THE ESSENCE OF MENTAL TRAINING AND OPPORTUNITIES FOR ITS USE IN THE VIOLIN TEACHING AND LEARNING PROCESS OF PUPILS IN PRIMARY SCHOOL EDUCATION

Mentālās vingrināšanās būtība un tās pielietošanas iespējas sākumskolas skolēnu vijoļspēles mācību procesā

Fiona MērijaVilnīte *(Fiona Mary Vilnite)*
Riga Teacher Training and Management Academy
e-mail: musicforstrings@gmail.com

Māra Marnauza
Riga Teacher Training and Management Academy
e-mail: mara.marnauza@choir.lv

Abstract. *The subject of mental training has gained a great deal of attention in the field of sports psychology and various authors have shown that many of the components of mental training transfer successfully to a musical setting (Green, Gallwey, 2012). Yet the explanations for its success, why this may depend on certain conditions and whether there are special considerations for musicians, have remained relatively obscure (Johnson, 2003). Additionally, mental training is more frequently used in both sports and music with already-trained practitioners; the few studies that explore the components of mental training with children are currently in the field of sport (e.g. Orlick, McCaffrey, 1991; Julien, 2002; Li-Wei et al, 1992) and therefore do not address the specifics of learning a musical instrument.*
The aim *of this paper is to investigate the premise of mental training and to assess opportunities for its use in the one-to-one violin teaching and learning process of primary school-aged pupils.*
The applied methods*: Analysis of the scientific literature on mental training, its connections to literature in neuroscience and primary school age-related studies; teaching observations.*
Relevant conclusions*: Children from a young age have mental imagery abilities and there are opportunities for the use of mental training in the violin teaching and learning process of pupils in the primary school age group. A synthesis of the literature on mental training, neuroscience and empirical teaching observations suggests that for mental training to be most beneficial, it should be introduced consciously and purposefully within the teaching and learning process.*
Keywords: *mental imagery, mental training, primary school students, violin learning.*

Introduction

Becoming an artist on the violin requires integration of musical concepts, coordination of differing motor skills and memory abilities. Since playing to a high standard requires accurate execution of these – and often from a young age – effective methods of teaching and learning the instrument are needed from the very beginning of studies. About the technical requirements of violin playing, there is a plethora of printed contemporary and historical documents, ranging from self-tutor books to violin treatises and violin methodologies. All detail what outcomes are desired. Yet the subject of how to effectively reach these outcomes and gain musical concepts is not widely included in the literature. This process is left up to the individual teacher in their *approach* and as such has largely been left to undocumented oral tradition. This is the quasi-psychological side to violin playing, which has the potential to inspire, motivate, or even deter learning.

In sports, psychologists have noted that success of learning and performance is greatly influenced by the type of mental imagery used by athletes in their practice routine (e.g. Morris et al, 2005; Woolfolk, 1985). In fact, mental imagery is an everyday thought process of seeing or hearing in the „mind's eye,” which may or may not be consciously employed (Kosslyn, 1990). Using mental imagery consciously, athletes literally visualise, or mentally rehearse, the action or situation they are preparing for (e.g. Hale, Crisfield, 1998). Mental training integrates the

conscious use of mental imagery and the awareness of psychological and cognitive components which influence the learning and performing of a task (Mayer, Hermann, 2011).

Since, similar to sports, the components of violin playing are connected to a series of cognitive, neural processes, rather than mere external muscular movements and reproduced musical interpretations, the inclusion of mental training in the violin teaching and learning process has the potential to supplement and improve the acquisition of technique and develop musical concepts.

Whilst the components of mental training have been the subject of texts in general music (e.g. Klöppel, 1996; Green, Gallwey, 2012), they are often only considered as a peripheral part of the conservatoire-level instrumental learning process (Haddon, 2007) and there are currently no texts on mental training specifically designed for violinists. Additionally, a further problem exists: mental training is frequently used both in sport and music with already already-trained practitioners and the few studies that explore the components of mental training with children are currently in the field of sport (e.g. Orlick, McCaffrey, 1991; Julien, 2002; Li-Wei et al, 1992); thus, the specifics of learning a musical instrument with mental training are not addressed.

