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Implementing imagination for evoking teleodynamic systems which create constraints to constitute improvised musical pieces

Jaak Sikk¹

Department of Contemporary Improvisation,
Estonian Academy of Music and Theater, Tallinn, Estonia

Marju Raju

Allan Vurma

Department of Musicology, Estonian Academy
of Music and Theater, Tallinn, Estonia

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ABSTRACT Improvising freely together with their peers in a classroom setting can be challenging for a music student, as no specific guidance is provided, and students must rely solely on their inner ideas, rules, etc. This long-term exploratory study with eight Estonian music students tested imagination as a tool for providing improvisation guidelines to enhance group dynamics. A different set of methods (behavioral observation of the whole situation, detailed musical analysis of the improvisations, professional evaluation by improvisation teachers, and student feedback) was used for analysis. The results show that the implementation of conscious imagining is helpful for forming a certain constrained expressive area for improvisers, in which the improvised music is clear, stylistically coherent, and the improvisers are at relative ease in self-expression.

KEYWORDS:

–improvisation
–imagination
–teleodynamic systems
–group dynamics
–music education

Correspondence

1 jaak.sikk@eamt.ee

INTRODUCTION

The current research originates from the real-life situations occurring in improvisation lectures in which students needed to improvise with a new duo partner or improvisation teacher for the first time. For novice improvisers, that kind of situation can be challenging and produce some level of anxiety, as in the context of improvising freely, no specific guidance or rules are provided (Lock, 2022, p. 191–221). Music students, especially classically trained ones, are mostly used to interpreting pieces written by composers; therefore, spontaneous self-expression in the field of improvisation can be intimidating. It is common for students to have their own aesthetic preferences, which could interfere as expectations to judge oneself while improvising. A preventive mindset, aimed at avoiding failure according to preset expectations, can lead to hesitation and curbed creativity (Maddox, 2009).

Through the years of teaching improvisation, a method that can be implemented in group improvisation has been developed by the first author of this research. The aim of the method is to help beginning improvisation students acknowledge their inner creativity and access it through semiotic models of meaning creation. The method created has proven efficient based on practical teaching experience. It consists of three main steps: (1) preparation—concentrating on any of the mental reactions triggered by the signals from the surrounding environment, (2) listening to the duo partner improvising and simultaneously imagining (without playing on the physical instrument) what they would play together with the improvised music heard, (3) listening to the duo partner improvising and at the same time expressing any musical idea on the physical instrument that is triggered as a mental response to the improvised music heard. During the preparation phase, the musician becomes accustomed to being aware of the reactions to

the surroundings. In the second phase, the student is in a “safe zone” (just imagining mentally) and collects means for expression, which can be perceived as mental responses triggered by the music improvised by the duo partner and which can be used as artistic material. The third step consists of real expression, inspired by the improvised music played by the duo partner.

From then on, trusting the inner meaning creation process as a response to the surroundings and following it (without self-judgment) will be the task that enables the formation of a strong and sustaining habit of contextually sensitive, spontaneous self-expression. Accepting the context of improvisation as it is and embracing the events that occur during the performance is a crucial approach while improvising (Corbett, 2016, p. 26). The positive influence of this method in helping improvisers get closer to the aforementioned approach in group improvisation was the driving force that made the authors decide to carry out this particular research.

THEORETICAL FRAMEWORKS

The role of imagination in playing musical instruments is so all-encompassing that it is difficult to overestimate its importance (Chang, 2016, p. 37–39). Already in the nineteenth century, Karl Leimer and Walter Giesecking taught in their book *Piano Technique* how to memorize and learn piano pieces mentally, using imagination (Giesecking & Leimer, 1972, p. 11–18). Heinrich Neuhaus, who is one of the most influential piano teachers of all time, writes that a clear artistic vision of the piece learned and performed helps to find proper technical means for exact expression (Neuhaus, 1973, p. 2). It has been studied that the use of mental imagery while performing raises the precision of execution of bodily movements and ergonomic effectiveness (Keller, 2012). One of the leading pianists,

Marc-Andre Hamelin, says in an interview that often the most meaningful discoveries regarding interpretations of musical pieces appear away from the real instrument. While practicing mentally, it is possible to play the piece in the imagination flawlessly, without the restrictions of the physical world (Iverson, 2008). There are plenty of other examples of musicians and instrumental teaching schools that consider the use of imagery as one of the key skills in interpretative professionalism.

