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Design and Elaboration of the Neuro-Coaching Education Model (Neuroscience of Coaching)

Babak Asadi Dezaki [1], Mohammad Reza Dalvi Esfahan[2*], Alireza Shirvani [2]

[1] PhD student, Department of Management, Dehaghan Branch, Islamic Azad University, Dehaghan, Iran.
[2] Associate Professor, Department of Management, Dehaghan Branch, Islamic Azad University, Dehaghan, Iran.

*** Corresponding author email address**: mdelvi@dehaghan.ac.ir

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A B S T R A C T

Purpose: The aim of the present study was to design and elaborate the neuro-coaching model (neuroscience of coaching) at Isfahan Steel Company.

Methodology: This research is an applied study and, in terms of methodology, a mixed-methods (qualitative-quantitative) research. The statistical population of the study consisted of 15 experts from Islamic Azad Universities and managers of the Isfahan Steel Company. In the qualitative section, their opinions were used to identify and code the categories. For modeling purposes, the statistical population included a group of officials from the Isfahan Steel Company. Cochran's formula was used for sampling, resulting in a sample size of 384, and the sampling method was randomly accessible. To identify the factors, interviews were conducted initially, and with the help of open coding, selective coding, and axial coding, categories and concepts were extracted.

Findings: The results of included 41 axial codes and 251 open codes. Subsequently, in the next stage, using confirmatory factor analysis, the axial, causal, contextual, intervening conditions, strategies, and outcomes were examined. Finally, consensus was reached on 209 open codes and 40 selective codes. For modeling, structural equations and partial least squares (PLS) with Smart PLS software were utilized. The results indicated that the neuro-coaching model (neuroscience of coaching) at Isfahan Steel Company is underpinned by 8 causal conditions, 8 contextual conditions, 6 intervening factors, and 7 strategies, leading to 11 major outcomes for Isfahan Steel Company. These outcomes include: improved neural process performance, personal growth and development, empowerment and psychological improvement, enhanced interactions and satisfaction, improved performance and cost reduction, psychology and personal relationships, interaction and communications, personal and psychological growth, individual and professional development, interactions and exercises, and the quality and effectiveness of neural solutions.

Conclusion: In conclusion, the neuro-coaching model holds significant promise for transforming coaching practices and enhancing organizational outcomes. The integration of neuroscience principles provides a robust framework for developing more effective and scientifically grounded coaching interventions.

Keywords: *Neuro-Coaching, Neuroscience, Modeling, Isfahan Steel Company*

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1. Introduction

In recent years, the integration of neuroscience into coaching practices has emerged as a prominent area of research and application, emphasizing the scientific underpinnings of coaching interventions. This development aligns with the growing recognition of the importance of evidence-based approaches in enhancing personal and professional development (Camiré et al., 2017; Cushion et al., 2017; Dyess et al., 2017; Erickson et al., 2008; Fried, 2019; Gozzoli et al., 2014; Grant, 2015; Oosten et al., 2019; Selimi et al., 2023; Sullivan et al., 2012; Townsend et al., 2017; Vangrunderbeek et al., 2023). The concept of neuro-coaching, or the application of neuroscience principles to coaching practices, has gained traction as it promises to offer more effective and scientifically grounded methods to improve individual and organizational outcomes (Boyatzis et al., 2022; Boyatzis & Jack, 2018).

The traditional methods of coaching have predominantly relied on psychological theories and anecdotal evidence. However, with advancements in neuroscience, there is an opportunity to deepen our understanding of how coaching can influence brain function and behavior. Boyatzis and Jack (2018) highlight the potential of neuroscience to transform coaching by providing insights into the neural mechanisms underlying learning, motivation, and behavior change. This neuroscientific perspective offers a robust framework for developing more effective coaching interventions that can lead to sustained behavioral change and improved performance (Boyatzis & Jack, 2018).

Furthermore, the increasing complexity of organizational environments necessitates innovative approaches to leadership and employee development. Coaching, when informed by neuroscience, can address these challenges by enhancing emotional and social competencies, which are critical for effective leadership (Oosten et al., 2019).