Whilst the reason for the dearth of literature on mental training in instrumental pedagogy is not clear, it may be associated with the fact that texts on mental training itself have not yet been linked comprehensively to the latest researches on mental imagery and mental processes in neuroscience. Without this, it is more difficult to establish the significance of mental training within the teaching and learning process.

Another reason for its non-inclusion in educational processes may connect to the fact that a large proportion of mental training – especially as a part of sports psychology – focuses on sorting out the problems of the already trained practitioner (Dosil, 2006). Indeed, many concepts in mental training are concerned with coping strategies – negating the nerves associated with performance, or solving situations that have lead to tendonitis, or other problems, such as lack of motivation or poor stamina, which may, in fact, be associated with concepts of posture or stress. Indeed these issues in their exaggerated form can lead to burnout or depression – major causes for use of medications in professional musicians (Stegemann, Geretsegger, 2014) and which can threaten not only musical careers, but also the quality of life. The indication that the use of medication amongst professional orchestral musicians is rising (Fishbein et al., 1987; Breda, Kulesa, 1999), suggests that the pedagogical system or approach in instrumental studies may need to be addressed. What components of mental training that have been used so effectively with already-trained musicians and athletes could also be introduced into the violin teaching and learning process of pupils from the beginning of their studies? How could the use and awareness of mental training from the early stage of instruction help to avert the course of any problems occurring in the first place?

The Aim of the Research, Material and Methods

To explore the basis of mental training in the scientific literature and to determine its effectiveness in the one-to-one teaching and learning process of pupils in the primary school age group (ages 7 to 14).

This paper references the following literature on mental training in music and sports (Klöppel, 1996; Morris et al, 2005; Eberspächer, 2007; Connolly, Williamon, 2004; Hale, Crisfield, 1998; Mayer, Hermann, 2011), mental imagery (Woolfolk, et al, 1985; Hirsch et al, 2006) mental imagery and neuroscience (Kosslyn et. al, 1990; Ganis et al., 2004; Zatorre, Halpern, 2005; Haueisen, Knösche, 2001), mental imagery abilities in the primary school age group (Piaget, 1973; McPherson, 2005), violin pedagogy (Vengerov, Barenboim, Broughton, 2008; Zukerman, 2014), personal teaching observations of pupils in the primary school age group.

Before the literature can be analysed and incorporation of mental training in the violin teaching and learning process can be discussed, it is necessary to define what is meant by the term “mental training.” This paper will use the term “mental training” to refer to the utilizing of mental techniques that can be used to enhance teaching, learning, and performance processes. As such, the term is used similarly to the term “Mentales Training” frequently found in German publications (e.g. Klöppel, 1996; Mayer, Hermann, 2011; Eberspächer, 2007). In German texts, this term has been defined as: **(1)** the process of mentally practising an action without the actual accompanying physical movement, (Eberspächer, 2007; Mayer, Hermann, 2011) and **(2)** the psychological and cognitive elements which influence the learning and performing of a task (Mayer, Hermann, 2011). Whilst this term originates from the sphere of sport, it has also been used in music publications (e.g. Klöppel, 1996; Buyer, 2008, 2009). The two-part definition of the term „mental training” helps to identify relevant scientific literature, which may use differing terminology – including the Anglo-American terms “mental rehearsal” and “mental practice.” These terms equate to definition (1) above. Research using the term “mental imagery” will be also referred to in this paper as an important component part of definition (1) above. “Mental imagery” has been defined as a quasi-perceptual experience which reflects actual perceptual experience, but happens in the absence of external stimuli (Thomas, 2014).

