The Relationship Between Mindfulness and Second Language Acquisition Under Neurolinguistics Perspectives

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ABSTRACT

Mindfulness has been proposed as a technique for assisting people in overcoming stress and anxiety in daily life. Furthermore, mindfulness has academic benefits, particularly in second language acquisition (SLA), because it can increase verbal learning and memory through enhanced encoding, as well as influence academic accomplishment and awareness. This research intends to investigate the relationship between mindfulness and SLA from the perspective of neurolinguistics in order to elucidate the benefits of mindfulness in SLA. Using a qualitative research method, this work investigates the positive changes in the neural system caused by mindfulness practices based on neuropsychology and neurolinguistic theories, which may have an impact on SLA. As a result, mindfulness has an effective impact on the neural system, which can help learners enhance their concentration as well as their working memory, hence improving their academic performance on SLA. Given the benefits that mindfulness can provide to learners, it is advised that learners be taught some mindfulness practices during the teaching and learning process.

Keywords: Mindfulness, Second Language Acquisition, Mindfulness and SLA.

1 Introduction

There is no denying that mindfulness has numerous advantages for people. First, it is thought that mindfulness can help people feel less stressed and anxious (Brat, 2017; Cohen & Miller, 2009; Nguyen, 2017; Tang et al., 2007). Second, mindfulness can improve concentration, support efficient emotion regulation mechanisms, and encourage metacognitive awareness (Corcoran et al., 2010). Third, empathy and mindfulness are closely related (Shapiro & Izett, 2008; Walsh & Shapiro, 2006). Last but not least, self-compassion and two elements of empathy, such as adopting other people's viewpoints and responding to others' affective experiences with discomfort, are substantially connected with mindfulness (Kingsbury, 2009).

The relationship between mindfulness and SLA as well as the impact of mindfulness on the neural system leading to better performance of second language (L2) learners should both lack research despite the fact that many studies have been conducted to determine the benefits of mindfulness. It is obvious that as technology advances, L2 learners may have more opportunities to acquire L2 knowledge, but how to enhance language acquisition while minimizing stress and how to acquire L2 knowledge actively and confidently should be challenging problems for researchers.

With the goal of identifying a new technique for assisting L2 learners in improving their academic performance, this research attempts to establish a link between mindfulness and neural system activity, which may have a favorable impact on SLA. The study will draw out the relationship between mindfulness and SLA utilizing qualitative research methodologies, primarily focused on documentary analysis of various written records regarding mindfulness under neuropsychology and neurolinguistics, as well as theories related to SLA. The conclusions of this study may be useful for persons who wish to learn a second language effectively, joyfully, and without stress. Furthermore, the findings of this study should be useful in teaching and learning a second language.

This paper has the following major sections in addition to the Introduction and Conclusion. The first section includes a review of the literature on mindfulness and its applications in various facets of daily life, as well as theories on SLA. The second section should be a synthesis and analysis of prior research to determine the relationship of mindfulness and SLA from the standpoint of neurolinguistics, as well as its impact on academic performance of L2 learners. The next section discusses implications and suggestions, with a focus on mindfulness practices in practice to help learners maximize their ability to acquire knowledge of an L2.

The study intended to address the following research questions in order to meet its purpose:

Research question 1: What is the connection between mindfulness and SLA?

Research question 2: Under neurolinguistics perspectives, how can mindfulness help L2 learners improve their academic performance?

2 Literature review

To clarify the main points of this study, following concepts and theories should be reviewed.

2.1 Mindfulness

Mindfulness is an old Indian religious practice, particularly in Hinduism and Buddhism (Nguyen, 2017; Zeilhofer, 2020). Mindfulness techniques are becoming increasingly popular around the world as a result of their good effects on both the body and the mind. Mindfulness is something that all humans are born with; yet, practicing mindfulness on a regular basis requires patience and time.