The role of conscious imagery has been much less studied in the field of free improvisation. One reason for this could be the intuitive contradiction between conscious imagining and improvising—how could one possess a conscious projection of the ongoing improvisation while the core idea of improvising is to be spontaneous and unplanned? We argue that a conscious, dynamic imagining that can change at any moment, driven by the surrounding environment and the changes in mental processes, does not constitute a preconceived plan. It has more to do with integrating the multimodal resources of the mind into one flow of consciousness.

As this paper researches the use of imagery in the field of free improvisation, it is necessary to create a foundation for a general understanding of free improvisation in this specific context. The research follows the concept of non-idiomatic improvisation created by Derek Bailey, whose main idea is that free improvisation does not need to be restrained by any overarching style or idiom, and improvised music carries its independent value in itself (Bailey, 1992, p. x-x11).

Jaak Sikk's doctoral thesis elaborates on the influence of stimulus-induced mental imagery on the process of improvising freely. In the experiment conducted by Sikk (2020) as part of his doctoral research, short improvised pieces played by pianist-students were studied. Half of the pianists were given a stimulus and were asked to form mental imagery based on the given stim-

ulus before improvising; the other half improvised without previous use of imagery. An expert group assessing the recordings of the improvised pieces gave statistically significantly higher points to the group of pianists who received stimulus prior to improvising (Sikk, 2020). However, the research by Sikk was on solo improvisation, and the sample consisted of pianists only.

Ashley Walton, Michael J. Richardson, and Anthony Chemero have formed a model for analyzing improvised pieces as self-organizational teleodynamic (self-creating and self-sustaining) systems (Chemero, 2014, p. 12-25). According to their concept, an improvised piece is a teleodynamic system that needs specific constraints (instead of entropy) to enable musicians to form a certain structure that constitutes a piece. Both improvisers of the duo are components of this system of constraints, and they need to expend energy and attention to maintain the structure of the piece. Without restraining themselves and their partner, the piece as such would dissolve. Therefore, constraints are necessary for efficient duo improvisation.

Based on the research of Gallagher and Rucińska (concept of strongly embodied imagination), the use of imagination can be a suitable tool for enabling the formation of artistically substantial constraints in group improvisation. If imagination is used with bodily movement, the content of what is imagined is tested out in the surrounding reality as a live stream activity. This helps to match the processes of imagination with the context and thus justify their situation-relevancy (Gallagher, 2021). Gallagher and Rucińska emphasize that if imaginings are coupled through group interaction, the movement and action can be constrained meaningfully. As their research is about any possible performing activity, the same concept is implemented in the field of improvisation.

The hypothesis of the authors is that creating the constraints needed for improvising meaning-

ful musical pieces, particularly in group improvisation, can be enhanced when conscious imagery is used while improvising. We argue that if one duo partner listens to the other partner improvising while actively mentally imagining what they would improvise along with the improvised music heard, a fruitful ground is created for duo playing in a meaningfully constrained way.

Following the concepts of (1) an improvised piece as a teleodynamic system where improvisers are components of that system, which need to dissipate energy to form constraints that constitute an artistic form of an improvised piece, and (2) strongly embodied imagination, which can enhance the skills of improvisers in creating the restrictions needed for that artistic form, the authors designed an experiment to conduct empirical research. The aim of the study was to investigate whether imagination as a tool is helpful in enhancing the duo's capabilities in novice improvisers and, if so, in what way.

