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A Cognition-Based Pedagogy of Improvisation for Post-Secondary Education

Building on the cognitive research of Sarath, Pressing, Gellrich, Johnson-Laird, and others, a pedagogy of musical creativity has been created that blends composition and improvisation with keyboard skills and collaborative work. This pedagogy, called 'comprovisation', is intended for use in aural skills classes, as a means of developing musical fluency, technical proficiency, performance flexibility, and compositional creativity without overwhelming the students or the teacher. This article identifies the three most important cognitive skills for musical creativity, and describes each of the developmental stages of comprovisation that develop these skills.

Aural skills curricula often require disparate activities, which can overwhelm the teacher and student. Besides dictation and sight singing, many aural skills programs include keyboard harmony, improvisation, and composition. Singing and piano playing are essential performance skills for all musicians, so they must be included in some part of the music curriculum. The study of improvisation is valuable for a variety of reasons, one of which is the encouragement of flexibility in the performer, through reactions to unintended notes by the soloist or accompaniment. As no performance environment ends up being exactly as intended, musicians need this flexibility to immediately respond to unforeseen events. Improvisation also helps to develop a fluency in the musical language being studied. The student improviser learns to recognize the tendencies of melodic notes, as linear phenomena and in interaction with harmonic progressions.[1] Composition is necessary to maintain music as a living art. For classical music to keep from becoming disconnected with the current generation of listeners and musicians, that generation must continue to create new music. This creative process should not be relegated to a few specialists, but rather be a normal practice for all musicians.

The standard on composition and improvisation is based on the belief of the National Association of Schools of Music (NASM) membership that professional musicians benefit significantly from study and experience in the creation of musical works, because the musician's challenge of creating musical coherence requires the integration of knowledge and skills in performance, theory, and historical styles and practice. It also develops the musical mind, hones analytical capacities, and develops sensitivity to the possibilities of musical structure.[2]

There is a significant debate whether composition is a different activity from improvisation. On one hand, both activities are essentially processes of creating new music.[3] On the other, composition allows editing, creation out of the temporal constraints of performance, and the performance abilities of the composer do not limit the virtuosity of the composed

1 More benefits of improvisation can be found in Santos and Del Ben 2004, pp. 266-276; Larson 1995, pp. 76-90; Covington 1997, pp. 49-64; and Silberman 2003.

2 *Notes for Music Faculty and Administrators: Standards for Composition/Improvisation, Repertory/History, and Technology in Undergraduate Professional Degrees in Music.*

3 Nettl 1974, p. 4-6; Alperson 1984, pp. 17-29.

piece. [4] Improvisation permits no fixes to errors, all creation is done in real time, and the improviser can only create that which s/he can perform. Sarath distinguishes composition and improvisation by the quality of continuity.[5] Improvisation is a continuous process of serial creation with immediate performance, whereas composition is a discontinuous process. The musical work does not have to be created in one temporal order, and many alterations can be made before it is performed. Pressing clarifies this definition: 'If erasing, painting over, or non-real-time editing exist, improvisation does not.'[6]

Despite this difference in revision opportunities, both activities are based on the creation of music, and therefore related in cognitive skills. Thus advancement in one technique will aid the other. Therefore, when incorporating musical creativity into an aural skills program, the teacher should not try to constrain the students to only composition or only improvisation. The pedagogical method presented here utilizes both in a program called 'comprovisation'.

One problem with teaching improvisation in an aural skills program comes in finding a course of improvisation that does not rely upon a specific genre or specific starting abilities. Since most aural skills programs focus on classical music, a shift to jazz styles for improvisation would imply disconnections between the very activities that we hope to integrate. A typical starting class of classical college musicians will have some students who have created their own music, and a large number of students who have never improvised or composed before. Many classical music students have had no experience playing jazz music, so they have had no experience with the rhythmic and harmonic language of jazz. Incorporating jazz improvisation would require teaching jazz style as well as improvisation skills, overburdening the aural skills program. Thus improvisation should not be jazz-based, eliminating most existing methods of teaching improvisation.[7]

Another problem is deciding what to remove from the curriculum to allow for improvisation and composition. For example, *The Musician's Guide to Aural Skills* has many good improvisation and composition exercises, but they are nestled among many other dictation, singing, performing, and listening exercises.[8] A fair amount of time devoted to each of these activities would result in a five-day-a-week class rather than the more typical twice or three-times weekly scenario. What is needed is a program that develops improvisation and composition skills within a realistic timeline that emphasizes the connections among dictation, singing, keyboard skills, improvisation, and composition.

Finally, a pedagogy of musical creativity needs to be practical in what it requires from the students. The ability to create with innovation and coherence is developed through the development of various cognitive skills. The pedagogy presented in this article is based upon recent studies, identifying the cognitive skills that are necessary and determining how best to develop them.[9] This method of comprovisation is intended to fit within a core two-year aural skills sequence for music majors. Within this sequence students learn to create in a collaborative environment, one that also encourages the development of keyboard skills.

