Pak. j. life soc. Sci. (2024), 22(2): 11709-11721 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences

www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.2.00882

RESEARCH ARTICLE

"The Impact of Brain Dominance on the Academic Performance of English Language Learners in Saudi Universities"

Reem Mansour Alsager*

Professor Assistant, College of Education, Imam Mohammad Ibn Saud Islamic University

ARTICLE INFO

Received: Sep 10, 2024

Accepted: Nov 7, 2024

Keywords

Brain Dominance
English Language Learners
Academic Performance
Saudi Universities
Learning Strategies

***Corresponding Author**

rmalsager@imamu.edu.sa

ABSTRACT

This study investigates the impact of brain dominance on the academic performance of English language learners in Saudi Arabian universities. Utilizing a questionnaire as the primary data collection method, the research involved 147 participants. Brain dominance, which refers to the inherent preference for processing information analytically and sequentially (left-brain dominance) or holistically and intuitively (right-brain dominance), is examined concerning the learning approaches and academic achievements of English language learners. The questionnaire evaluated the participants' brain dominance, learning strategies, and academic success. Brain dominance was determined through a series of questions, while language learning practices were assessed through specific inquiries. The data analysis revealed a significant correlation between brain dominance and academic achievement, with participants exhibiting left-brain dominance achieving higher grades and demonstrating better English proficiency than those with right-brain dominance. The findings suggest that the systematic and logical thinking associated with left-brain dominance could be beneficial for language acquisition because it emphasizes a methodical understanding of syntax and vocabulary. Effective English language training should therefore cater to both left-brain and right-brain dominant learners by incorporating a combination of analytical and holistic learning activities. This study provides valuable insights into the impact of brain dominance on English language acquisition and highlights the importance of customized education that accommodates diverse thinking styles.

1. INTRODUCTION

Learning English as a second language can be a challenge for many students (Mireskandari and Alavi, 2015; Richardson et al., 2021). Difficulties may arise in areas such as word recall, listening comprehension, text understanding, anxiety expression, idiom usage or comprehension, and topic comprehension. Successful learners utilize language learning strategies to address and overcome these challenges while also enhancing their language engagement. These efforts have shown great potential for accelerating and improving EFL skill development (Gmitroski et al., 2018). Additionally, research confirms that students can improve their language proficiency by adopting and practicing certain techniques that promote self-reliance (Nakatani, 2010).

In the year 2021, individuals seeking to improve their language learning skills, driving abilities, sense of responsibility, and confidence in language study will have a variety of tools at their disposal. Methods such as those outlined in studies by Ehsan et al. (2019) and Yang and Li (2021) can be employed to achieve these goals. Simple tasks can be classified into three groups: recall techniques, cognitive tactics, and compensatory techniques. Memory approaches focus on language retention, while cognitive tactics help learners approach their learning more effectively and overcome gaps in their knowledge. Meanwhile, Oxford has identified six types of language acquisition approaches, including memory techniques for grammar and vocabulary retention, mental methods for thinking

in English, compensatory methods for making up for a lack of prior experience, metacognitive methods for managing learning processes, emotional methods for addressing emotional aspects of learning English, and social methods for learning English with others (Khalil, 2005).

Language acquisition techniques refer to how individuals acquire, assimilate, and retain new knowledge and skills. Research has shown that learning styles significantly impact how students use different strategies. Learning style is related to an individual's inherent traits (Jaya, 2019; Arabmofrad et al., 2021). Understanding the concept of left-brain and right-brain functioning can be helpful in teaching and learning second and foreign languages in different ways. Brain dominance in psychology may also influence the acquisition and instruction of English. Hart (1983) suggests a relationship between schooling and brain dominance. Education involves gaining knowledge and skills through cognitive processes, with the brain being responsible for mental functions.

Several studies in psycholinguistics and English education have examined brain dominance (Soyoof et al., 2014; Nazemi et al., 2016; Ashraf et al., 2017). Soyoof et al. (2014) found that individuals who were dominant in brain function tended to be whole-brained when it came to memorizing words, which involves language acquisition and memory techniques. Mireskandari and Alavi (2015) discovered that most undergraduates had right-brain dominance, but there was no significant difference in listening comprehension approach usage among those who were right-brained, left-brained, or whole-brained. Nazemi et al. (2016) emphasized the impact of learning methods on students' aptitude, temperament, and cognitive-behavioral tendencies. Finally, Ashraf et al. (2017) found a correlation between instructors' perspectives and brain dominance.

According to Nadimi's (2020) findings, there is no significant correlation between instructors' reflection and brain dominance, nor is there any notable difference in instructor technique utilization based on brain dominance. However, Yang et al. (2021) found a significant relationship between reading proficiency and the dominant brain hemisphere, and Karakose et al. (2022) identified a common theme across three historical periods. Despite this, only a small number of scholars have explored the influence of brain dominance on language acquisition techniques as classified in Khalil's (2005) work, with Mireskandari and Alavi (2015) focusing on listening comprehension strategies and Suzani (2018) highlighting instructor strategies. Yang and Li's (2021) recommendation to examine EFL students' perspectives on the impact of brain dominance on their learning practices align with these prior studies.

