Jazz vocal sound: A timbre knowledgebase for research and practice

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Background in psychoacoustics
Timbre, the colour or quality of a sound, is differentiated from pitch and loudness. The results of psychoacoustic studies (similarity ratings, multidimensional scaling) have limited practical usefulness. Relatively little research has addressed the large vocabulary of words and phrases used by musicians to describe instrumental and vocal timbre (Bellemare & Traube, 2006; Garnier et al., 2007). Prem and Parncutt (2007; 2008) listed 250 timbre descriptors used by six professional female jazz vocalists during lessons and when describing recordings.

Background in jazz research
Sound is a holistic term that includes timbre, timing, articulation, musical style, and musical context or accompaniment. Research on jazz sound highlights its central importance for the performance and character of jazz. It is difficult to describe sound directly so we often use metaphors. Jazz singers have a large and colourful vocabulary of words to describe sound, including e.g. Mickey Mouse, sexy, laid back, nasty, focused, and open. There is no clear boundary between timbre and other musical parameters in this vocabulary. Sound in jazz singing also depends on corporeality - the human body and the physical environment (Prem and Parncutt, 2008). Jazz singers and teachers use their vocabulary intuitively to achieve interpretive goals; they seem to be unaware of its artistic importance and extent (Prem and Parncutt, 2007). In both jazz and classical singing the vocabulary refers to perceptible acoustic characteristics, mechanisms of sound production, and the singer’s identity and emotional state (Garnier et al., 2007).

Aims
We are creating a knowledgebase of timbre and sound descriptors for both academic and practical purposes. We are focusing on musicians’ perceptions and verbal descriptions of sound, and aim to clarify them from acoustical, physiological and cultural perspectives. By generating tag clouds we are able to rate the similarity of timbre descriptors or listening examples and to represent the vocabulary in a multidimensional space.

Main contribution
Method We are asking 20 professional male and female jazz singers to describe the sound of jazz voices in their own CD collections. We are modelling interview transcriptions and 200 collected musical excerpts (15 seconds each) using a standardised representation format (TEI). The timbre knowledgebase will enable searches for timbre descriptors and musical examples as well as multidimensional scaling of different similarity measures of timbre descriptors in tag clouds.

Results When describing listening examples artists use a much more imaginative vocabulary then teachers. Conversely teachers use a small selection of technical terms (e.g. from Speech Level Singing, Riggs 1992). This difference in personality correlates with the two biggest categories in the vocabulary: emotionality and corporeality. The most important emotions jazz singers want to communicate are sadness, longing and erotic. Corporal descriptors such as open, warm, forward
and relaxed address ideals in jazz singing. An ideal sound is commonly described as natural, spoken and individual. The listening examples mostly represented the role models of a jazz singers, e.g. Ella Fitzgerald and Nat King Cole. Accordingly individuality seems to be desirable but our results show that it is not taught in lessons.

Conclusions
The vocabulary is subdivided in common technical terms and individual associations. The subdivision of the participants in jazz singers that are mainly artists and jazz singing teachers is reflected in the two main categories of the vocabulary: emotionality/imaginativeness and corporality/technical terms. The participants agree on the definition of an ideal jazz singer in terms of preferring the same music and using related timbre descriptors.

Implications
The correlation between status (artist/pedagogue) and vocabulary divides jazzsingers in two groups according to personality. That raises the question of wether being an artist/pedagogue influences the personality or vice versa. The high agreement on the ideals of a jazzsinger, according to the descriptions and the favourite music of the participants represents a standardised ideal of a jazzsinger. Individuality in this context becomes a paradox.

Reference


http://www.tei-c.org/index.xml

Daniela Prem is a doctoral student at the Centre of Systematic Musicology, University of Graz, Austria. Her masters (diploma) thesis in musicology was entitled “The timbre vocabulary of professional female Jazz vocalists”. She has a practical background in jazz singing, choir conduction and theatre pedagogy. In acting as an intermediator she aims to achieve synergies between musical research, pedagogics and arts.

Richard Parncutt is Professor of Systematic Musicology at the University of Graz. His publications address musical structure, music performance, the origins of tonality and of music, and musicological interdisciplinarity. He holds qualifications in music and physics from the University of Melbourne and a PhD from the University of New England, Australia. He is or was a board member of all leading music psychology journals and founding academic editor of the Journal of Interdisciplinary Music Studies.
Exploring methodological issues around the design of music information systems

This paper will consider and explore the significance around choosing methodologies for the development of music information systems, attempting to foreground and make explicit the often implicit: how beliefs and philosophical contexts influence system design through the choice of a methodology. My explorations focus on the interdisciplinary and technology-mediated subject areas of music information systems development, including system design and data structures. However, it highlights issues that are key to many interdisciplinary areas between science and music.

In 1997 Mourad stated that we need a post-modern acceptance of fragmented but self-organising areas of knowledge, in which “particular foundations would emerge in the course of the inquiry rather than be predetermined in the form of discipline-bound theories, methods, and schools of thought.” (Mourad 1997) In 2005 I wrote that I saw music technology “as an interdisciplinary subject, which amongst other interdisciplinary subjects emerging in the last couple of decades (such as neuroscience, biochemistry, and biomedical engineering) could be seen to (...) be still struggling to come to terms with the different methodologies of its own user community” (Boehm, 2005), be that within the development of system, the interdisciplinary research enquiries around music perception or the more pragmatic areas of choosing “REF-able research” in the more practice-based activities of this subject area.

Avison and Fitzgerald have highlighted in 2006 how any methodology is always based on some “philosophical” view, otherwise it is merely a method, like a recipe.” (Avison 1995:10). Too often we ignore this philosophical context. Often the conceptual frameworks exist only implicitly, unmentioned. However, there is a growing acceptance that the explicit making of the surrounding philosophy can only improve our understanding of how we develop research enquiries for specific contexts, including systems development. (see Avison 1995:420) System developments thus always will be based on “a set of rationales and underlying philosophy that supports, justifies and makes coherent such a recommendation for a particular context. “ (Avison 2006:568)

The paper will start exploring these issues with a look at the methodologies of interdisciplinary - as well as mono-disciplinary - research enquiries, the methodological cultures of the relevant disciplines, the differences of knowledge acquisition, knowledge transfer and knowledge presentation between the sciences and the arts - specifically reflecting on music theoretical approaches vs computer science ones - and it will elaborate in this context the debate surrounding the perceived dichotomy between empirical approaches and constructivist ones.

Carola Boehm is Head of Department, Contemporary Arts at Manchester Metropolitan University Cheshire, UK and has held previous positions at the University of Glasgow and Mainz, the Conservatory of Music in Hannover, and the Royal Conservatory of Music in Den Haag. She holds degrees in music, computer science and electrical engineering and has been lecturing and researching in the area of music and music technology for more than 20 years.

References


### Emergent structures in collective free improvisation

Presentation format: talk  
Submitted: 2011-04-15

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#### Background in Musicology

Collective Free Improvisation is conceived as a musical phenomenon produced by at least two persons improvising simultaneously and freely, i.e trying to leave undecided every compositional aspects until the very moment of the performance.

CFI is not deprived of all the automatic behaviours that can generate the improvised musical output on a short-term time scale: embodied patterns and learned gestures are present as much as in other kinds of improvisation. In this regard, free improvisation is not to be confused with an illusory "pure" improvisation, which would account for instantaneous ex nihilo creation.

In return, CFI can be defined as a referent-free improvisation. According to Pressing, a referent is an underlying formal scheme or guiding image specific to a given piece, used by the improviser to facilitate the generation and editing of improvised behaviour on an intermediate time scale. In CFI, as opposed to referent-based improvisation (like straightforward jazz), there is no founding act (like the common choice of a standard) that confers a given set of musical or extra-musical data the status of common knowledge in a group.

#### Background in Physics

Landau equations, as amplitude equations, describe phase transition and pattern forming instabilities. When coupling such equations, one obtains coupled map lattices which can present collective behaviours, typical of complex systems. Here, we use a Landau equation to describe the dynamics of a single musician's signal on a short time scale. We then couple such equations together to model the group of musician, and we vary the coupling on a longer time scale.

#### Aims

We want to model Collective Free Improvisation (CFI) in order to determine if, and under which conditions, a collective structure can emerge from CFI.

In the paradigm of CFI, the musicians’ signal is not constrained by preexisting structures or idioms. Besides improviser’ own creativity and technique, the signal is only bounded by psychological limits: cognitive load and boreness. However, what we call "signal" here is not the real musical signal produced by the musician. Its realistic description would require a huge number of variables. On the contrary, our description of the signal is extremely simplified and does not contain anything about the acoustic representation.

As a direct consequence, our model does not focus on the signal per se but rather on more high-level phenomena. The coupling between the improvisers and the different types of interactions are the core of our model.

One of the main interest of this model is to show the existence of collective sequences. We call collective sequence a time frame during which each improviser maintain a relative musical identity (i.e. his intention stays more or less constant). This is a way to probe and quantify coordination efficiency in the group. If we find a lot of collective sequences, and if collective sequences are long enough, we say that coordination amongst musicians in the group is good.
Main contribution
In CFI, improvisers face two specific problems. First, the generation of improvised musical output on an intermediate time scale is not regulated. The formal unfolding is thus totally undetermined. Second, improvisers' musical coordination is not regulated and free improvisers' simultaneous production is much more difficult to control than in referent-based improvisation. The fact that the way improvisers interact in CFI is not predetermined makes it even harder.

While very simple, our model captures interesting mechanisms of CFI. The model describes two variables: the intention and the objective. Both these variables are used to describe the production and organization of the improvisers' signals.

The intention evolves on a short time scale (order of seconds); on this scale, the generation of improvised behaviour is primarily determined by previous training and embodied patterns, and is not very piece-specific.

The objective evolves on a long time scale (order of minutes) and defines individual sequences as a set of processes and/or a number of features (acoustical, cinetical, musical...) holding for a given duration.

Besides these two main variables, we define other quantities such as information and cognitive load, that have a direct interpretation and makes our model more realistic.

Statistical analysis of our model’s output will provide a finer understanding of the way a collective structure can emerge from CFI. We will thus determine which improvisers’ features lead to more numerous and/or longer collective sequences.

Implications
As CFI is a very interesting case of interaction, where shared information and pre-existing structures are almost nonexistent (each improviser can be described as "agnostic" before the interaction begins), it can be seen as paradigmatic. This model can be useful both in understanding social phenomena requiring effective coordination between agents (coordination problems) and in reinforcing the intuitive link between improvisational disposition and an agent's efficiency inside a complex system.

Besides understanding the musical and cognitive processes in CFI, the model addresses basic issues of collective performance.

