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Perceived Versus Actual Practice Strategy Usage by Older Adult Novice Piano Students

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Abstract

The purpose of this research was to evaluate learning of practice strategies as a tool for teaching individualized piano instruction (IPI) to novice older adults (ages 60-85). The research questions examined in this study included: (1) Does strategy-training assist novice older adults by improving their practice? and (2) Are there differences between perceived and actual use of practice strategies? Participants (n=8) were given a set of 19 different strategies to employ in their required 30 minutes of daily-recorded practice. They were counseled on their use of these strategies during lessons. Trained raters used the IPI Rating Forms to quantify strategy implementation for a sampling of 30 minutes of recorded practice for each of nine weeks of instruction (270 minutes). Results of the study provide evidence to suggest that older adults perceived more frequent usage of practice strategies than actual implementation.

Introduction

Practice allows for the consolidation of learning through repetition and systematic implementation. It is an essential component to learning a musical instrument. Years of practice contribute to expertise in the acquisition of complex cognitive, physical, and musical skills that are ultimately non-dependent upon conscious control. According to one theoretical model, three stages associated with increased proficiency on a musical instrument include a cognitive-verbal-motor stage, an associate stage, and an autonomous

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stage (Barry & Hallam, 2002). Although movement between stages is not necessarily a linear process, many novice musicians advance between stages to become elite performers (Ericsson et al., 1993). Novices often spend a great deal of time in the cognitive-verbal-motor stage often described as 'deliberate practice.' The cognitive-verbal-motor stage requires high levels of effort, attention, and concentration. For this reason, practice strategies may assist the novice musician.

As Barry and Hallam suggest that, most novice musicians learn to use complex practice strategies while refining technically demanding passages. Strategies such as conscious repetition, passage isolation, and slow focused practice, help musicians to remedy incorrectly played notes and rhythms. With the adoption of specialized practice strategies, the musician becomes more proficient and begins to include higher-order processes necessary for the analysis of stylistic considerations (Barry & Hallam, 2002).

Some strategies naturally develop while learning a musical instrument. However, a mature understanding of the necessity of practice strategies may take years to develop. Although some studio instructors emphasize what to practice rather than how to practice, recent research shows little usage of practice strategies compared to perceptions of strategy usage for college-level musicians after specific strategies are provided by studio instructors (Kostka, 2002). One longitudinal study found discrepancies between the estimated duration and quality of applied music practice with actual practice (Madsen, 2004). Research on children and young adults suggests that assisting students in the development of practice strategies may enable them to better handle technical challenges on their instrument (McPherson, 2005). In addition, other factors such as error-detection abilities and the

conditions of the practice environment can affect the usage of practice strategies (Sheldon, 2004).

Although a review of the research literature related to practice strategies revealed studies on strategy usage by novice child and young adult musicians, few studies have examined practice strategy development among older adult musicians. Previous research related to teaching music to older adults suggests some physical and psychological considerations important for participation in piano instruction (Orlofsky & Smith, 1997). Many factors such as attitude, motivation, musical achievement, and coordination, can influence musical self-efficacy and ultimately musical practice. While older adults may not be as cognitively flexible as young children, older adults exhibit higher levels of maturity, self-motivation, abstract thinking skills, and critical thinking processes than children (Meyers, 2003). Therefore, when presented with practice strategies, we predicted that older adults would be responsive towards implementation of specific practice strategies. In addition, we hypothesized that perceptions regarding practice strategy usage would be consistent with practice strategy implementation in older adults (ages 60-85).

Strategy usage is an important component in cognitive interventions such as memory training and contextual processing (Derwinger et al., 2005, Paxton et al., 2006). Aging is often associated with a decrease in strategy usage for memory training due to cognitive deficits in executive function. Executive function refers to one's capacity to plan and carry out cognitive and other self-serving tasks (Lezak, Howieson, & Loring, 2004). Since musical training enhances executive function in older adults (Bugos et al., 2007), we sought to examine music's role in strategy training and implementation in novice pianists.

