

The Differences in Mental Strategies and Practice Behavior of Musically Average and Highly Gifted Adolescents in Germany

Stella Kaczmarek

Faculty of Music, University of Paderborn, Germany
stellka@poczta.fm

ABSTRACT

The amount of research on instrumental practice and the demand for this topic has increased greatly in the last decade. More than half of all research concerns professional musicians, and there is relatively little research carried out with children or adolescents. The aim of this paper is to present a recent study on musically gifted adolescents in Germany. The research groups were young students who participated in a special study program at the music conservatories in Germany (Hannover, Cologne and Detmold). Participants of the control group were average music students from the local music school in Paderborn. Two questionnaires were used in which young musicians were asked to reflect on their practice behavior, practice strategies, and strategies of mental rehearsal. The analysis suggests that highly gifted adolescents – in comparison to average music students - have greater knowledge regarding the use of appropriate planning and evaluation strategies. We have only found significant differences in the use of mental strategies between two groups in one scale, which means that “experts” do not always stand out in mental rehearsal than the average music students.

I. INTRODUCTION

The practice is the most important activity in the life of every musician. As a matter of fact, the time musicians spend practicing is important in the development of expertise (Ericsson, Tresch-Romer & Krampe, 1993). Studies on musicians` practice strategies and rehearsal techniques started in the 80s due to the possibilities offered by audio or video recordings. Some studies used recordings of practice behavior in combination with some kind of verbal reports (Nielsen, 1997, 2001, Miklaszewski, 1989, Chaffin et al., 2002, Chaffin & Imreh, 2001); other examinations relied on interviews or questionnaire studies (Hallam, 1995, 1997, McPherson & McCormick, 1999, Williamon & Valentine, 2002, Ginsborg, 2002). Most of the studies were carried out with students or professional musicians (McPherson, 2005, O`Neill, 1997, Hallam, 1995, Harnischmacher, 1993). There is relatively little research carried out on children or musically highly gifted adolescents.

A. Aim of the study

The present study investigates the differences in practice behavior and the use of practice strategies between “musically highly gifted” adolescents, who study at a music academy and “musically average gifted” adolescents from a music school. The aim of this study is to examine the quality and structure of practice strategies in both groups of young instrumentalists, especially focusing on the planning, organization and evaluation strategies, as well as mental rehearsal strategies.

B. Research questions

Our research questions were following:

1. Are there any differences in the quality of practice (e.g. in the length and duration of practice)?
2. Are there any differences in the quantity of practice?
3. Are there any differences in the use of practice strategies?
4. Are there any differences in the use of mental practice?

Those research questions were investigated with quantitative methods.

II. METHODS

A. Instruments

To examine the differences in practice behavior between two groups we have used two questionnaires. One was developed in the Institute for Giftedness at the University of Paderborn (*Fragebogen zur Praxis des Ubens*, 2008). It consisted of items related to the use of practice strategies, practice time, practice behaviour, practice motivation, and the special aspects of practicing (like troubles by playing, relaxation and sport activity). This questionnaire was designed by a project group, which included experts from Paderborn and Detmold.

The second one was the *Functions of Imagery in Music Questionnaire* from Gregg, Clark & Hall, (*FIMQ*, 2008). The FIMQ questionnaire was created to explore how musicians use the functions and power of imagery, if they use any mental strategies and how they use mental skills during practice. The FIMQ is a self-report with 28 items, which assess cognitive and motivational functions of imagery. The FIMQ based on 5 different dimensions: cognitive specific (CS), cognitive general (CG), motivational specific (MS), motivational general-arousal (MG-A) and motivational general-mastery (MG-M).

B. Participants

Our participants were young students from a special study program at the German conservatories in Detmold ($n=21$), Hannover ($n=29$) and Cologne ($n=20$). These special study programs were created for the “musically highly gifted” adolescents who are between 10 and 18 years old. The control group consisted of students from the music school in Paderborn (“music students”, $n=50$). Belonging to the expert groups was determinate by the passing examination for the music academy for special study programs for young people and expert ratings. Our “expert group” makes up for 56.2% ($n=70$) and the control group for 43.8% ($n=50$) of the whole sample ($N=120$).

C. Methods

For data analyzing we have used the method factor analysis to find the hidden dimensions or constructs. Furthermore, practice behavior and mental practice in the music imagery questionnaire were compared with the *t*-test for both

groups in a 5 given subscales (cognitive specific, cognitive general, motivational specific, motivational general-mastery and motivational general -arousal). All data were analysed with the statistical software program SPSS.