The theoretical foundation of this study is grounded in the principles of neuroscience as they apply to coaching. Neuroscience provides a comprehensive understanding of the brain's functioning, which can inform the development of coaching practices that are aligned with how the brain naturally learns and adapts (Grant, 2015). The integration of neuroscience into coaching involves several key concepts, including neuroplasticity, the brain's ability to reorganize itself in response to learning and experience; the role of emotions in decision-making and behavior; and the impact of stress and anxiety on cognitive function (Fried, 2019).

Neuroplasticity is particularly relevant to coaching as it underscores the potential for individuals to change their behaviors and thought patterns through targeted interventions. By leveraging techniques that promote neuroplasticity, such as mindfulness, goal-setting, and cognitive restructuring, coaches can facilitate significant and lasting changes in their clients (Boyatzis et al., 2022). Additionally, understanding the neural basis of emotions can help coaches develop strategies to manage stress and enhance emotional regulation, which are crucial for effective leadership and performance (George, 2023).

The integration of neuroscience into coaching is a relatively new but rapidly growing field. Boyatzis and Jack (2018) discuss the transformative potential of neuroscience in coaching, emphasizing the importance of understanding the neural mechanisms that underpin behavior change (Boyatzis & Jack, 2018). This perspective is supported by Grant (2015), who argues that a neuroscientific approach to coaching can enhance the effectiveness of interventions by aligning them with the brain's natural processes. Oosten et al. (2019) highlight the impact of emotional and social competency development on leadership outcomes, demonstrating that coaching interventions that focus on these areas can lead to significant improvements in performance and well-being (Oosten et al., 2019). This finding is echoed by Fried (2019), who suggests that co-active life coaching, which incorporates elements of neuroscience, can effectively manage stress and anxiety, leading to better overall mental health (Fried, 2019). In addition to these psychological benefits, the application of neuroscience in coaching can also improve organizational outcomes. Dyess et al. (2017) emphasize the importance of structured coaching programs in developing staff, which can lead to enhanced performance and reduced costs. This is particularly relevant in high-stakes environments such as the steel industry, where efficiency and productivity are critical (Dyess et al., 2017).

The proposed neuro-coaching model is built on several key components identified through the qualitative phase of the research. These include causal conditions, such as management and organization, rational decision-making, and resource management; contextual conditions, such as collaboration and coordination, customer orientation, and organizational budgeting; and intervening conditions, such as ethical principles, professional development, and cognitive reinforcement. The core phenomenon of the model is the importance and implementation of neuro-coaching, which is influenced by these conditions and, in turn, affects

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various strategies and outcomes. The primary objective of this research is to design and elucidate a neuro-coaching model specific to the context of Isfahan Steel Company. This involves identifying key components and conditions that influence the effectiveness of neuro-coaching and developing a structured framework that can be applied within the organization. The study also aims to evaluate the impact of this model on various outcomes, such as personal growth, psychological empowerment, and organizational performance.

2. Methods and Materials

The present study is an applied research in terms of its objective, as it aims to design and elaborate the neuro-coaching model (neuroscience of coaching) at Isfahan Steel Company. In terms of execution method, it falls under the category of qualitative grounded theory research and is exploratory in nature. The statistical population of this study includes two sections. The first group of participants consists of experts from Islamic Azad Universities and managers of Isfahan Steel Company. Fifteen individuals were purposefully selected and interviewed, meeting at least one of the following criteria: 1. Familiarity with the concept of neuro-coaching (neuroscience of coaching) and having conducted studies in this area. 2. Managers of Isfahan Steel Company and faculty members who held executive positions at Islamic Azad University.

The second group of participants in this study comprises officials from Isfahan Steel Company. After collecting and simultaneously analyzing the qualitative data, the results were conceptualized within the framework of the Strauss and Corbin paradigmatic model of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company. Subsequently, based on the relevant model, a questionnaire was developed to examine the relationships between the variables of the model using quantitative data to identify the most appropriate model for neuro-coaching. Initially, the validity and reliability of the prepared questionnaire were assessed, and after ensuring the questionnaire's validity, the proposed model was evaluated and its fit indices were calculated.

The statistical population in the quantitative section of this study includes officials from Isfahan Steel Company. For determining the sample size in the quantitative section, the formula for an infinite population was used. Based on this formula, the sample size was determined to be 384 individuals.

3. Findings and Results

In response to the research question (What is the proposed model of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?), the qualitative data gathered from the process of conducting semi-structured interviews with the research participants (experts and academic scholars) were analyzed through open, axial, and selective coding. The summary of findings obtained from the process of three-stage coding is presented in Table 1.