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Method

Participants

Eight musically inexperienced (less than three years of prior musical training) older adults (ages 60-85; mean age=71.3 years) were recruited from the Pitt County Council on Aging and non-assisted living facilities in Greenville, North Carolina (Table 1). Informed written consent of all participants was obtained in accordance with the East Carolina University Institutional Review Board. Participants were screened for cognitive impairments such as Alzheimer's disease using the Telephone Interview for Cognitive Status (TICS; Brandt & Folstein, 1999). The TICS is a brief overall assessment of cognitive status administered on the telephone. It is an 11-item screening test that assigns points for correct responses (up to 41 points). Scores below 30 points signify potential significant cognitive impairments such as dementia or Alzheimer's disease. In order to qualify for participation in the study, a score of 30 or above was required. Participants were also screened for depression using the Beck Depression Inventory (BDI; Beck et al., 1961). The BDI is a 21-question self-report inventory that measures symptoms of depression. A score of 11 or higher indicates potential depressive symptoms. To qualify for study participation, participants must score below 11 on the BDI.

Procedure

To ensure group uniformity and examine potential effects of musical aptitude on strategy implementation, we measured musical aptitude and overall intelligence.

Participants completed a measure of music aptitude, Advanced Measure of Music Audiation (AMMA; Gordon, 1989) and a measure of estimated intelligence, North American Adult Reading Test (NAART; Uttl, 2002) (Table 1). The AMMA required participants to determine whether two pre-recorded melodic phrases were the same, tonally different, or rhythmically different. The NAART consists of 35 printed words and required participants to read words aloud. The NAART yields an estimate of verbal intelligence (VIQ), performance intelligence (PIQ), and full-scale intelligence (FSIQ) (Table 1).

Participants received nine-weeks of Individualized Piano Instruction (IPI) and four group studio classes. The IPI program is a broad-based music education program, including progressively difficult instruction in music repertoire, technical and motor dexterity exercises, and music theory. The rationale for the IPI program is that any progressively difficult mulitimodal program that engages complex learning and memory processes will directly contribute to maintaining overall cognitive abilities. Maintenance of overall cognitive abilities is essential for successful aging. Since IPI training program targets diverse cognitive processes, each weekly thirty-minute lesson includes a combination of music theory, technique, and performance.

Students complete theory assignments from the *Schaum Note Speller* (Schaum, 1996), perform scales, arpeggios and other technical exercises composed by the principal investigator, and perform repertoire and other exercises from the *Alfred All-In-One Basic Piano Course Level 1* (Lethco *et al*, 1996). Topics in music theory consist of basic note reading, determining intervallic and key relationships, and analyzing basic tertian harmony. Music literacy was an important focus as participants were musically inexperienced and

unable to read music prior to enrollment. Participants performed initial exercises presented in the *Alfred All-In-One Basic Piano Course Level 1* prior to performing their pieces (Lethco et al., 1996) as well as technical exercises composed by the principle investigator. The exercises in the Alfred method are designed to familiarize the student with basic chord progressions and rhythmic challenges encountered in their pieces. The technical exercises expand upon the Alfred publication by including basic concepts of music theory in each exercise. Once students are familiar with the lesson's objective and have practiced a particular skill in isolation, students are ready to integrate this knowledge into performance.

Part of the IPI program includes the participant's ability to play scales, primary triads, and perform dexterity exercises. Most students are taught new scales and arpeggios every two weeks. Hands separate practice is required for each scale in the first week, followed by scale hands together practice as the scale is completed during the second week. Students learn major and minor scales using the circle of fifths and the pieces studied as guidelines. In this study, only one dexterity exercise was assigned each week and often these required two weeks to complete at a moderate tempo. Speed was not a requirement of these exercises as the purpose was to develop finger strength and dexterity.