References


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**Validity of acoustical pitch evaluations in traditional vocal performance**

Desired format: talk
Submission date: 15 April, 2011

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**Background in music perception**

Significant work has been done in the evaluation of pitch jnds. It was found that pitch jnd is several cents (Hess, 1983; Zwicker & Fastl, 1999, p. 185; etc.). This mostly holds for the best listening conditions, and for the time and pitch ranges characterized by the sharpest perception. Thus, pitch jnd usually is considerably higher, exceeding 10, 20, or even more cents (Parncutt & Cohen, 1995, p. 863). It means that measurement precision of some 10 cents could be considered adequate for a study of pitch phenomena in traditional vocal solo performance characteristic of quite unstable fundamental frequency.

Brief changes of logf₀ contribute to a certain fuzziness of a perceived pitch and make the evaluation of pitch problematic. It was demonstrated, for instance, in experiments of perception of short glides, vibrato, and other contours of logf₀ (d’Alessandro & Castellengo, 1994; Rüütel & Ross, 1985). Ambrazevičius proposed a simplified technique for perceptual pitch evaluation in vocal solo performance in these problematic cases (Ambrazevičius, 2005-2006, p. 67).

**Background in ethnomusicology**

Evaluations of pitch are very important in ethnomusicological research. First, there is abundant evidence of systematic differences between the traditional music scales and twelve-tone equal temperament (regarding Lithuanian cases, see Ambrazevičius 2005-2006 and other papers by the author). Relationships among intonation with sound durations and melodic context were traced (Ambrazevičius, 2008). Different types of folk intonation assigned to different stages of mode development were discussed (e.g., Alexeyev, 1986).

Thus, the techniques of the discussed evaluations should be developed and the sound material to be applied to get reliable results should be specified.
Aims

We aim to verify the presumption that sound duration (IOI) has influence on the precision of pitch evaluation in traditional vocal performance. If this is so, we need to specify the characteristic durations suitable for different tasks of evaluation.

Main contribution

One example of Lithuanian harvest song performed by prominent Lithuanian female folk singer Maret Navickienė has been chosen for the analysis. The recording of the song contained 14 melostrophes featuring complicated semi-free rhythm and abundant ornamentations. Software Praat was applied for the evaluation of IOIs and pitches employing the methods developed earlier (mentioned in the background section). The measurements were carried out by the three authors independently. One of the authors repeated her measurements after a pause of several days. Comparison of the results confirmed the presumptive tendency to evaluate individual long durations more similarly (by the three authors as well as by the author who repeated the experiment); both in IOIs and in pitches. Standard deviations of the pitch evaluations were less than 10 cents starting from app. 450 ms. This means that decisions on individual pitches can be considered valid only for such long sounds (if making no additional time consuming attempts and applying no additional intricate methods of evaluation). However, the decisions on the musical scales averaged across the entire performance can be considered valid when applying the data of significantly shorter sounds. The deviations of pitch (i.e., scale degree) evaluations were shown to be noticeably less than 10 cents (4 to 7 cents) even when all short ornamental sounds were included in the analysis. Some further considerations (e.g., influence of melodic context on the validity of the decisions on musical scale, additional tips for the technique of measurements, etc.) will also be presented.

Implications

The results of the study could function as landmarks for acoustical measurement of recorded vocal performances, especially when there is a large amount of the material to be studied and when time is limited. A comprehensive account of the phenomena of musical performance (its aspects of pitch and time) requires expertise in both the humanities (music analysis, ethnomusicology) and the sciences (music psychology, acoustics, statistics).

References

Rüütel, I., & Ross, J. (1985). *A study of pitch contours and the scale structure in Votic folk*
Biography of Rytis Ambrazevičius

Rytis Ambrazevičius has a degree in physics from Vilnius University and he received his Ph.D. from the Lithuanian Academy of Music and Theatre. He is a Prof. at the Kaunas University of Technology and Assoc. Prof. at the Lithuanian Academy of Music and Theatre. His research interests include music and speech acoustics, ethnomusicology, and music cognition. He has authored or co-authored ca 50 papers and books, and ca 400 entries for the Lithuanian Encyclopedia of Music. Member of ESEM and ESCOM. He is also active as a folk and folkrock musician.

Biography of Robertas Budrys

Robertas Budrys has a degree in musicology from the Lithuanian Academy of Music and Theatre. His research interests include music cognition, especially tonal hierarchies and other features of musical scales that can be studied with the aid of psychological experiments and acoustical analysis.

Biography of Irena Višnevska

Irena Višnevska has a degree in musicology from the Lithuanian Academy of Music and Theatre; she is currently a doctoral student at Institute of Arts, Polish Academy of Sciences. Her research interests include ethnomusicology, especially traditional music of the Polish minority in Lithuania and the study of stylistic features of traditional singing through acoustical analysis. She is also active as a folk singer.
Performance rules in academic and traditional music
Desired format: talk
Submission date: 15 April, 2011

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Background in music perception
Performance rules indicate small systematic deviations of time, pitch/$f_0$, loudness/SPL, etc., applied in musical performance to make it come “alive”, i.e., different from the mechanically precise score. For instance, nomenclature and classification of performance rules has been developed in KTH, Stockholm (Friberg et al, 2006). For the present study, the rules *inégales*, *melodic intonation*, and *high sharp* are the most topical.

Background in ethnomusicology
There is significant number of ethnomusicological studies dealing with acoustical measurements of timing, intonation, and musical scales in traditional musics. As a result of some studies, kinds of direct or indirect performance rules could be envisaged. For instance, Alexeyev (1986) notes “wandering” tones characteristic of a certain stage of mode development. A manifestation of time performance rules is observed or could be extracted from the analysis of Estonian folk music (Ross and Lehiste, 2001). Pitch performance rules are traced in Lithuanian traditional singing (Ambrazevičius & Wiśniewska, 2008).

Aims
We aim to collate examples of rules in Lithuanian traditional and Western academic musical performances and to discuss their similarities and differences.

Main contribution
The sample consisted of 40 recordings of Lithuanian traditional vocal performances, 10 from each of the four main musical dialects. All of them were typical solo performances, presented by accepted representatives of the traditions. Additionally, the data from a previous study (Ambrazevičius & Wiśniewska, 2008) were included. Timing and pitches of the performances (evaluated from log$f_0$ tracks) were obtained with the help of software Praat. Generalization of the results led to the conclusion that manifestations of the rules *inégales*,...
leading tone (a type of melodic intonation), and ascending/descending sequences (probably, a type of high sharp) are common in the Lithuanian traditional singing examined. The findings were compared to the cases of the rules in academic music discovered earlier by other authors. Different versions of inégaless in the traditional singing were registered. Interestingly, the internal division of beat (e.g., LS or SL; different ratios) reveals distinct tendencies in different musical dialects. Therefore, the types of inégaless could serve as differential markers of the traditions. Apparently this is related to the rhythm of the spoken dialects.

The vocal performance intonation rules in one of the musical dialects (Suvalkija) revealed earlier were verified in the present study employing examples from other dialects. Similarly to the case of violin intonation in academic performance (the semitone between leading tone and tonic is narrowed; Fyk, 1994), the corresponding ‘neutral’ second in the traditional singing is also narrowed. Although the intervals differ (minor second / ‘neutral’ second), the tendencies of ‘gravitation’ of the leading tone by the anchor tone are the same in academic and traditional cases. Additionally, slight sharpening is characteristic of ascending sequences, whereas flattening tends to appear in descending sequences of the traditional performances examined; this could have common perceptual roots with the rule high sharp.

Implications

The performance rules (at least for the examined cases) can be considered as universals in music perception. They could help explain certain phenomena in disparate music cultures, as well as contribute to cross-cultural studies.

A comprehensive account of the phenomena of musical performance (its aspects of pitch and time) requires expertise in both the humanities (music analysis, ethnomusicology) and the sciences (music psychology, acoustics, statistics).

References


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**Biography of Irena Višnevská**

Irena Višnevská has a degree in musicology from the Lithuanian Academy of Music and Theatre; she is currently a doctoral student at Institute of Arts, Polish Academy of Sciences. Her research interests include ethnomusicology, especially traditional music of the Polish minority in Lithuania and the study of stylistic features of traditional singing through acoustical analysis. She is also active as a folk singer.
El Sistema: Development Beyond the Orchestra

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Background in Cognitive Development and Psychology
In order to establish an understanding of a child’s development, it has become customary to make observations and gain multiple perspectives. When operating in an educational setting, teachers, parents, administrators and the students all have a voice to contribute in the description of the child. Currently, self-regulation skills, motivation, peer-respect and responsibility have come into the focus of researchers. These are the skills and behaviors that are of interest and markers for cognitive, emotional and social development beyond academic achievement.

Background in Music Pedagogy and Performance
Rooted in Venezuela, El Sistema is a visionary global movement that since 1975 has transformed the lives of hundreds of thousands of youth through music. The Conservatory Lab Charter School reinvented and invigorated its curriculum in September 2010 when it adopted the El Sistema music program. The pedagogical focus of El Sistema is the orchestra, a model for an ideal community. By advancing the social and performance skills needed to participate in an orchestra, students are empowered by their personal and musical development.

Aims
The aims of this project include collecting and interpreting perceptions of social and behavioral changes in Conservatory Lab Charter School students, through qualitative measurements and quantitative musical performance assessments in order to provide a holistic view of the potential positive influence of El Sistema.

Main Contributions
Questionnaire surveys were developed and administered to each group of the school community to address the research questions outlined above. The questionnaire asked respondents to discuss the changes in student behavior they had observed over the course of the year specifically focusing on the developmental skills of self-regulation, motivation, peer-respect and responsibility. In addition to collecting survey data from school administrators, classroom teachers, El Sistema music teachers and parents, students in the upper grades were interviewed about their experience and perception of performing in and learning through the El Sistema program. Additionally, a music performance skills and literacy test developed by Dr. Larry Scripp was administered to all students and the assessed results were joined with the
perceptions of the school community.

In our observations, the El Sistema curriculum has been perceived as a positive influence on the students’ social and behavioral development at Conservatory Lab. The surveyed populations converge on the idea that the social learning experience provided by performing in orchestra scaffolds students in their development. By learning and performing together students are given an opportunity for valuable social interactions, enabling them to engage in collaborative learning, as well as propel their musical knowledge.

Implications
Our data from the music literacy tests suggests that learning to achieve a high level of musical performance can impact classroom learning. Also, it has been reported that participating in orchestra has positively affected the students behavioral and performance skills. Since the music literacy test assesses critical thinking and problem solving skills in addition to musical ability, in the future we can determine if the results relate to performance in other academic areas, such as literacy and mathematics. As the students at CLCS continue to excel in their performance skills the curriculum will produce better musicians, better students and better members of society.

Through further academic assessment, we can determine the El Sistema curriculum’s impact outside of the music classroom. Potential cross cultural applications of our assessments at other El Sistema programs would create a global understanding of the positive influences through the orchestra into the classroom.

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brain plasticity. Music Perception, 26 (3).