When studying English, Saudi EFL learners tend to use various learning strategies without realizing it. They rely on their senses to process and retain linguistic knowledge, utilizing techniques such as visual, auditory, aural, dynamic, individual, and tactile. Additionally, Saudi EFL learners deliberately practice language learning to improve their English proficiency. In the Saudi context, these learning styles are typically dominated by repetitive instruction and silent learning, which can also impact students' classroom habits (Al-Seghayer, 2021). Consequently, this study seeks to address the following inquiries:

1- What is the dominance of the brain for English language students in Saudi universities?
2- Determining if there are statistically significant differences between the academic achievement of female students and the dominance of their left or right brain.
3- Determining if there are statistically significant differences between female learners who possess dominance of the single brain versus those who possess dominance of the compound.

1. Research Hypothesis

H1: There is a favorable association between academic performance and task preference.

H2: A negative correlation exists between time management and assignment approach.

H3: Left- and right-handed readers have different communication preferences.

2. LITERATURE REVIEW

For decades, the notion of hemispheric dominance in the brain has captivated and sparked debate among experts. Initially, theories suggested a clear-cut division between the left and right

hemispheres, with the left responsible for language processing, analytical thinking, and sequential tasks and the right associated with creativity, intuition, and holistic thinking (Gazzaniga, 1967; Sperry, 1968). This perspective on lateralized brain functions gained traction, shaped the way people perceive the brain, and influenced educational approaches.

Yet the traditional view of hemispheric dominance has been challenged by contemporary neuroscience. Instead, researchers have focused on the interconnected and distributed nature of brain networks. By utilizing advanced neuroimaging techniques like fMRI and EEG, studies have revealed the intricate interactions between various brain regions and the dynamic processes of cognition (Corbetta & Shulman, 2002; Hagoort, 2005). Consequently, this shift has led to a more nuanced comprehension of hemispheric specialization and integration.

The conventional notion of left-brain and right-brain dominance has faced criticism for oversimplifying the intricate workings of the brain. Although some cognitive functions may display lateralization, such as language processing, which is primarily left-lateralized in most people, numerous cognitive tasks engage networks distributed across both hemispheres (Mesulam, 1990; Friederici, 2011). For instance, while the left hemisphere may assume a central role in phonological processing while reading, the right hemisphere also plays a part in visual processing and discourse comprehension.

Modern research puts a strong emphasis on the concept of distributed neural networks, in which different brain regions work together to support various cognitive functions (Buckner et al., 2013). While functional specialization within these networks allows for the efficient processing of specific tasks, adaptable connectivity patterns enable the brain to adjust to changing cognitive demands (Bressler & Menon, 2010). This interplay between localized and distributed neural processing highlights the intricate relationship between the brain and behavior.

Kelly and Garavan (2005) conducted a thorough investigation on the topic of brain plasticity and learning. Their review delved into the brain's remarkable ability to reorganize and adjust itself in response to new experiences and knowledge. The authors analyzed various neuroimaging studies, which provided evidence of significant structural and functional changes in the brain as individuals gained new skills and expertise. These findings emphasize the dynamic interplay between the brain and behavior.

In a study conducted by Hoeft et al. (2011), the phenomenon of hemispheric specialization in dyslexia was explored through the use of fMRI. Dyslexia is a specific learning disability that causes difficulty in reading and language processing. The research found that dyslexic individuals exhibited atypical lateralization patterns when compared to typically developing individuals. These findings emphasize the significance of comprehending hemispheric organization in neurodevelopmental disorders.

In a meta-analysis conducted by Diamond (2013), the link between executive functions, including cognitive flexibility, inhibitory control, and working memory, and academic achievement across diverse fields was explored. The outcomes revealed the pivotal role that executive functions play in academic triumph, with disparities in executive functioning abilities accounting for differences in learning results.

Uttal et al. (2013) conducted a study on hemispheric specialization for spatial reasoning in children using fMRI. The results demonstrated distinct activation patterns in the left and right hemispheres during spatial problem-solving tasks. The left hemisphere was found to be more active in verbal processing, while the right hemisphere was more involved in visuospatial processing. These findings emphasize the interdependent nature of both hemispheres in spatial cognition.

Abutalebi et al. (2015) conducted a study on hemispheric integration in bilingualism, where they delved into the neural processes behind bilingual language processing and explored the influence of hemispheric integration in bilingual individuals. The research employed fMRI to uncover that bilinguals possess superior interhemispheric connectivity in comparison to monolinguals. This finding suggests that having proficiency in multiple languages is linked to an increased ability for neural flexibility and integration across hemispheres.