Table 1

Dimensions and Components Obtained from the Three Stages of Coding

Dimensions	Components
Causal Conditions	• Management and organization
	• Rational decision-making
	• Neuro-coaching process
	• Budget and taxation
	• Evaluation and support
	• Expertise and capabilities
	• Resource management
	• Neurological culture in the organization
Core Phenomenon	• Importance and implementation of neuro-coaching
Contextual	• Collaboration and coordination
Conditions	• Customer orientation and knowledge updating
	• Neurological management and productivity
	• Mindfulness and mastery of cognitive skills
	• Combination of methods and principles
	• Psychological interpersonal relationships

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	• Organizational budgeting
	• Neurological-based social and behavioral communications
Intervening	• Ethical principles
Conditions	• Professional development
	• Cognitive reinforcement
	• Principled counseling based on neuro-coaching approaches
	• Neurological focus
	• Collaboration and interaction
	• Technology application
Strategies	• Neurological-based planning and goal-setting
	• Neuro-coaching skills
	• Neurological training and empowerment
	• Support and conflict reduction
	• Use of neuroscience in management and scheduling
	• Behavior analysis and feedback
	• Utilizing neurological methods
Outcomes	• Improved neural process performance
	• Personal growth and development
	• Empowerment and psychological improvement
	• Improved interactions and satisfaction
	• Improved performance and cost reduction
	• Psychology and personal relationships
	• Interaction and communications
	• Personal and psychological growth
	• Individual and professional development
	• Interactions and exercises
	• Quality and effectiveness of neurological solutions

The paradigmatic model consists of six components derived from three stages of coding: causal conditions, core phenomenon, contextual conditions, intervening conditions, strategies, and outcomes. At this stage, using the extracted categories from the coding stage, the importance and implementation of neuro-coaching were identified as the core phenomenon and placed at the center of the paradigmatic framework. Subsequently, other components of the coding paradigm were identified.

To extract the paradigmatic findings related to achieving and exploring the main category, which is the core of the paradigmatic model and organizing other elements in relation to it, data collection was carried out through semi-structured interviews with 15 key informants. The researcher aimed to monitor the research subject in knowledge-based technology companies, conducting interviews with a number of experts from Islamic Azad Universities and managers of Isfahan Steel Company. The interviews, consisting of 14 questions, began according to the research topic and objective of elaborating the neuro-coaching (neuroscience of coaching) model at Isfahan Steel Company.

During the data collection process, concepts and propositions accumulated gradually. By the tenth interview, the main category of the importance and implementation of neuro-coaching was identified. Subsequent questions were formulated around this main category, and by the twelfth interview, theoretical saturation was somewhat confirmed. However, to ensure this and fill conceptual gaps, interviews continued until the fifteenth interview.

Ultimately, categories were organized into 40 main categories within the six dimensions of the paradigmatic model: 8 causal conditions, 8 contextual conditions, 6 intervening factors, and 7 strategies, leading to 11 major outcomes. The relationships between these elements are presented in the paradigmatic model. Figure 1 shows the results of the confirmatory factor analysis along with factor loadings.

