006). Traditional neuroleadership research has primarily focused on exploring the neural mechanisms and correlates underlying leadership behaviors, decision-making processes, and social interactions in organizational settings (Boyatzis, 2011).

Through the use of advanced neuroimaging techniques such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG), researchers have made significant strides in identifying the brain regions and neural processes associated with key leadership traits and behaviors. For example, studies have highlighted the role of the prefrontal cortex in emotional regulation and decision-making (Waldman et al., 2011), the amygdala in processing social and emotional cues (Boyatzis et al., 2014), and the mirror neuron system in empathy and effective communication (Molenberghs et al., 2014). These findings not only contribute to our understanding of leadership but also have implications for learning and performance in educational contexts (Rock & Ringleb, 2013).

Seminal studies and influential frameworks have also shaped the field of neuroleadership. David Rock's SCARF model (Rock, 2008) has been widely recognized for its exploration of how social factors like status, certainty, autonomy, relatedness, and fairness influence neural processes and leadership effectiveness. This model has provided a foundation for understanding the neural basis of social interactions and motivation in organizational contexts. Moreover, the principles underlying the SCARF model, such as the importance of creating a "toward state" in the brain associated with positive emotions and social connection, are also relevant for optimizing learning experiences in educational settings (Rock & Ringleb, 2013).

However, while traditional neuroleadership research has provided valuable insights into the biological underpinnings of leadership, there has been a growing recognition of the need to translate these findings into actionable strategies for leadership development and organizational effectiveness (Boyatzis, Rochford, & Jack, 2014). This shift towards a more applied approach has led to the alignment of neuroeducation as a complementary field, seeking to bridge the gap between neuroscience and education to enhance learning and cognitive performance (Jensen, 2008). The interconnectedness of neuroleadership and neuroeducation is further highlighted by the concept of neuroplasticity, which refers to the brain's ability to change and adapt in response to experience (Rock & Ringleb, 2013). By leveraging this principle, both leaders and educators can provide opportunities for practice, reflection, and feedback, fostering the development of new skills and habits.

Bridging the Gap: Integrating Neuroleadership and Neuroeducation

As the fields of neuroleadership and neuroeducation continue to evolve, there is a growing opportunity to integrate their insights and principles to create a more comprehensive approach to

learning and development. By aligning the foundational concepts of neuroleadership with the practical applications of neuroeducation, leaders can design and implement strategies that optimize learning experiences and drive individual and organizational success. In the following section, we propose a framework that integrates Dr. Mariale Hardiman's Brain-Targeted Teaching (BTT) model with key principles from neuroleadership to create a holistic approach for enhancing learning and development in various contexts.

A Proposed Framework for Optimizing Learning and Leadership Development

In this article, we build upon the foundational principles of traditional neuroleadership research while extending its application to the realm of education. We propose aligning Dr. Mariale Hardiman's Brain-Targeted Teaching (BTT) model, a neuroeducation framework, with principles from neuroleadership to create a holistic approach for optimizing learning and development in both organizational and educational contexts. The BTT model consists of six brain targets: emotional climate, physical environment, learning design, teaching for mastery, teaching for application, and evaluating learning (Hardiman, 2012). By integrating these brain targets with established leadership theories, such as emotional intelligence (Goleman, 1998), transformational leadership (Bass & Riggio, 2006), and adaptive leadership (Heifetz et al., 2009), we aim to provide leaders with a comprehensive framework for creating environments that foster continuous improvement, innovation, and individual growth.

Our goal is to bridge the gap between neuroleadership and neuroeducation by highlighting the commonalities and complementary aspects of these two fields. By drawing upon the BTT model's emphasis on creating optimal learning conditions and the insights from neuroleadership research on effective leadership practices, we propose a synergistic approach that leverages the strengths of both domains. This alignment enables leaders to design and implement strategies that are grounded in neuroscience and tailored to the needs of both learners and organizations.

The BTT model's six brain targets provide a structured framework for leaders to address the various factors that influence learning and performance. For instance, by focusing on the emotional climate and physical environment, leaders can create supportive and engaging spaces that promote well-being, motivation, and collaboration (Hardiman, 2012). Integrating these principles with concepts from emotional intelligence and transformational leadership, such as self-awareness, empathy, and inspirational motivation (Goleman, 1998; Bass & Riggio, 2006), enables leaders to foster a positive and emotionally resonant culture that encourages learning and growth.