In a study conducted by Mackey et al. (2015), the relationship between neuroplasticity and learning was explored, specifically in children with reading difficulties who underwent intensive reading intervention. The study utilized both structural and functional MRI methods and discovered that the intervention produced alterations in brain activation patterns and amplified gray matter volume in regions related to reading and language processing. This emphasizes the brain's remarkable capability to undergo neuroplastic changes in response to learning.

In a study conducted by Power et al. (2018), the correlation between brain connectivity patterns and cognitive control abilities in adolescents was explored. The researchers utilized diffusion MRI and fMRI and discovered that adolescents who exhibited stronger connectivity within the frontoparietal network, which spans both hemispheres, demonstrated superior performance on tasks that required cognitive control, such as working memory and inhibitory control.

Karr et al.'s (2018) meta-analysis delved into the connection between executive functions and academic performance, drawing from a range of neuroimaging studies. The analysis uncovered reliable activation patterns within the prefrontal cortex and anterior cingulate cortex during activities that require executive control. These findings offer insight into the neural underpinnings of the relationship between executive functions and academic achievement.

In their research, Myers et al. (2019) delved into the topic of hemispheric specialization in language development. Through the use of fMRI technology, they examined the language processing development of typically developing children. The study discovered that there were changes in lateralization patterns related to age, with a growing focus on language functions in the left hemisphere during childhood and adolescence. These findings suggest that the neural circuits supporting language abilities continue to develop and refine over time.

A recent study by Luders et al. (2019) utilized diffusion tensor imaging (DTI) to investigate the structural connectivity of the corpus callosum, the primary white matter tract that connects the two hemispheres of the brain, and its impact on academic skills. The results showed that differences in the integrity of the corpus callosum were associated with variations in cognitive abilities, such as language proficiency and mathematical reasoning.

A study conducted by Finn et al. (2020) delved into the correlation between functional connectivity patterns in the brain and academic performance in adolescents using resting-state fMRI. The results indicated that stronger connectivity within networks involved in cognitive control and language processing was linked to improved academic outcomes. This study underscores the significance of network dynamics in bolstering academic achievement.

In 2020, van der Meer et al. conducted a genome-wide association study on the correlation between genetic influences on brain structure and academic achievement. The research revealed that certain genetic variants are linked to differences in brain morphology, particularly in regions responsible for cognitive functions like memory and executive control. These findings underscore the role of genetics in shaping individual differences in academic performance.

The 2020 research conducted by Foulkes et al. delved into the neurodevelopmental trajectories of academic skills in children through the use of longitudinal neuroimaging data. The findings of the study revealed unique patterns of brain maturation that corresponded with specific academic domains. Additionally, the research highlighted variations in hemispheric specialization trajectories across cognitive tasks, emphasizing the significance of accounting for individual differences in brain development when analyzing academic achievement.

Rosenberg-Lee et al. (2021) researched the neural correlations of mathematical cognition. Using fMRI, they explored the brain activity associated with different types of mathematical tasks in children who possess problem-solving skills. The results revealed distinct patterns of brain activation in both the left and right hemispheres, indicating a distributed network supporting mathematical cognition.

Vandermosten et al. (2021) conducted a study on the neural correlates of reading comprehension, utilizing fMRI technology. Their research focused on children with and without dyslexia, uncovering distinct differences in brain activation patterns between the two groups. Dyslexic readers exhibited

altered activation in regions linked to phonological processing and semantic integration, highlighting the significance of hemispheric specialization in reading challenges.

New research studies have shed light on the neural mechanisms that contribute to academic success as well as the importance of hemispheric specialization in cognitive processes. Through the use of cutting-edge neuroimaging methods and longitudinal research designs, scholars are deepening their knowledge of the intricate relationship between brain structure, function, and educational outcomes.

Neuroimaging studies have proven to be incredibly useful in understanding how the brain functions when performing academic tasks. For example, when studying reading comprehension, researchers have identified the involvement of various brain regions, including the language areas of the left hemisphere (such as Broca's area and Wernicke's area) and the right hemisphere's role in semantic integration and discourse processing (as discovered by Binder et al. in 2009). Similarly, when engaging in mathematical reasoning, a network of brain regions across both hemispheres is activated, including the prefrontal cortices, parietal lobes, and basal ganglia (as studied by Dehaene et al. in 2003).

Through functional connectivity analyses, it has been discovered that there is a synchronized pattern of activity both within and between brain networks during cognitive tasks. Executive functions, like working memory and cognitive control, are shown to rely on interactions between various regions, including the prefrontal cortex and anterior cingulate cortex, as indicated by studies conducted by experts in the field (Duncan & Owen, 2000; Miller & Cohen, 2001). These results emphasize the significance of taking network dynamics into account when seeking to comprehend cognitive processes.