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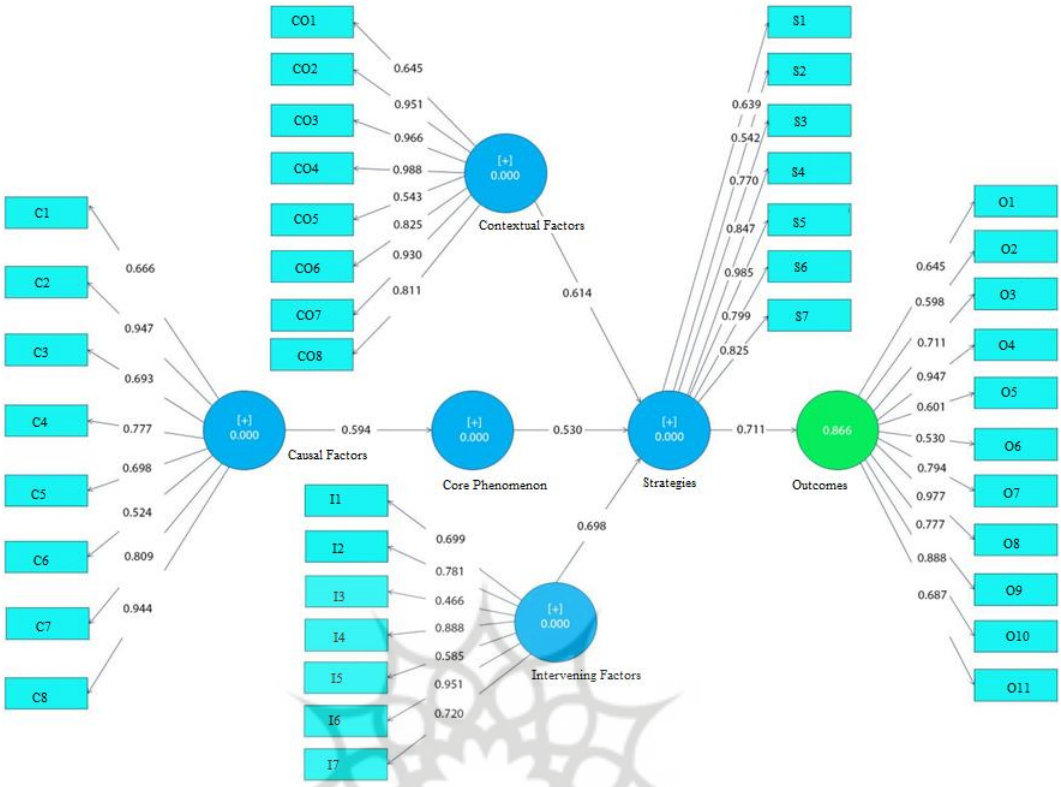
Figure 1

Model with Factor Loadings



What are the core conditions of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?

To answer this, interviews were conducted, and the interviews were coded using grounded theory. After final summarization and confirmatory factor analysis, the results showed that the type and importance of neuro-coaching are among the core conditions of neuro-coaching at Isfahan Steel Company.

What are the causal conditions of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?

To answer this, interviews were conducted, and the interviews were coded using grounded theory. After final summarization and confirmatory factor analysis, the results showed that from 8 axial codes and 59 open codes, ultimately 8 axial codes and 50 open codes were finalized. Nine sub-criteria with factor loadings less than 0.4 were removed. The main factors, ranked by priority and factor load, are as follows: Management and organization (0.947), Neurological culture in the organization (0.944), Evaluation and support (0.809), Budget and taxation (0.777), Expertise and capabilities (0.698), Rational decision-making (0.693), Neuro-coaching process (0.666), and Resource management (0.594).

What are the contextual conditions of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?

To answer this, interviews were conducted, and the interviews were coded using grounded theory. After final summarization and confirmatory factor analysis, the results showed that from 8 axial codes and 46 open codes, ultimately 8 axial codes and 42 open codes were finalized. The main factors, ranked by priority and factor load, are as follows: Customer orientation and knowledge updating (0.988), Collaboration and coordination (0.966), Organizational budgeting (0.951), Combination of methods and principles (0.930), Mindfulness and mastery of cognitive skills (0.825), Psychological interpersonal relationships (0.811), Neurological-based social and behavioral communications (0.645), and Neurological management and productivity (0.543).

What are the strategies of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?

To answer this, interviews were conducted, and the interviews were coded using grounded theory. After final summarization and confirmatory factor analysis, the results showed that from 7 axial codes and 31 open codes, ultimately 7 axial codes and 28 open codes were finalized.

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The main factors, ranked by priority and factor load, are as follows: Use of neuroscience in management and scheduling (0.985), Support and conflict reduction (0.847), Utilizing neurological methods (0.825), Behavior analysis and feedback (0.799), Neurological training and empowerment (0.770), Neurological-based planning and goal-setting (0.693), and Neuro-coaching skills (0.542).

What are the intervening factors of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?

To answer this, interviews were conducted, and the interviews were coded using grounded theory. After final summarization and confirmatory factor analysis, the results showed that from 7 axial codes and 26 open codes, ultimately 7 axial codes and 24 open codes were finalized. The main factors, ranked by priority and factor load, are as follows: Collaboration and interaction (0.951), Principled counseling based on neuro-coaching (0.888), Professional development (0.781), Technology application (0.720), Ethical principles (0.699), Neurological focus (0.585), and Cognitive reinforcement (0.466).