**Biography of Katherine L. Campe**

Katherine is currently completing her Master's in Mind, Brain, and Education at Harvard’s Graduate School of Education. While at Harvard, working at the Conservatory Lab Charter School, and the Music and Neuro-Imaging Lab at Beth Israel Deaconess Medical Center, has allowed her to focus her research on children’s cognitive development and music. She has presented her research at various conferences including ICMP 11. Previously, Katherine received her M.M. in Theory from the University of Cincinnati-College Conservatory of Music, and a B.M. in Music Education and Voice from Westminster Choir College.

**Biography of Brian L. Kaufman**

Brian Kaufman currently works as a resident artist in the El Sistema program at Conservatory Lab. There he has assisted in developing the curriculum, lead ensembles, taught music literacy, and implemented a school wide music literacy assessment. Additionally, he is the artistic director of the Sounding Board, an organization that addresses social issues through music, and serves as a mentor for From The Top’s (NPR) Center for the Development of Arts Leaders. Brian holds degrees from New England Conservatory (M.M. Conducting), the University of Maryland (M.M. Performance), and the University of Michigan (B.M. Performance and Music Education).
Sound identities of jazz performers: can listeners distinguish between different players?

Helen F Mitchell, Sydney Conservatorium of Music, University of Sydney

Raymond AR MacDonald, Department of Psychology, Glasgow Caledonian University

Background in Music Performance

Listening to music performers is an everyday occurrence for musicians, music pedagogues, music critics and indeed for every music listener. As musicians, we take for granted that we can distinguish between instruments, and also readily discriminate between performers playing the same instrument. There is an implicit assumption that musicians can identify individual performers by their sound alone. Yet little is known about listeners’ mental representation of an individual’s sound quality as they use a limited selection of descriptors to communicate sound.

Background in [discipline B]

Verbal overshadowing (VO) can occur when we use words to describe sensory experiences (such as seeing, tasting or hearing). The verbal description, or verbal encoding, impairs later recall of the sensory experience and individuals are less able to identify the original from a line-up of similar stimuli. The VO effect has been most apparent in face recognition, where witnesses to crimes have to describe the perpetrator of a robbery in detail, and later select their face from a photographic line-up. The act of verbal description distorts later recall of the original memory.

Background in [discipline C] (if appropriate)

Aims

This study will investigate musicians intuitively assess individual performers’ sound. The aim of the study is to assess musicians’ ability to recognise individual performers by their sound and to examine the impact of VO on listeners’ recognition of performers.

Main contribution

Tenor saxophonists (n=5) performed jazz standard *Blue Bossa* in a sound-treated studio. Listeners (n=40) each attended a single listening session where they heard one of the five players and were informed that the purpose of the study was to investigate the effect of visual and verbal
tasks on the ability to recognise aural stimuli. Listener participants were assigned to either a verbal description group or a non-description control group. All listeners heard a short sample of a single saxophonist performing 15s of *Blue Bossa*. Listeners were then asked to perform a filler-task for 5 minutes. In the following five minutes, the verbal description group were asked to write a detailed description of the saxophonist they heard while the control group completed a word puzzle. Finally, both groups were presented with the five saxophonists playing a repeat of the phrase and asked to identify the original player they heard and to rate their confidence in their response.

A binary logistic regression will see if verbal overshadowing predicted line-up identification success. If there results are comparable to the significant body of work published in VO research (e.g. face recognition), we would expect those participants in the verbal description groups to score significantly lower in correctly identifying the singing voices. Additionally, the analysis will explore the confidence ratings and verbal descriptions to key words and phrases used by the judges who successfully identified or misidentified the target player.

**Implications**

The results will be discussed with reference to how auditory experts, such as musicians, intuitively assess individual performers’ sound. This study will challenge preconceived ideas of how we listen to music performers and contribute to the growing body of knowledge investigating the way listeners perceive, rate and describe music performances. The results will be contextualised within wider issues of music perception and communication. Directions for future research, incorporating educational and performance implications of verbal overshadowing effects, will also presented.

**References**


**Biography of Contributor A**

Lecturer in Music at Sydney Conservatorium of Music. Originally from Scotland, Helen graduated from the University of Oxford with an Honours degree in music in 2000. After winning the Northcote Graduate Scholarship, she moved to Australia in 2001 to undertake doctoral studies at the University of Sydney. She completed her PhD in 2004 and subsequently won an Australian Postdoctoral Fellowship at Sydney Conservatorium of Music (SCM) as part of a collaborative project on singing voice quality and training. Her research focuses on music perception, performance and pedagogy. She is currently Editor of *Australian Voice*. 

[Contact Information]
<table>
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<th>Biography of Contributor B</th>
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<tr>
<td>Professor of Music Psychology and Improvisation at Glasgow Caledonian University. After completing his PhD at the University of Glasgow, investigating therapeutic applications of music, he worked as Artistic Director for music company, Sounds of Progress, specialising in working with people who have special needs. He has published over 50 papers in peer reviewed journals on topics relating to improvisation, musical communication, music therapy, music education and musical identities. He has co-edited two texts, Musical Identities (2002) and Musical Communication (2005) and is working on two new texts Musical Imaginations and Music Health and Wellbeing. He is Editor of the journal Psychology of Music and Associate Editor for The International Journal of Music Education, Jazz Research Journal and Research Studies in Music Education. As a saxophonist and composer his work can be heard on over 40 CDs and he has toured and broadcast in Europe, Australia, Japan and North America. <a href="mailto:raymond.macdonald@gcal.ac.uk">raymond.macdonald@gcal.ac.uk</a></td>
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| Additional Biographies (if appropriate) |
First Author (with institutional affiliation, if appropriate)
Katy Hamilton, Royal College of Music

Second Author (with institutional affiliation, if appropriate)
Dr Natasha Loges, Royal College of Music

Background in [discipline A]
Musicology/performance

Background in [discipline B]
Musicology/performance

Aims
Contemporary concert practice is dominated by only a handful of familiar and closely-defined musical genres, whose practical execution is facilitated by well-established, pre-existing instrumental and vocal forces (symphony orchestras, choirs, string quartets, soloists). This narrow range does not reflect the large number of different types of composition which have flourished in past centuries. In the case of nineteenth-century vocal repertoire, this manifests as an almost exclusive focus upon choral works and lyrical solo song recitals. Drawing on interviews with teaching staff and student at the Royal College of Music, this paper will explore a range of issues surrounding this ‘narrowing’ of the repertoire, including

(i) the practical considerations of performing repertoire requiring unusual forces or performance styles
(ii) the unspoken limitations imposed upon practitioners when they are confronted by non-traditional genres
(iii) the cross-disciplinary implications such as the different ways in which vocal music can relate to its root text

The genres which fall into these categories include small-scale vocal ensemble repertoire, narrative genres such as melodrama and compositions for a variety of instrumental and vocal forces which are yet to be categorized. Specific works to be considered include Schubert’s melodramas for piano and spoken voice, Schumann’s Szenen aus Goethes ‘Faust’, Brahms’s vocal quartet O schöne Nacht and also his narrative cycle Romanzen aus Tiecks ‘Magelone’.

Main contribution
A co-delivered spoken paper with recorded illustrations.

Implications
This presentation has two types of implication. The first is that the practitioners with whom we conduct our research (primarily vocal teachers/coaches) will be encouraged to examine their teaching practice and re-evaluate how they select repertoire for their students. By drawing attention to the unspoken limitations we impose on ourselves when we programme repertoire, we also hope to encourage a more open attitude to programming.

References

Biography of Contributor A
Katy Hamilton is in her final year of doctoral study at the Royal College of Music, and also holds the post of Junior Fellow in Performance Documentation in association with the RCM’s Centre for Performance History. Her doctorate focuses on the vocal quartets of Johannes Brahms, and combines practical and theoretical approaches to the repertoire, including the production of recordings of music by some of Brahms’s lesser-known contemporaries. She gained a first class degree in Music, specializing in piano performance, from the University of Nottingham, where she also completed her MA in Musicology with distinction in December 2005.

In addition, she is an active chamber accompanist and repetiteur, having worked with instrumentalists, singers and choirs in England, Ireland, Spain and Germany. She is acting as Graham Johnson’s research assistant for his forthcoming Schubert Song Encyclopaedia for Yale University Press; and is also the Course Organiser of ISSMUS, a specialist summer school for singers, composers, conductors and pianists.

Biography of Contributor B
Natasha Loges is Deputy Head of Undergraduate Programmes at the Royal College of Music. She gained her BMus in piano performance at the Guildhall School of Music & Drama, and her MMus at King’s College, London. She completed her doctoral thesis at the Royal Academy of Music, entitled Text and Context in Brahms’s Lieder. Natasha has also worked as a song accompanist, and has performed in various venues overseas and in the UK including St John’s, Smith Square and the Holywell Music Rooms, Oxford; she has also broadcast live for BBC Radio 3.

MUSICAL ASPECTS OF THE REPRESENTATION OF
WHIRLING DERVISH RITUALS AS PUBLIC PERFORMANCES

March 31th, 2011

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Desired presentation format: Talk

BACKGROUND IN PERFORMANCE and MUSIC THEORY

Considering the Whirling Dervish Rituals, as the worship of the Mevlevi Order of Sufism, music can be stated as one of the main contents of the ritual. The music accompanying to the rituals is actually a form in Makam music, which is called Ayin-i Şerif, consisting of a specific set of theoretical rules in tonality, rhythmic structure and melodic contour. The lyrical content of Mevlevi music is based on the writings and speeches of the Mevlana that were codified by his son Sultan Veled and his followers.

During the Ottoman Empire, Mevlevihanes had been the most crucial place where Turkish-Ottoman Art music had been performed and composed, as well as the most important composers of Turkish-Ottoman Art music tradition were dervishes from Mevlevi Order. The ritual has its roots in 13th century and the repertoire that had been performing in those had transmitted to subsequent generations through oral tradition. The earliest datable Mevlevi Ayini is attributed to Mustafa Dede, a Mevlevi dervish and a musician of the 18th century. Since then, the compositional aspects of Ayin-i Şerif had transmitted to recent times with few changes.

In 1925, all Sufi sects were banned by the Turkish government. Şimşekler stated that after the ban, the first ceremony organized in 1943 in Konya with an integrated conference of Prof. Dr. Nafiz Uzluk (2003: 26). From then on, the rituals were only allowed to be performed in government control.

BACKGROUND IN ETHNOMUSICOLGY

Recently the representation of Whirling Dervish Rituals as an indication of cultural heritage or tourist attractions are among the issues that need to be considered in the means of embracing the musical and spiritual values of Mevlevi culture. This situation has its roots from the attempts stated on the early days of Turkish Republic, with the aim of maintaining a secular state. Nowadays, Whirling Dervish Ceremonies are being performed even in the bars, restaurants, or wedding ceremonies and there is a vast amount of examples of such commercially oriented shows.
The commodification of cultural and spiritual traditions into products and the representation of rituals in the form of public performances has become one of the concerns in the field of ethnomusicology as it is in the anthropology and ethnology. World music market can be mentioned as one of the industries highly influenced by this process, especially in the cases of ritual concept strongly affiliated with the accompanying music. There are albums recorded and promoted with a title of ‘Mevlevi Music’ for the New Age music industry, that only including electronic sampling and nay; with no connections with the actual definitions of the music tradition itself.