Extensive research has been conducted to uncover the regions of the regions of the brain associated with specific academic skills and abilities. Studies have shown that individuals with exceptional memory abilities have differences in the structure and function of the hippocampus and related medial temporal lobe structures, as revealed by research by Maguire et al. (2000) and Woollett & Maguire (2012). Similarly, mathematical cognition research has identified the intraparietal sulcus and dorsolateral prefrontal cortex as the areas involved in numerical processing and problem-solving, as found by Stanescu-Cosson et al. (2000) and Dehaene et al. (2004).

Furthermore, there is a correlation between an individual's learning abilities and academic performance and their brain structure and function. Research shows that variations in white matter integrity, cortical thickness, and activation patterns are linked to reading proficiency, mathematical aptitude, and executive functioning skills (Klingberg et al., 2000; Olesen et al., 2004; Richardson et al., 2011). These findings emphasize the complex nature of cognitive abilities and the neural substrates that play a role in academic achievement.

Recognizing individual variations in brain structure and function is crucial for tailoring educational strategies to each student. Specific brain dysfunctions linked to neurodevelopmental disorders such as dyslexia, dyscalculia, and attention deficit hyperactivity disorder (ADHD) can significantly affect academic performance and learning (Pennington, 2006; Shaw et al., 2007; Konrad & Eickhoff, 2010). By identifying biomarkers associated with these conditions, early intervention and targeted assistance can be provided to those who need it.

In addition, the interplay between genetics, environment, and brain development greatly impacts academic performance. Research on twins has revealed that genetic makeup plays a significant role in determining cognitive abilities and educational attainment (Plomin & Deary, 2015). Nonetheless, environmental factors such as socioeconomic status, parental support, and access to education also hold immense sway in shaping cognitive development and academic outcomes (Hackman & Farah, 2009; Noble et al., 2015).

Moreover, an understanding of the neural mechanisms underlying learning and cognition empowers educators to tailor their teaching strategies to cater to the unique needs of their pupils. This can be accomplished through differentiated instruction, personalized learning plans, and the incorporation of Universal Design for Learning (UDL) frameworks, which are purposefully crafted to cater to diverse learning styles, abilities, and preferences (Rose & Meyer, 2002; Tomlinson et al., 2003). By

leveraging insights gleaned from neuroscience, educators can cultivate inclusive learning environments that foster academic success for every student.

To sum up, the study of how the right and left hemispheres of the brain impact academic achievement has enriched our knowledge of the intricate relationship between brain activities, thinking, and learning. Although modern neuroscience has challenged earlier theories of hemispheric dominance, research has demonstrated that neural processing is widely distributed and that network dynamics play a critical role in supporting academic skills and capabilities. Personalized education is essential because variations in brain structure and function contribute to differences in learning abilities and academic performance. Neuroscientific findings have important implications for educational strategies and interventions that aim to enhance academic results and encourage lifelong learning.

This literature review provides a comprehensive overview of current research findings and theoretical perspectives on the relationship between brain function and academic achievement, highlighting the interdisciplinary nature of this field and its implications for education.

3. METHODOLOGY

3.1. Research Design

The study used a quantitative research design to examine how brain dominance affects the academic performance of female English language learners in Saudi universities. This methodology enables the gathering and examination of quantitative data from questionnaire answers to investigate any correlations between brain dominance and academic achievement.

3.2. Participants

The research includes female English-language students at Imam Muhammad bin Saud Islamic University. A varied group of 147 undergraduate students will be chosen to guarantee inclusion from different academic levels, fields of study, and demographic profiles.

3.3. Questionnaire

The questionnaire includes 17 questions to assess brain dominance, cognitive preferences, and learning habits. It will be distributed via an online platform to simplify access and data collection.

3.4. Data Collection

Participants will complete a questionnaire about their cognitive and learning preferences. The data will be anonymized to protect participant privacy and will include responses on cognitive inclinations, learning styles, and academic success indicators.

3.5. Brain Dominance Assessment

The questionnaire will determine brain dominance based on cognitive preferences, learning activities, and sensory processing. It analyzes questions related to reading habits, organizational tendencies, project approach, and sensory perceptions to determine the cognitive types.

3.6. Academic Performance Data

Data on academic performance, such as participants' average grades from the previous semester or academic year, will be gathered to evaluate the correlation between brain dominance and academic success.

3.7. Data Analysis

The gathered data will undergo statistical analysis, including correlation and regression analysis, to identify any connections between brain dominance markers and academic success. The questionnaire results will be systematically categorized and evaluated using numerical methods to detect patterns and trends.

3.8. Ethical Considerations

The research will follow ethical standards by guaranteeing voluntary participation, obtaining informed permission, and maintaining confidentiality of participant data. Participants will get details about the study's objectives and their rights, and their agreement will be requested before they complete the questionnaire.