III. RESULTS

Each questionnaire was completed by 120 candidates. The average age in total sample was 15.32 ($SD = 1,98$). The average age of the experts was 15.75 ($SD = 1,94$), and the control group was 14.79 years old ($SD = 1,93$). Differences in age between the groups were statistically significant ($t(119) = 2,707, p < .05, \eta^2 = .05$). Within the 120 candidates, 52 (43,3%) boys and 68 (56,7%) girls participated in the study. Most of the students played strings instruments (38%) keyboard instruments (31.4%), and woodwinds instruments (15.7%). Rest of sample was composed of brass instruments and singing (both 5.79%), and other instruments (3.3%). Differences in the played instrument between the two groups were not significant.

Not surprisingly, difference in the length of time playing a main instrument between the two groups was significant. Group of young students from DHZ (Detmolder Hochbegabten Zentrum), IFF (Institut für Früh-Förderung in Hannover) and PCC (Pre-College-Cologne) spent a higher average number of years playing an instrument ($t(119) = 5.394$, two-tailed $p < .001, d = 2.76$) than the control group. For the experts the median was 9.2 years of playing ($SD = 2,98$), and for the music school students 6.5 years ($SD = 2,64$). The discrepancy between groups in the length of the instrumental playing accounts for almost 4 years. All participants had regular individual music instrumental lessons for a minimum of one hour per week.

A. Use of practice strategies

Since the researchers had many questions about the use of practice strategies in the questionnaire, they used the PCA analysis with varimax rotation to reduce items to a smaller number of factors. A principal component of the factor analysis was conducted on the correlations of the 19 variables considering the use of practice strategies. The first factor analysis on practice strategies found 5 factors, which explain 48.65% of the variance. Detailed information about the summary of the factors is given in Table 2 (see next page).

The first factor "listening" (18.42% of variance) included the items related to listening carefully to one's own playing, or listening to the recording of the piece being played. In the second factor "fingering" (9.95% of the variance), the following statements were often mentioned: the fingerings before or during practice or during the learning of the new piece. The factor "mental practice" (7.55% of the variance) arranged the items concerning the mental practice or the quiet note analysis before practice, as well as during practice of the new piece. The next factor "difficulty in piece" (7.12% of the variance) focused on the practice of technical and difficult sections or multiple repetition of a poorly played part. The immediate correction of the fault belongs to the fifth factor, "error correction," which explains 5.60% of the variance. Only in the first ("listen", $t(71) = 5,463, p < .001, d = 1.09$) factor, significant differences between the groups have been found.

Table 1. Sample table caption.

Nr .	Factor	Eigenvalue	% of variance	Cumulative %
1	Listening	5.712	18.42	18.425
2	Fingering	3.085	9.95	28.375
3	Mental practice	2.341	7.55	35.926
4	Trouble spots	2.209	7.12	43.053
5	Error correction	1.737	5.60	48.655

B. Practice behavior

The questions concerning practice behavior were combined in the following items of the questionnaire like: playing by ear, playing from memory, improvising, sight-reading and making a recording. Categories came from the study of McPherson (2005). *t*-test comparison found significant differences in four given practice behaviors. Experts use more frequently a recording of their practice ($t(118) = 4,676, p < .001, d = .66$). The control group use more frequently: playing by ear ($t(118) = -3,695, p < .001, d = -.58$), sight-reading ($t(118) = -2,673, p < .01, d = -.42$), playing from memory ($t(118) = -3,532, p < .001, d = -.53$). In the item "improvise" no significant differences between the groups could be found ($t(117) = -1,112, p > .05, d = -.17$). Participants of the control group felt more confident and used the informal kinds of practice. The other hand experts used the practice behavior, which indicates to the control strategies while practicing.

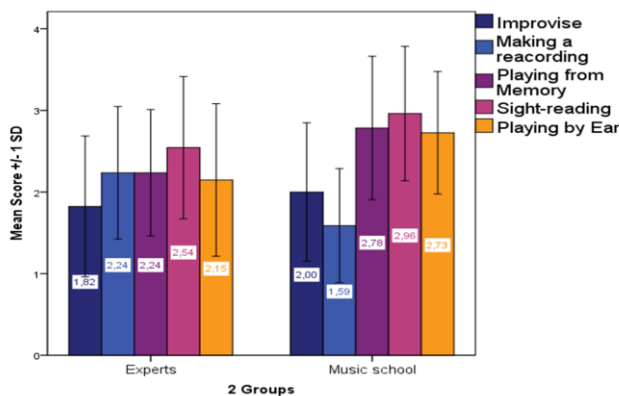


Figure 1. Practice behavior in the 5 given scale.