According to Oxford Advanced Learner's Dictionary, mindfulness can be defined as "*a mental state achieved by concentrating on present moment, while calmly accepting the feelings and thoughts that come to you, used as a technique to help you relax.*" Mindfulness can also be defined as paying attention in the present moment on purpose and without judgement (Brown & Ryan, 2003; Kabat-Zinn, 1994), as a state of awareness and attention (Bodhi, 2000), as a method of self-regulation (Bishop et al., 2004), or as the cognitive tendency to be aware of what is happening in the moment without judgement or attachment to any particular outcome (Napoli et al., 2008).

Mindfulness has been discussed in more detail under psychology in order to be properly measured for empirical reasons. Mindfulness, according to Dimidjian & Linehan, (2003), can be separated into two sets of three attributes. The first group should be related to mindfulness acts such as observing, describing, and participating; the second set should be related to how these mindfulness actions are executed with three qualities: non-judgmentally, with a focus on the present, and effectively. Mindfulness is defined by five components: mindful attention, reduced self-talk, non-judgment, non-doing, and ethical convictions (Leary et al., 2007). Mindfulness can alternatively be defined by four components: decentered awareness, keeping attention amid adversity, accepting challenging thoughts, and experiencing various cognitions without reaction (Chadwick et al., 2008).

In brief, mindfulness can be understood as "*a state of mind in which one is observing one's own actions in a way that is attached and non-reactionary, and with an emphasis on utilizing one's awareness and attention*" (Zeilhofer, 2020).

2.2 The benefits of mindfulness in education

There is no doubt that mindfulness has several benefits in all spheres of life. Mindfulness has also been shown to improve teaching and learning in the classroom. It is believed that stressed instructors have negative effects on learners, which can lead to unpleasant learning outcomes; thus, mindfulness practices can provide learners with a better learning environment, allowing them to enjoy positive emotional

classroom climates and more effective academic achievements (Baijal et al., 2011; Lueke & Lueke, 2019; Napoli et al., 2008; Semple et al., 2010).

To instructors: First, without stress and burnout reduction for instructors, maintaining a healthy classroom atmosphere must be difficult; second, learners' academic achievements must suffer. Mindfulness techniques, on the other hand, can help instructors reduce stress and burnout while also improving their teaching efficacy by establishing a pleasant learning environment (Flook et al., 2013; Roeser et al., 2013). Second, with a mindfulness-based professional development program called Cultivating Awareness and Resilience in Education (CARE for Teachers) and Mindfulness-based interventions (MBIs), it has been clearly demonstrated that instructors who participate in this program should have greater efficacy in performing their job and improve classroom environments (Jennings et al., 2013; Klingbeil & Renshaw, 2018). Third, MBIs can improve instructors' emotion management and reduce psychological distress, resulting in more emotionally supportive classrooms where both instructors and learners can do their jobs better (Jennings et al., 2019).

To learners, not only does mindfulness bring benefits to instructors, it can also bring meaningful outcomes to learners, mainly in attention and learning skills, social and emotional skills, and resilience (Etherington & Costello, 2019; Baijal et al, 2011) . Regarding attention and learning skills, it is evident that attention is a cognitive system that regulates one's thoughts, emotions, and behaviors; consequently, attention must be required for various types of learning (Baijal et al., 2011). Learners' ability to pay attention should improve with the help of mindfulness activities, allowing them to develop their learning skills and maximize knowledge acquisition (Baijal et al., 2011; Lueke & Lueke, 2019; Napoli et al., 2008; Semple et al., 2010). Furthermore, mindfulness practices can help learners improve their cognitive development (Sanger & Dorjee, 2016), promote well-being and prosociality, and produce positive school outcomes (Schonert-Reichl et al., 2015). In terms of social and emotional abilities, mindfulness can assist learners in improving their good actions at school. (Barnes et al., 2003; Schonert-Reichl et al., 2015; Semple et al., 2010). Learners who engage in regular mindfulness practices have higher levels of empathy and compassion (Cheang et al., 2019; Schonert-Reichl et al., 2015), lower levels of depression and peer-rated aggression, become more prosocial, and have higher levels of sociometric popularity (Napoli et al., 2008; Schonert-Reichl et al., 2015). In terms of resilience, learners benefit from improved emotional regulation and academic performance with the use of breathing techniques (Metz et al., 2013; Thierry et al., 2016). Mindfulness can also help learners reduce stress, anxiety, post-traumatic symptoms, and depression, allowing them to improve their academic performance and be more active in their learning (Etherington & Costello, 2019; Napoli et al., 2008; Sanger & Dorjee, 2016; Schonert-Reichl et al., 2015; Sibinga et al., 2016).