Students in the program received lessons from one of the two authors of the study, each of whom is a pianist with a Ph.D. in music education. Both instructors team taught the four studio classes. The instructors strove to use a consistent approach to providing IPI lessons each week, and each student's lesson followed a similar outline. Students demonstrated their ability to perform selections from *Alfred All-In-One Basic Piano Course Level 1* (Lethco et al., 1996) and were counseled on strategies to overcome weaknesses.

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Each week participants received a new assignment, incrementally building on their individual cumulative achievements. If participants had difficulty with particular skills, such as coordinating hands on certain passages, a reduced load was assigned for that particular week.

During each lesson, an instructor evaluated progress each week, provided individual diagnostics, assigned new material for the successive week, evaluated practice, and counsels on preferred practice strategies. Participants performed technical exercises and repertoire pieces. The instructor critiqued the performance, and assigned new material for the succeeding week based upon successful performance. The instructor recommended particular practice strategies, demonstrates these to the student, and encourages the student to refer to a practice strategy handout in order to self-optimize practice time. Students were required to practice 30 minutes per day between lessons, and to record all practice sessions using a tape player or Roland C-2 CD recorder and were required to log all practice time. In bi-weekly studio classes, students performed for other students, discussed their experiences and challenges with peers, received additional instruction in practice strategies, and observed an instructor demonstrating practice strategies.

In the first IPI session, an instructor introduced each student to 19 practice strategies (Appendix), based upon the Practice Strategy Inventory (Smith, 2005). Students received a handout describing the strategies, grouped into the categories of rhythmic accuracy, vocalization, coordination, and miscellaneous other strategies. Strategies related to rhythmic accuracy include counting aloud, rhythmic variation, metronome usage, and clapping rhythms. Recommended vocalization strategies include reading notes aloud,

singing along, and verbal self-examination of formal musical structure. (Verbalizations included such techniques as verbalizing the key signature, time signature, number of phrases, and potential repetitions found in each piece.) Strategies related to coordination include practicing each hand separately, repeating difficult passages, using slow careful practice, and addressing challenges passages first before playing the entire piece.

Trained raters used the IPI Rating Forms to quantify strategy implementation for a sampling of 30-minutes of practice for each of nine weeks of instruction (270 minutes). Raters were graduate music students who completed six hours of training and practice with IPI rating forms. Individual practice samplings were randomly selected from completed practice sessions. Although most adults recorded each entire practice session, two participants experienced technical difficulty with recording equipment during two separate practice occasions and data from those sessions was excluded from the analysis. The sampling provides useful information that may help to determine if older adults employ learned strategies in musical practice by evaluating error types, repetition rates, correct performances, and strategy implementation rates for each instructed strategy.

In the ninth week of the study, a questionnaire was administered to the participants to collect information about their perceptions of practice. The questionnaire consisted of a Likert scale, which required each participant to rate how often they used each strategy in their practice sessions (1= always, 2=almost always, 3=sometimes, 4=seldom, and 5=never). An example of a statement from the questionnaire is, “I repeat difficult passages at least ten times or more.” Participants were asked to then rate the statement based upon its applicability to their practice strategy implementation pattern.

Results

The participants in this study performed similarly on measures of music aptitude and intelligence (Table 1). No outliers were found among preliminary measures of intelligence as estimated by the NAART and music aptitude as measured by the AMMA. There were no significant (p<.05) correlations between musical aptitude and actual implementation of practice strategies.

The analysis consists of correlations between perceived strategy usage as measured by the survey and actual strategy implementation as measured by external practice-tape reviewers. A significant (p<.05) negative correlation (r=-.46*)* was found between acknowledgement of participant repetition of difficult passages and their actual repetitions, which decreased over nine weeks (Figure 1). In addition, results indicate a significantly (p<.05) negative correlation found between participants who reported clapping or tapping rhythmic patterns and their actual usage of this strategy (r=-.52). Although not significant, negative correlations were also found for counting rhythmic passages (r=-10) and performing passages slowly (r=-.04) (Table 2).

