

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Mornell, A;Osborne, MS;McPherson, GE

Title:

Evaluating practice strategies, behavior and learning progress in elite performers: An exploratory study

Date:

2020-03-01

Citation:

Mornell, A., Osborne, M. S. & McPherson, G. E. (2020). Evaluating practice strategies, behavior and learning progress in elite performers: An exploratory study. *Musicae Scientiae*, 24 (1), pp.130-135. <https://doi.org/10.1177/1029864918771731>.

Persistent Link:

<https://hdl.handle.net/11343/251875>

PRACTICE STRATEGIES IN ELITE PERFORMERS

Abstract

Typical musicians devote most of their time to blocks of physical practice and mistake-avoidance, as opposed to mental preparation, desirable difficulties, and strategies that strengthen self-efficacy and autonomy. For this reason, teachers try to steer students away from mindless drill and towards self-regulated learning strategies. Yet, both the scientific and pedagogical literature lack guidelines for development musicians that are supported by empirical research. This exploratory study with 14 musicians was designed to capture what they planned to practice, as well as what they actually did in the practice room, in order to assess the level of repetition and innovation intended and carried out. A questionnaire captured the musician's self-reported intentions (cognitions), behavior, and emotions during practice. The questionnaire accompanied a self-recorded video of a practice session of the participant's choice. Evaluation of the questionnaire and videos provided evidence that participant's own ratings of the effectiveness of their practice supported their belief in the importance of repetition. The evaluation scores of these students' practice sessions by two independent raters, in contrast, indicated that varied strategies were more beneficial with regard to individual progress than habitual repetition.

Keywords

musical development; practice strategies; self-regulated learning; self-efficacy; motivation, learning strategies, autonomy

PRACTICE STRATEGIES IN ELITE PERFORMERS

An increasing body of research in both music and sports psychology indicates that repetitive, habitual and mindless practice often leads to sub-optimal preparation and performance (Schmidt & Lee, 2011; Wulf & Lewthwaite, 2016). In contrast, preparation for public performance can be enhanced when musicians focus their efforts on deliberate practice (Mornell, 2009; Papageorgi & Kopiez, 2012). Learning can be more efficient when strategies include desirable difficulties (Bjork & Bjork, 2014). Musicians can become more deeply involved and intrinsically motivated to succeed, when they are self-motivated (McPherson & Zimmermann, 2011), and adopt a growth mindset (Dweck, 2008). Despite research evidence, many developing musicians are resistant to change when it comes to traditions and rituals such as rote practice (Yan, Thai, & Bjork, 2014; Abushanab & Bishara, 2013; Simon & Bjork, 2001). Automation of musicians' motor patterns is believed to facilitate error-free performances, but the training of self-motivated, flexible and creative artists involves more complex strategies. Repetition and inattention can actually degrade motor learning pathways instead of improving them ("Penelope Effect": Altenmüller, 2006).

The aim of this study was to develop and evaluate a practice protocol based on the three-phase self-regulated learning framework (McPherson & Zimmermann, 2011; see also McPherson, Osborne, Evans & Miksza, 2017). We sought to gain initial evidence of the effectiveness of the protocol to encourage musicians to disengage from habitual mindless practice, and instead adopt a strategic and challenging approach characterized first by focus and planning ("forethought"), then appraisal of what had been achieved during practice ("performance"), and finishing with an assessment of the difficulty of applying this strategy and their motivation to use it in the future ("self-reflection"). We sought to explore the usefulness of this preliminary protocol, and to use the information gained from this study as the basis for designing a more robust approach that could be applied with subsequent samples of musicians.

PRACTICE STRATEGIES IN ELITE PERFORMERS

Method

Participants

Fourteen musicians – faculty, alumni, and current students in music degree programs at a prominent European music school were recruited via calls for volunteers that were posted on notice boards, provided to students enrolled in a class on practice techniques, and emailed to faculty members who had expressed interest in research projects. Ten female (71.4%) and four male (28.6%) musicians responded to invitations to participate in the study. The mean age of the sample was 26.88 years ($SD = 7.41$) and the number of years playing an instrument was 18.86 years ($SD = 7.60$). There were three pianists, two flutists, and one each of the following instruments: accordion, cello, hammer dulcimer, guitar, harp, marimba, organ, (classical) saxophone, and violin. Because the researchers were from two different countries (Germany and Australia), ethics clearance was sought and granted at both institutions' ethics review boards. Informed consent was obtained from all participants.

Materials and Procedure

Each participant received written instructions in a three-part document called "Self-Regulated Practice Strategies of University Musicians"ⁱ. Part 1 contained three questions (1-3) to be completed prior to the videotaping of an excerpt of a practice session for the study. Question 1 asked participants to mark the focus of the session somewhere on a continuum between "specific" and "general," on a second continuum between "technical issue" and "musical issue," and to use their own words to describe the focus of the session. Question 2 asked them to identify the focus of the practice session using a circle of options. Here they could mark any number of the following terms: accuracy, fluency, musical expression, technical control, and quality of sound, as well as "other, please explain" which had a line for free text. These suggestions for practice focus were derived both from the authors'

PRACTICE STRATEGIES IN ELITE PERFORMERS

teaching experience and from the validated “Music Performance Rating Scale” of Wrigley and Emmerson (2011). Question 3 asked the musicians to mark how they had chosen their strategy, with multiple answers possible. Here the options were: modification of existing strategy, observation of others (teachers, colleagues etc.), chance/coincidence, sudden insight/ brainstorming and other/ please explain.