METHODS

Design

Eight students (3 male, 5 female, average age 22 years) from the Estonian Academy of Music and Theatre and Heino Eller Tartu Music College participated in the study. Only one student had previous experience with improvisation lessons; the others had used it only occasionally in their private rehearsal time. Three students played violin, two played piano, one played cello, and one sang in the study setting. Among the participants, different mother tongues were represented: Estonian, English, Spanish, and Russian.

Students were paired into four duos, and the duos were divided into two groups (A and B) with different task descriptions. Group A was asked to improvise a short piece together during a three-minute time period measured by

the hourglass. Group B was given the task to engage in creating imaginings to form mutually shared meaningful constraints before improvising a short piece together. At first, one student was asked to play a short musical material, and the other student had to listen to this material and then mentally imagine what they would play along with the improvised music heard. Then the same procedure was repeated by the second player. After playing individually, the duo improvised together during a three-minute time period measured by the hourglass. Instructions were provided in written form in Estonian or English. For improvisation sessions, the same hall was used every time, and the setup of the hall was kept as similar as possible each time. The researchers never met the participants to avoid any unnecessary influences between the researchers and participants. Interaction between the authors and participants took place via emails and Facebook Messenger. Participants were asked to enter and leave the room through different doors to avoid contact with other duos waiting their turn in the lobby.

All the duos from both groups (A and B) met six times over the course of several weeks from November 2022 to June 2023. All sessions were recorded using an iPhone 14 and Huawei P30 Pro. Sound was recorded using a Zoom H2n recorder. Recording devices were visible to participants. After six sessions, all participants filled out a short online questionnaire. According to the study design (four duos × six sessions), 24 audio files and 24 video files were created.

Analysis

In the analysis, the main emphasis was placed on the qualitative research of the pieces. The second author (qualified as a music psychologist) carried out the observational event-based analysis of the video material. Each significant event regarding the ensemble playing of all participants in every

recording was marked, and its psychological significance was described to shed light on the coherence and communication quality in the duo playing. The significant events were summarized, and corresponding conclusions were formed.

The first author (qualified as an improviser) researched every audio recording according to the assessment criteria created within the framework of the Metric project (Modernizing European Higher Music Education through Improvisation). Metric was an Erasmus+ funded project involving more than fifteen European higher music institutions, which collaborated in the field of improvisation (www.metricimpro.eu). One goal of the project was to formulate criteria for assessing improvised performances. The created assessment methodology consists of thirty-one different value criteria, which were used as a basis for thoroughly describing all the audio recordings of the improvised pieces by the author of this study. Additionally, a mark using a 10-point scale was given to each piece in every value criterion.

To obtain supportive quantitative data, a group of international experts ($n = 6$) in the field of improvisation was asked to assess the audio recordings of improvised pieces. Audio recordings were given to the experts in a randomized order, using a randomization algorithm on the site www.random.org. Each expert gave a mark using a 10-point scale to each piece. In total, the number of elements for analysis was 144 marks. As the number of elements was too limited for substantial statistical analysis, the statistical research was carried out to reveal any clear trends using t-tests and ANOVA tests, which could serve as pointers to guide the qualitative analysis process.

RESULTS

Among the participants, almost all evaluated their experience as satisfying; only one participant chose the answer “rather not satisfied.”

The results based on the t-test did not indicate any significant difference in the comparison of the marks of groups A and B, 6.01 ($SD = 2.17$) and 5.69 ($SD = 2.08$); $t(144) = 0.65$, $p > .05$. The t-test results do not confirm any general positive influence of using mental imagery prior to improvising in duos.

The coherence between the marks of the experts was weak. The results of Cohen’s weighted kappa analysis identified only two expert pairs out of fifteen in which the agreement between experts was in the ‘moderate’ category.