A significantly (p<.05) positive correlation was found between reports of hands separate practice and actual implementation (r=.50). In addition, an increase of occurrence for hands separate practice continued over the nine-week period (Figure 2). In contrast, a decrease in repetition of difficult passages occurred over the nine weeks (Figure 3). Although not significant, another positive correlation was found for metronome usage

(r=.45) and listening to recordings (r=.55) as participants reported not employing the metronome nor listening to the enclosed recordings during practice sessions. The independent raters verified these data.

Limitations and Explanations

One limitation of this study design is that no measure of self-efficacy was administered. High levels of self-efficacy in young adults may enhance practice quality, which would include usage of many measured practice strategies (Nielson, 2004). Perhaps, additional opportunities to perform previously learned repertoire might contribute to enhancing self-efficacy in the older adult. In addition, no measure of other factors such as social and inter-relational aspects related to practice strategy implementation was administered.

This research assumes that practice habits were stable throughout the study. Although practice strategies were discussed during each lesson and during bi-weekly studio instruction, the results of this research are based upon survey responses collected upon the conclusion of instruction. Survey responses are compared with tallied means of scores collected from practice implementation over each of nine-weeks. Further research is necessary to examine perceptions by participants incrementally. Incremental analysis of perceptions and practice strategy implementation will provide music educators with a clearer picture as to how adult musicians implement strategies.

Another limitation of the research was the number of research participants (N=8). A larger population would allow for more generalizable results. Adults in this study were highly educated with an average of 15.6 years of education. It would be interesting to

examine practice strategy usage in a larger, more diverse sample. In addition, although samplings included entire practice sessions for selected dates during each week of training, results may have differed if all practice sessions were evaluated for strategy usage. This procedure was not entirely possible for this particular study as some participants forgot to record until mid-session on some practice tapes. In this case, only completed practice sessions were selected for evaluation.

Discussion

The purpose of this research was to evaluate the adult learner's use of specific practice strategies. We chose to compare perceptions of practice strategy usage with actual strategy implementation. Prior to the initiation of instruction, adults were provided a list of specific strategies, which they were asked to review prior to each practice session. Adults received regular consultation regarding practice strategy usage in weekly individual lessons and bi-weekly group studio classes. Although our hypothesis predicted differences in strategy usage between adults and children due to development of abstract reasoning skills and mature thought processes, results indicated both similarities and differences in strategy implementation between children and older adults.

For strategies such as *rhythmic variations* and *addressing challenging passages* first, older adults reported few instances of usage. This was consistent with practice strategy implementation analysis and may be one reason for fewer correct performances and less repetitions throughout the nine-week program. Not only are repetitions essential

for fluency, research indicates that moderately high levels of contextual interference stemming from repeated skills with rhythmic or melodic variations reinforces learning (Sanders, 2004). This is consistent with previous research on practice strategy usage in children.

Negative correlations between reported strategy usage and strategy implementation indicate that older adults were not employing reported strategies such as repetition of difficult passages, clapping or tapping of rhythmic passages, counting rhythmic passages aloud, and practicing passages slowly. Data are consistent with previous music research examining strategy usage in children and young adults (Kostka, 2002; McPherson, 2005). Perhaps, novice musicians require additional practice strategy training or techniques. Since high levels of planning and organization are required to participate in musical performance, strategies designed to assist novices would benefit group-based as well as studio-based instruction (Drake & Palmer, 2000). Recent research suggests that older adults are more likely to retain self-generated strategies (Derwinger et al., 2005). Perhaps, a different approach to practice strategy instruction may include counseling on self-generation of applied music practice strategies.

Cognitive research shows older adults exhibit perseverative errors with regard to novel strategies in memory training paradigms and everyday tasks (Schmidt et al., 1999). Perseverative errors refer to persistent repetitions of incorrect responses or behaviors. Despite task novelty and the repetition of strategies during Individual Piano Instruction (IPI) and group studio sessions, a more rigorous pedagogical approach for practice strategy instruction may be necessary. Perhaps, older adults would benefit from fewer practice

strategies. Nineteen practice strategies may have been too many to recall or may have been confusing. In addition, introducing strategy instruction prior to the inclusion of lesson content and in-context strategy illustration may assist retention and usage rates.