AIMS

This paper concentrates on the musical aspects of the representation of Whirling Dervish Rituals as public performances. By making comparisons between the music tradition of Mevlevi Order from the manuscripts and the performances in public shows; how the tradition is being reflected is among the main attempts.

MAIN CONTRIBUTION

In Whirling Dervish Ceremonies that are performed as tourist attractions, there are numerous cases that do not follow the musical aspects and the ritualistic rules of an actual ritual. Those can be attributed as mimesis of a spiritual tradition. Through an extensive fieldwork conducted in ceremonies performed in bars, restaurants and hotels and its comparison with the repertoire founded in manuscripts; it has been concluded that the commodification process resulted in pseudo reflections of Mevlevi music.

IMPLICATIONS

As follows:

1. Mimesis of the real ceremony, that imitates the main rules of the ritual, with the process of commodification turns into a show.

2. In the case of Turkish Art Music or the fusion of nay and electronic sampling promoted as Mevlevi Music, the spiritual values of Mevlevi culture becomes a base for meanings attributed to the music positioned in the world music market with spiritual content.

3. In touristic performances, it is observed that instead of performing the whole Ayin-i Şerif which is approximately 1 hour long, the sections of it have combined to accompany the whirling show.

4. In such performances, usually Mevlevi Ayini in Nihavend, Buselik, Rast and Segah makams have been performing, because those create proximity with European art music tonal system.

REFERENCES


Şehvar Beşiroğlu is a professor of music, specialized in Ottoman-Turkish art music. She is a Kanun and Çeng (Turkish Harp) player. She conducted her BA studies in Kanun in ITU Turkish State Music Conservatory; MA and DMA degrees in Turkish Music program at ITU; Post-Doctoral studies in Ottoman History and Music at Harvard University. She performed in numerous projects such as Eurasia Ensemble, The Cantemir Ensemble, Hattusha Ensemble. Since 1986 she has been teaching Kanun Performance, Makam Theory, Systematic Musicology, Organology, Ethnomusicology, Ottoman-Turkish Music, Music in Turkey, Music and Gender, Music in Mediterranean Cultures at the ITU State Conservatory of Turkish Music and ITU MIAM.

Yaprak Melike Uyar is a research assistant and lecturer at the department of Musicology of ITU Turkish Music State Conservatory. She is also a music critic and radio programmer. She is recently conducting her PhD studies in musicology at ITU, where she completed a MA degree in ethnomusicology. She teaches History of Popular Music and Jazz Appreciation for non-music majors and music undergraduates at ITU.
Title: **Musical and social communication in expert orchestral performance**

Submission date: 20/4/2011

Desired presentation format: talk

First Author (with institutional affiliation, if appropriate)

Melissa Dobson, Guildhall School of Music & Drama [Melissa.dobson@gsmd.ac.uk](mailto:Melissa.dobson@gsmd.ac.uk) / 07799 410281

Second Author (with institutional affiliation, if appropriate)

Helena Gaunt, Guildhall School of Music & Drama

Additional Authors (if appropriate) (with institutional affiliations, if appropriate)

n/a

Background in music psychology

Previous studies devoting attention to orchestral musicians have predominantly used survey methods to measure stress and/or work satisfaction (e.g. Parasuraman & Purohit, 2000); studies have seldom used in-depth interviews to ask orchestral musicians to reflect on their own practice, despite a lack of knowledge about classical musicians’ working lives (Bennett, 2008). Recent work has considered orchestral musicians’ motivations, career aspirations, and performance experiences (Brodsky, 2006), but has neglected to elicit musicians’ perceptions of the processes involved in expert orchestral performance.
Background in music education

There is growing evidence that professional musicians require a range of skills (musical and extra-musical) in order to successfully negotiate the transition from higher education to the music profession. Recent studies have particularly highlighted the importance of interpersonal and communication skills (e.g. Creech et al., 2008; MacNamara et al., 2008), with calls for conservatoire training to become better aligned with the demands imposed by professional work.

Aims

This research aims to investigate performers’ experiences of working in a major London orchestra, focusing in particular on the skills and qualities they feel are required, and on how they negotiate challenges and sustain their careers. By focusing on the skills and qualities required for expert orchestral performance, this research seeks to produce findings which can inform the training of music performance students.

Main contribution

Semi-structured interviews were undertaken with 20 members of a major London orchestra. The participants were recruited to represent a range of instruments, positions in the orchestra (i.e. principal players, those with a numbered seat, and rank and file players), ages, and length of time working in the orchestra. The interview schedule covered motivations for becoming an orchestral musician, the skills and qualities required for their work, strategies for maintaining their career, and aspects of work that they find particularly challenging and satisfying. The interviews were analysed thematically using a grounded theory approach.

Outstanding instrumental technique was viewed by the participants as a prerequisite for expert orchestral performance. More significantly, however, they emphasised a set of skills which they considered vital for achieving excellence in the orchestral context, encompassing listening to, communicating with, and adapting to those around them at all times during rehearsal and performance. In a context where high technical facility was assumed as a basic requirement, listening and then adapting was seen as a primary skill, and one which players often felt they had developed during their careers. This aspect of their work provided them with motivation, with fresh challenges at each performance, even when playing repertoire they know well; additionally, the cooperation and teamwork exemplified by this process was a major source of work satisfaction. Because orchestral performance is a group endeavour, strong social and interpersonal skills were also cited as important for orchestral work, with participants stressing the significance of maintaining good social relationships with colleagues in order to foster a conducive environment to achieving excellence on stage.
Implications

This research has produced preliminary findings on ensemble communication in orchestral performance on which further, more detailed, work can be based. The findings suggest that conservatoire training could more effectively equip students for music performance work by devoting greater attention to ensemble performance, collaborative work, and the development of interpersonal skills, and to exploring the relationship between these and the development of a strong artistic voice.

References


Biography of Contributor A

Melissa Dobson is a post-doctoral Research Assistant at the Guildhall School of Music & Drama, where she is working on projects on the themes of orchestral musicians in the twenty-first century and understanding audiences. She received her PhD from the University of Sheffield in 2010, with a thesis investigating audience experience and enjoyment of classical music concert attendance. Her research interests lie broadly in the social psychology of music, with a particular focus on audience and performer perspectives on live music-making.

Biography of Contributor B

Helena Gaunt is Assistant Principal (Research and Academic Development) at the Guildhall School of Music & Drama. Her current research focuses on one-to-one and small group tuition in conservatoires, orchestral musicians in the twenty-first century, the role of improvisation (verbal and musical) in developing professional expertise, and on the motivation and aspirations of
students in conservatoires. Alongside research, she is a professional oboist. From 2007-10 Helena chaired the Research group of the Polifonia project for the Association of European Conservatoires (AEC); she is also on the Partners Board of the London Centre for Arts and Cultural Exchange (LCACE).

Additional Biographies (if appropriate)

n/a
Title: Exploring the perceptual effects of performers’ interpretations

Submission Date: 22/04/11
Desired Presentation Format: Talk

First Author
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Hubert Eiholzer, Conservatorio della Svizzera Italiana

Background in Performance Analysis and Perception
Empirical studies of performance attributes such as tempo variations, dynamics (Palmer, Repp 1997, 1999) and even physical gestures (Wanderley) posit that structural emphases can be measured from these aural and visual streams. Recording continuous perceptual responses from audience judges on tasks such as shaping perceived phrasing and tension (Vines) provides insight into the communicative function of these performances and allows the exploration of relationships between performance parameters and their “communicative” outcomes.

Background in Philosophy
To perform a piece of music is to present and portray the patterns of that piece of music (Walton). Also, to hear and understand a piece of music is said to hear the performance as sound patterns under certain descriptions (e.g. Kivy, Scruton). The nature and extent to which performers may actually articulate such patterns is unclear. Empirical studies in this field may help clarify questions such as the artistic value of the performer’s contribution in performing a musical work and the comparability of different performances (performative interpretations) of the same piece. Also, it may help shed light on the audience’s attitude towards performances and the idea that audiences attribute patterning intentions to the performer when valuing his or her performance.

Aims
Proceeding from results that audiences can detect phrasing structures accurately (Vines, MacRitchie et al.), it is interesting to view the extent and limits of these communications. This study aims to examine whether a performer’s unique interpretation can be conveyed to the point where it changes how the listener “hears” a piece, extending the work of (Spiro). Compositions which provide several interpretative avenues for performers are used.

Main contribution
Method: In a preliminary pilot study of this question, three performances each of Chopin’s B Flat minor sonata finale, and Chopin’s Prelude in E minor are played aurally to audience judges, all who have a high level of musical training. These judges are asked to continuously indicate phrasing using a slider. This study examines the effects across participants for the one performer and also across performances and how these relate to measured aural features such as tempo and dynamics.

Results: Results from the one performance across all participants show a range of responses indicating that there is not an ‘agreed’ interpretation across judges. However, these responses change slightly across performances of the same piece. Overall tempo appears to effect the rate of phrasing boundary responses in the finale, however, this does not translate across to
performances of the prelude.

**Conclusions**: This study would benefit from further musical examples and a larger range of participants as is planned, however, these preliminary results show that despite that the act of listening to music can be personal and dependent on a number of a priori factors, different interpretations can have an effect on how we hear phrasing.

**Implications**

Implications are evident in performance pedagogy; being able to understand the effect performers can have on audiences, how audiences respond in comparing performances and potentially redefining the role and artistic value of performers in music making.

**References**


**Biography: Jennifer MacRitchie**

Jennifer MacRitchie is a postdoctoral researcher in performance science at the Conservatorio della Svizzera Italiana, Lugano, Switzerland. Her main fields of research lie in performance analysis, the connection between movement and sound and the consequent effects of these in the perception of musical features. She gained her PhD at the Music and Science Research Group, Glasgow University (2011) and an M.Eng in Electronics with Music, Glasgow University (2006). Jennifer also performs regularly on both piano and viola.

