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Advantages of Creative Study for Musical Instrument Learning in General, and with Particular Reference to the Violin

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Abstract

Playing a musical instrument requires a particular coordination of brain activity and muscular movements. In general the muscles involved are small muscles. A student of any musical instrument needs to practise in order to present the interpretation that one would like to show. This practice focuses on the coordination of both hands, musical and technical timing, tone and technique rather than muscular workout. The learning rate of our brain, together with the smooth communication of the brain and organs which perform these abilities, determine the rate at which new works can be learned, and at which the corresponding physical abilities can be acquired. Researches show that the main brain activities are very intense during the early phases of learning and then new abilities are absorbed into some kind of an ability memory, after which brain activities turn to normal levels. In this article we discuss how this influences the design of new methods of instrumental learning through creative study methods, with particular reference to the violin, which will give new learning principles for students of musical instruments, avoiding wasting time on excessive mechanical repetition of difficult passages, which will help them to reach new technical and creative levels.

Keywords: instrument learning, bimanual ability, creative study methods, violin

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Enstrüman Çalmayı Öğrenmede Yaratıcı Çalışmaların Faydaları ve Keman Üzerinde Örneklerle Gösterilmesi

Öz

Bir müzik enstrümanı çalmak beyin ve kaslar arasında çok özel bir koordinasyon gerektirir. Müzik enstrümanı çalmak çok karmaşık hareketler zincirinden oluşur ve beynin iki ele aynı zamanda odaklanmasını gerektirir. Kaslar bakımından daha yoğun olarak küçük kaslar kullanılır. Herhangi bir enstrümanı çalabilmek için ve istenen yorumu ortaya koyabilmek için antrenman yapmak şarttır. Bu antrenman kas çalışmasından ziyade iki elin koordinasyonu, müzikal ve teknik zamanlama, ton ve teknik üzerine yoğunlaşır. Herkesin ileri düzeye geldiğinde kendine özgü bir çalışma şekli geliştirmesi beklenir. Ancak ileri seviyeye kadar gelebilmek için akıllı ve yaratıcı çalışmalardaki yöntemleri öğrenmek önemlidir. Yeni eserlerin ve fiziksel yetilerin öğrenilme hızı ve yetilerin kalitesini, beynin öğrenme hızı ve beyin ile bu yetileri gerçekleştirecek uzuvların engelsiz iletişimi belirler. Konuyla ilgili araştırmalar, esas beyin faaliyetlerinin öğrenmenin ilk aşamasında çok yoğun olduğunu ve sonrasında yeni becerilerin bir tür beceri hafızasına alındığını ve beyin faaliyetlerinin normal düzeye döndüğünü göstermektedir. Bu makalede ele almak istenilen konu, bu araştırmaların sonuçlarının enstrüman eğitim yöntemleri üzerinde yaratıcı çalışma yöntemleri ile nasıl bir katkı sağlayabileceğini ve bu yöntemlerin keman üzerinde örneklendirilmesidir. Bu yöntemler aynı zamanda enstrüman öğrencilerine yeni öğrenme prensipleri gösterecektir ve onlara sadece mekanik tekrar gibi verimsiz ve zaman kaybına yol açan yöntemlerden uzak, kendilerini teknik olarak geliştirebilecekleri, yaratıcı olabilecekleri yolları sunulmaktadır.

Anahtar Sözcükler: enstrüman öğrenimi, yeti öğrenimi, yaratıcı çalışma yöntemleri, keman

Introduction

Playing a musical instrument consists of very complex chain of movements, requiring the brain to concentrate on both hands at the same time. In order to learn these movements, considerable training and practice is required. A student is expected to develop his or her own individual study method when they reach an advanced level. However, in order to reach that level, it is important to learn creative methods of study which go beyond mere repetition. Forty minutes of study following these principles brings about more benefits than the 40 minute study for one week basing solely on repetitions.

For a person who does not play any instrument, attempting the following move will give some understanding of the difficulties of instrumental playing. This move is also surprisingly difficult for instrument players, although it feels very familiar to them.