The positive effects of mental strategies on performance outcomes in sport and music have been noted in a variety of studies (Driskell et al, 1994). Interestingly, James Driskell's review of the efficacy of *mental practice* on performance outcomes in various studies disregarded studies which include his definition of *mental preparation*, since these included the “disparate techniques” of “positive imagery, psyching-up strategies, attention focusing, relaxation, self-efficacy statements and other forms of cognitive or emotional preparation” (Driskell et al, 1994, 481). In practice, however, authors have noted that these are the exact components that dictate the success, or failure, of a mental practice routine. Indeed, Sports author Tony Morris notes that positive images must be formed in the mind, otherwise repeated negative images based on one where the athlete breaks down at the “point of maximum effort,” for example, can inhibit performance (Morris et al, 2005, 5). Other sports authors have noted similar phenomenon (e.g. Woolfolk et al, 1985; Hirsch et al., 2006). As a result, authors in both sports and music have cited relaxation techniques as an important basis of mentally-generated exercises (Morris et al, 2005; Klöppel, 1996; Li-Wei et al., 1992). It would therefore seem from the practical use and observations of mental training that both definitions of the German term „Mentales Training” are indeed important in a study of mental training and will be used accordingly in this study.

Formation of Mental Imagery. Mental training could not occur without mental imagery, since it is the manipulation of this which enables the mental practice or rehearsal of an action (see Morris et al, 2005, Amasiatu, 2013). Interestingly and important for this study, is the fact that mental imagery does not have to be especially created, or imaged, on purpose – it is an everyday mental process that is spontaneously created, consciously or not (Kosslyn et. al,1990). A general example of this would be in memory recall – thinking about how many windows there are in the living room (Kosslyn, 1995), or thinking about whether one sound (such as a cat's meow) is higher or lower in pitch than the sound of a blender (Kosslyn, 1995, 1335). Additionally, reading a story and visualising the characters and events in that story (Sadoski, 1985) is also an example of the way imagery is used in everyday circumstances. Indeed, imagery exercises can involve any of the senses – visual, haptic, motor, auditory, or any combination of them (Thomas, 2014). Stephen Kosslyn's survey of everyday mental imagery found that whilst visual mental imagery was the most commonly used, the experience of auditory imagery was actually stronger than visual mental imagery (Kosslyn et al., 1990).

It could be argued that the process of playing the violin encourages a specific set of quasi-spontaneous imagery. The need for violinists to produce self-regulated pitches and sound colours almost requires the player to match practically that which has already been mentally imaged. Additionally, the appropriate motor movement for these sounds to occur must be prepared in

advance. Pinchas Zukerman noted in a masterclass given at the Royal College of Music in London, the importance of preparation in playing the violin (Zukerman, 2014). In this pedagogical setting, imagery clearly takes the first step away from spontaneous imagery, to deliberately induced imagery – and as such could regarded as a step towards mental training. It is the conscious use of mental imagery that discerns spontaneous mental imagery from mental training. But one thing seems clear – mental imagery could be induced in a pedagogical setting by the teacher whether or not it is intended. The use of metaphors, for instance, are often used in lessons to demonstrate musical or technical components and can induce a memory of an experience the learner has already had – in just the same way as imagery is created in remembering how many windows there are in the living room, as mentioned earlier. An example of this would be, in P. Zukerman's masterclass, where spiccato bowing in the Tchaikovsky Violin Concerto is likened to diamonds (Zukerman, 2014). The metaphor effectively combines various mentally-imaged senses; haptic, for the hardness of the diamonds and visual, for their shape. This image effectively then controls the concept of the motor movement needed for spiccato – short, individual, somewhat rounded, but hard movements. Another example of more deliberate use of metaphors is in a masterclass given by Maxim Vengerov who uses visualisation, scenarios and metaphors in a positive manner to achieve musical interpretations (Vengerov, Barenboim, Broughton, 2008). In this filmed masterclass, it is possible to witness the marked improvement of the students, who seem to be able to easily and instantly incorporate characters and musical concepts in their playing.