Descriptive statistics indicated that the first recordings of the improvised pieces (1, 2) received somewhat lower marks compared to the middle (3, 4) and last recordings (5, 6) (see Table 1). At the same time, no statistically significant difference was revealed between the marks given to the first, middle, and last recordings.

Qualitative psychological analysis of the body language, verbal interaction, and gestures (significant events) of the performers in the video recordings indicates that there was more alignment, mirroring, and eye contact between the duo partners of group B compared to group A. The duos of group A experienced more anxiety, and there was more communicative friction during the performance (this includes arguments between partners, stopping of the piece for making clear statements, and rearranging the improvisation).

Qualitative analysis based on the assessment criteria of the Metric project indicates that duos that used imagery as a tool performed better in the categories “responsive sense of ensemble, listening and interplay,” “awareness of function – solo, leading, background, provocation, silence,”

and “presence and purpose in ensemble.” In the pieces played by group B, there was more stylistic coherence, use of imitation technique, pauses as giving space to the partner, and conscious contrasting through finding one’s own expressive area regarding pitch and dynamic range instead of competing for the same area. At the same time, the overall results of the Metric assessment of the recordings do not identify any significantly better outcome in the improvisations of the duos in group B.

DISCUSSION

The fact that the statistical analysis (t-test) did not indicate statistically significant differences between the marks of groups A and B did not come as a surprise for two reasons. (1) The number of elements analyzed statistically was only 144, and it does not form a sufficient pool for reliable analysis. Also, the main focus was on the qualitative analysis, whereas statistics were used as a supportive measure. (2) Imagery is a complex phenomenon, and when used as a tool, it is adaptable to many different ways of implementation. In this research, imagining was used specifically to influence the aspect of group improvising as an interactively engaging process. Therefore, the authors did not hypothesize that

the general results of group B would be higher than those of group A.

In certain criteria, the improvising duos of group B compared better to group A. According to the conducted qualitative analysis, the duos of group B demonstrated more stylistic coherence, responded to each other more sensitively, had more space for listening to each other, and used more interplay. There were greater musical contrast and awareness of the expressive space chosen. The body language of the improvisers in group B was more mirrored and showed less anxiety and communicative friction compared to group A. This confirms the authors’ hypothesis that conscious imagery used while improvising in duos can enhance the creation of the constraints needed for improvising meaningful musical pieces.

Based on the current research, it can be suggested that while the use of conscious imagining enhances the creation of constraints required for forming improvised pieces, it can also curb creativity and stylistic variety during improvisation. It was evident from the metric assessment-based qualitative research that both partners in both duos of group B found a common stylistic language and remained within a similar musical archetype for all six recordings, whereas there was more variety in the recordings of group A. This could be indicated as one of the side effects

TABLE 1: Descriptive statistics

| | sum | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Valid | 4 | 4 | 4 | 4 | 4 | 4 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 31.750 | 31.000 | 35.250 | 35.500 | 39.750 | 37.500 |
| Std. Deviation | 6.702 | 6.272 | 9.777 | 5.802 | 8.655 | 5.447 |
| Minimum | 25.000 | 24.000 | 26.000 | 31.000 | 27.000 | 30.000 |
| Maximum | 38.000 | 39.000 | 46.000 | 44.000 | 46.000 | 43.000 |

of imagining-based constraints, which still needs further investigation.

Improvising is always based on the structures formed in the past of the improvisers (Mitchell, 2018), and art can be seen as an analogue of the internal world of the improviser put into the “language” of music (Lotman, 1990, p. 9). Therefore, it cannot be expected that the specific way of imagining used in this research would remarkably expand the variety of mental structures carried by the improvisers and would significantly influence the quality of improvised pieces. It can rather be argued that the use of conscious imagining following the current research design (and the method proposed in the introduction of the article) is helpful for forming a certain constrained expressive area for improvisers in which the improvised music is clear, stylistically coherent, and improvisers are at relative ease in self-expression.

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