In Part 2, each participant chose the location and time of the practice session filmed, thus mirroring normal rehearsal as much as possible. Participants were instructed to record a practice unit and label it with a code word of their choice before proceeding to Part 3. There were no restrictions regarding the minimum or maximum length of the film or the type of recording device.

Part 3 (post-recording) contained six questions (4-9) that involved both a description of what had happened during the practice session as well as reflections about the outcomes. Question 4 provided a line for the participant to mark how each participant rated the method chosen on a continuum between “a variation of what I normally do” and “something very different.” Question 5 provided three lines for descriptions of what the participant was doing, feeling, and thinking while using the strategy during the session. Question 6 asked how effective and how easy to apply the strategy was in the practice session. A matrix was provided with a horizontal scale between “difficult to apply” and “easy to apply” and a vertical scale between “very effective” and “not effective.” Participants were asked to mark one X on the applicable point in the matrix. Question 7 was meant to further clarify Question 6 and asked in 7a “In what way was the strategy easy or hard to apply” and in 7b “In what way was the strategy effective or not effective for improving your performance.” Question 8 was a yes or no question “Can you see yourself using this strategy or a version of this strategy in your future practice?” and provided two lines for explanation: 8a “If yes, would

PRACTICE STRATEGIES IN ELITE PERFORMERS

you change or adapt it in any way? If so, how?” and 8b “If no, why not?” Question 9 asked for demographic data – sex, age, years of playing the instrument, and status, providing three options: student, faculty, or working exclusively as a professional musician.

Participants submitted their data either digitally (email, Dropbox) or as a combination of paper questionnaires and digital video data on a USB-stick or DVD. The 14 questionnaires and videos were then independently evaluated by two music psychologists with music training and performance experience who provided assessments on three dimensions:

1. Overall rating of the approach (from 0 = rote to 10 = far from rote) based upon observations marked on a continuum between a high frequency of repetition of musical phrases without a noticeable change of strategy (“rote”), and practice behavior that displayed continued, flexible experimentation with alterations in performance variables such as tempo, dynamic, or articulation (“far from rote”).
2. Clarity of strategy (from 0 = unclear to 10 = very obvious) based on a rating of how practice appeared to be an obvious product of planning (“forethought” in the SRL model), or appeared to be unclear in intention where no specific goals for the session were apparent to the observer.
3. Improvement over the course of the practice session (0 = none identifiable to 10 = highly evident).

Results

When asked to describe the focus of the practice session on a continuum, 66% of responses indicated “a general issue” compared to “a specific issue”. Most issues were indicated as musical (71%) rather than technical. Since participants could choose any

PRACTICE STRATEGIES IN ELITE PERFORMERS

number of goals, they marked between one and six issues that they were trying to address at one time, a further demonstration of diffuse focus (see Table 1). The prevalence of “accuracy” and “technical control” and the limited mention of “musical expression” and “quality of sound” underscored the concept of (rote) practice as a means to improve technique rather than hone musicality.

[insert Table 1 here]

Participant self-evaluations of strategy effectiveness were correlated with rater assessments taken from practice video footage.ⁱⁱ Strong positive relationships were found between: participant-rated strategy effectiveness and rater-assessed mindful deliberate/ intentional/ “far from rote” practiceⁱⁱⁱ ($r = .66, p = .01$) and degree of progress ($r = .59, p = .03$); as well as rater-assessed degree of progress and deliberate/ intentional/ “far from rote” practice ($r = .95, p < .001$).

Discussion

This study utilized a written questionnaire and video recording to gather data on musicians’ practice goals, choice of strategies, and implementation of intentions. The findings of this exploratory study suggest that the musicians who participated lack appropriate strategies for all three self-regulated learning stages: *forethought*, *assessment*, and *self-reflection*, despite their years of training. The incidental remarks of the participants (“filming myself was amazing: I don’t usually practice with that much concentration”), and their multiple responses to the question “What is the problem, for which this practice session will attempt to find a solution?” point towards vague intentions and inefficient use of time in everyday practice. An emphasis on control and correctness as evidenced by the participants’ choices of goals, suggests that technical practice may be absorbing energy that could be better invested in sound quality and musical interpretation.

Breaking any cycle of less than optimal practice methods requires the adoption of

PRACTICE STRATEGIES IN ELITE PERFORMERS

new strategies that augment or replace old habits. To do this one must self-regulate, by identifying habitual patterns of behavior and then actively working to modify these routines (McPherson et al., 2017; McPherson & Zimmerman, 2011). This study supports the three-phase self-regulated learning model suggested by Zimmerman (2011) by providing preliminary evidence for the efficacy of a short protocol that encourages musicians to improve practice outcomes through self-regulated skills in practice planning and observation for proactive learning and enhanced performance.

