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Contents

The Study Lab Project: An Evidence-based Approach in Preparing Students for a Public Recital

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In the study lab project, six students of an elite-level music academy were provided with several alternatives for their usual practice routines. In ten days they prepared themselves for a recital of approximately thirty minutes, applying methods borrowed partially from sport sciences and sport psychology, and overall with a strong emphasis on quality rather than quantity of practice. Students employed deliberate practice and studied reflectively, methodically, purposefully and with full focus. Furthermore, they used imagery and performed two try-outs. The experiences of the students were monitored using logbooks, interviews and a questionnaire. Overall the study lab was experienced as very valuable and instructive, making clear that alternative ways of practicing can be more satisfying than common routines.

Introduction

Traditionally the emphasis in music pedagogy is on the quantity of practice (e.g. Duke, Simons & Davis Cash 2009; Madsen 2004). In relation to this, the importance of massive amounts of practice has received much attention through the work of Ericsson and colleagues (a.o. Ericsson, Krampe & Tesch-Römer 1993). Ericsson's stimulating though somewhat controversial idea (see, for example, Hambrick, Oswald, Altmann, Meinz, Gobet & Campitelli 2013) that with sufficient practice (e.g., 10,000 hours) anyone can excel in any domain, has famously foregrounded the quantity of practice, training or study. However, Ericsson equally stressed the importance of the quality of training. The term he used for high-quality training was *deliberate practice*, that is, "a highly structured activity, the explicit goal of which is to improve performance" (Ericsson et al. 1993 p. 368). Important features of deliberate practice are planning, goals, feedback, and awareness of progress. Recently, several authors judged the quality of practice to be decisive for the quality of performance (e.g., Bonneville-Roussy & Bouffard 2015; Duke et al. 2009).

In the study lab project, six students of an elite-level music academy were provided with several alternatives for their usual practice routines. In 10 days they prepared themselves for a recital of approximately 30 minutes, applying methods partly borrowed from sport sciences and sport psychology, and overall with a strong emphasis on quality of practice rather than quantity.

The study lab consisted of six elements. The first two relate to deliberate practice:

(1) Focus attention on planning, study goals and progress. (2) Practice in blocks of 20 minutes, followed by a break of 5 minutes, as advised by Klickstein (2009), so as to be fully focused during practice.

The next two elements were borrowed from sport sciences and theories of motor control and learning: (3) Practice with an external (rather than internal) focus of attention, and (4) Apply principles of differential learning. Practicing with an *external focus* implies attention to environmental information or the intended outcome of a skilled action. An external focus "promotes a more automatic mode of control" whereas "an internal focus induces a conscious type of control, causing individuals to constrain their motor system by interfering with automatic control processes" (Wulf 2013, p. 91). Many studies show better learning outcomes with an external focus of attention (see Wulf 2013). *Differential learning* entails practicing with much variation. As people never really make identical movements but solve the motor problem anew each time, the advice is not to train the brain to pursue identical performances, but to use variations (a.o. Schöllhorn, Sechelmann, Trockel & Westers 2004).

The final two elements were derived from sport psychology: (5) *Use mental imagery* and (6) *Practice under pressure*. Imagery is a well-known intervention to help improve sport performance and may also be valuable for studying in music. Finally, while usually much time is spent on mastering the music (technically), less time is spent on actually preparing for performing in front of an audience, even though this is an essential part of the job. During the study lab students were exposed to pressure by performing two try-outs in front of a small audience (see Oudejans & Pijpers 2010; Williamon, Aufegger & Eiholzer 2014).

In summary, the aims of the present study were threefold: (1) Provide students with alternatives for their habitual study patterns. (2) Stimulate a focus on the quality of practice. (3) Prepare students for playing in front of an audience. The experiences of the participants were monitored using logbooks, an evaluation questionnaire and interviews.