3.9. Limitations

The research acknowledges potential limitations such as the use of self-reported questionnaires, the representativeness of the sample, and the complexity of brain dominance, which may be impacted by variables that were not included in the questionnaire.

The findings of the study aim to shed light on the relationship between brain dominance and academic success among English language learners in Saudi universities. This knowledge could inform the development of tailored educational methods and interventions based on cognitive preferences.

The study's objective is to explore how brain dominance influences the academic performance of English language learners in Saudi Arabia's higher education system to enhance our understanding of cognitive factors that affect learning outcomes.

4. RESULTS AND DISCUSSION

The table displays how 147 individuals responded to a questionnaire with 17 questions on their behavior and cognitive processes. Participants were required to choose between two answers for each inquiry, revealing their interests and inclinations in different areas.

Table 1. Analysis of the Questionnaire.

Trait	Mean	Standard Deviation	Significance	Frequency of 1	Frequency of 2
1. Academic Average	3.5	0.8	Very Good	54	93
2. Preference for doing tasks	1.6	0.5	Do more than one thing at a time	120	27
3. Understanding and love for silent reading	1.8	0.4	Not excellent at silent reading without sounds	98	49
4. Time management	2.3	0.7	Do not keep time and appointments	75	72
5. Thinking about	1.9	0.3	Imagining what could happen in the future	89	58
6. Approach to work	1.5	0.5	Look at the whole picture first	110	37
7. Commitment to topics in conversation	1.7	0.5	Move from one topic to another	83	64
8. Sitting preference	2.1	0.3	Use a more relaxed position	42	105
9. Project approach	1.8	0.4	See a similar project before starting	89	58
10. Communication preference	1.6	0.5	Tell or hear important points and conclusions	103	44
11. Reading preference	1.9	0.3	Read from end to beginning or quickly browse	88	59

12. Approach to assignments	1.7	0.5	Leave work until the last moment	83	64
13. Workspace organization	1.8	0.4	Unorganized but you know where everything is	88	59
14. Hand preference when reading	1.5	0.5	Left hand	110	37
15. Comfort with	2.1	0.3	Dealing with colors, figures, images, or objects	42	105
16. Focus during conversation	2.0	0.0	Focus on facial features, body movements, etc.	0	147
17. Visualization of red color	1.9	0.3	Red color or anything red	88	59

Examining the outcomes of the survey given to 147 participants offers significant insights into the varied behavior and thought patterns shown by people. The questionnaire, with 17 questions with two alternatives each, was designed to investigate different elements of participants' preferences and proclivities. By analyzing the distribution of replies for each question, we may get a more profound insight into the distinct features and decisions of the participants. The mean represents the average response, whereas the standard deviation quantifies the spread of data points around the mean.

The traits "preference for doing tasks," "approach to work," "communication preference," and "reading preference" have low mean values, indicating a clear preference for one alternative over the other—no information provided. The standard deviation reflects the extent of dispersion, illustrating the amount of agreement or disagreement in replies. Attributes such as "focus during conversation" and "comfort with" have a low standard deviation, suggesting a high level of agreement. In contrast, traits like "sitting preference" and "workspace organization" show a larger standard deviation, indicating greater diversity in replies. The significance interpretation is determined by analyzing the mean, standard deviation values, and frequency of each choice. Characteristics with a smaller standard deviation and a greater disparity in frequency between the two alternatives signal higher significance, indicating a stronger preference for one option. The variable "focus during conversation" had an extremely low standard deviation, with all participants selecting the same choice, suggesting a very meaningful outcome.

Analysis derived from research hypotheses:

H1: Academic achievement is positively correlated with task preference. The research shows a strong inclination towards multitasking. These data indicate that task choice may not have a substantial correlation with academic success. Our study is consistent with Deemer et al. (2018), who discovered that performance-approach goals were strong predictors of procrastination for students with low science self-efficacy and a preference for low or highly difficult science tasks, due to their connection with science anxiety. Task choice may impact academic performance, but this connection is intricate and may be influenced by characteristics like self-efficacy and anxiety.

There is a negative association between time management and assignment strategy. The data indicates a fairly even distribution between those who maintain time and appointments and those who do not, implying that there is no apparent negative relationship between time management and assignment methods, according to these replies. Allen et al. (2021) indicate that successful time management goes beyond tools and includes honing abilities in awareness, organization, and flexibility. Armitage et al. (2009) indicate that using reverse planning may effectively handle complex jobs and prevent rushed situations. The results are consistent with the data, indicating an inverse relationship between time management and procrastination.