Further research will provide more answers as to the most appropriate strategy training for novice older adult musicians. Based upon outcomes of this research, older adults differ from children with regard to practice strategy usage as participants routinely commented on their levels of understanding and the importance of strategy implementation. Although novice adult musicians have developed abstract and critical thinking skills, adults present similar outcomes relative to children with regard to strategy implementation, especially with regard to slow, careful practice. Further research will determine how to most efficiently present and train adults to use practice strategies and what types of practice strategies are most helpful for the developing musician at any age.

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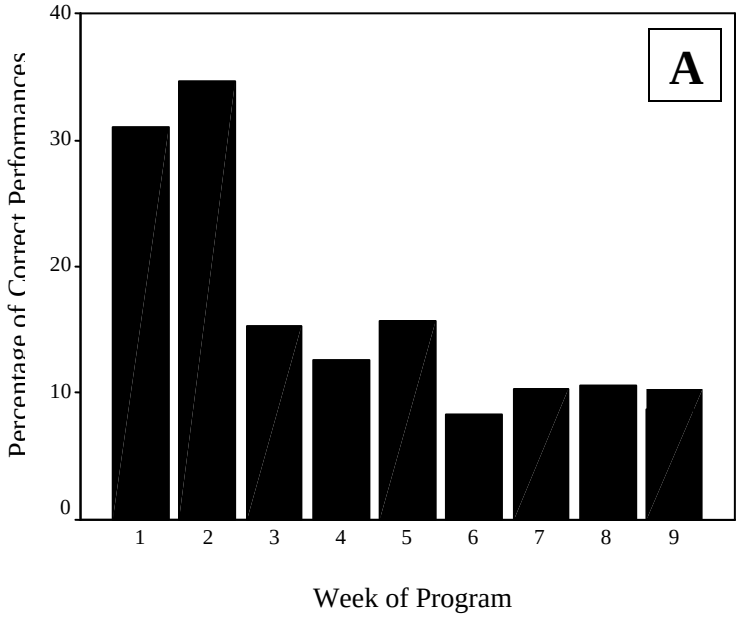
Table 1. Demographic Table

	Older Adults (n=8)
No. of males/no. of females	3/5
Age	71.3 (7.5)
Education	15.6 (3.2)
Length of reported prior musical instruction in months	7.0 (10.6)
BDI	2.3 (1.8)
FSIQ	107.8 (7.9)
PIQ	108.6 (4.2)
VIQ	105.9 (9.0)
AMMA Tonal RS	24.0 (2.8)
AMMA Rhythmic RS	25.1 (4.3)

Note: BDI: Beck Depression Inventory; FSIQ: Full Scale Intelligence Quotient; PIQ: Performance Intelligence Quotient; VIQ: Verbal Intelligence Quotient; AMMA: Advanced Measures of Musical Audiation: Tonal and Rhythmic Raw Scores

*Note FSIQ, PIQ, and FSIQ scores estimated by NAART


A
Percentage of Correct Performances
40
30
20
10
0
1
2
3
4
5
6
7
8
9
Week of Program