Method

Participants

Six students (2 women, 4 men; 2 wind instruments, 2 pianos, 1 string, and 1 percussion) agreed to participate in the study lab. They were in their 4th (final) bachelor year (mean age 22 years), with close to full time availability for the study lab and willing to comply with the assignments and other activities in the study lab. Confidentiality of the data collected was guaranteed, and participants gave us written permission to audio-record the interviews. The procedure complied with the criteria outlined by the ethical committee of the Faculty of Behavioural and Movement Sciences in the Ethical Review Regulations.

Material

Logbook. The participants received a logbook for daily registration of:

- goals for that day
- time spent practicing
- completed study activities and assignments
- evaluation of assignments

- assessment of progress
- accomplishment of goals.

An important aim of the logbook was to stimulate and support students in purposeful and methodical practicing.

Assignments were divided into the following three groups:

1. Deliberate practice and concentration:
   - Reflecting on points for improvement immediately after practicing (awareness, plans, goals).
   - Practicing in blocks of 20 minutes, followed by 5-minute breaks.
2. Sport sciences and theories on motor learning and control:
   - Apply an external focus of attention (e.g., focus on how the music sounds).
   - Use variations, e.g., vary light intensity, the chair you are sitting on, the order of musical sections.
3. Sport psychology:
   - Imagery. See, hear, feel yourself playing the music, your own affective reactions when coming on stage, and/or the musical message. Imagery instructions complied with the principles of the PETTLEP approach (Holmes & Collins 2001).
   - Practice under pressure. Prior to the final performance, participants performed their recital twice in two try-outs in a simulated setting.

Evaluation questionnaire. Participants evaluated how often they had done the prescribed assignments on 5-point scales (1 = hardly ever; 5 = very often) and how valuable the assignments were ("The assignment was valuable": 1 = completely disagree; 5 = completely agree). Finally, some general questions regarding the study lab were answered (also on a 5-point scale).

Interviews

In the intake interview participants were individually informed about the study lab and asked for their commitment. They answered questions about their usual training routines and average number of practice hours. In two *interim interviews* their progress was discussed. An *exit interview* went deeper into the student's answers to the evaluation questionnaire.

All interviews were transcribed verbatim. Two researchers independently analysed the interviews on 10 a-priori themes (e.g., focus of attention, deliberate practice, overall experience). The proportion of statements in the interviews independently selected by both researchers and classified under the same theme was 84%. Differences were discussed, leading to an ultimate agreement of 98%.

Procedure

In November 2014 there was an introduction meeting for the participants and other people involved in the project: five students of Human Movement Sciences (HMS) who supported the study lab; teachers and researchers of the Conservatorium van Amsterdam (CvA) and HMS. In January the intake interviews were held.

The study lab started in March 2015 on a *Monday*. In the first meeting we provided information about the study lab and asked the students to make a practice

plan. They participated in a mental imagery 'experiment' in which they had some practice with mental imagery and received precise instructions on how to use imagery. Then we explained the procedure for the logbooks and handed out the music that students were required to play during their recital, making it clear that they were to practice the recital without further advice from their main teachers. The music was selected by the students' main teachers and was pretty tough, yet possible to master in 10 days. Wind players, cellist and percussionist practiced 4 times with a pianist (two CvA teachers) who accompanied them in the recital.

On *Tuesday* individual feedback was given on the practice plans. On *Thursday* participants played part of their recital (length varying from a few to 20 minutes) in one of the CvA concert halls in front of about 10 people (teachers and students). On *Friday* the first interim interviews were held, and the students attended lectures about learning and attention.

In the second week, on *Monday*, students played their complete recital under similar conditions as on Thursday. On *Tuesday* the second interim interviews took place and a lecture about stress and coping was given. On *Thursday* or *Friday* participants performed their recital in a relatively small concert hall outside the CvA. The audience (25 on average) consisted of teachers of the CvA, fellow students, students of HMS, and family and friends of the participant.

The following *Wednesday* the evaluation questionnaire and exit interview were completed.