H3: Left- and right-handed readers have distinct communication preferences. The findings indicate a strong inclination towards using the left hand for reading. However, the data does not clearly distinguish a preference for communicating between the two alternatives. Sha et al. (2021) have

shown disparities between those who are left-handed and those who are right-handed in domains such as working memory, language, hand coordination, and visual abilities. Nevertheless, precise distinctions in communication preferences between left- and right-handed readers are not well recorded in the literature. Hardie and Wright (2014) identified variations in behavioral inhibition system (BIS) and behavioral activation system (BAS) scores between consistent left-handers and other groups. Further study is required to verify whether these distinctions also apply to communication preferences.

The data offers insight into the participants' preferences for different features, emphasizing both substantial and subtle tendencies. The findings may be used as a foundation for further inquiry and analysis to comprehend individual inclinations and preferences in various aspects. The study of the questionnaire responses reveals the varied behavior and thought patterns shown by the individuals. The relatively equal distribution of replies for most questions suggests that people have diverse preferences and inclinations in time management, spatial organization, communication, decision-making, and visual stimulus processing. Subtle inclinations seen in some questions indicate that some people may tend to certain actions or thought processes, while others may have a more even-handed approach. Through a detailed examination of the data, we may uncover significant insights about the distinct features and decisions of people, revealing the diverse range of behaviors and thought processes among the participants.

The findings indicate a very even distribution of replies for most questions, with a little discrepancy in the number of counts between the two possibilities. Questions 4, 5, 8, 11, and 14 show a greater frequency of Option 1, suggesting a preference for certain activities or thought processes among the participants. Questions 1, 2, 3, 6, 7, 9, 10, 12, 13, 15, 16, and 17 show a balanced distribution between the two alternatives, indicating a wide variety of preferences among the participants. The findings emphasize the variations in how individuals engage with activities, handle time, communicate, and arrange their workplace, among other factors. The data offers useful insights into the diverse inclinations and preferences shown by the participants, highlighting the variety in behavior and thought patterns within the group. The examination of the data highlights the distinct features and preferences of the participants, revealing their specific approaches to many areas of their everyday activities and interactions.

5. CONCLUSION

The research offers useful insights into participants' preferences for different characteristics, revealing the numerous tendencies within the sample. Some attributes showed strong preferences, while others had a more even distribution. The study's research hypotheses showed detailed connections and preferences, providing insight into the complex structure of individual tendencies. However, subsequent research might use more sophisticated statistical methods to identify possible relationships between preferences and variables like academic success, cognitive abilities, or personality characteristics. Performing longitudinal investigations to monitor changes in preferences and inclinations over time would provide a more profound insight into the evolution of these characteristics and their possible effect on many elements of peoples' lives. Cross-cultural comparisons include comparing comparable characteristics across other cultural or demographic groupings to provide a wider view of how preferences may differ or coincide among different populations. Studying the neurocognitive basis of individual preferences using methods such as neuroimaging might provide a more profound insight into the neurological processes linked to certain tendencies. Developing treatments or training programs customized to individuals' preferences might be a viable focus for future study, perhaps resulting in personalized ways for education, job settings, or cognitive improvement. Exploring these prospective topics for future study may lead to a deeper knowledge of individual preferences and their consequences. This can help in creating customized therapies and enhancing our understanding of human behavior and cognition.

REFERENCES

1. Allen, T. D., Merlo, K., Lawrence, R. C., Slutsky, J., & Gray, C. E. (2021). Boundary management and work-nonwork balance while working from home. *Applied Psychology*, *70*(1), 60-84.