Email: jennifer.macritchie@conservatorio.ch

**Biography: Hubert Eiholzer**
Hubert Eiholzer is vice director and head of the research department of the university school of music at the Conservatorio della Svizzera Italiana, Lugano, Switzerland. In the past ten years of working at this institution, he has been essential in the school’s transformation to a university school and has created, among other things, the research department focusing on research in music directed at musical production, performance and teaching. He has taught courses in music history, music theory and music philosophy, supervised students’ BA and MA dissertations and has been involved in a variety of ways in the department’s research projects. He has a licencees lettres (1983, philosophy) and diploma in instrumental music teaching (1984, piano) and a doctorate in philosophy (1994, music aesthetics). Email: hubert.eiholzer@conservatorio.ch
Title: Improvisation and the use of interactive systems in musicology

First Author
Marcelo Gimenes: Núcleo Interdisciplinar de Comunicação Sonora (Campinas State University, Brazil)

Second Author
Antônio Rafael Carvalho dos Santos: Instituto de Artes (Campinas State University, Brazil)

Background in Artificial Intelligence
Artificial Intelligence systems involve numerous fields (e.g., Psychology, Music) and methods (e.g., rule-based, grammar-based, and machine-learning systems) in order to reproduce human intelligence. There are today some systems that can learn to simulate musical styles (Cope 1991) or interact with human performers in real-time (Rowe 1993; Pachet 2003; Assayag, Bloch et al. 2006). These systems, however, do not address the study of the emergence and development of musical styles.

Background in Musicology
As an unusual form of expertise (Johnson-Laird 1991), improvisation is, according to a traditional definition, the spontaneous creative process of making music while it is being performed. In music education students are usually encouraged to listen to other musicians (performers and composers) as to derive rules concerning interpretation and to learn improvisation. This experience allows the identification of certain structures and regularities and students naturally start to induce the laws that govern them (Meyer 1989; Gimenes 2008). As a consequence, after being exposed to certain musical styles, students' improvisation start to show some of the elements of these styles. An interesting musicological investigation is precisely to identify connections amongst different improvisational styles and previous learning stages.

Aims
In our research we want use the improvisation experience to tackle the issue of how different musical influences can lead to particular musical worldviews (styles). A musical worldview is a two-way route that connects individuals with their musical environment. Through their worldview people are connected to the world, absorbing and exercising influence.

Main contribution
In our research we use a new computer system, the Interactive Musical Environments (iMe) to investigate the emergence and development of particular musical styles in artificial worlds. To achieve this objective, the system architecture is inspired in various aspects of the human perceptive and cognitive abilities. Modelling these abilities plays an important role in iMe, as we believe that the way in which music is perceived and organized in our memory has direct connections with the music we make and appreciate.

The iMe system simulates an environment where intelligent agents interact with each other as well as with the real world (human musicians) by performing musical tasks (e.g. performance,
improvisation). The more agents are exposed to certain types of elements, the more these elements get meaningful representations in their memory. The result of this exposure and interaction is that their memory is constantly changing, with new elements being added and old elements being forgotten. Experiments with Brazilian popular music (e.g. works by Chiquinha Gonzaga and Ernetso Nazareth) have been able to demonstrate the transmission of musical structures between artificial agents and between an agent and a human performer (Gimenes 2008).

**Implications**

This project is highly interdisciplinary in nature, and involves numerous subjects from areas such as music performance, music cognition and computer science. Interactive musical systems have already demonstrated to be extremely helpful in areas such as the investigation of music performance. iMe has an additional concern, the study of processes of musical influence and how musical styles are originated and developed.

Besides the study of the development of musical styles in artificial worlds, we are conducting experiments with human subjects in order to assess iMe's effectiveness to evaluate musical influences in inter-human interaction. The study of creativity and interactive music in artificial and real worlds could benefit with a number of iMe's features, which are currently being evaluated.

**References**


**Biography of Marcelo Gimenes**

**Current position:** Researcher at Núcleo Interdisciplinar de Comunicação Sonora (NICS/Unicamp), Visiting Lecturer at the Campinas State University (Unicamp)

**Main field of research:** Interactive musical systems

**Main research areas:** Artificial intelligence and music, music cognition, music evolution

**Relevant qualifications:** PhD in Computer Music (University of Plymouth, 2008), Master in Arts (Campinas State University, 2003)

**Contact:** http://www.computermusiclab.com/  mgimenes@gmail.com

**Biography of Antônio Rafael Carvalho dos Santos**

**Current position:** Professor of Popular Music at the Campinas State University (Unicamp)
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<th><strong>Main field of research:</strong></th>
<th>Piano performance</th>
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<tr>
<td><strong>Main research areas:</strong></td>
<td>Brazilian popular music, instrumental music, song, musical arrangement, popular music and improvisation</td>
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| **Relevant qualifications:** | Bachelor in Music (Mozarteum University of São Paulo, 1986)  
DMA in Piano Performance And Pedagogy (University of Iowa, 1997) |
| **Contact:**              | rdsantos@unicamp.br |
Title: Repetition and Identity.

Aims
The aim of this paper is to address the seeming disjunction between, on the one hand, music as understood by some contemporary practitioners and, on the other, certain philosophical ontologies of music. Through an exploration of musical repetition, the notion of the musical ‘object’ that is prevalent in philosophical ontology will come into question, as will the underlying presumption that music is identically repeatable. The electroacoustic composition Drift by Simon Waters will be used to elucidate this: through an analysis of its structure, it will be suggested that music is best considered as a process rather than an object, and that it is therefore inherently non-identical in nature.

Main contribution
Within certain strains of contemporary musical thought, there has been a shift away from the idea that music is a system of objects consisting of ‘works’ towards a focus on music as a practice, as an activity or social process. Herein, music is a process that occurs in and through time, and is therefore non-identical. This approach conflicts with contemporary philosophical ontologies of music: literal repetition is
implicitly assumed within the prevailing static ‘type’/‘token’ distinction, since identical repetition underlies questions about the musical work and its realization in performance. Here, ‘universal’ musical forms or ‘works’ are materialized in performance through certain identically repeatable structural features, such as form or tonal configurations. In short, this paper aims to show the shortcomings of ontologies that abstract from music as practice, since these contradict the phenomenology of music experience.

**Implications**

This paper will suggest that increased dialogue between philosophers of music and practicing musicians might contribute to a less reductive and object-privileging view of the subject of study on the part of the former, and a greater rigour in the presentation of the argument for music as practice by the latter.

**References**


**Biography of First Author**

**Simon Waters** is Director of the Electroacoustic Music Studios of the University of East Anglia, Norwich, where he is also a Senior Lecturer. Having studied composition with Nigel Osborne at Nottingham University and Electroacoustic Composition with Denis Smalley, he established a career writing electroacoustic music for contemporary dance and physical theatre in the 1980s, writing for Rambert Dance Co, Moving Being and Adventures in Motion Pictures, amongst others. Since the 1990s, his work has moved away from fixed-media and his most recent works explore different aspects of live music’s technologised status.

**Biography of Second Author**

**Férdia Stone-Davis** holds a doctorate from the University of Cambridge and a Masters in music performance from Trinity College of Music, London. As well as being an accomplished performer of both baroque and contemporary recorder repertoire, she is an inter-disciplinary academic working in the fields of music, philosophy and theology. Her recent book is *Musical Beauty: Negotiating the Boundary between Subject and Object* (Cascade, Wipf and Stock, 2011).
The E-Drum
A Case Study for Machine Learning in New Musical Controllers

Adam R. Tindale and George Tzanetakis
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A submission for a talk and paper in the proceedings
Submission Date: April 29, 2011

Abstract
This paper describes a system of drum gesture acquisition via machine learning methodologies. Discussions of techniques, advantages, and previous work are discussed in the context of evaluating a new controller for musical expression. An evaluation of the machine learning mechanism is provided in the form of statistical results of classification tests. An informal evaluation of the effectiveness of the system for percussionists is provided in the form of performance reports of the first author’s use of the system.

1 Background in Music Performance

The rate of advance in Music Technology has increased enormously, yet commercial electronic percussion has been stagnant for approximately 20 years. There is not even an entry for it in the standard book Percussion Instruments and their Histories Blades (1997). Commercial electronic percussion hardware has not improved and the sounds have only evolved to imitate sounds that have already become popular. Current percussion controllers only provide data on the velocity of the impact, forcing a single dimension of data to represent something as complex as musical gestures.
Figure 1: A diagram of the signal flow in the E-Drum software.

2 Background in Computer Science

Rebecca Fiebrink has presented numerous works on integrating machine learning into the live performance context Fiebrink et al. (2008); Wang et al. (2008). Fiebrink’s system incorporates a machine learning framework with a real-time Open Sound Control interface in order to allow an agnostic system towards feature extraction systems.

Roberto Aimi received his Ph.D. from the MIT media lab where he focused on developing novel percussion interfaces Aimi (2007). Aimi’s convdrum uses piezo microphone that is attached to a drum and fed into a computer where a convolution algorithm is applied to the signal. Convolution offers many advantages as a synthesis method. When one uses a high quality sample of an acoustic instrument then the it is possible to get a high quality reproduction of the acoustic instrument.

3 Aims

The E-Drum utilizes the concept of an acoustically driven physical model as the primary form of sound generation. Typically physical models are driven by synthetic excitations. By modifying the algorithms to accept audio input acoustically excited physical models are created. This model allows for the use of brushes and scraping gestures that standard drum controllers are not able to capture. See figure 1 for the general software overview of the E-Drum.
4 Main Contribution

The E-Drum software provides two methods of recognizing gestures: implicit and explicit position tracking. Explicit position tracking is achieved using machine learning to determine the timbre produced by a drum controller and then infer position based on labeled training data. The explicit position tracking can be tailored to a specific application by using different classification algorithms outlined in this chapter. Implicit position tracking is achieved by using the acoustic signal of a drum controller to allow the listener to hear to timbral variations that naturally occur when the controller is struck at different locations. The accuracy of these systems is sufficient for performance, as will be demonstrated in the following chapter.

5 Implications

The E-Drum has been used in a number of performances. In these environments there is no tolerance for noise or failure. During years of performance experience the E-Drum has proven to be a reliable concert instrument. The flexibility of the instrument is illustrated by the ability to improvise in a number of musical situations.

The Electron Orchestra Withdrawal is an exploration in expanding the prototypical rock ensemble: guitar, bass, drums, and vocals. The group consists of Clinker (aka Gary James Joynes) on bass and electronics, Les Robot on Guitar, Jackson 2Bears on turntables and electronics, and the primary author on E-Drum. The group is able to explore electronic music, rock music, ambient and metered structures through improvisation.

References


Figure 2: Performing with E-Drumset and the Electron Orchestra Withdrawal.
6 Biographies

Adam R. Tindale

Adam Tindale is an electronic drummer and digital instrument designer. He is a Permanent Instructor of Interaction Design in the Media Arts and Digital Technologies department at the Alberta College of Art and Design. Adam performs on his E-Drumset: a new electronic instrument that utilizes physical modeling and machine learning with an intuitive physical interface. He completed a Bachelor of Music at Queen’s University, a Masters of Music Technology at McGill University, and an Interdisciplinary Ph.D. in Music, Computer Science and Electrical Engineering at the University of Victoria.