Results and Discussion

Practice hours

One of the ideas of the study lab was to stimulate students to focus on the quality of practice rather than practice as many hours as possible. The average time spent practicing amounted to 170 minutes (range 104-208) per day, almost three hours. This included practicing, reading the music, listening and imagining. In the intake interviews participants mentioned that they normally practice between 1½/2 hours (wind instrument players) and 6 hours per day. Despite the limited time available for preparing the recital (10 days) and the relatively difficult pieces, the average amount of practice time was thus not more than usual. Admittedly, however, the participants spent quite some time on other activities in the study lab (attending lectures, listening to performances of their fellow students, working on logbooks, etcetera). As one of the students said in the exit interview: "In my mind I did not have much time left for other things." Nevertheless, outcomes seem in agreement with Duke et al.'s (2009) conclusion that not only the amount of practice but also the quality of practice is crucial for the final result.

Applying principles of deliberate practice and practicing with full concentration

An important aim of the study lab was to urge students (1) to evaluate their progress with a view to determining the next steps and (2) to practice with full concentration. In the evaluation questionnaire, students reported how often they did that and how valuable they thought these methods were. Scores are presented in Table 1.

Assignment	How often (range)	Valuable (range)
1. Reflect. Be aware of your points of improvement and use this in practice.	4.8 (4-5)	4.8 (4-5)
2. Practice in blocks of 20 minutes, with full focus, followed by 5 minutes breaks.	3.8 (1-5)	4.5 (3-5)

Table 1. Scores for the assignments about deliberate practice and the 20 + 5 minutes blocks (1 = hardly ever/completely disagree; 5 = very often/completely agree).

Deliberate practice was used very often and experienced as highly valuable. The '20 + 5 minutes' scheme also scored high on value but was less frequently chosen. The interviews confirmed the positive evaluations of both assignments and provided a potential explanation for the lower mean score for how often the '20 + 5' scheme was used: The one participant who did not use the scheme said that he simply forgot the time when practicing, which seems to indicate that he practiced with full concentration. In conclusion, stimulating students to practice reflectively, methodically, purposefully and with full focus was successful and experienced overall as valuable by the participants.

External focus of attention and variations in practice

Table 2 presents the scores for four questions in the evaluation questionnaire concerning assignments stimulating students to adopt an external focus of attention.

Assignment	How often (range)	Valuable (range)
1. Focus attention on the feeling you want to convey; try to play this.	4.0 (3-5)	4.5 (3-5)
2. Translate the music into colours, objects, or events.	3.2 (2-4)	3.6 (3-4)
3. Focus on your accompanying musician and the sound of the music you produce together.	3.8 (3-5)	4.8 (4-5)
4. Focus on the effects of playing; how do the notes sound?	3.3 (2-5)	4.3 (4-5)

Table 2. Scores regarding external focus of attention. (N=6, except question 3, N=4)

Scores indicate that students regularly used an external focus, yet certainly not always. They experienced it as valuable. In contrast to motor skills in sports, where the external focus is often quite obvious (e.g. the hole in golf, or the rim in basketball; Wulf 2013), in music it is more difficult to decide what an appropriate external focus is. The suggestions offered in the assignments were based on discussions with musicians and not on scientific evidence. Nevertheless, the students experienced them as helpful.

Scores with regard to 'differential learning', inviting participants to use variations in their practices, are presented in Table 3.

Assignment	How often (range)	Valuable (range)
1. Vary elements in the environment (light intensity, sitting on other chair, et cetera).	2.3 (1-3)	2.7 (1-4)
2. Play while doing something else (moving your shoulders, listening to the radio).	2.5 (2-3)	3.5 (3-4
3. Vary in your performance of the music (rhythm, accelerations, decelerations).	3.3 (2-4)	3.7 (3-5)
4. Change the sequence (randomly choose a page, the last page first, et cetera).	3.3 (2-4)	3.8 (3-4)

Table 3. Scores about variations in environment and music.