Neural processes of Mental Imagery Formation. It is important here not to underestimate the importance of the positive imagery M. Vengerov uses, which is positive and light-hearted. As we have seen from the various examples in sport, the use of positive imagery is extremely important for the success of performance. But how can this be explained neurologically?

To understand its importance it is necessary link to research that has shown how negative imagery can create a state of anxiety (Hirsch et al., 2006), which is not desirable in the learning environment (Perry, 2006). As Bruce Perry points out, stress activates the limbic system in the brain which regulates what has been termed as the “fight or flight” mechanism. This basic instinct existent for self-protection, filters out any information that it considers non-critical for the purpose of survival, and makes it difficult to learn and retrieve stored information (Perry, 2006). Indeed, research shows that access to the long term memory is needed for successful mental imagery to occur (Hishitani, 1993) and that activation of the amygdala – a part of the limbic system – at a high level, which is gained through anxiety, prevents the appropriate functioning of the prefrontal cortex (Arnsten, 1998), which is needed for long term memory formation (Blumenfeld, Ranganath, 2007). It is this reduced prefrontal cortex functioning that also has a direct negative effect on cognitive ability (Arnsten, 1998).

Additionally, research has shown that the anxiety caused by negative imagery literally creates a „mental block,” activating an area of the brain called the posterior cingulate gyrus (Nielsen et al., 2005), a neural „suppressor,” which also has extensive connections to the limbic system (Maddock et al., 2003). The cascading effect of negative mental imagery in the brain is visually represented in Figure 1.

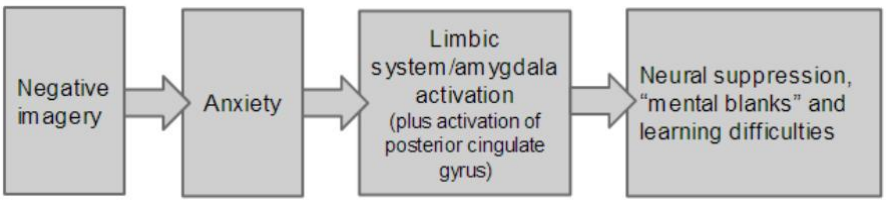

Figure 1. The „domino effect” of negative imagery (Vilnite, 2014). (Diagram after: Morris et al, 2005; Hirsch et al.,2005; Perry, 2006; Maddock et al., 2003; Hishitani 1993, 2011)

As can be seen, using and integrating mental imagery in the violin teaching and learning process is actual. It is important for teachers to use positive imagery in pedagogical settings, and it is important for all teachers to be aware of the effects of negative imagery, whether full mental training is planned or not. As James Gallwey points out, the language that teachers use in lessons is repeated as self-talk in pupils (Gallwey, 1974). It therefore seems logical to assume that if the concepts and resultant imagery created by the teacher in the lesson are positive, then the pupil's self-talk will also be positive, creating mental images that are positive, which can lead to improved, or at least uninhibited, performance and learning. Indeed, J. Gallwey even recommends reducing verbal instructions, criticisms and judgements in a pedagogical setting.

Techniques of Mental Training. So how can mental imagery be deliberately manipulated in the manner of the first definition of the term mental training? Whilst many techniques of mental training concern themselves with mental rehearsal-type skills, it is interesting to note that most exercises begin with progressive relaxation (e.g. Connolly, Williamon, 2004). Whilst we have seen that this helps to keep a positive state of mind, separate studies in neurobiology have noted how a meditative state improves general cognition (Zeidan, 2010). Additionally, it may have the added advantage of encouraging the player to find a relaxed technique whilst playing. This is especially important in violin playing, where muscular tension in any one area can have a cascading effect of further tensions elsewhere (Fischer, 1998).