2.3 Theories on Second Language Acquisition

Behaviorism: Language learning, according to behaviorism, is the same as acquiring a new behavior. The environment should be the most significant aspect in learning a language. Learning entails creating responses to stimuli in the environment. If these responses are rewarded with positive reinforcement, they will be repeated. However, if any of these responses receive punishment, they will be abandoned. According to this view, SLA takes the following steps: To begin, in order to learn a second language, students must repeatedly mimic correct models. The learning process is then aided by positive reinforcement of correct imitations and correction of incorrect imitations. The active participation of learners is the most crucial aspect of this learning process. According to behaviorism, brain processes were not engaged in learning; it was simply a response to environmental stimuli. Thus, language learning occurred as a result of the organism's interaction with its environment (Van Patten & Williams, 2014).

Skill Acquisition Theory: Skill Acquisition Theory describes how learners grow from beginning learning to advanced mastery in a number of skills. Skill Acquisition Theory is divided into three stages, which include the components of declarative knowledge, proceduralization, and automatization. In the first stage, learners must gain knowledge of a skill without attempting to apply it through perceptive observation and analysis of others engaged in skilled behavior. The stage of putting this information into a behavior, also known as proceduralization, follows. Once the knowledge has been proceduralized, it can be retrieved whenever the conditions for that behavior are met.

There should be a lengthy way for the relevant to be displayed with perfect fluency and without faults with procedural understanding. This takes a lot of practice. This is known as aummomatization. The important thing to remember is that the entire sequence of proceduralization and automatization cannot begin until the proper proceduralization prerequisites are met. According to this idea, learners must be taken from explicitly taught declarative information to autimatization by deliberate proceduralization by engaging in relevant tasks while the declarative knowledge is most activated (Dekeyser, 2015).

Neurobiological Motivated Theory of First and Second Language (The Declarative/ Procedural Model): The actions of long-term memory systems in language acquisition are the emphasis of this theory. Declarative memory and procedural memory are two long-term memory systems that are necessary for language learning. First, an overview of the necessary neurobiological fundamentals is required. The cerebrum is the largest region of the brain and plays a key role in cognition, including language. The cerebrum is divided into two halves, each with four lobes: (1) the frontal, (2) the temporal, (3) the parietal, and (4) the occipital. Cortical areas, including Broca's area, are among the sections of the cerebrum that contribute to language acquisition. Furthermore, the cerebellum is important for movement, memory, and language. The basal ganglia, which includes the caudate neucleus, and the hippocampos, which is assumed to underpin memory, are two other components that play essential roles in languages. Figure 1 depicts the different sections of the brain.
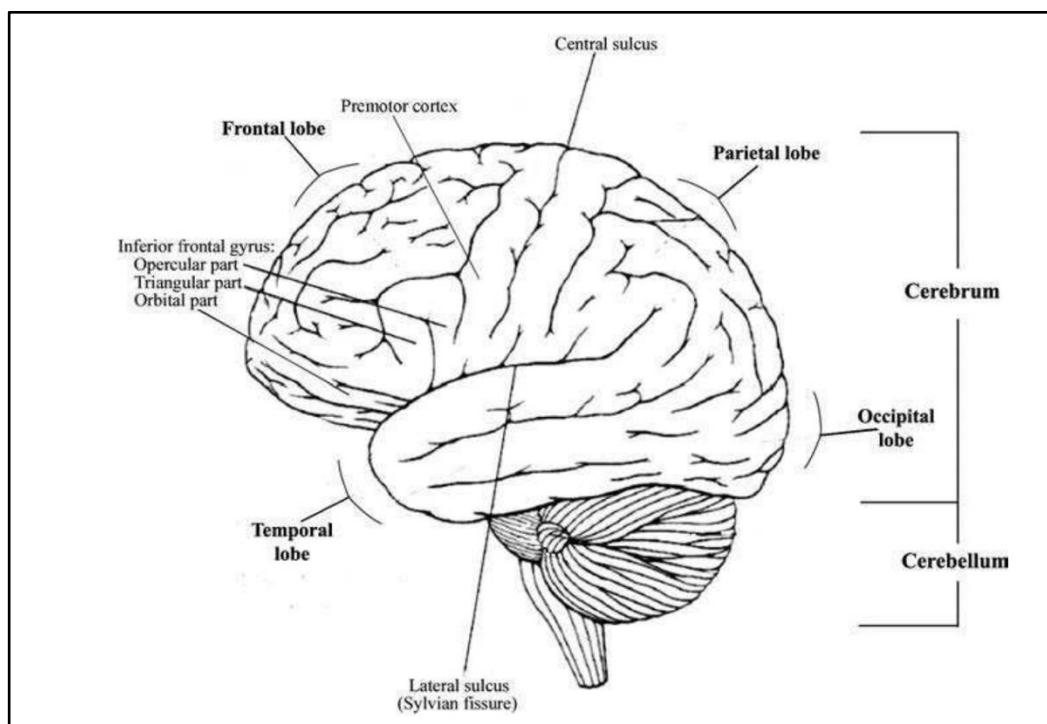