Similarly, the BTT model's emphasis on learning design, teaching for mastery, and teaching for application aligns with neuroleadership principles related to goal-setting, feedback, and experiential learning (Rock & Ringleb, 2013). By incorporating these elements into their leadership approach, leaders can create meaningful and effective learning experiences that promote the acquisition and transfer of knowledge and skills. Furthermore, by adopting an

adaptive leadership mindset (Heifetz et al., 2009) and leveraging the BTT model's focus on evaluating learning, leaders can continuously assess and adapt their strategies to meet the evolving needs of their teams and organizations.

Through this alignment of neuroleadership and neuroeducation principles, we aim to provide leaders with a practical and comprehensive framework for driving individual and organizational success. By harnessing the power of neuroscience and applying it to both leadership and learning, leaders can create environments that nurture talent, foster innovation, and promote continuous improvement. This holistic approach represents a significant step forward in translating the findings of neuroleadership and neuroeducation research into actionable strategies that can be implemented across various contexts.

Brain-Target One: Establishing the Emotional Climate for Learning

A positive emotional climate in the workplace is essential for fostering employee engagement, motivation, and performance. However, negative experiences can lead to "downshifting" (Hardiman, 2012; Willis, 2014), a state where individuals focus on survival rather than higher-order thinking and creativity. Factors contributing to a negative emotional climate include high stress, anxiety, fear, and a lack of psychological safety (Edmondson, 1999; Frazier et al., 2017). Gender bias and discrimination can also contribute to negative emotional climates, with women more likely to experience these challenges in the workplace (Smith et al., 2018; Nyberg & Sveningsson, 2014).

Leadership plays a crucial role in establishing and maintaining a positive emotional climate. Transformational leaders inspire and motivate followers through emotional connections, leading to enhanced cognitive associations and better performance on creative thinking measures (Hardiman, 2012; Udin et al., 2022). Similar to supportive teachers, supportive leaders nurture growth and well-being through emotional support and care (Bagdžiūnienė et al., 2022; Berkovich & Eyal, 2021). To create a positive emotional climate, leaders can regularly check in with team members to understand their thoughts and feelings (Kahn, 1990), set clear expectations for respectful communication, and actively address instances of negative behavior or bias (Nembhard & Edmondson, 2006). Providing opportunities for employees to share ideas and engage in creative problem-solving in a safe and supportive environment (Carmeli et al., 2014) is also essential. Furthermore, modeling positive emotions and behaviors (Sy et al., 2005) can contribute to a positive emotional climate as well.

Brain-Target Two: Creating the Physical Learning Environment

The physical work environment significantly impacts learning, attention, and engagement (Hardiman, 2012). Poor physical conditions, such as excessive noise, inadequate lighting, or uncomfortable temperatures, can hinder productivity and well-being (Cheryan et al., 2014;

Wargocki & Wyon, 2017). Open office layouts, while intended to promote collaboration, can lead to distractions and decreased satisfaction if not designed properly (Kim & de Dear, 2013; Bernstein & Turban, 2018). Servant leaders prioritize the well-being of team members and the work environment to ensure productivity (Greenleaf, 1977; Brewer, 2010; van Dierendonck, 2011), while adaptive leaders recognize the importance of adapting the work environment to support evolving needs (Heifetz & Linsky, 2002; Northouse, 2019).

To create an optimal physical learning environment, leaders can design office spaces with a variety of work zones, such as quiet areas for focused work, collaborative spaces for team projects, and relaxation areas with comfortable seating and natural elements (Oseland, 2009). Encouraging employees to choose the space that best suits their needs throughout the day (Wohlers & Hertel, 2017) and investing in high-quality lighting, ergonomic furniture, and noise-canceling headphones (Veitch et al., 2007) can ensure comfort and minimize distractions. Regularly assessing and adjusting the physical environment based on employee feedback and changing needs (Al Horr et al., 2016) and incorporating elements of biophilic design, such as plants and natural light, can promote well-being and productivity (Kellert et al., 2008). Creating a flexible and supportive physical environment ultimately promotes employee well-being, productivity, and engagement (Clements-Croome, 2018).