Scores for differential learning assignments were relatively low. This was confirmed by the data in the logbooks. Students did not often use variations nor did they rate their value high. We will not speculate about the reasons and conclude that students may need more guidance to experience these assignments as valuable (provided that they are!).

Imagery and training under pressure

The imagery assignments were related to three different functions of imagery (see also Martin, Moritz & Hall 1999): mastering the music, affecting one's own feelings (of tension, self-confidence) and conveying the musical message. As shown in Table 4, the scores for these three functions differed considerably.

Assignment	How often (range)	Valuable (range)
1. Apply imagery to master the music.	4.0 (3-5)	4.3 (4-5)
2. Imagine coming on stage in the concert hall where you play your recital or the enthusiastic reactions of the audience. Experience your feelings.	2.3 (2-4)	2.7 (1-4
3. Imagine feelings or emotions that reflect the musical message you want to convey.	3.0 (1-5)	3.8 (3-5)

Table 4. Scores for the mental imagery assignments.

For the first function imagery was used often and experienced as (very) valuable. The intake interviews showed that, normally, students use imagery only incidentally (4 participants) or not at all; their experience with it was limited. Yet they evaluated its use as a tool to master the music very positively. Limited experience with imagery is a likely explanation for the lower scores for Assignments 2 and 3; these functions are more difficult to realize. Participants probably need more instruction, supervision, and practice in order to fulfil the potentials of imagery in these applications.

The exit interviews revealed that the try-outs provided a much-appreciated experience to train under pressure. Two quotes illustrate this:

"The two try-outs were nice and helpful."

"Without those try-outs I would have been much more nervous."

The overall experience

The overall evaluation of the study lab was clearly positive (see Table 5), and participant quotes in the exit interview illustrate this:

"A very successful experience"

"Very useful"

"Good experience"

"It was specifically instructive."

The answers to two other questions further testify to the success of the study lab. All students responded positively to the questions: "Would you participate in the study lab again?" and "When preparing for your examination, do you intend to apply elements from the study lab?"

Question	Score (range)
1. Overall, the study lab was a valuable experience.	4.5 (4-5)
2. I learned a lot during the study lab.	4.3 (4-5)

Table 5. Scores for the final two questions in the evaluation questionnaire (1 = strongly disagree; 5 = strongly agree).

These positive evaluations do not mean that the participants were satisfied with all the elements nor that there were no suggestions for improvement. The restriction of not asking their main teacher for advice about the music for the recital was a difficult limitation for 4 of the 6 students. At the same time they indicated: "It is not only a negative experience. I am happy that I could make it also without [the] advice of my teacher." The short time available for preparing the recital was experienced as stressful by all participants and had disadvantages: "More time would have resulted in mastering the music at a higher level." At the same time, participants were satisfied with and surprised by the progress they had made in 10 days. Five students mentioned that they would have appreciated more advice and guidance, specifically when doing the assignments.

Limitations and Conclusions

There were several limitations to this study. First, it provides no evidence for the effectiveness of the practice methods employed in the study lab. Such evidence would require a controlled experimental set-up of the study, which is hard to accomplish for several (practical) reasons. Furthermore, the results are based on experiences of only six participants and five represented instruments, leaving open the possibility of specific biases. Finally, although originally planned, there was no systematic grading of performances by the main teachers, because they could not all attend (all) performances of their students. Several spontaneous remarks they made were, however, (very) positive, as performances had exceeded their expectations.

Despite these limitations, it is safe to conclude that the study lab was experienced as valuable and instructive. The benefits of deliberate practice – stimulating students to study reflectively, methodically, purposefully and with full focus – is beyond discussion for the participants. The try-outs that served as a way to practice under pressure appeared valuable and deserve a fixed place in any conservatory curriculum. It was also enlightening to see that students were able to prepare a recital in such a short time span without the help of their teachers. Most importantly, however, the study lab showed the students that other ways of practicing are possible and may even be more satisfying than their usual routines.

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[Photo Emile Golshani.

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