Figure 1: *The left side of the brain with its structures* (Ullman, 2014)

The function of the declarative memory brain system in linguistic idiosyncratic knowledge may explain why they are crucial for learning facts and events (semantic knowledge and episodic knowledge). It has been demonstrated that knowledge can be learnt relatively quickly in declarative memory with as little as a single stimulus exposure; any explicit knowledge must be learned in declarative memory. In terms of SLA, learning in declarative memory appears to enhance during childhood, adolescence, and early adulthood before declining. Another factor to consider is that females outperform males in declarative memory. Other characteristics that may influence declarative memory include left-handedness, sleep, and exercise. Procedural memory is made up of an interwoven network of brain structures centered in frontal/basal ganglia circuits. The basal ganglia play a key role in cognitive skill learning and consolidation. The procedural memory emphasizes the implicit learning and processing of navigation sequences, rules, categories, and routes; hence, this system is useful for learning to predict. Learning and consolidation in this memory, unlike declarative memory, appears to be robust early in childhood and appears to deteriorate over adolescence, leading in inferior learning ability in adulthood. These two memory systems interact, with the declarative memory initially acquiring knowledge and the procedural memory subsequently learning equivalent knowledge. This theory is thought to be a very valuable and informative theoretical approach, particularly in terms of providing a wide range of behavioral and neurobiological predictions for both L1 and L2. Declarative and procedural memory, when used appropriately in language teaching and learning, should improve language learning, particularly SLA (Ullman, 2014).

Input, interaction, feedback, and output in SLA: This SLA theory is also refered to as the Interaction Hypothesis or Interaction Theory, constructed into four components, including Input, Interaction, Feedback, and Output. This theory clearly outlines the process involved when learners encounter information, engage, receive feedback, and produce output while using this framework. It also attempts to explain why interaction and learning might be related by employing cognitive concepts such as noticing, working memory, and attention. Input is just the language that a learner encounters in a communicative setting. Input is an important component of learning because it provides evidence from which learners can construct liguistic hypotheses. Interaction refers to the talks in which learners participate. Interactions must be significant because learners gain information on the correctness and incorrectness of their statements in this setting. There are two sorts of feedback: explicit feedback and implicit feedback. Corrections and metalinguistic explanations are examples of explicit feedback; negotiation methods such as confirmation checks, clarification requests, comprehension checks, and recasts are examples of implicit feedback. Feedback may provide additional opportunity for learners to focus on their production or understanding, encouraging L2 growth. Output forces students to transition from comprehension to syntactic language use. It also encourages automaticity, or the routinization of language use. Attention is thought to be one of the mechanisms that mediates the relationship between input and learning. It is widely acknowledged that L2 learners are subjected to more material than they can handle, and that some technique is required to assist learners in "sorting through" the huge volumes of input they get. Working memory (WM) has also been proposed as a possible explanation for how interaction driven L2 learning, as well as language learning in general, occurs. There is evidence that people who were more capable of suppressing interfering information were also more capable of learning from interaction. In summary, the approach's central tenet is that interaction facilitates the process of acquiring L2 by providing learners with opportunities to receive modified input and feedback, both explicitly and implicitly, which may draw learners' attention to a problem (Gass & Mackey, 2014).