Make a fist with your left hand. Lift your thumb up (See image 1). Make a fist with your right hand and point at your left thumb with your forefinger (image 1) While making this move, make sure than you only use your left thumb and your right forefinger. Now reverse the move and point at your left forefinger with your right thumb (image 2). Reverse the move andrepeat these two steps rapidly. Even though it is impossible to make this move faultless at the beginning, it can be learned very quickly, and the learning phases described below can also be observed while learning this move.

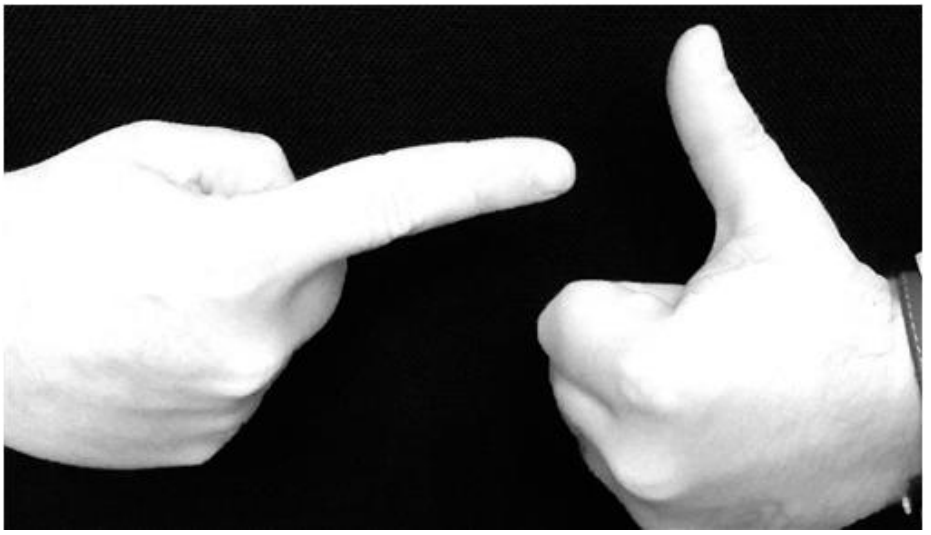

Image 1. *Starting point for test manoeuvre*

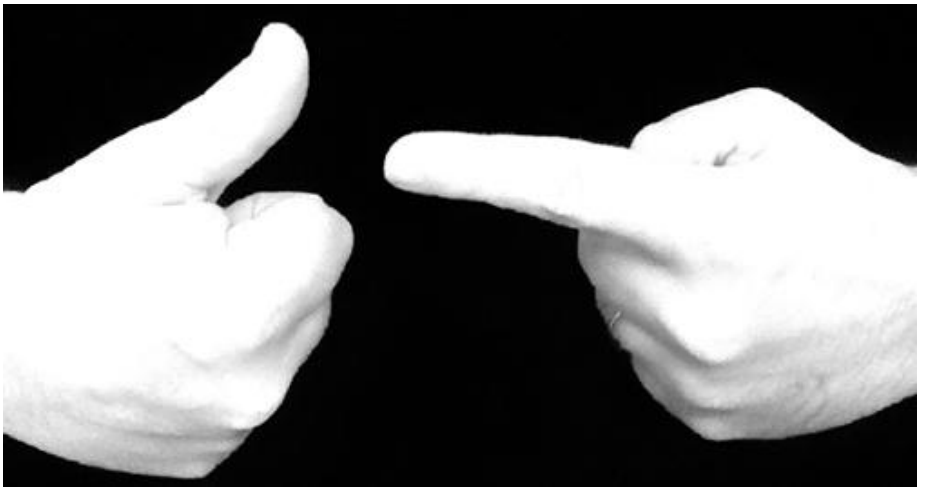

Image 2. *Continuation of test manoeuvre*

Creative study in the case of the violin

Let us examine the chain of events which takes place while learning the violin. A musical note is read, and is mentally translated into a pitch and is heard in the player's head. The brain then issues a command in order to play the comprehended note. This command is transmitted to the fingers and arms. The entire body then executes this instruction, and the physical sensations experienced are then transmitted back to the brain. At the same time the sound heard by the ears reaches the brain, which then makes a comparison between the desired tone, pitch, rhythm, movement and coordination, and what has been produced. A correction command is then sent to the arms and fingers almost immediately, and any necessary correction is then made.