George Tzanetakis

George Tzanetakis is an Assistant Professor in the Department of Computer Science with cross-listed appointments in ECE and Music at the University of Victoria. He received his PhD in Computer Science at Princeton University in 2002 and was a Post-Doctoral fellow at Carnegie Mellon University in 2002-2003. His research spans all stages of audio content analysis such as feature extraction, segmentation, classification with specific emphasis on music information retrieval. He is also the primary designer and developer of Marsyas an open source framework for audio processing with specific emphasis on music information retrieval applications. His pioneering work on musical genre classification received a IEEE signal processing society young author award and is frequently cited. More recently he has been exploring new interfaces for musical expression, music robotics, computational ethnomusicology, and computer-assisted music instrument tutoring. These interdisciplinary activities combine ideas from signal processing, perception, machine learning, sensors, actuators and human-computer interaction with the connecting theme of making computers better understand music to create more effective interactions with musicians and listeners.
Martin Clayton and Laura Leante

The University of Durham

Imagery, gesture and listeners’ construction of meaning

This study demonstrates the importance of imagery and movement in the aesthetic appreciation of North Indian classical music. Listeners express emotions elicited by and meanings they attribute to the music with the help of imagery. Reception is affected by culturally shared attitudes to the genre and particular performance formats, as well as processes of embodiment of patterns of movement encoded in the music.

We will show how patterns of movement, expressed through images and embodied through gesture, relate in turn to the meanings attributed to a given performance. We will argue that although meanings are individually constructed by each listener common themes emerge from different people’s reflections on the same performance, and an important key to understanding this phenomenon is the realisation that movement patterns encoded in the music may be interpreted by listeners with the help of visual images. The panel draws on extensive video footage of musical performances, as well as ethnographic interviews with performers and concert-goers collected during fieldwork in India.
A study of intonation tendencies in a professional SATB ensemble.

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Submission date: April 15, 2011
Desired presentation format: talk

First Author
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Second Author
Jonathan Wild, Music Theory and Composition Areas, Schulich School of Music, CIRMMT, McGill University, wild@music.mcgill.ca

Additional Authors
Peter Schubert, Music Theory Area, Schulich School of Music, McGill University, schubert@music.mcgill.ca
Ichiro Fujinaga, Music Technology Area, Schulich School of Music, CIRMMT, McGill University, ich@music.mcgill.ca

Background in Music Technology
The use of a MIDI-audio alignment algorithm to identify notes onsets and offsets and a fundamental frequency estimation algorithm to extract frequency information allows for intonation-related information to be extracted automatically from recordings of the singing voice. This expedites the extraction of performance data from the recordings compared to manual methods, allowing for a larger number of performances to be analysed.

Background in Music Theory
Most of the earlier work on intonation has focused on the overall adherence to, or deviation from, fixed intonation systems, such as equal temperament, Just Intonation, or Pythagorean tuning (Howard 2007a, 2007b; Jers and Ternström 2004). The exercises designed for this experiment and the analysis of “Es ist ein Ros’ entsprungen” by Praetorius allow for an exploration of how musical context may influence intonation.

Aims
The aim of this study is to evaluate a professional SATB quartet’s intonation across several renditions of two sets of musical exercises and a well known musical piece. The analysis focuses
on whether the context in which the intervals occur influences the way in which they are tuned.

Main contribution

Method: A professional SATB quartet from the Montreal area performed a set of exercises, where both semitones and whole tones occur in different harmonic contexts, three times. They also performed the first verse of Praetorius’ “Es ist ein Ros’ entsprungen” seven times, four times with the German text, and three times to the syllable “mi”. The singers were recorded with individual directional microphones to facilitate fundamental frequency estimation. Intonation data were calculated by first annotating the onset and offset of each note with a MIDI-audio alignment algorithm (Devaney et al. 2009) and fundamental frequency estimates were made with the YIN algorithm (de Cheveigné and Kawahara 2002). Perceived pitch was calculated by taking a weighted mean across the frame-wise fundamental frequency estimates returned by YIN. Linear regression analysis was used to explore the influence of musical context on melodic and vertical intervals.

Results: For the melodic intervals, we found that the chromatic semitones were significantly smaller than the diatonic semitones and that the descending whole tones were significantly larger than the ascending ones. For the vertical intervals, we observed that their tunings were, on average, closer to the Just Intonation tuning in certain musical contexts. We also found a significant effect for the syllable on which the notes were sung, with the average size of both the ascending and descending melodic intervals and the vertical intervals being larger when sung in German.

Conclusions: Overall our results confirm earlier findings that singers’ tunings have some degree of variability and that they do not strictly adhere to a prescribed tuning system, be it equal temperament, Just Intonation, or Pythagorean tuning. The results do suggest the influence of music context can explain some of the variation in the intonation data.

Implications

Empirical study of singers’ intonation practices provides data for developing expressive performance models of singers’ intonation practices. Such expressive performance models have potential pedagogical applications for training vocalists and could be correlated with the results of psychological experiments on musical expression and emotion. They could also be useful for generating “natural” sounding digital re-creations.

References


### Biography of Contributor A

Johanna Devaney research is focused on studying and modeling performance practice. She is currently working on her PhD in Music at McGill University. Johanna holds an MPhil degree in Music from Columbia University, an MA and BFA in Music from York University in Toronto, where also she taught also courses in Digital Music.

### Biography of Contributor B

Jonathan Wild is Assistant Professor at McGill University’s Schulich School of Music in Montreal, where he teaches Theory and Composition. He holds a Ph.D from Harvard University. He is an active composer, sought after for vocal music especially, and his compositions are widely performed. His scholarly interests include the analysis of nineteenth- and twentieth-century music; mathematical modelling and computational investigation of musical relationships; and alternative tuning systems.

### Additional Biographies

Peter Schubert is Associate Professor at the Schulich School of Music, McGill University, where he teaches counterpoint and early music analysis, and chairs the Department of Music Research. He directs the professional vocal ensemble VivaVoce and has published two counterpoint texts, *Baroque Counterpoint*, with Christoph Neidhöfer and *Modal Counterpoint, Renaissance Style*.

Ichiro Fujinaga is an Associate Professor and the Chair of the Music Technology Area at the Schulich School of Music at McGill University. He has a Ph.D. in Music Technology from McGill University. Research interests include music theory, machine learning, music perception, digital signal processing, genetic algorithms, and music information acquisition, preservation, and retrieval.
Does acoustics contribute to polyphonic chants in Corsica?

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submission date: 28/04/2011
desired presentation: talk

Background in acoustics

Room acoustics have played an important role in artistic expression since the ancient greek tragedy representations[1]. Since that time, acoustic studies have been crucial in the design of theaters, churches and concert halls[2,3]. The geometry and the materials used in room design have a clear influence on the overall reverberation time and acoustic resonances generated in that room. Even more, these resonances may vary if the sound source is located at different places[4]. In the last centuries, many measurement and analysis techniques to evaluate room acoustics have emerged[5]. By using these techniques, we are able to deduce (and even simulate) how a listener will perceive a given sound in a specific location, and how different room designs may affect it.

Background in musicology

Multipart singing by groups of men at different mediterranean regions is a well-observed phenomena[6]. Polyphonic chant is a personal and social experience and it articulated the social organization of villages until the first half of the 20th century[7]. These singing events hold a specific rhetoric (singers position, flavours, lighting) according to the religious calendar of the region. In this study, we focus on the Holy Wednesday which the Cunfraternita di Sant Antone Abbate (Brotherhood of Saint Anthony the Abbot) carries out in Calvi, Corsica. This celebration has been widely studied by musicologists [8]. In a certain point of this celebration, singers follow the rhetoric of the so called "sonorous fullness", that is, a search for a growing intensity of the sound produced by their chants.

Aims

The aims of this work is to determine the role of the room acoustics in the polyphonic chant performed on the Holy Wednesday, in Calvi, Corsica. Specifically, we try to explain (a) whether the room geometry (and their associated room modes at different locations) plays an important role in the harmonic creation of the polyphonic chant, and (b) whether reverberation time influences the harmonic generation in polyphonic chant. The contribution of the room acoustics to the generated sound may arise during the "sonorous fullness" part, mentioned above.

Main contribution

To address the goals proposed in the previous section, we designed two sets of acoustic measurements in the Oratoriu within the fortified Citatella of Calvi. The first set is focussed on the obtention of the overall reverberation time, which is considered to be the constant for all the positions in the space. The second set of measures is focused on the obtention of the room modes
and impulse responses at different locations. These latest measures are complemented with an acoustic analysis of the room plan. By comparing these results with the musicological analysis of this event[9], we observe how the main room modes measured near the shrine coincide with the harmonics of the main played notes in the score. On the other hand, the reverberation time is flat and relatively low enough to support chants without affect the overall performance. In conclusion, room modes contribute to the creation of overtones required for polyphonic chant. On the other hand, reverberation times contributes with a moderate reverb that, even it may be considered aesthetically positive, it has no clear influence on the development of the celebration.

Implications

The inclusion of room acoustic measurements in musicological analysis may justify the space distribution of singers (or instruments) in a physical space, and may justify the creation of a specific sonority for specific events. For instance, these type of measurements may explain why male singers were located at the upper gallery (or choir) in a church (typical in romanic churches at the Pyrenees) and how they could make to rumble the walls during ceremonies.

References


Biography:

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Title
Preparation and spontaneity in performance: effects on subsequent recall

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Desired presentation format
Talk

Background in music performance
A growing number of practitioners – composers, teachers and performers – are undertaking “practice-based” research. In the case of performers this involves reflecting on their own practice (in both senses of the word), rehearsal and performance, not only to increase the effectiveness of their own preparation and performance but also to inform their teaching, where appropriate. While the first author of this paper is a music psychologist as well as the singer whose performance is under scrutiny, most practitioners are by definition not trained researchers and it is therefore invaluable for such research to be carried out collaboratively with, for example, psychologists.

Background in psychology
Expert musicians’ preparation for performance from memory has been studied since the mid-1990s using the longitudinal case study method, whereby individual performers record and transcribe their performance and annotate the musical score so as to indicate thoughts during practice, rehearsal and performance. Analysis of these data shows that a subset of the features of the music to which the performer attends during practice and rehearsal is retained as performance cues (PCs), which guide the performer’s attention and serve as cues for memory retrieval during performance (Chaffin et al., 2002). In our most recent study (Ginsborg & Chaffin, in press), a follow-up to an earlier investigation of the development of shared PCs in which the first author’s recall and forgetting for a different work was tracked over the course of six years (Ginsborg & Chaffin, 2011), we explored the possibility that PCs could also emerge spontaneously during live performance. While the majority of the singer’s thoughts during the performance of two newly (re-)learned and memorised songs by Schoenberg were about features that she had attended to while practising and rehearsing (prepared PCs), a substantial proportion were about features that acquired new musical or expressive significance during the performance (spontaneous PCs).

Aims
The present study aims to establish the extent to which subsequent recall for the Schoenberg songs was predicted by the singer’s attention during practice to features
that were automatised and therefore not retained as PCs, prepared PCs and spontaneous PCs.