Sociocultural Theory and L2 Development: According to Sociocultural Theory (SCT), human mental functioning is essentially a mediated process organized by cultural artifacts, activities, and concepts. Within this framework, humans are understood to use existing cultural artifacts and to create new ones that allow

them to regulate, or more fully monitor and control, their behavior. SCT also contends that, while human neurobiology is required for higher mental processes, the most important types of human cognitive activity emerge through interaction with social and material surroundings, such as those found in educational settings. Although lower mental processes are recognized, the distinctive dimension of human consciousness was its capacity for voluntary control over biology through the use of higher level symbolic artifacts such as language, literacy, numeracy, categorization, rationality, logic, and so on, as well as material artifacts and technologies. These artifacts may act as a buffer between the individual and the environment, as well as a medium between the individual and the social-material world. Each of the three processes, including object regulation, other regulation, and self-regulation, must be symmetrical and recoverable in order to be a successful user of a language. As a result, under stress, both SL learners and native speakers may produce grammatical and nonsensical statements. Another argument is that participation in culturally organized activity organizes and amplifies higher order mental functions such as voluntary memory, logical cognition, learning, and attention. In conclusion, the theory's significance lies not only in the analytical lens it gives for understanding psychological growth, but also in its ability to directly influence that development. Understanding communicative processes as inherently cognitive processes, and cognitive processes as inseparable from humanistic issues of self-efficacy, agency, and the effects of participation in culturally organized activity, SCT approaches take the issue of applying research to practice seriously (Lantolf et al., 2014).

3   Materials and Methods

Scientific study is predicated on finding a solution to a specific problem to be recognized. In research, there are two basic approaches to data gathering and interpretation: qualitative research and quantitative research. Unlike quantitative research, which is based on numerical data and methods that can be objectively applied by other researchers, qualitative research is used to understand human beings' beliefs, experiences, attitudes, behavior, and interactions using non-numerical data (Pathak et al., 2013).

According to Pathak et al., (2013), there are three basic forms of qualitative research: (1) observational studies, (2) interview studies, and (3) documentary or textual examination of diverse written records, each with its own set of benefits and drawbacks. In general, qualitative research works well for adaptability, natural settings, significant discoveries, and the production of new ideas. However, this research method is untrustworthy, subjective, has limited generalizability, and is labor-intensive.

This study employs qualitative research along with documentary examination of various documents to answer the two research topics. First, answers to the first research question "*What is the connection between mindfulness and SLA*?" can be found based on previous studies on mindfulness and its benefits in education, as well as theories on SLA. The findings from mindfulness and neural system research, as well as SLA theories, are then thoroughly investigated to determine the answers to the second study question, *"Under neurolinguistics perspectives, how can mindfulness help L2 learners improve their academic performance?"*

4   Results and Discussion

Research question 1: What is the connection between mindfulness and SLA?