Brain-Target Three: Designing the Learning Experience

Explain the target first.
Effective learning experiences are coherent, meaningful, and connected to real-world applications (Hardiman, 2012; Darling-Hammond et al., 2020). Leaders guide teams towards strategic objectives, emphasizing global understanding and big ideas (Zasa & Buganza, 2022; Hardiman, 2012). Integrating brain-compatible learning theories and adaptive leadership principles, leaders create adaptive learning environments that mirror real-life challenges, fostering resilience and innovation (Tokuhama-Espinosa, 2019; Heifetz et al., 2009). Disconnected or fragmented learning experiences can lead to disengagement and decreased motivation (Hardiman, 2012; Darling-Hammond et al., 2020). To avoid this, leaders should strive to create learning experiences that are relevant, meaningful, and interconnected (Immordino-Yang & Damasio, 2007; Fischer & Immordino-Yang, 2008).

Leaders can design effective learning experiences by creating visual roadmaps that highlight key objectives, milestones, and connections between different departments or projects (Eppler & Platts, 2009) and regularly updating and prominently displaying these roadmaps to reflect progress and changes (Kerr et al., 2013). Using storytelling and case studies to help employees understand the real-world impact of their work and how it contributes to the bigger picture (Denning, 2011) and encouraging employees to apply their learning to real-world situations and share their experiences with the team (Kolb & Kolb, 2005) can further enhance the learning

experience. Fostering a culture of continuous learning and providing opportunities for employees to develop new skills and knowledge (Filstad et al., 2019) is also essential. By designing coherent and meaningful learning experiences, leaders help employees develop a deeper understanding of the organization's goals and their role in achieving them (Kolb & Kolb, 2005).

Brain-Target Four: Teaching for Mastery of Content, Skills, and Concepts

Mastery of content, skills, and concepts is essential for employee performance and adaptability. Continuous improvement through feedback fosters a culture of reflection and growth (Lee et al., 2021; Hattie & Timperley, 2007), while promoting a growth mindset encourages learning and experimentation, leading to innovation and resilience (Xie, 2019; Dweck, 2006). Building intellectual agility enables teams to thrive in diverse environments (Harvey & De Meuse, 2021; DeRue et al., 2012), and authentic leadership emphasizes genuine connections between learning and application (Walumbwa et al., 2008; Gardner et al., 2011). Environments that lack opportunities for feedback, growth, and development can lead to stagnation and decreased motivation (Hardiman, 2012; Ericsson & Pool, 2016). Leaders should prioritize continuous learning and provide regular opportunities for employees to receive constructive feedback and develop new skills (Hourani et al., 2019; Carless, 2019).

To promote mastery of content, skills, and concepts, leaders can implement mentoring programs that pair experienced employees with newer team members (Allen et al., 2004), encouraging mentors to provide guidance, feedback, and support to help mentees develop their skills and knowledge (Eby et al., 2008). Offering regular training sessions and workshops on topics relevant to employees' roles and career goals (Aguinis & Kraiger, 2009), creating a culture of continuous improvement by setting clear expectations for learning and growth (Ericsson et al., 2018), and providing resources and support for employees to pursue additional education or certifications related to their roles (McCall, 2010) are also effective strategies. By fostering a culture of continuous improvement and providing opportunities for mastery, leaders help employees build the skills and knowledge needed to succeed in their roles and adapt to changing environments (Ericsson et al., 2018).

Brain-Target Five: Teaching for the Extension and Application of Knowledge—Creativity and Innovation in Education

Creativity and innovation are crucial for organizational success in today's rapidly changing world. Transformational leadership fosters innovation and creativity by inspiring and motivating team members (Bass & Riggio, 2006; Gumusluoglu & Ilsev, 2009), while authentic leadership promotes genuine connections between academic learning and practical skills (Walumbwa et al., 2008; Avolio & Gardner, 2005). Environments that discourage risk-taking, punish mistakes, or prioritize conformity over creativity can stifle innovation and problem-solving (Hardiman, 2012;

Amabile, 1998). Leaders should create a psychologically safe space where employees feel comfortable sharing ideas, experimenting, and learning from failures (Edmondson, 2018; Carmeli et al., 2010).