After the initial relaxation, movements are imagined, using either external imagery (imagining visually from an external viewpoint the *look* of a movement) or internal imagery (imagining the *feel* of a movement) (e.g. Morris et al, 2005; Klöppel, 1996). Combining or alternating types of imagery has been explored in a musical setting – imagining the sound of a phrase, followed by imagination of the associated pose and movements of the hand (Klöppel, 1996). Repetition of the chosen imagery is also recommended, so that the action can be achieved mentally at normal speed and in full colour (Hale, Crisfield, 1998).

Neural Processes of Mental Training Techniques. The kinaesthetic (motor), visual, auditory or haptic mental imagery involved in mental rehearsal exercises can be linked to the studies in neuroscience that show how mental imagery in fact activates similar brain areas to actual movement, perception, and hearing, etc. This is especially similar in the premotor cortex for motor imagery (Cisek, Kalaska, 2004), the frontal and parietal regions for visual imagery (Ganis et al, 2004) and in the auditory cortex for auditory imagery (Zatorre, Halpern, 2005). Interestingly, other research has shown that pianists listening to a performance of a work that they have had experience playing, results in brain activation of the listening pianist's primary motor regions corresponding to the fingers have used during their own performance of the work (Haueisen, Knösche, 2001). A pianist watching a silent video of someone fingering piano keys, has also been shown to activate auditory areas of the brain in the pianist observer (Haslinger et al., 2005). In this way, T. Gallwey's experience of issuing few verbal instructions and giving the pupil the chance of observing a task would also seem to have an additional basis in neuroscience. Additionally, the identification of the mirror neuron system, where the spontaneous and involuntary imitation of both actions (Buccino, et al, 2001) and emotions (Reiniger, Court, 2005) has been noted, is particularly interesting when considered in a teaching and learning environment, since it further supports the notion of non-verbal communication and imitation. Additionally, the significance of emotional imitation during the teaching and learning process needs to be noted, since the concept of teacher-pupil and pupil-teacher emotional imitation is actual in the one-to-one teaching and learning process.

Additions and Developments of Mental Training Techniques. Considering the neural basis of mental training helps to establish components in mental training that could be emphasised and expanded. Considering the mirror neuron system and activation of associated brain areas during observation, for instance, brings new importance to the role of observation in mental training techniques. Plus, the use of metaphors can be used as a method of developing single and multi-modal mental imagery. Additionally, understanding neural processes

particularly helps apply mental training techniques to the pedagogical process, since knowing the reason why they work helps teachers to purposefully use them and better plan scientifically-based solutions for technical challenges and incorporation of musical concepts (see Table 1).

Table 1

How Components of Mental Training can be connected to Concepts in Neuroscience

Concepts in Neuroscience	**Associated Mental Training Components**
Mental imagery and activation of associated brain areas	Mental rehearsal, mental practice, observation
Calming of „fight and flight” and limbic system	Sense of ease, relaxation techniques
Non-activation of posterior cingulate gyrus (the „neural suppressor”)	Positive imagery, positive affirmations, reducing teacher verbal instructions, criticisms and judgements
Mirror neuron system	Positive teacher attitude, teacher demonstration
Use of long-term memory	Use of metaphors, connecting violin techniques or sound qualities, etc, to past experiences of learner