C. Use of mental strategies

The first estimations and analysis showed that the difference between two groups in the *Functions of Imagery in Music Questionnaire* is only significant for one scale (Table 1). In the study, researchers found significant differences using the *t*-test for unrelated scores between experts and music students; this only concerns the cognitive general scale ($t(119) = 3.253$, two-tailed $p < .05, d = 3.71$) of the music imagery questionnaire. In the other four subscales, no significant differences between the expert and the control group could be found. The results of this comparison in the FIMQ questionnaire between the two groups are shown in Table 2.

Table 2. Group differences in the FIMQ questionnaire in the 5 given subscales.

Scale	Experts		Music School		t	Df	p	Coh. d
	M	SD	M	SD				
CS	23.14	4.54	21.41	6.75	1.643	83.62	n.s.	1.70
CG	24.68	5.47	20.98	6.83	3.253	115	.002	3.71
MS	22.43	7.76	22.71	8.76	-.183	112	n.s.	-0.28
MG_M	25.59	8.07	25.62	9.01	-.016	111	n.s.	-0.03
MG_A	24.71	7.73	24.06	8.64	423	113	n.s.	0.65

We wanted to know which content has mental rehearsal. Participants had possibility to describe the content of mental rehearsal. On the figure 2 you can see the five categories, which most frequently came in the open questions. In the most cases it was a general representation of music. The second big group is made up of kinesthetic, auditory, and visual imagination of music played. The last group consists of the emotional imagery of played music. There were no significant differences in both groups. As conclusion participants from both groups use mental rehearsal to imagine the same content.

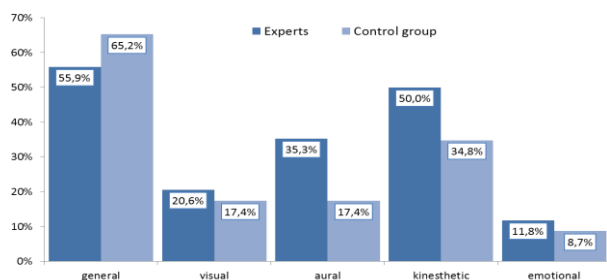


Figure 2. Content of mental rehearsal in the 5 given categories.

IV. DISCUSSION

Results concerning the use of mental practice are disappointing. We could not find any differences in the use of mental rehearsal strategies, except in cognitive scale in the FIMQ questionnaire.

In the study of Gregg et al. (2008) with classical musicians, who participated in the study, it was discovered that musicians from the Faculty of Music at the University of Western Ontario reported employing imagery to overcome distractions and avoid errors, maintain mental toughness, demonstrate confidence, and overcome mental and physical fatigue. Researchers of the German conservatories study have found significant differences in the use of mental strategies between both groups only in one scale, which was responsible for mentally running through an entire piece or program. That demonstrates that experts were not better in mental rehearsal than the average music students. *A possible explanation for the different results between the two studies is the age of the participants.*

The analysis suggests that highly gifted adolescent musicians do not use of right practice strategies while

practicing. The control group made more use of the informal way of practice.

In our study only information from the self-perceived perspective were collected without proving the actual musical level of competencies of participants. At this point of the study we cannot say anything about the link or correlation between the use of practice strategies and the improvement of the musical abilities.

The limitation of the study is the missing consideration of the role of the teachers and parents in the process of practicing or learning how to play an instrument. Possibly better results of experts also depend on the quality of music education they had. In our study it was important to check the current knowledge and use of practice strategies during the practice at home, independently from the teacher's quality.

V. CONCLUSION

Results of this study show the importance of teaching students right planning and practice strategies. Analysis suggests that highly gifted adolescents – in comparison to average music students - know about the use of appropriate planning and evaluation strategies. Experts are not better in mental rehearsal than the average music students. Music teachers should consider, how they could teach the pupils the right practice strategies during the music lesson.

Music and instrumental teachers teaching adolescents should certainly consider these results. It is important for musical educators to know what could be improved in the content of music lessons.

In the future, researchers will expect studies to include a detailed analysis of the use of practice strategies by musically gifted adolescents. A future study might explore the use of practice and mental strategy by observation and in more diverse samples of young musically gifted musicians.

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