What are the outcomes of neuro-coaching (neuroscience of coaching) at Isfahan Steel Company?

To answer this, interviews were conducted, and the interviews were coded using grounded theory. After final summarization and confirmatory factor analysis, the results showed that from 11 axial codes and 89 open codes, ultimately 11 axial codes and 69 open codes were finalized. The main factors, ranked by priority and factor load, are as follows: Personal and psychological growth (0.977), Improved interactions and satisfaction (0.947), Interactions and exercises (0.888), Interaction and communications (0.794), Professional development (0.777), Empowerment and psychological improvement (0.711), Quality and effectiveness of neurological solutions (0.687), Improved neural process performance (0.645), Improved performance and cost reduction (0.601), Personal growth and development (0.598), and Psychology and personal relationships (0.530).

Does the neuro-coaching (neuroscience of coaching) model at Isfahan Steel Company have appropriate validity and reliability?

To examine the neuro-coaching model in Chapter Four, structural equations and partial least squares (PLS) methods were used. In this model, it was found that causal conditions with a factor loading of 0.594 affect the core phenomenon. Intervening factors with a factor loading of 0.698, contextual conditions with a factor loading of 0.614, and the core phenomenon with a factor loading of 0.530 affect strategies. Additionally, strategies with a factor loading of 0.711 affect outcomes.

As mentioned, the quantitative model in this research was fitted using structural equations and quantitative methods. Various methods, such as measuring validity and reliability, were used to examine the items and factors of the model. Based on the findings, it can be concluded that the research model has relatively desirable internal consistency. To establish and maintain the validity and reliability of the instruments, comprehensive criteria and methods were used. Three types of validity assessment indices, including internal consistency, item validity, and discriminant validity, were calculated in two stages of the research. In the findings section, the assessment of the three validity evaluation indices concluded that the model's validity is desirable and appropriate in all three cases. Cronbach's alpha coefficients increased, and composite reliability was estimated to be suitable. Additionally, using specific tests for model fit, such as R^2 and the GOF index (0.725), it was found that the fitted model has a strong and appropriate fit, making the research findings reliable and credible.

4. Discussion and Conclusion

The findings of this study underscore the significant potential of integrating neuroscience into coaching practices within organizational settings, specifically at Isfahan Steel Company. The neuro-coaching model developed through this research aligns with previous literature and offers a structured framework to enhance individual and organizational outcomes. This section discusses the implications of these findings in light of existing research, highlighting the critical components of the model, the effectiveness of neuro-coaching strategies, and the broader implications for coaching practice.

The study identified several key components and conditions crucial for the successful implementation of neuro-coaching. Causal conditions such as management and organization, rational decision-making, and resource management were found to be fundamental. These findings echo the arguments made by Boyatzis and Jack (2018), who emphasize the importance of understanding the organizational context and the role of management in facilitating effective coaching interventions. Rational decision-making, supported by neuroscience, ensures that coaching strategies are aligned with the cognitive and emotional realities of individuals, thereby enhancing their effectiveness (Boyatzis & Jack, 2018).

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Contextual conditions, including collaboration and coordination, customer orientation, and organizational budgeting, were also significant. These elements are crucial for creating an environment conducive to neuro-coaching. As Boyatzis et al. (2022) suggest, the organizational culture and climate play a vital role in determining the success of coaching programs. A collaborative and coordinated approach ensures that all stakeholders are aligned, and resources are effectively utilized, which is critical for the sustainability of coaching interventions (Boyatzis et al., 2022).

Intervening conditions, such as ethical principles, professional development, and cognitive reinforcement, further underscore the complexity of implementing neuro-coaching. Ethical principles, in particular, are crucial for maintaining the integrity and trustworthiness of coaching practices. This is supported by the work of Nowack and Radecki (2018), who highlight the importance of addressing neuro-mythconceptions and ensuring that coaching practices are based on sound scientific principles. Professional development and cognitive reinforcement are essential for continuous improvement and adaptation, enabling individuals to benefit from the latest advancements in neuroscience (Nowack & Radecki, 2018).

The strategies identified in the neuro-coaching model, such as neurological-based planning and goal-setting, neuro-coaching skills, and neurological training and empowerment, were found to be highly effective. These strategies leverage the principles of neuroplasticity, emotional regulation, and cognitive enhancement to facilitate behavior change and improve performance. Grant (2015) argues that coaching strategies grounded in neuroscience can significantly enhance their effectiveness by aligning with the brain's natural processes (Grant, 2015).