Age-related issues. Since mental training and imagery-related studies are mainly aimed at the older age groups, the lack of literature on mental training for violinists and other musicians for the beginning stages of learning would, at first glance, seem to suggest that perhaps the concepts of mental training are too abstract, or too difficult for children to grasp. Yet children's ability to engage in mental imagery has been noted by Jean Piaget, who remarks that this ability is gained through language learning between the ages of two and seven (Piaget, 1973). There is also research in the field of music psychology showing that primary school age-group pupils (ages 7-9) can already transfer this ability to learning a musical instrument; that many pupils naturally use methods to memorise melodies which amount to mental rehearsal and mental imagery techniques. These included singing the music and moving fingers in accordance with the fingering needed to play their instrument and "playing" the music in this manner from the beginning to the end, and others creating a mental image of the musical notation (McPherson, 2005). Interestingly, the mental imagery techniques used by the pupils followed in this research were not introduced to pupils in instrumental lessons, but had been learnt in the family situation – to memorise telephone numbers, for instance. Gary McPherson found in this longitudinal study that there was a connection between mental strategies, greater enthusiasm for learning and higher skill development, compared to those that did not use any mental strategies. Additionally, a link was found between not using any mental strategies within the first few months of learning and reduced musical skills, and even the likelihood of ceasing to learn a musical instrument altogether. The results of his research suggest that mental training methods are indeed actual in the primary school age group. Indeed, G. McPherson suggests that future research should focus on "musical thinking and learning" (McPherson, 2005, 32).

Results

Taking into account the theoretical literature connected to mental training and its associated neural basis, opportunities for including mental training in the violin teaching and learning process of primary school-aged violin pupils can be identified in three main areas: 1) Cognitive, general to learning. These concern the basic approach to teaching and learning: positive teacher and pupil attitude, positive teacher demonstrations and using language that produces positive mental images, and 2) Cognitive, age-related and 3) Cognitive, specific to learning the violin.

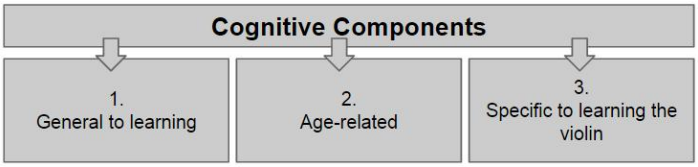

Figure 2. Cognitive areas that can be developed with mental training.

Components of general cognition and mental training (see Figure 2 above: box 1. General to learning) concerns the basic approach to teaching and learning: positive teacher and pupil attitude, positive teacher demonstrations and using language that produces positive mental images. These basics create a feeling of ease and comfort, necessary for effective assimilation of information. Developing the use of (multiple sense) mental imagery for memory skills and performance practice can also be sorted into this first category. Practically, this can include making a visual mental image of the notation and alternating that with auditory mental imagery of the notation. Using metaphors and story scenarios can also act as a memory aid and be categorised as general to learning.

When considering age-related factors in mental training and factors specific to learning the violin (see Figure 2 above: boxes 2. and 3.), it is useful to note that mental training techniques are usually aimed at students who have already gained playing skills. On the one hand, this would seem logical, since mental imagery is produced from the long-term memory, which means that a pupil would have to have had an experience of playing in a certain way to be able to create mental imagery of it. However, using metaphors as described earlier can circumvent this and can also aid pupils in their first years of study, since they can learn using their own experiences from everyday life, to gain technical and musical abilities.

However, general teaching observation of the teaching and learning process of pupils in the primary school age group (ages 7 to 14), suggests that very little experience is actually needed to be able to mentally recreate a motion or feeling connected to playing the violin. Indeed, mental imagery and mental rehearsal of a movement can usually be carried out from the second or third lesson. However, the strength of this would seem to be connected to a pupil's general ability to use mental imagery.

To test this, 19 pupils – 8 violin pupils and 11 piano pupils – were observed from Cesu 1. pamatskola from classes two to seven. 15 (78.9 %) out of the 19 pupils reported that they could easily create a visual mental image of a posture or a movement. Results also showed that all of those who found this easy could also engage in everyday mental imagery – mentally-imaging what was eaten for breakfast, for instance. Similar to G. McPherson's study with pupils in this age range, the pupils were asked to create a visual mental image of a score. Again, those that could image a posture or a movement could also easily mentally image the initial phrase of their sheet music (four to eight bars). Interestingly, the score could be imaged by the pupils both before and during actual playing and doing this also seemed to increase the awareness they had for the preciseness of the music being learned. An unexpected result from these tests, was that these students also had greater ease of learning two phrases of eight to sixteen bars from memory during a 20 minute session and, when tested a week later, had increased memory recall for the phrase(s) that had been mentally-imaged, compared to those pupils who said they could not visually image a score.