The three most important cognitive skills for musical creativity are temporal awareness, memory, and the application of appropriate schemata. Sarath would also add heightened consciousness to the list, though this may be a topic uncomfortable for some teachers

4 Foss 1962, pp. 684-685.

5 Sarath 1996, p. 1.

6 Pressing 1984, p. 346.

7 There is a tradition of improvisation pedagogy within church music programs, but these systems are very specific to the keyboard and to religious context. Examples include Bender 1975, Hilty 1987 and Rockholt 1968. There are also a couple of improvisation books for aural skills classes, but these books focus on keyboard improvisation: Berkowitz 1975 and Wittlich and Martin 1989.

8 Phillips, Clendinning, and Marvin 2004.

9 This use of cognitive research for pedagogical purposes is inspired by Covington and Lord 1994, pp. 159-170.

and students to address and it could be discussed as an aspect of temporal awareness.[10] I will describe some leading cognitive models of improvisation and composition, and demonstrate how comprovisation is inspired by these models.

Jeff Pressing created the first cognitive model for improvisation twenty years ago. In this model, an improvisation is divided into a sequence of non-overlapping sections called 'event clusters'. Triggers generate each event cluster at a specific time point in the improvisation. These clusters can be represented in three ways: objects, features, and processes. Objects are specific cognitive or perceptual things, like chords or scales. Features are those properties that are shared by objects, and processes are changes in features or objects over time. Each type of representation can be characterized by the importance of that factor in the improviser's cognitive processes. As an example, a given event cluster could be described as an arpeggio (object), a subdominant function (feature), or the skipping of every other note in the diatonic scale (process). Each of these descriptions is assigned a value from 0 to 1, based on how important that description seems to be to the performer's conception.[11] These factors are often redundant, as are the acoustic, musical, and movement aspects of the event cluster. 'Cluster aspects' are the various perspectives of the cluster, from physical sensations of hearing and touch to cognitive identification of style features and emotional content. The redundancies built into this model maximize the possible realizations of creative impulses and cognitive processes. This maximization is particularly necessary, as Pressing believes that the improviser does not have conscious control over which aspects or factors s/he will attend to during the improvisation. Thus there must be as many possible paths to creation as possible.[12]

Pressing emphasizes that the triggers generating the event clusters are oriented on schemata, the generalized knowledge of the style and musical language, rather than on specific details of what specific notes to play or what physical motions to make. His cognitive model stresses the importance of developing this background knowledge. Philip Johnson-Laird also talks about schemata in his psychological theory of improvisation. Coming from the perspective of available computing power, Johnson-Laird determined that improvisation requires a regular grammar, the weakest type of formal grammar in the Chomsky hierarchy.[13] Regular grammars require less processing in working memory, which is important for an activity that requires real-time creativity with no editing capabilities. The regular grammar that Johnson-Laird describes for his potential improvising software is a system of schemata. These rules, based on music theories of tonal harmony, melody, and rhythm, are those same rules that we teach in music theory and aural skills classes. Johnson-Laird does caution that the integration of theoretical knowledge into the subconscious is a slow process, hence beginners are 'truly incompetent'.[14] One of the few studies on the generative processes of composition also highlights the importance of schemata, though with different terminology. John Sloboda uses 'general tonal and stylistic knowledge' as the unconscious repertoire that inspires musical ideas.[15]

Besides the need for a firm background of schemata to generate ideas, cognitive studies emphasize the role of memory in improvisation. Martin Gellrich describes eight types of cognitive processes involved in improvisation, of which three are different levels of memory (short-term recall, medium-term recall, and long-term recall).[16] These levels

10 Sarath 1996, p. 15. A different look at transcendentalism in music education can be found in Palmer 2006, pp. 143-158, and Kenney and Gellrich 2002, pp. 125-126.

11 Pressing does not clarify how these cognitive strengths are determined.

12 Pressing 1988, pp. 152-166.

13 Johnson-Laird 1991, p. 301.

14 Johnson-Laird 1991, p. 320.

15 Sloboda 1985, pp. 118-121.

16 Kenney and Gellrich 2002, p. 124.

correspond to the three types of memory: echoic memory (up to 3 seconds in the past), short-term memory (the previous musical phrase, about 3 to 12 seconds in the past), and long-term memory of the entire improvisation up to the present moment. Gellrich does not point out that echoic memory is very different from short-term memory or long-term memory. The immediate recall of echoic memory consists of raw, uncategorized sensations, whereas the other forms of memory utilize bottom-up or top-down cognitive processing to organize the memorized items in groups.[17] Memory is stressed for the need to evaluate past ideas and as part of the important ability to be aware of temporal orientation.