Neurological-based planning and goal-setting are particularly effective as they provide a clear and structured approach to achieving desired outcomes. This strategy is supported by the findings of Oosten, McBride-Walker, and Taylor (2019), who demonstrate that clear goals and structured planning are critical for the success of coaching interventions (Oosten et al., 2019). Neuro-coaching skills and training empower individuals to apply neuroscience principles in their daily practices, leading to improved emotional regulation and cognitive function. These skills are essential for managing stress and anxiety, as highlighted by Fried (2019), who emphasizes the importance of co-active life coaching in promoting mental health (Fried, 2019).

The broader implications of the neuro-coaching model developed in this study extend beyond the specific context of Isfahan Steel Company. The findings contribute to the growing body of literature on the application of neuroscience in coaching and highlight the importance of evidence-based approaches. By integrating neuroscience into coaching practices, organizations can achieve more effective and sustainable outcomes, enhancing both individual and organizational performance.

One of the key implications is the need for continuous professional development and education for coaches. As neuroscience is a rapidly evolving field, it is essential for coaches to stay updated with the latest research and developments. This aligns with the findings of Cushion, Griffiths, and Armour (2017), who emphasize the importance of ongoing education and training for coaches to ensure the effectiveness of their practices. Developing competencies in neuroscience-based coaching can enhance the credibility and impact of coaching interventions (Cushion et al., 2017).

Another important implication is the need for a supportive organizational culture that values and promotes coaching. The success of neuro-coaching interventions depends significantly on the organizational climate and the support provided by leadership. As Boyatzis and Jack (2018) suggest, creating a culture that encourages continuous learning and development is crucial for the sustainability of coaching programs. Organizations should invest in creating an environment that supports coaching and provides the necessary resources and infrastructure (Boyatzis & Jack, 2018).

Despite the promising findings, there are several challenges and considerations that need to be addressed for the successful implementation of neuro-coaching. One of the main challenges is the potential resistance to change from both individuals and organizations. Implementing a new coaching model that integrates neuroscience requires a shift in mindset and practices, which can be met with resistance. It is essential to address these concerns through effective communication and change management strategies.

Another consideration is the need for rigorous evaluation and assessment of neuro-coaching interventions. As highlighted by Nowack and Radecki (2018), it is important to ensure that coaching practices are based on sound scientific principles and are evaluated for their effectiveness (Nowack & Radecki, 2018). Organizations should invest in robust evaluation frameworks to assess the impact of neuro-

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coaching and make necessary adjustments based on the findings.

The integration of neuroscience into coaching practices offers significant potential for enhancing individual and organizational outcomes. The neuro-coaching model developed in this study provides a comprehensive framework for applying neuroscience principles to coaching, leveraging key components such as causal, contextual, and intervening conditions. The strategies identified in the model, including neurological-based planning and goal-setting, neuro-coaching skills, and neurological training and empowerment, have been found to be effective in facilitating behavior change and improving performance.

The findings of this study align with existing literature and contribute to the growing body of research on neuro-coaching. By integrating neuroscience into coaching practices, organizations can achieve more effective and sustainable outcomes, enhancing both individual and organizational performance. However, it is important to address the challenges and considerations associated with implementing neuro-coaching, including resistance to change and the need for rigorous evaluation.

Overall, the neuro-coaching model developed in this study offers a promising approach for enhancing personal and professional development. By leveraging the latest advancements in neuroscience, coaches can develop more effective strategies to facilitate behavior change, enhance emotional regulation, and promote overall well-being. The findings of this study highlight the importance of evidence-based approaches in coaching and provide valuable insights for both researchers and practitioners in the field.

In conclusion, the neuro-coaching model holds significant promise for transforming coaching practices and enhancing organizational outcomes. The integration of neuroscience principles provides a robust framework for developing more effective and scientifically grounded coaching interventions. As organizations continue to navigate the complexities of the modern workplace, the application of neuro-coaching can play a critical role in fostering personal and professional growth, improving performance, and achieving sustainable success.

Authors' Contributions

The first author was responsible for conducting the interview and collecting data, and the other authors were responsible for analyzing the data and writing the article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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