Main contribution
Method: The singer annotated copies of the score of Schoenberg’s Ich darf nicht dankend and In diesen Wintertagen (op. 14) following the final rehearsal to indicate the features to which she had attended, and, ten hours later, immediately after she had performed the two songs in public, to indicate her PCs. The features and PCs were then categorised as basic, interpretive, expressive and shared; in addition the PCs were categorised as prepared and spontaneous (a small number of extraneous thoughts was also reported). Once the data analysis and writing-up of this initial stage of the study had been completed, the singer did not look at the score, think of or listen to the music for four months. At the end of this period, before starting work on further analysis and writing, she recorded a practice and rehearsal session in which she attempted to sing the two songs from memory, first unaccompanied and then with piano.

Results: As long a gap as possible needed to be left between performance, analysis and reporting of the initial data, and subsequent recall from long-term memory, so the singer’s musical and verbal utterances have only just been transcribed, and preliminary analyses undertaken. The locations of features and PCs, prepared and spontaneous, will be used as predictors of starts, stops and repetitions of musical material in a hierarchical regression analysis. The singer’s recall without accompaniment consisted only of the opening phrases of the two songs. It then took 35 minutes for her to reconstruct them with cues (musical and verbal) from the pianist, and to be able to sing them from memory. The melodies were recalled with ease, the words less so, requiring the singer (and pianist) to deploy a variety of strategies for retrieval.

Implications
Evaluation will be made of the methodological innovations used in the study: in previous studies, features and PCs were reported simultaneously, and free recalls were written-out rather than in the form of live practice, rehearsal and performance. The findings will show the extent to which recall is determined not only by what the performer does in practice and rehearsal, but what she thought about during the performance itself.

References

Biographies
Jane Ginsborg was a professional singer before she became a music psychologist. She is currently Associate Dean of Research at the Royal Northern College of Music,
Director of the Centre for Music Performance Research and Managing Editor of the on-line journal *Music Performance Research*. In addition to expert performers’ preparation for performance her research interests include collaborative music-making and musicians’ health. She still performs in public from time to time.

Roger Chaffin is Professor of Psychology at the University of Connecticut, where he is also Director of the Music Psychology Lab. In addition to pioneering the longitudinal case study method of studying the cognitive processes underlying musical performance, he has published widely on the topics of memory, language and problem-solving. He is an amateur flautist and singer.

Alexander Demos is a doctoral student in the Perception, Action and Cognition program at the University of Connecticut. His current research interests include music perception, synchronization between musicians, and the similarities between language and music. He is an amateur violinist.
Dr Tom Hall

Digital Performance Laboratory, Anglia Ruskin University

Unaligning Diatonicism: Listening and Composing around Post-atonal Tonality

Whether tonality was the baby thrown out with the bath water of musical high Modernism will be debated within some circles well into this century, around a century since the events themselves. This paper attempts to avoid a polemical stance in either direction, and illustrates one of many possible ways to musically engage with this issue in the creation of a music which may lie somewhere between what Milton Babbitt described as the “contextual” nature of atonal music, and the earlier communality of common practice tonality. In particular I discuss a number of compositional projects all centred in some way around diatonic materials, and illustrate the manner in which each lies somewhere along an imagined continuum of alignment or not, as the case may be, to tonal centres, with implications for listening. A related thread throughout this talk is how such an approach has been employed with computer-aided algorithmic composition, which arguably brings the composer closer a position of external listener than is otherwise usual.

Tom Hall is an Cambridge-based Australian composer, musicologist and performer. As a composer and performer, he is interested in electroacoustic music which combines composed, algorithmic and improvisatory elements often using multichannel sound. Musicological interests include the music of Morton Feldman and composers’ encounters with early tape, electronic and computer technologies. Tom is a lecturer in creative music technology at Anglia Ruskin University.

www.ludions.com
Dr Nicky Hind

Independent Composer, California

Seizing the moment: rate of change as a key parameter towards holding listener attention

As a composer interested in the trance-inducing possibilities offered by repetitive structures, I frequently consider questions of how much repetition and at what pace should my music unfold? Used effectively, repetition is a device that can lure listeners into investing greater attention, rewarded by a heightened awareness that results from re-experiencing musical material. Inducing trance involves not only capturing listener attention, but holding it intently. The listener’s mind, however, is a sophisticated if slightly restless instrument, constantly seeking stimuli and shifting awareness between a set of perceptions. In a repetition-based framework, pace and pattern recognizability are key parameters. Too slow a pace or too recognizable a pattern structure and the unfolding becomes predictable; tending to reduce listener attention. Too fast a pace and too unrecognizable a pattern structure and the unfolding becomes time-bound, reducing trance potential. The solution I have found lies in stepping back from, objectifying, the creative process, in an attempt to hear the music purely as a listener might. It involves developing a self-critical faculty that is perhaps akin to the role of an editor. I discuss these ideas in the context of the composition, revision, and performance of my triptych for three female voices: The Gentle, The Well, and The Joyous.

Nicky Hind was an active participant in Scottish musical life during the 1980s and 90s, his debut recording Hindsight (premiered CCA/Third Eye Centre, 1987) leading to collaborative work in dance, theatre, video, and with numerous Scottish musicians and ensembles. He studied composition at the University of Glasgow with Graham Hair before moving to California to pursue research in computer music at Stanford University. Following this he was for a time immersed in the development of a computer-based music performance system. Nicky Hind's works for guitar and electronics have been performed and recorded by guitarists such as José Luís Bieito (Spain), Robert Lampis (Germany), and Cem Duruöz (USA, Turkey). In 2007 he released the retrospective CDs Hindsight and Seven Visions (on his own label Listen to the Wind). Nicky Hind presently works for Sony Computer Entertainment developing audio software used in game development, and lives in northern California on the banks of Clear Lake; where he also enjoys sailing.
Stephen Husarik, Ph.D.
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Biographical Note:

Stephen Husarik is a full professor of Humanities/ Music History and Head Carillonneur at the University of Arkansas – Fort Smith and holds degrees from the Universities of Illinois and Iowa. Dr. Husarik is currently co-editor of Interdisciplinary Humanities, and is past editor of American keyboard Artists, and Who’s Who in the Humanities. He has published articles in the International Journal of the Humanities, Clavier, NAHE Journal, HERA Journal, Classical Magazine, Journal of American Liszt Society, International Biographical Dictionary, American Music, Sonneck Society Newsletter, NAHE Newsletter, Segue and others. He has received state, national and international awards both for his teaching and research—including three traveling grants and fellowships from the National Endowment for Humanities. His article “How Beethoven’s Works Contributed to the Growth of Musical Terminology.” [International Journal of the Humanities 7/7, Fall, 2009] was a finalist in the Award of Excellence. Dr. Husarik was soloist in a lecture-recital entitled “Beethoven’s Farewell to the Piano in the Sonata, Opus 111,” on the University of Arkansas campus, February, 2010.

Stephen Husarik has developed an extensive bibliography on the history of Grosse Fuge, and draws upon his experience with Autograph 9 sketchbook materials from studies at Harvard University in the “Beethoven Sketchbook” seminar with Lewis Lockwood, and personal experience with the autograph manuscript located at the Bibliothèque Jagiellońska. His presentation includes previously unpublished alternative passages crossed in Beethoven’s original manuscript that give insight into this new analysis.
ABSTRACT

Beethoven’s Grotesque Comedy: Rhetorical Aspects of Grosse Fuge, Opus 133

Almost two centuries have passed since the Grosse Fuge was first performed in March, 1826. At first received as a Chinese puzzle by the reviewer of the Allegeime Musikalische Zeitung, positive critical commentary about the work didn’t develop until much later when it was heralded as a masterpiece by notables such as Igor Stravinsky who said that “in rhythm alone, it will be forever new,” and contrapuntist Glenn Gould who thought that the Grosse Fuge was the greatest piece of music ever written. Vincent D’Indy (1909) was perhaps the first scholar to present an effective and detailed analysis of Grosse Fuge, but not until the 1960s did Warren Kirkendale brilliantly locate the model for its syncopated cantus firmus in Albrechtsberger’s, Gründliche Anweisung zur Komposition.

Despite these analytical advances, the overall character of Grosse Fuge remains a mystery. Most analyses divide the work into sections that define its boundaries, but not its overall sense of direction. Such schemes have inspired misguided attempts to force it into classical forms (e.g., sonata forms, etc.), inappropriate to fugue-writing. Grosse Fuge is a warehouse of rhetorical figures gradually shifting from strict contrapuntal textures to a homophonic style whose concluding passage combines three principal subjects into a comedic ending. Along the way, Beethoven combines rhetorical figures (e.g., abruptio, antithesis, hyperbole, etc.) with disjunct leaps and irregular phrase lengths (in pentameter/tetrameter) to create a grotesque comedic effect. The shape of the two-voiced main subject of this fugue is shown to reflect not only the overall form of the work, but certain individual sections. After a brief review of analytical literature, this paper explores how rhetorical figures are disposed throughout this work, and how the wedge-shaped cantus firmus contributes to its inexorable comedic conclusion.

Key Words: Beethoven, Grosse Fuge, Rhetoric
What makes a musical improvisation creative?

CIM11
Conference on Interdisciplinary Musicology 2011
Glasgow
August 30 – September 3, 2011

First Author
Anna Jordanous, University of Sussex

Second Author
Bill Keller, University of Sussex

Background in Improvisation

What makes a musical improvisation creative? And what exactly is it that justifies one improviser being described as more creative than another?

Not all people accept creativity in musical improvisation can be defined. Bailey (1993) proposes that creativity exists at a level that is inexpressible in words. Pressing (1987), however, advocates making more explicit connections between improvisation and creativity. For a clearer understanding, it is a practical necessity to follow the lead of those such as Berliner (1994) and Gibbs (2010), who make the study of improvisational creativity more tangible by describing it in terms of subprocesses (Berliner) or components (Gibbs).

Background in Computational Linguistics

The log likelihood ratio statistic can be used to compare two sets of texts (corpora) to examine word distribution patterns in each set (Dunning 1993). Using this statistic, we can identify which words are used more in academic papers on a particular topic - creativity - compared to a matched set of papers on other topics.

Lin's similarity measure (Lin 1998) allows us to quantitatively measure how similar a pair of words are in meaning. With this semantic information, words with similar meanings can be clustered together using an algorithm such as Chinese Whispers (Biemann 2006). Clustering highlights semantic themes in a collection of words, helping to summarise large data sets.