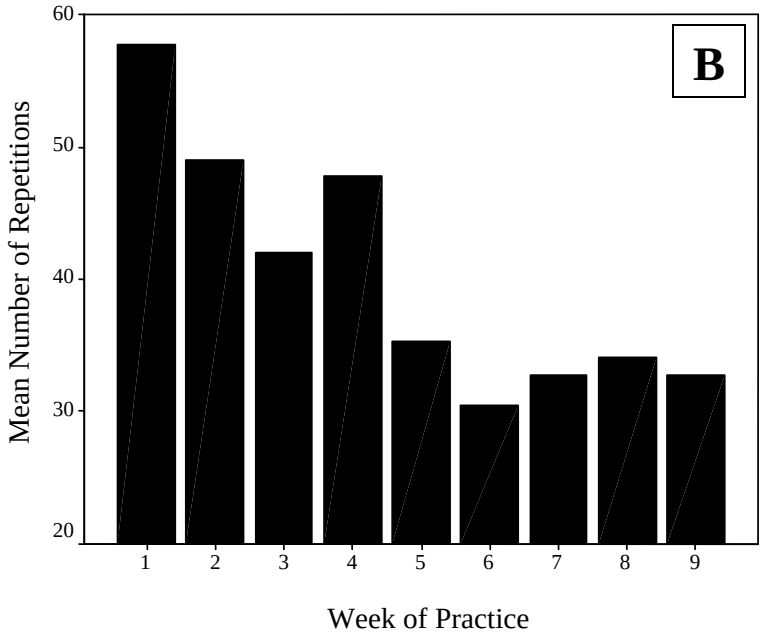

B
Mean Number of Repetitions
60
50
40
30
20
1
2
3
4
5
6
7
8
9
Week of Practice

Figure 1. (A) Percentage of Correct Performances by Week of Musical Training and (B). Mean Repetitions by Week of Musical Training

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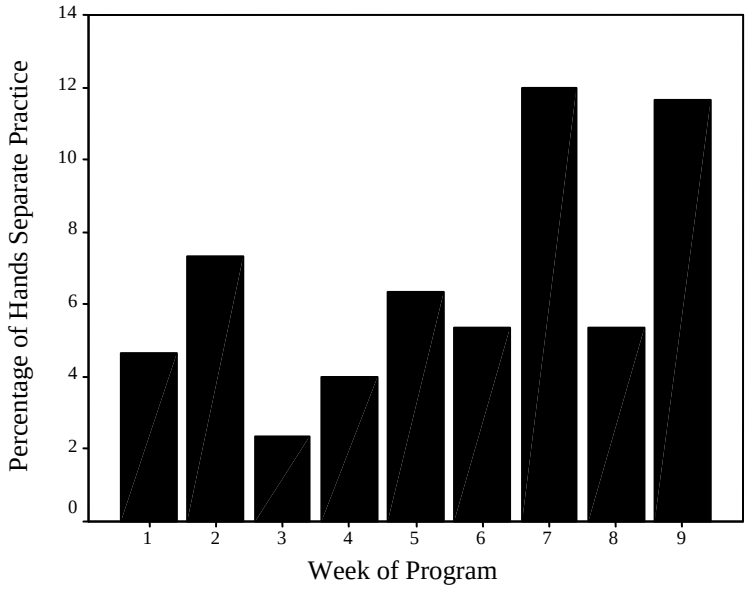

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Figure 2. Practice Strategy Usage by Week for Performances Hands Separate, the most commonly reported strategy.