We cannot directly teach our fingers, but can only learn from the sensations that we experience while playing. In order that these sensations can be fed back to provide correct information to the brain, it is necessary to avoid all spasms and tensions which could interfere with this process. The stiffer the muscle movements in the entire body, the harder it becomes to perform a consistently repeatable movement. The points evaluated by the correction command are: the quality of the sound, its pitch, power, rhythm, and the coordination of both hands and the musical interpretation. The position of the note in its musical context, be it horizontal (melodic) or vertical (harmonic) is also measured. Because there is so much to think about at the same time, to learn a passage requires study through a variety approaches. However students are seldom made clearly aware of how and why this is done. As a result, they may waste much time in mechanical repetition of difficult passages. Instead, the foundation of learning should be based on creative study from the earliest stages, and the purpose should be to interpret rather than to simply reproduce the notes as they are written. A method for the imagination and brain to take action before the physical action takes place needs to be found in (Andres et al, 1999) the authors obtain significant

information supporting the idea of creative studies for musicians. In summary, 8 people (average age around 40) sit at a table. They place their arms and hands comfortably on the table, palms facing downwards. There is a button under each finger of each subject. In order to prevent eye contact with the hands, a screen is placed between the hands and eyes. The subjects are taught button combinations—consisting of eight button presses for each hand—which they are asked to perform to the accompaniment of a metronome at 1 Hz speed (See Figure1). The subjects practise until they can perform the combinations faultlessly ten times in a row. Next, they are asked to combine these two combinations as one button with one hand, one button with the other; 16 presses using both hands with a metronome at 2Hz speed (See Figure 2). The subjects are given half an hour to practice this new combination and their brain activities are recorded as EEG and EMG during this time period.

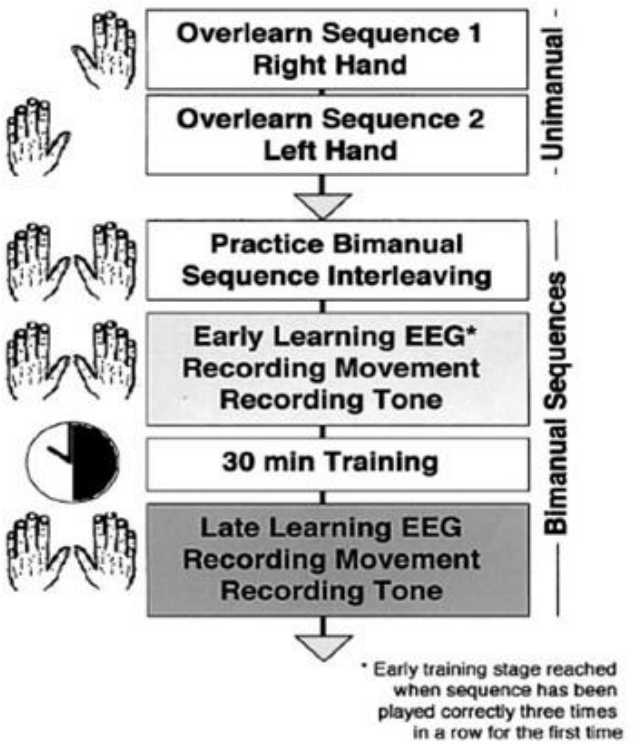

Figure 1. Learning scheme of button press routine

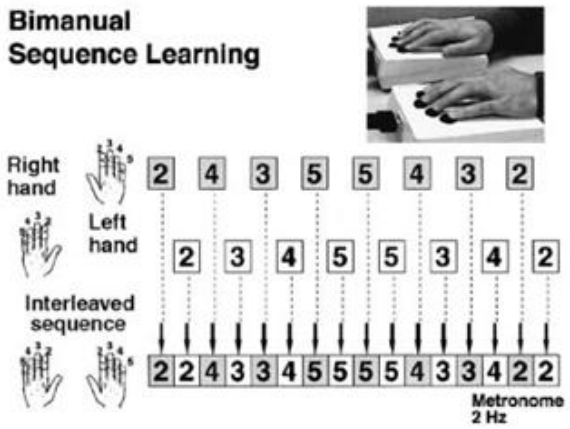

Figure 2. Button press routine

Here are the summary of the research findings which are of interest to musicians:

1) While learning the combination learned with one hand, a high level of accuracy is attained. Brain activities are similar to, but at a much lower level than, those observed during the two hands study as described below.