Mendonça and Wallace's three stages of temporal cognitive processes for improvisation also emphasize the importance of memory, along with the ability to be aware of the temporal location within the improvisation.[18] This awareness of rhythm and form is called 'orientation' by Mendonça and Wallace, 'flow status' by Gellrich, and 'inner-directed temporality' by Sarath.[19] Johnson-Laird makes rhythm and timing the cornerstone of his psychological theory of improvisation, stressing the need for coherent rhythm and form at all levels.[20] In making the quick decisions required of improvisation, the soloist must be aware of his/her place in the form, in the meter, and in the beat.

Based on these cognitive studies, comprovisation places emphasis on the development of memory, temporal/rhythmic awareness, background knowledge of the tonal language, and collaborative skills. Before students begin to actually improvise, they develop memory and tonal fluency through echoing exercises and performances of memorized compositions. In the first stage, Call and Response, students repeat tonal phrases, singing on solfège and performing on their instruments. By performing as a group, they have to be accurate in meter and rhythm. This exercise builds their short-term memory, encouraging them to chunk notes together and develop subconscious awareness of trends in melodic behavior.[21] This is a typical type of exercise in aural skills classes, the only difference is in stressing that this activity will build skills for future improvising.[22] The alternation of sight singing with instrumental playback stresses tonal fluency, developing the schemata that will be the triggers for idea generation. Memory can also be developed with other aural skills activities, especially melodic dictation.

Many students get a creative block when asked to improvise for the first time. The creative process can be terrifying by itself, and becomes even more intimidating when done in real time. So the first creative acts in the comprovisation program are compositions. These composition assignments have very strict parameters, giving the students the comforting experience of paint-by-numbers rather than a frightening blank canvass. And by giving the students time on their own to wrestle with their creative muse, they will feel safe enough to be open to their creativity. In this stage the students memorize their compositions and perform them in class. The required memorization emphasizes the importance of memory, encourages the development of tonal schemata, and removes the barrier between the musician and the music that a music score can create.[23]

Students are grouped in pairs, and required to work as a team for the whole semester. Grades are earned as a group, to mimic the real-world situation that a performance is only as good as its weakest performer. Students that would not normally prepare a

17 Snyder 2000, pp. 19-22.

18 Mendonça and Wallace 2004.

19 Mendonça and Wallace 2004; Kenney and Gellrich 2002, p. 124; and Sarath 1996, p. 5.

20 Johnson-Laird 1991, pp. 293-297.

21 Snyder 2000, pp. 47-56, 87-90.

22 See Karpinsky 2000, pp. 129-130, for descriptions of instrumental playback and the pedagogical benefits of this activity.

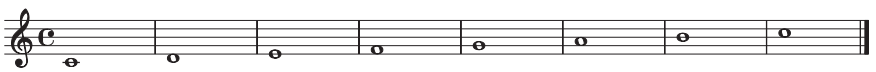
23 Azzara also emphasizes memorization in his improvisation method: 1999, pp. 21-25.

piano skill or improvisation assignment feel the pressure not to let their classmate down. The students also realize how rewarding collaborative efforts can be, that two creative spirits can accomplish more than a single person can. The students develop the skills of scheduling rehearsals and developing workload plans, and sometimes have to deal with a partner who is not working hard enough. These skills correlate directly to professional musical life. Working with peers reduces the level of stress, and emphasizes the equality of roles in the creative process. Paul Berliner stresses the importance of peer interaction in learning how to improvise,[24] as well as the rewards of collaboration.[25] The grading rubric measures creativity and accuracy, as shown in Example 1. Creativity is defined by the clear presentation of a style or meaning that would be appropriate for a public performance. This encourages the students to move away from the block chord accompaniment and simple chord-arpeggiated melodies.

Grade Qualities	
A (Excellent)	Very well prepared by soloist and accompanist and creative arrangement of material
B (Good)	Both players are prepared, though mistakes are made, or not creative in performance
C (Average)	Both players make many mistakes, but still are creative; or some mistakes plus not creative
D (Poor)	Many mistakes and not creative

Example 1
Grading Rubric.

For a given assignment, the team performs twice, once with Student A soloing on his/her instrument and Student B accompanying on the piano and once with Student B soloing to Student A's accompaniment. The students can use the same accompaniment if they wish, but they are not so required. When piano skills are quite disparate, each student usually develops his/her own accompaniments to fit his/her abilities. By acting as both soloist and accompanist, the students gain practical experience about the connection between melody and harmony and the importance of rhythmic and metric accuracy. And even at this stage of memorized compositions, students start learning about creative flexibility. When one of them makes a mistake during a performance, that student cannot stop and fix the mistake without wrecking the synchrony with his/her partner. Thus they start on the path to immediate creativity, thinking of ways to get back on track with their partner. A sample beginning assignment is shown in Example 2.