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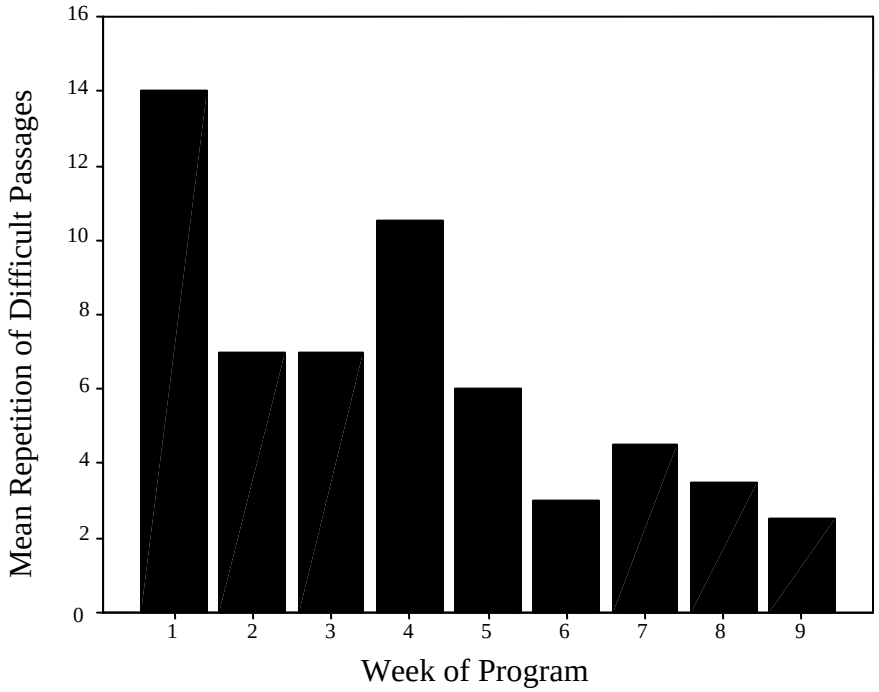

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Figure 3. Practice Strategy Usage by Week for Repetition of Difficult Passages

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Table 2. Correlation Between Perceived Strategy Usage and Actual Strategy Implementation

Strategy	r value
Repetition of Difficult Passages	-0.46
Sings with Practice	0.39
Metronome Usage	0.45
Count Rhythmic Passages	-0.10
Perform Passages Slowly	-0.04
Hands Separate	0.50
Clap or Tap Rhythmic Pattern	-0.52
Challenging Passages First	0.29
Rhythmic Variations	0.31
Listen to Recordings	0.55

Appendix. Practice Strategies

Strategy	Category	Description
1. Repetition of Difficult Passages	Coordination	Over learn difficult passages by repeating them at least ten times or more.
2. Sings with Practice	Vocalization	Sing the melody to help with top voicing (emphasizes melodic line).
3. Metronome Usage	Rhythmic Accuracy	Use a metronome to ensure rhythmic evenness and rhythmic accuracy.
4.Count Rhythmic Passages	Rhythmic Accuracy	Counting rhythms aloud can assist with rhythmic accuracy.
5. Perform Passages Slowly	Coordination	Practice each section slowly until you can play it perfectly. Only after, increase tempo.
6. Hands Separate	Coordination	Practice hands separate prior to hands together will allow time for your fingers to learn the technique and prepare you for coordinated movements.
7. Clap or Tap Rhythmic Pattern	Rhythmic Accuracy	Clapping or tapping the rhythm in isolation can help with rhythmic accuracy.
8. Challenging Passages First	Coordination	Always address challenging passages in the piece first.
9. Rhythm /Articulation Variations	Rhythmic Accuracy	Practice challenging scales and exercises containing patterns by varying rhythmic and articulations involved.
10. Listen to Recordings	Other	Listening can provide information on interpretation and style.
11. Power of the Mind*	Vocalization	Mentally, go through the piece and study it before performing. Vocalize formal structures.
12. Short Focused Practice*	Other	Two short practice sessions are often more focused than one long session.
13. Small Steps First*	Other	Break the music into smaller sections to remedy trouble areas.
14. Analyze*	Vocalization	Analyze the music by examining repeated patterns or phrases that are similar. Read notes aloud and read formal structures aloud.
15. Record Practice*	Other	Keep written records and electronically record your practice to ensure accountability.
16. Aim High*	Other	Set specific and appropriate goals for each practice session.
17. Mistakes? Not Me!*	Other	Always stop when you know that you have made a mistake. Go back to the difficult section and practice until correct.

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18. Mental Imagery *	Other	Use mental imagery or fantasy to assist by lessening worry and enabling better focus.
19. Accompaniment*	Other	Perform along with the provided accompaniment. This can help rhythmic accuracy.

Note: * refers to strategies that were not quantified in Table 2. These strategies are based upon the *Practice Strategy Inventory* (Smith, 2005).

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