According to neurolinguistics, studying a language is the process of gathering information about that language from its surroundings. The information is then processed in the brain and remembered as knowledge, which learners can use when needed. There are some prerequisites for efficiently acquiring this new knowledge. To begin, existing information must be actively engaged; consequently, prior to acquiring new knowledge, learners should have opportunity to explore fundamental knowledge to which the new ones will relate. Second, paying attention to the material during the learning process should be necessary in

order to help the brain digest the information correctly and store knowledge in long-term memory. This appears to be particularly crucial when learning a second language because learners must work with the pronunciation, form, meaning, usage, and so on of many words, as well as the connection of words, all at the same time. Third, new knowledge must be incorporated into the schama by learners in a manner that they understand. This requires some practice and review to ensure that the information stored is thorough and accurate. The review of new language knowledge is increasingly significant in the process of acquiring L2 knowledge. This will assist learners in remembering various components of an L2 for a longer period of time in the brain. The learning process is depicted in Figure 2.

Back to mindfulness, neuropsychology shows that it can help neurons in the neural system enhance their connection, allowing them to perform more effectively and enable new knowledge be remembered for a longer period of time. This is critical when learners acquire new knowledge in L2. Furthermore, based on findings in numerous studies, it is widely assumed that mindfulness can assist L2 learners in increasing their attention capacity, which is important in learning something new, not just L2 knowledge. All aspects of L2's new knowledge will be carefully observed in order to aid the learning process occurring in the brain effectively. Then, learners can maximize their chances of acquiring that type of knowledge in L2.

It can be seen that if learners have opportunities to practice mindfulness consistently before or during the learning process of L2, they may be able to maximize their potential to acquire new knowledge in L2. In summary, several studies on mindfulness and SLA theories, as well as explanations in neuropsychology and neurolinguistics, lead to the conclusion that mindfulness and SLA should have a proportional link. This indicates that the more opportunities learners have to practice mindfulness while learning L2, the more knowledge L2 learners can acquire and apply later in appropriate contexts.
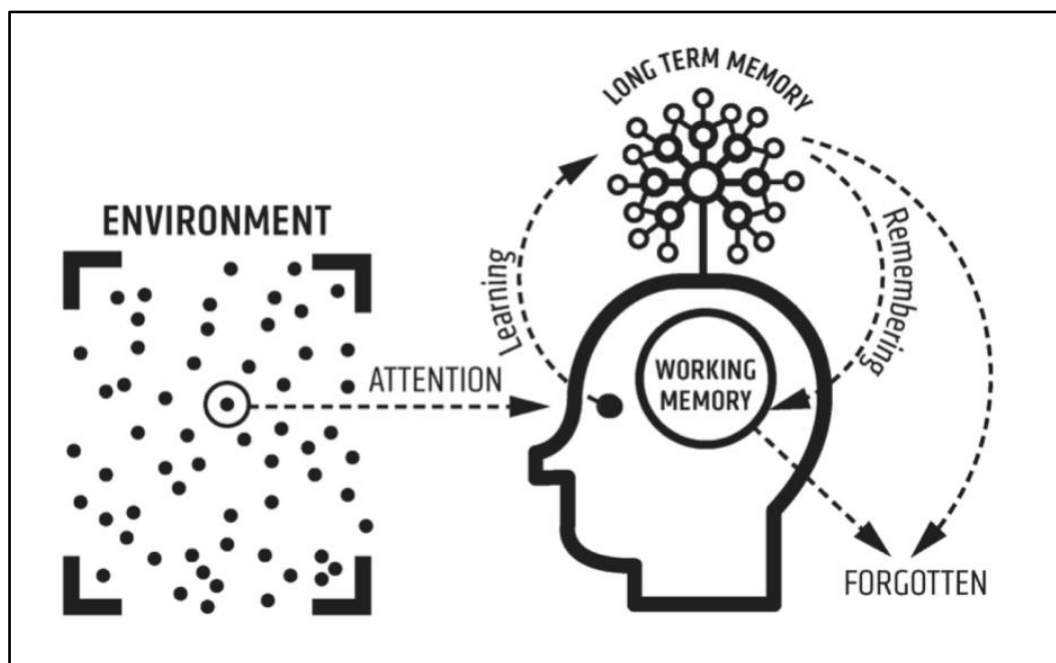

Figure 2: *Learning process in the brain*

(Source: (Sherrington, 2020)

Research question 2: Under neurolinguistics perspectives, how can mindfulness help L2 learners improve their academic performance?