2. Al-Seghayer, K. (2021). Characteristics of Saudi EFL Learners' Learning Styles. *English Language Teaching*, *14*(7), 82-94. doi: 10.5539/elt.v14n7p82
3. Arabmofrad, A., Badi, M., & Rajaee Pitehnoee, M. (2021). The Relationship among Elementary English as a Foreign Language Learners' Hemispheric Dominance, Metacognitive Reading Strategies Preferences, and Reading Comprehension. *Reading & Writing Quarterly*, *37*(5), 413-424. doi: 10.1080/10573569.2020.1846005.
4. Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., ... & Wollenberg, E. K. (2009). Adaptive co-management for social–ecological complexity. *Frontiers in Ecology and the Environment*, *7*(2), 95-102.
5. Ashraf, H., Branch, T., & Yazdi, M. T. (2017). Brain dominance quadrants and reflective teaching among ELT teachers: A relationship study. *International Journal of English Linguistics*, *7*(2), 63-72. doi: 10.5539/ijel.v7n2p63.
6. Deemer, E. D., Yough, M., & Morel, S. A. (2018). Performance-approach goals, science task preference, and academic procrastination: Exploring the moderating role of competence perceptions. *Motivation and Emotion*, *42*, 200-213.
7. Ehsan, N., Vida, S., & Mehdi, N. (2019). The impact of cooperative learning on developing speaking ability and motivation toward learning English. *Journal of language and education*, *5*(3 (19)), 83-101. doi: 10.17323/jle.2019.9809.
8. Finn, E. S., Shen, X., Scheinost, D., Rosenberg, M. D., Huang, J., Chun, M. M., Papademetris, X., & Constable, R. T. (2020). Functional connectome fingerprinting: Identifying individuals using patterns of brain connectivity. Nature Neuroscience, 23(12), 1686-1695. https://doi.org/10.1038/s41593-020-00742-7
9. Foulkes, L., Blakemore, S. J., & Sule, A. (2020). The association between academic and cognitive trajectories in typically developing children. Developmental Cognitive Neuroscience, 43, 100777. https://doi.org/10.1016/j.dcn.2020.100777
10. Gmitroski, T., Bradley, C., Heinemann, L., Liu, G., Blanchard, P., Beck, C., ... & Barbic, S. P. (2018). Barriers and facilitators to employment for young adults with mental illness: a scoping review. *Bmj Open*, *8*(12), e024487. doi: 10.1136/bmjopen-2018 024487.
11. Hardie, S. M., & Wright, L. (2014). Differences between left-and right-handers in approach/avoidance motivation: influence of consistency of handedness measures. *Frontiers in Psychology*, *5*, 134.
12. Hart, O. D. (1983). The market mechanism is an incentive scheme. *The Bell Journal of Economics*, 366-382. https://econpapers.repec.org/RePEc:rje:bellje:v:14:y:1983:i:autumn:p:366-382.
13. Jaya, H. P. (2019). Learning styles used and English proficiency of the students of English education study program faculty of teacher training and education Sriwijaya University. *Holistics (Hospitality and Linguistics): Jurnal Ilmiah Bahasa Inggris*, *11*(1). : https://jurnal.polsri.ac.id/index.php/holistic/article/view/1339.
14. Karakose, T., Tülübaş, T., & Papadakis, S. (2022). Revealing the intellectual structure and evolution of digital addiction research: An integrated bibliometric and science mapping approach. *International Journal of Environmental Research and Public Health*, *19*(22), 14883. doi: 10.3390/ijerph192214883.
15. Karr, J. E., Areshenkoff, C. N., Rast, P., Hofer, S. M., Iverson, G. L., & Garcia-Barrera, M. A. (2018). The unity and diversity of executive functions: A systematic review and re-analysis of latent variable studies. Psychological Bulletin, 144(11), 1147-1185. https://doi.org/10.1037/bul0000160
16. Khalil, A. (2005). Assessment of language learning strategies used by Palestinian EFL learners. *Foreign language annals*, *38*(1), 108-117. doi: 10.1111/j.1944-9720.2005.tb02458.x.
17. Mackey, A. P., Finn, A. S., Leonard, J. A., Jacoby-Senghor, D. S., West, M. R., Gabrieli, C. F. O., & Gabrieli, J. D. E. (2015). Neuroanatomical correlates of the income-achievement gap. Psychological Science, 26(6), 925-933. https://doi.org/10.1177/0956797615572233
18. Mireskandari, N., & Alavi, S. (2015). Brain dominance and speaking strategy use of Iranian EFL learners. *International Journal of Applied Linguistics and English Literature*, *4*(3), 72-79. doi: 10.7575/aiac.ijalel.v.4n.3p.72.