2) When a different combination is created by combining the two combinations which have been learned separately by each hand, the effect is that of learning a new combination, and the brain activities exceed the normal level. When these combinations are practiced for half an hour, the subjects increase their level of accuracy from 58.3%+21.1% to 83.7% +-15.3%. Their brain activities are very high, and an intense communication is observed between the two sides of the brain at the initial learning phase (until three faultless repetitions can be performed successively). Then the brain activities come back down to normal levels. See figures 3-4 (from Andres et al.1999).

3) The brain activities and the communication between its two sides change during the learning process. The learned movements are recorded in a kind of movement memory. This finding is supported further (Sperry, 1968) by studies of people whose brain sides have been completely separated by surgery: they have difficulties in obtaining new abilities, and yet the abilities they learn before the surgery are not lost.

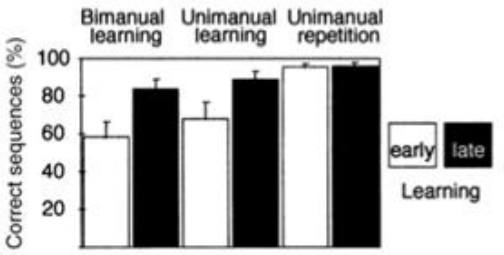

Figure 3. Behavioural data showing the training-related increase in the percentage of correct sequences in both of the learning paradigms but not in the repetition paradigm. Error bars indicate 1 standart error.

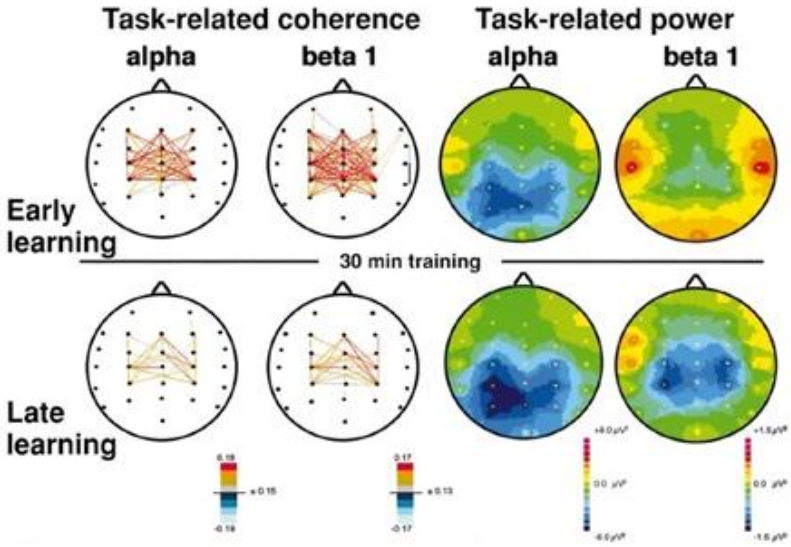

Figure 4. Bimanual sequence learning. Execution-and training- related changes in TRCoh link pieces (left) and TRPow maps (right) during bimanual sequence playing before (upper panel) and after (lower panel) training. Interhemispheric TRCoh decreased significantly during training in both the alpha and the lower beta band (beta 1). TRPow decreased further during training.

It can be seen that these research findings are also valid when learning how to play an instrument, which requires the combination of very complex movements, and they are consistent with teaching techniques which have been developed over the centuries. It is essential to repeat the passages; however, the learning process has two distinct phases, separated at the point where three faultless repetitions have been performed successively. The first phase is the active learning process, and the second one is a kind of repetition of the stored movements in the memory. Moreover, when only mechanical study is performed in the second phase, there is little increase in the level accuracy and a deep learning cannot be achieved. This can be seen especially in

students who have just begun to learn an instrument. Even if they can play a passage that they have learned correctly from beginning to end, when asked to play it starting from the middle of the passage they have as much difficulty as if they had never played it before. Accordingly, by focusing on different parts of the passage or phrase after the early learning process, the passage can be diversified in a creative way. In this way, the act of study becomes more enjoyable and the student gains the opportunity to study the passage in every aspect.