According to neuropsychology and neurolinguistics, if learners become active and enthusiastic in acquiring new L2 knowledge, they can maximize their ability to acquire that new knowledge. Obtaining new

knowledge actively and without any obstacles from anxiety or stress might help the brain process information from L2 more successfully; consequently, knowledge from processed information may be stored and remembered more effectively in the long term. This will allow learners to apply their L2 knowledge more freely in practice.

Having opportunities to practice mindfulness while learning L2 will provide several benefits in terms of attention and learning abilities, social and emotional skills, and resilience. As is well known, attention regulates learners' ideas, emotions, and behaviors; hence, attention must be required for many forms of learning, providing learners with additional opportunities to maximize information acquisition in L2. If L2 material is processed appropriately and effectively in the brain, it must be retained longer, and learners can actively apply that knowledge for higher academic success and cognitive development. Furthermore, mindfuness can assist learners in reducing stress, anxiety, post-traumatic symptoms, and depression, allowing them to improve their academic performance and participate actively and positively in SLA.

Mindfulness and memory have a close relationship; consequently, mindfulness and memory can be thought of as a powerful link between mindfulness and learning. It is widely assumed that throughout the process of acquiring a new knowledge of L2, learners may frequently encounter proactive interference, a phenomena in which past information diminishes the ability to learn new information. Limiting the negative effects of proactive interference and accepting its counterpart - proactive facilitation, in which prior learning can support new learning - should thus be a need. Mindfulness practices may be useful in this situation. Mindfulness can reduce proactive interference and increase proactive facilitation, allowing our brain's working memory to be more productive. When the working memory functions easily and effectively, L2 learners can feel more at ease when learning new information, recall that information for longer periods of time, and improve their academic achievement.

5   Conclusions

Although mindfulness has its roots in ancient religions, its benefits to modern society are undeniable. Mindfulness has been shown to be effective in education through several studies undertaken by various scholars from all around the world, and SLA is no exception. With the help of mindfulness, learners become more attentive and self-control in acquiring knowledge, resulting in improved performance of language functional areas in the human brain. This study demonstrates a proportionate relationship between mindfulness activities and SLA. Attention and memory processes in the brain are vital while studying an L2. Learners can increase their memory capacity, self-regulation ability, and attention with the help of mindfulness techniques. As a result, learners can acquire and absorb linguistic knowledge more efficiently. Furthermore, mindfulness can be viewed as a link between linguistic knowledge and the human brain. Through the revision of some common theories on SLA, it is clear that mindfulness plays an important role in assisting the neural system in relaxing in order to maximize its capacity for learning a language in general. Learners become more motivated in their studies and more effective in their academic performance.

As a result, it is proposed that mindfulness practices be included in L2 programs to help learners maximize their proficiency in SLA. In actuality, there are numerous strategies to develop mindfulness, one of which should be breathing technique. Before beginning a period of L2, learners should be given 3 - 5 minutes to develop mindfulness using breathing techniques. This may assist learners in feeling relaxed, avoiding tension, and paying close attention to the instruction. Furthermore, during break time, students may be given the opportunity to relax by listening to instrumental or zen music. This may help students concentrate better when they return to the classroom after a break.

6 Declarations

6.1 Study Limitations

The study is simply an attempt to determine whether there is a link between mindfulness and SLA. Furthermore, this study demonstrates the ability to assist L2 learners in improving their academic performance while utilizing the benefits of mindfulness in teaching and learning an L2 from a neurolinguistic perspective. Though the findings clearly show that when mindfulness is used appropriately in teaching and learning an L2, it can help learners become more active and confident in acquiring knowledge of an L2, the study still lacks an experiment with a real sample. The findings of this study might be more convincing if additional research focused on the benefits of mindfulness on SLA through experiments in real-world classes.

6.2 Acknowledgements

6.3 Competing Interests

There are no conflicts of interest to disclose.

6.4 Publisher's Note

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