The musicians' inability to determine *when* they were learning, even by those who were actually making progress, is a finding worthy of serious consideration. Without the ability to detect an increase in *competence*, one of the major motivational components of Self-Determination Theory (Deci & Ryan, 2000; Ryan & Deci, 2000), practice is likely to leave learners frustrated or demotivated. Setting short-term practice goals ("forethought") to encourage skills that aid focussed attention and willpower on the task being performed ("performance") in order to facilitate feelings of satisfaction at the end of the session and motivation to choose creative strategies for the next day's practice ("self-reflection") are components of self-regulated learning that would be beneficial in music education. Our hope is that the use of this type of protocol will encourage musicians to engage in more dynamic, rewarding and satisfying practice.

Acknowledgements & Funding

While this research received no specific grant from any funding agency in the public, commercial, or not-for profit sector, we wish to thank the State of Bavaria for their financial support in the form of a travel grant ("Bayerisches Förderprogramm zur Anbahnung internationaler Forschungskooperationen") and the participants of the study.

PRACTICE STRATEGIES IN ELITE PERFORMERS

References

- Abushanab, B., & Bishara, A. J. (2013). Memory and metacognition for piano melodies: Illusory advantages of fixed- over random-order practice. *Memory and Cognition*, 41, 928-937.
- Altenmüller, E. (2006). Hirnphysiologische Grundlagen des Übens. In U. Mahler (Ed.), *Handbuch Üben* (pp. 47-66). Mainz: Schott.
- Bjork, E. L., & Bjork, R. A. (2014). Making things hard on yourself, but in a good way: Creating desirable difficulties to enhance learning. In M. A. Gernsbach & J. Pomerantz (Eds.), *Psychology and the real world: Essays illustrating fundamental contributions to society* (2 ed., pp. 59-68). New York: Worth.
- Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268.
- Dweck, C. S. (2008). Can Personality Be Changed? The Role of Beliefs in Personality and Change. *Current Directions in Psychological Science*, 17(6).
- Ericsson, K. A., Krampe, R. T., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100, 363-406.
- McPherson, G. E., Osborne, M. S., Evans, P., & Miksza, P. (2017). Applying self-regulated learning microanalysis to study musicians' practice. *Psychology of Music*, Advance online publication. doi:10.1177/0305735617731614
- McPherson, G. E., & Zimmerman, B. J. (2011). Self-regulation of musical learning: A social cognitive perspective on developing performance skills. In R. Colwell & P. R. Webster (Eds.), *MENC handbook of research on music learning. Volume 2: Applications* (pp. 130-175). New York: Oxford University Press.
- Mornell, A. (2009). Antagonists or allies? Informal learning vs. deliberate practice: Defining pathways to musical expertise. In P. Rübke & N. Ardila-Mantilla (Eds.), *Vom wilden*

PRACTICE STRATEGIES IN ELITE PERFORMERS

Lernen. Musizieren lernen – auch außerhalb von Schule und Unterricht (pp. 79-98).

Mainz: Schott.

Papageorgi, I., & Kopiez, R. (2012). Psychological and physiological aspects of learning to perform. In G. E. McPherson & G. F. Welch (Eds.), *The Oxford handbook of music education* (1 ed., Vol. 1).

Ryan, R. M., & Deci, E. L. (2000). Self-Determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.

Schmidt, R. A., & Lee, T. D. (2011). *Motor control and learning: A behavioral emphasis* (5th ed.). Champaign, IL: Human Kinetics.

Simon, D. A., & Bjork, R. A. (2001). Metacognition in motor learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27(4), 907-912.

Wrigley, W. J., & Emmerson, S. B. (2011). Ecological development and validation of a music performance rating scale for five instrument families. *Psychology of Music*, 41, 97-118. doi: 10.1177/0305735611418552

Wulf, G., & Lewthwaite, R. (2016). Optimizing performance through intrinsic motivation and attention for learning: The OPTIMAL theory of motor learning. *Psychonomic Bulletin & Review*, 23(5), 1382-1414.

Yan, V. X., Thai, K.-P., & Bjork, R. A. (2014). Habits and beliefs that guide self-regulated learning: Do they vary with mindset? *Journal of Applied Research in Memory and Cognition*. doi:10.1016/j.jarmac.2014.04.003

Zimmerman, B. J. (2011). Motivational sources and outcomes of self-regulated learning and performance. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 49-64). New York, NY: Routledge.

PRACTICE STRATEGIES IN ELITE PERFORMERS

ⁱ The full protocol is available from first author in both English and German.

ⁱⁱ Interrater reliability was high with intraclass correlations (2,2) = .97-.99, $p < .001$. For the correlations, rater assessments were averaged into one variable. Pearson correlations were used as assumptions of normality were met.

ⁱⁱⁱ To include concepts from “deliberate practice” as defined by Ericsson et al as well as the “desirable difficulties” identified by Bjork, we refrained in this preliminary study from using one term for this category.