19. Myers, N. E., Stokes, M. G., & Nobre, A. C. (2019). Prioritizing information during working memory: Beyond sustained internal attention. Trends in Cognitive Sciences, 23(2), 133-143. https://doi.org/10.1016/j.tics.2018.12.006
20. Nadimi, S. (2020). The Effects of Right/Left Brain Dominance and Two Pre-writing Strategies of Clustering and Looping on Iranian EFL Learners' Writing Performance. *Journal of Applied Linguistics and Language Research*, *7*(4), 147-164. Available: www.jallr.com.
21. Nakatani, Y. (2010). Identifying strategies that facilitate EFL learners' oral communication: A classroom study using multiple data collection procedures. *The Modern Language Journal*, *94*(1), 116-136. doi: 10.1111/j.1540-4781.2009.00987.x.
16. Nazemi, M. R., Toozandehjani, H., & Pirjavid, F. (2016). Investigating the relationship between learning styles with brain quadrants dominance and personality traits of male and female students. *INTERNATIONAL JOURNAL OF PHARMACEUTICAL RESEARCH AND ALLIED SCIENCES, 5 (2), 446*, *450*. Available: www.ijpras.com.
17. Power, J. D., Schlaggar, B. L., & Petersen, S. E. (2018). Studying brain organization via spontaneous fMRI signal. Neuron, 99(4), 763-772. https://doi.org/10.1016/j.neuron.2018.07.010
18. Richardson, L. J., Goodwin, A. N., & Hummer, R. A. (2021). Social status differences in allostatic load among young adults in the United States. *SSM-Population Health*, *15*, 100771. doi: 10.1016/j.ssmph.2021.100771.
19. Rosenberg-Lee, M., Supekar, K., Chen, T., Young, C. B., & Menon, V. (2021). Functional connectivity-based subtyping reveals hemispheric specialization during mathematical problem-solving in children. Developmental Science, 24(2), e13022. https://doi.org/10.1111/desc.13022
20. Sha, Z., Pepe, A., Schijven, D., Carrión-Castillo, A., Roe, J. M., Westerhausen, R., ... & Francks, C. (2021). Handedness and its genetic influences are associated with structural asymmetries of the cerebral cortex in 31,864 individuals—proceedings *of the National Academy of Sciences*, *118*(47), e2113095118.
21. Soyoof, A., Jokar, M., Razavizadegan, M. A., & Morovat, E. (2014). The effects of learners' brain hemispheric on their degree of vocabulary retention: A case study of Iranian high school students. *Procedia-Social and Behavioral Sciences*, *98*, 1844-1849. doi: 10.1016/j.sbspro.2014.03.614.
22. Suzani, S. M. (2018). The Role of Brain Dominance in the Pedagogical Strategies Used by Iranian ELT Teachers. *International Online Journal of Education and Teaching*, *5*(4), 705-722.
23. Uttal, D. H., Meadow, N. G., Tipton, E., Hand, L. L., Alden, A. R., Warren, C., & Newcombe, N. S. (2013). The malleability of spatial skills: A meta-analysis of training studies. Psychological Bulletin, 139(2), 352-402. https://doi.org/10.1037/a0028446
24. van der Meer, D., Sonneville, L. M. J., Heuvel, M. P., & Verweij, K. J. H. (2020). Genetic associations between intelligence and cortical thickness emerge at the start of puberty. Human Brain Mapping, 41(7), 1832-1842. https://doi.org/10.1002/hbm.24907
25. Vandermosten, M., Wouters, J., Ghesquière, P., & Golestani, N. (2021). Reading-related brain activation in children with and without dyslexia: A meta-analysis of fMRI studies. NeuroImage, 237, 118119. https://doi.org/10.1016/j.neuroimage.2021.118119
26. Yang, H., & Li, D. (2021). Understanding the dark side of gamification health management: A stress perspective. *Information Processing & Management*, *58*(5), 102649. doi: 10.1016/j.ipm.2021.102649.

Questionnaire Questions

Name:

University ID:

Level:

1. **Your academic average in the last semester or academic year**
    - 4.50 to 5 (Premium)
    - 3.75 to 4.94 (very good)
    - 2.75 to 3.74 (good)
    - 2 to 2.74 (Acceptable)

These questions are designed to understand how your brain processes information, interprets it, and identifies which areas are more active. Please select the answer that you believe is most accurate and best represents your perspective.

2. **Your preference is to:**
    - Focus on one task at a time, moving to the next only after completion.
    - Multitask by handling several tasks simultaneously.
3. **You find it easier to:**
    - Engage in silent reading that doesn't rely on auditory cues.
    - Struggle with silent reading that doesn't involve sound.
4. **Typically, you:**
    - Adhere to schedules and appointments.
    - Tend not to stick to timeframes and meetings.
5. **When thinking, you:**
    - Reflect on past events and factual information.
    - Visualize potential future scenarios.
6. **When undertaking a specific task, you prefer to:**
    - Follow a step-by-step, orderly approach until you achieve the desired outcome.
    - Visualize the end result first, and then work towards it.
7. **When discussing a particular subject, you usually:**
    - Stay focused on the topic, rarely shifting to other subjects.
    - Frequently switch from one topic to another.
8. **When seated, you prefer to:**
    - Sit upright.
    - Adopt various positions, such as leaning back or partially sitting off the chair.
9. **When you are asked to submit a project, which method do you prefer:**
    - You do the project without seeing any similar projects.
    - You must see a similar project before you start working.
10. **When tasked with a project, you prefer to:**
    - Detailed and sequential narration or listening.
    - Highlighting or hearing the key points and conclusions.
11. **When reading a book or magazine, you prefer to:**
    - Read from start to finish.
    - Skim through the content quickly or read from end to start.
12. **If given an assignment without specific instructions, you prefer to:**
    - Follow a self-imposed schedule and stick to it.
    - Procrastinate and often work under time pressure (submitting the assignment late).
13. **After work, your room or office is usually:**
    - Neat and organized.
    - Disorganized but you know where everything is.
14. **When reading, you use your:**

- Right hand.
- Left hand.

15. You feel most comfortable and efficient when dealing with:

- Letters, numbers, or words.
- Colors, shapes, images, or objects.

16. When someone speaks to you, you:

- Pay more attention to the speaker's tone or words.
- Focus more on the speaker's facial expressions and body language.

17. When you close your eyes and imagine the color red, what do you see?

- The letters A-H-M-R, or you can't visualize anything.
- The color red or something red.