However, musical and technical improvement was noted with all pupils when metaphors were used – regardless of whether or not they could easily create a visual mental image. Metaphors using multiple senses were found to be the most effective. For instance, those which connected to food, enabled the pupils to imagine the taste, the texture and the temperature of the food before playing a phrase. Playing a phrase in the manner of "tasty ice cream,"or"chips with tomato sauce" noticeably changed the style and sound of a phrase – so much so, that changing just one component in a metaphor (such as „*cold* ice cream" as opposed to „*warm* ice cream")

was audibly noticeable by both pupil and teacher. Additionally, and perhaps not entirely expected, pupils showed a greater enthusiasm to play their instrument using this exercise, finding a new independence unobserved previously, and especially enjoyed experimenting with their own food metaphors. This had the added advantage that verbal instructions could be reduced in lessons. In the following lessons, instructions were reduced to keyword reminders of the pupils' own imagery. This became an effective way of integrating musical and technical components and seemed additionally to help with memory recall of a phrase.

Practical observation indicates that improvements can indeed be gained in all of the three cognitive areas identified (Figure 2.) by using the components of mental training. Additionally, results show that musical and technical elements relevant to violin playing can indeed be effectively attained in an integrative manner.

Conclusion

Analysis of the literature and from teaching observations, it can be concluded that the components of mental training are already being used in pedagogical situations, but that for it to be used consciously and more effectively, awareness of the following is important:

- The neurological and psychological basis of mental training shows that the words used and attitudes purveyed in lessons can create spontaneous mental imagery in the pupil, whether planned by the teacher or not.
- The advantages of using mental training positively and consciously can effectively increase the speed of learning instrumental skills and enthusiasm for continued learning.
- Negative imagery can create stress which can impede learning and reduce enthusiasm.
- A sense of ease encourages a pupil's skills – both practically and mentally.
- Based on the mirror neuron system, teachers need to keep a positive attitude and emotion to encourage the same in the pupil.
- Mental training is actual in the primary school age group, since children from a young age have mental imagery abilities, but they may need to be prompted by the teacher to use them.

Experience of using mental training practically in this study showed that it is effective in the pedagogical process. The techniques can be used to effectively develop musical concepts, technical proficiency and cognitive components associated with learning.

Kopsavilkums. *Mentālā vingrināšanās ir ieguvusi lielu uzmanību sporta psiholoģijas jomā un dažādi autori ir norādījuši, ka daudzi mentālās vingrināšanās komponenti ir veiksmīgi pielietojami arī mūzikā (Green, Gallwey, 2012). Tomēr vēl nav skaidrs, kāpēc tieši mentālā vingrināšanās ir tik efektīva,kāpēc tā jāveic noteiktos veidos, un vai pastāv īpaši apsvērumi pielietojumam mūzikā (Johnson, 2003) un vijoļspēles pedagoģijā.*
Šajā rakstā ir aplūkots, kā neirozinātnes pētniecības rezultāti var rast skaidrojumus uz šiem jautājumiem un ilustrēt to, kā mentālā vingrināšanās izmanto tos pašus kognitīvos procesus, kas ir saistīti ar mācīšanos. Rakstā ir analizēts, kā un kāpēc apzināta mentālā vingrināšanās būtu jāiekļauj vijoļspēles pedagoģijā, cik lielā mērā tā, iespējams, jau pastāv un tiek pielietota neapzināti. Tiek aplūkoti apsvērumi, kā iekļaut mentālo vingrināšanos vijoļspēles mācību procesā pamatskolas skolēnu vecuma posmā.

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