To promote creativity and innovation, leaders can host regular "innovation sprints" where cross-functional teams collaborate on solving real-world problems (Knapp et al., 2016), encourage employees to think creatively, share ideas, and prototype solutions (Brown, 2009), and emphasize the importance of learning from failures and celebrate innovative approaches, even if they don't lead to immediate success (Sitkin, 1992). Providing resources and support for employees to pursue creative projects or explore new ideas (Amabile & Pratt, 2016) and modeling creative thinking and problem-solving while sharing personal experiences of innovation and failure (Bednall et al., 2018) can further promote creativity and innovation. By fostering an environment that supports creativity and innovation, leaders help employees develop the skills and mindset needed to adapt to changing environments and drive organizational success (Anderson et al., 2014).

Brain-Target Six: Evaluating Learning

Effective evaluation of learning is essential for continuous improvement and growth. Continuous evaluation ensures continual adaptation (Surak, 2017; Earl, 2012), while performance-based assessments gauge practical application of skills and knowledge (Hardiman, 2012; Wiggins, 1998). Authentic leadership promotes honest self-assessment and peer feedback, fostering personal and professional development (Walumbwa et al., 2008; Ashford, 1989). Evaluation systems that rely solely on quantitative metrics or fail to consider individual growth and development can demotivate employees and hinder learning (Hardiman, 2012; Pink, 2011). Leaders should implement holistic evaluation approaches that consider multiple factors, including practical application, personal growth, and peer feedback (Aguinis, 2019; Black & Wiliam, 1998).

To evaluate learning effectively, leaders can introduce a portfolio system where employees document their learning experiences, achievements, and reflections throughout the year (Zubizarreta, 2009), using these portfolios as a basis for performance evaluations that focus on individual growth and development rather than solely on quantitative metrics (Shalley et al., 2004). Encouraging employees to seek feedback from peers and engage in self-assessment to identify areas for improvement (Brutus et al., 2006), providing regular opportunities for employees to discuss their learning and development with managers and mentors (Levy & Williams, 2004), and using evaluation data to inform future learning experiences and support employee growth (Kraiger et al., 2004) are also effective strategies. By implementing a comprehensive and growth-oriented evaluation system, leaders help employees develop a deeper

understanding of their strengths, weaknesses, and opportunities for development (Levy & Williams, 2004).

In conclusion, leaders can create environments that optimize learning, foster innovation, and promote the well-being and success of their teams by addressing negative climates, providing practical solutions, and incorporating research-based strategies for each Brain-Target. This holistic approach, grounded in neuroscience and leadership theory, empowers individuals and organizations to thrive in an ever-changing world. By integrating the principles of transformational, supportive, servant, adaptive, and authentic leadership with the Brain-Targeted Teaching model, leaders can create a culture of continuous learning, growth, and innovation that benefits both employees and the organization as a whole.

Emotional Climate: Cultivate a respectful, open environment that supports vulnerability and builds emotional intelligence for leadership.

Physical/Virtual Environment: Create dynamic, professional settings (e.g., seminar-style rooms, Zoom breakouts) that simulate real-world leadership contexts.

Learning Design: Frame leadership topics around current business challenges (e.g., DEI, ESG, crisis response) to ensure relevance and engagement.

Mastery of Content: Teach leadership models (e.g., transformational, adaptive, servant leadership) using case studies, Harvard simulations, and debates.

Application of Knowledge: Provide experiential opportunities like team consulting projects, role-plays, or leadership labs to apply theory in practice.

Evaluation: Use multi-source feedback, reflective leadership journals, and capstone presentations to assess skill development and growth mindset.

Argumentative essays, maybe there are other lit. they dont understand brain science, argue that.
Bring BTT to leadership and create a new model. Within higher education context.
Essay example in leadership:
https://journals.sagepub.com/doi/pdf/10.1177/10525629211008645?casa_token=GKw03hkWnvQAAAAA:XJzR3Frzeg1TZgjpYDSQDcCfmDbIv_OharP-lnTgAsxj7ncvzX0KxybW3eg7sQuW4H4qBwCMtIBZTWA

Suggestion: higher education extend to work space as implication as trainings.
8000 words 6000 for essays.
What can we do in classroom? What can we do as curriculum designer? Future research opportunities.
Developing leaders
Organizaitonal practitioners

https://journals.sagepub.com/page/JME/SI-Preparing-Leaders-to-Tackle-Grand-Challenges
Management learning