Example 2
Sample Beginning Assignment.
The Accompanist plays the scale, while the soloist performs a composed or improvised melody over it. The students become sensitive to consonance and dissonance, without worrying about (or knowing about) chord structures.

After a few memorized compositions, the students are ready for improvisation within strict frameworks. As in the memorized composition stage, the constraints given can be harmonic, melodic, rhythmic, formal, or stylistic, depending on the relevant schemata being developed. Besides the comfort that limited choices give to the improvising novices, these limits also clarify mistakes, so students are easily aware when their intentions

24 Berliner 1994, pp. 37-44.

25 Berliner 1994, pp. 348-352.

and their output do not agree. The students continue to alternate roles as soloist and accompanist, and are encouraged to be creative in the design of the accompaniment as well as the improvisation. Students are allowed to write down pre-determined motives, as long as they are improvising the bulk of their solos. The truth of improvisation can be tested with multiple improvisations to the same assigned framework that are performed in succession. It is highly unlikely that the students would invest the time into composing and memorizing four or five melodies, when they could be practicing improvisation for the same effort. Besides the aforementioned composition and improvisation exercises in the *Musician's Guide to Aural Skills*, there are plenty of composition, harmonization, and figured-bass exercises in the major theory textbooks that can be incorporated into the memorized composition and limited improvisation stages.[26]

Finally, after success in the above activities, the students are ready for free improvisation. While no constraints are given to the students, the results usually do not resemble a performance by AMM[27] or Ornette Coleman. The students still use the schemata they have been developing, only without guidance from the teacher. This level of activity requires more creativity and more collaboration between the partners. Free improvisation also requires more rehearsal time, something the students often do not understand until their first disastrous attempt. Since a referent, to use Pressing's term,[28] is not being provided by the teacher, the partners must work out an agreement of an appropriate referent on their own. At this stage it is useful to have a class discussion on what mistakes are in a free improvisation. There are no rules given, so how can any rules be broken? Intention, implication and inference can be compared, and the role of 'happy accidents' considered.

In a typical four-semester aural skills program, the four stages can be cycled multiple times as new theoretical materials are discussed. I offer one possible plan that has been designed to conform to the progression of topics in the concurrent theory program and the other activities in the aural skills program at my university. In the first semester, a cycle of the four stages utilizes the standard four-measure phrase model, with diatonic melodies and simple rhythms. A second cycle extends the rhythmic possibilities to include syncopation, hemiola, and tuplets. In the second semester, the first cycle involves extended phrases, periods, and phrase groups, and the second cycle of comprovisation activities involve more complex diatonic harmonies such as sequences. The third semester introduces tonicization and modulation, and a cycle on small forms. Theme-and-variations forms can be used to practice improvised melodic embellishments, and as the improvisations get longer the students are stretched in both memory – what did I play for the A theme? – and sustained creative interest. The fourth semester really stretches the students with larger forms and more chromatic harmonies. Sonata form is almost impossible to freely improvise as a collaborative effort, so I allow the students to pre-compose many of the elements even at the third and fourth stages. For the Call and Response stage I break up the forms into smaller sections to be echoed, though the entire form can be played multiple times for standard dictation and transcription exercises.

The students could be given the choice between composition and improvisation in these activities. By allowing the students to choose which pace works best for them, the students would develop a confidence in their unique strategies for music creation. These strategies can also directly correspond to professional life. As a working musician, situations will arise when a person needs to create some new music. Some musicians need to write everything out, and others can 'wing' it. Even those students who would fully

26 Composition and harmonization exercises can be found in Aldwell and Schachter 1989, Laitz 2003, Roig-Francoli 2003, Kostka and Payne 2004, and Gauldin 2004.

27 AMM is a British free improvisation group, founded in 1965. See Prévost 1995.

28 Pressing 1984, pp. 346-348.

compose their comprovisations would likely get faster at working out their compositions, a skill that could help in professional situations with time constraints. This strategy could also be used to gently transition the more timid students from purely composed to partly improvised to purely improvised performances.

Because the comprovisation program incorporates sight singing, keyboard skills, and dictation, it can be included in an aural skills class with few sacrifices. Most of the learning process happens outside of class when the student partners rehearse, and graded performances can be done either in or out of class depending on time constraints. I prefer performances to be done in the classroom, so the feedback the teacher gives will instruct all of the students. The supportive environment provided by their peers also makes the soloists less tense, but also shows everyone what are acceptable levels of improvising and accompanying skills. Plus performance days make a pleasant change from dictations and sight singing exercises.

A good aural skills program helps the students to make connections between their theoretical studies and their performance skills. The practice of musical creativity, imparted by comprovisation exercises, builds those connections and encourages the students to continue being creative in their musical pursuits.

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