As can be seen in the experiment, a passage which is practiced with one hand can be learned as a new movement when it is combined with both hands. By making diversities, we can reintroduce a passage or some parts of it to ourselves as a new passage and thereby add new abilities to our ability memory by always remaining in the early learning process.

A speaker addressing an audience will find it difficult to capture their attention if he or she gives the impression of simply reciting the speech from memory; instead he or she needs to convey to the audience the speaker's understanding of the text. The same is valid also for musicians. Diverse study is helpful in creating the foundation for this, because it enables us to examine all parts of the work from different points of view and to be creative.

If we take “violin” as an example, different study variations can be rhythmic variations, different bow techniques and links which require different coordination and even different musical expressions. Moreover, special difficulties can be separated from the passage and varied. Different subjects which need attention can be focused on while making creative repetitions. An example of such variations may be seen in Figure 5.

Rapid passages can be practiced by dividing into small sections. A high accuracy rate can be achieved by combining all these small sections. For all these studies, a way should be found in order to prioritize the comprehension and thought over the physical movement, since these are the reasons of interpretation and it is very clear that no conclusion exists without a reason. When study turns into mechanical repetition, it is ceases to provide a benefit; if the musician feels that a passage or phrase requires deeper learning, this can only be achieved by diversifying it in a creative manner.

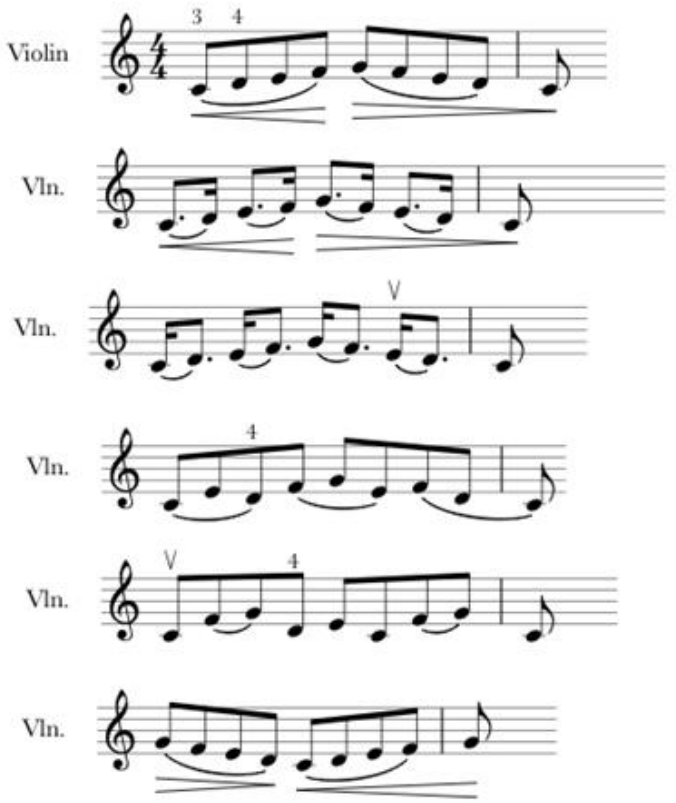

Figure 5. Musical Example.

Conclusion

Study should be based on creativity from the earliest stages. As soon as the comprehension and techniques are developed enough, improvisation should be included in these studies. This would be helpful in order to prioritize the comprehension and thought over playing. All these study methods can create a base for the students to make independent studies and support them to be interpreters instead of being only performers. Continuing since the creation of musical instruments, the human desire to express him with an instrument has undergone an evolutionary process along with the comprehension and instrumental techniques. Within this process, the performers had been both composers and interpreters until the 19th century. Moreover, an intense collaboration has emerged with instrument makers; and instruments themselves have undergone evolutions which support the ability of artists to express themselves. Since the mid-19th century when composition and interpretation became dissociated, some method studies basing on theoretical, muscle related and technical information related to instrument playing had been prepared; however, they could not survive for long, having brought performance to the forefront instead of interpretation. Today we can see the power of comprehension and thought, the benefits of creative studies and the importance of featuring classical music interpretation. Within this context, any future scientific studies of the learning processes of the brain will be beneficial for musical interpreters.

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