Aims

• To identify general components of creativity and develop understanding of creativity.
• To gain a detailed understanding of how creativity is manifested in musical improvisation.
Main contribution

Using the computational linguistics techniques outlined above, 694 words were identified which were used significantly more than expected when discussing creativity. Clustering these words and analysing the clusters, 14 key components of creativity have been identified (Figure 1), forming a set of building blocks of creativity:

- Social Interaction and Communication
- Independence and Freedom
- Intention and Emotional Involvement
- Spontaneity / Subconscious Processing
- Active Involvement and Persistence
- Variety, Divergence and Experimentation
- Progression and Development
- Originality
- Value
- Creation of Results
- Domain Competence
- General Intellectual Ability
- Thinking and Evaluation
- Dealing with Uncertainty

Figure 1: The 14 components / “building blocks” of creativity.

Creativity is often manifested in different ways depending on what is prioritised in a particular domain (Plucker & Beghetto, 2004). To identify important factors in musical improvisational creativity, 34 participants with a range of musical experience were questioned. The participants were asked to describe what creativity meant to them, in the context of musical improvisation. Their answers were tagged according to the 14 components of creativity in Figure 1.

Figure 2: How many times each component was mentioned positively (or negatively) by survey participants, in relation to creativity in musical improvisation.
Although all 14 components were mentioned by participants to some degree (see Figure 2), those mentioned most often were: Social Interaction and Communication; Domain Competence; Intention and Emotional Involvement.

Key aspects of creativity in musical improvisation have therefore been identified: the ability to communicate and interact socially; the possession of relevant musical and improvisational skills and knowledge; and the emotional engagement and intention to be creative. Conversely, the actual musical results produced during improvisation are relatively less important for creativity when compared with the process of improvising. Also, general intelligence is considered less important than having specific expertise and knowledge.

**Implications**

With a detailed understanding of what makes musical improvisation creative, improvisers and their teachers can identify what they should work on to improve their creativity (Gibbs 2010).

The aim of the project encompassing this work is an evaluation methodology for computational creativity. A rigorous, comparative evaluation process for creativity needs clear standards to use as guidelines or benchmarks (Torrance, 1988). This list of components has been used to evaluate computational musical improvisers in terms of how creative they are and identify why one system is perceived as more creative than another (Jordanous, 2011a, 2011b).

**References**


### Biography of Anna Jordanous

Anna Jordanous has conducted doctoral research on the question: How should we evaluate the creativity of computational systems? In September 2011 she will submit her DPhil thesis on *Evaluating Computational Creativity: A Standardised Procedure for Evaluating Creative Systems and its Application*. With a background in Artificial Intelligence and Computer Science, she has published work on musical improvisation systems and other computational music systems, including work with Alan Smaill presented at CIM08 and in the resulting special issue of the Journal of New Music Research, on automated accompaniment systems. As a musician, Anna plays and performs regularly, including occasional small-group jazz improvisation with her co-author Bill and other Sussex colleagues.

### Biography of Bill Keller

Bill Keller is a Senior lecturer in Computer Science. He has an MA in Cognitive Science and a PhD in computational linguistics from the University of Sussex and has published widely on topics in natural language processing. He developed an influential approach to the semantics of quantification in noun phrases and his work has led to a better understanding of grammar formalism design and made significant contributions to work on lexical knowledge-representation. More recently he has investigated statistical language modelling, automated grammar acquisition and lexical distributional similarity. Current PhD supervision includes graph-based methods for word sense discovery and automated acquisition of arabic morphology.
Evaluating the creativity of computational musical improvisation systems

This proposal demonstrates the SPECS creativity evaluation methodology: Standardised Procedure for Evaluating Creative Systems (Jordanous, 2011). SPECS has been used to systematically evaluate how creative four computational music improvisation systems are, using a three-step process:

1. Stating what creativity means in the context of musical improvisation
2. Deriving standards from Step 1 to test the computational systems' creativity
3. Performing tests to evaluate the systems along the standards identified in Step 2

Four jazz improvisation systems were evaluated: Voyager (Lewis, 2000), GenJam (Biles, 2007), Impro-Visor (Gillick, Tang & Keller, 2010) and an evolutionary jazz improvisation system (Jordanous, 2010).

For Steps 1 and 2, 14 key aspects of creativity were identified using computational linguistics techniques. In a questionnaire completed by 34 people of varying musical expertise, some of these aspects were found more important in the specific context of creativity in musical improvisation. Work submitted to CIM11 with Bill Keller reports these results.

For Step 3, the improvisation systems were rated on each of the 14 aspects, These ratings were then weighted according to their perceived importance in musical improvisation creativity, as found in the questionnaire results.

Overall GenJam was found to be most creative, though other systems were perceived as having higher associated value (Impro-Visor) or to be more spontaneous (Voyager).

As well as being a methodological contribution, the SPECS approach to evaluation has generated both comparative feedback on how creative various computational improvisors are and, perhaps more importantly, detailed formative feedback on how to improve each systems' creativity.

References
Fifteenth-century performance practice issues and the Buxheim Organ Book

Lecture-Recital

Contact: Frauke Jürgensen at f.jurgensen@abdn.ac.uk

Proposed Format: Lecture-Recital

Proposed Length: 1 hour (20 mins talk + 40 mins recital) would be ideal.

Disciplines combined: Historical musicology, computing/music information retrieval, performance

Presenters: Frauke Jürgensen (University of Aberdeen), Ian Knopke (BBC)

Performers: Frauke Jürgensen, soprano; Caroline Ritchie (Schola Cantorum Basiliensis) and David Smith (University of Aberdeen), various instruments; Ralph Stelzenmüller (University of Aberdeen), organ (we can source portable continuo organs if necessary)

Abstract:

At CIM04, 05, 08, and 10, we presented a series of papers concerning the application of computational methods to the analysis of late Mediaeval and Renaissance music. The primary corpus of music used for analysis was an electronic encoding of the Buxheim Organ Book (the largest fifteenth-century keyboard manuscript), and its concordances in mensural manuscripts. Primarily, these analyses served to address problems of performance practice, including pitch interpretation (musica ficta), tuning (keyboard temperament), and improvisation. The results have implications beyond the Buxheim Organ Book itself, from the ensemble pieces that formed the models for many of Buxheim's pieces, to the music of the mid-fifteenth century in general.

This year, we would like to draw together the various strands of our research, by showing how the results of our analyses can be applied in a live performance context.

In our lecture, we will provide a brief exposition of the methods employed in past papers, and explain the implications on performance practice of the results, using specific examples from the recital programme to illustrate our conclusions.

In our recital, we will perform a selection of repertoire drawn from the Buxheim Organ Book and its polyphonic models. The pieces presented will include French, German and English secular and sacred songs, keyboard intabulations of such songs, an alternatim hymn setting, a basse dance (complete with choreography) and some free keyboard compositions.
Proposed programme:

*Ad primum morsum* (anon.): drinking song
*Mille bonjours* (Du Fay): song + keyboard intabulation
*Duel angoisseux* (Binchois): song
*Se la face ay pale* (nos. 83 and 255) (Du Fay): keyboard intabulations
*Collinette* (basse danse): organ, instruments, and dance
*En fröwlin edel von natuer* (anon.): keyboard intabulation
*Bekenne myn klag die mir an lyt* (Paumann): song and keyboard intabulation
*Praemambulum super d* (anon.): organ
*Salve regina* (no. 72): *alternatim* hymn with singing and organ
*Descendi in ortum meum* (Plummer): sung motet
*Ave regina celorum* (Frye): keyboard intabulation and song

Biographies:

**Frauke Jürgensen** is a Lecturer in Music at the University of Aberdeen. Her research concerns the performance practice and compositional practice of late mediaeval and Renaissance music. She works in the field of computational musicology, frequently collaborating with Ian Knopke. She performs as a singer, organist, and dancer.

**Ian Knopke** completed his PhD in Music Technology at McGill University. He has worked at Indiana University and Goldsmiths University in the field of Music Information Retrieval. He is currently working on music search and recommendation systems for the BBC.

**Caroline Ritchie** studied baroque cello and viol with Jenny Ward Clarke and Richard Campbell at the Royal Academy of Music, graduating in 2004 with distinction and writing her MMus dissertation on the performance of Purcell’s Trio Sonatas. Caroline has worked with artists such as Jordi Savall, Andrew Manze, Trevor Pinnock and Sir Roger Norrington. Recent freelance work includes continuo cello for Rameau’s Achante et Cephise in Oslo, a series of concerts in Stockholm with her group, the Arcangelo Quartet, and a tour of France with the Academie Baroque Européenne d’Ambronay under Christophe Rousset.

**David Smith** is Head of Music at the University of Aberdeen. His primary area of research is early English keyboard music and the music of Peter Philips. He is a performer on recorder and keyboard instruments.

**Ralph Stelzenmüller** studied organ, church music and directing at the Mozarteum in Salzburg. He completed his postgraduate studies on harpsichord and organ at the Schola Cantorum in Basel, studying with Jean-Claude Zehnder. For three years, he held a lectureship and taught music history at the Athanor Akademie for theater. In increasing demand as both a player of basso continuo and as an accompanist for Lied, in 2005 he founded his own ensemble, Combassal. He has worked with Anthony Rooley for several years, performing in England and throughout Europe.
Title: Analysis of embodied cognition thorough gestural articulation in vocal pedagogy
Katty Kochman, Dirk Moelants, and Marc Leman
IPEM (Institute for Psychoacoustics and Electronic Music), Ghent University, Belgium.

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Submission Date: April 29, 2011
Presentation Format: Talk

BACKGROUND IN QUALITATIVE PERFORMANCE ANALYSIS

Gesture has an impact on the expression and communicative process. It is through the use of gesture that inner cognitive processes are translated into external form. These gestures can be thematically coded into to elucidate the information transmission system, in which gesture plays an active constructive role linking thought and gesture. The implications of these ideas are critical when understanding music performance and vocal pedagogy. Vocal instruction utilizes gesture to express images that cannot be expressed in speech. Within this context speech and gesture must cooperate to express the person’s meaning. (McNeill, 2003)

BACKGROUND IN EMBODIED MUSIC COGNITION AND EDUCATION

Gestural patterns associated with cognitive processing were observed. For example, the researcher observed that often a gesture was used to elucidate the initial presentation of the vocal concept presented by the instructor. The gesture may then reappear, with or without linguistic support, to remind the student of the initial concept during the course of the lesson. Finally, the student themselves utilizes the gesture when applying the new technique, to facilitate implementation and application of embodied understanding.

AIMS

Gestures are produced as part of an intentional communicative act. However, gesture and speech never convey exactly the same information. (Goldin-Meadow, 2003) This is especially the case in vocal instruction. The teacher is asked to describe complex internal processes involving intricate muscular coordination. Linguistic communication alone often fails to give a comprehensive understanding of the intended goal. Gesture aids in the development of more complete representation of the proper tactile sensations necessary to improve vocal technique. Results of the current research project may serve to inform musical instruction and enhance understanding of vocal techniques. Furthermore, this study seeks to develop additional techniques for the ecological analysis of vocal performance.

MAIN CONTRIBUTION

The application of gesture is commonly utilized intuitively in vocal pedagogy. Teacher and student use gesture to develop a common understanding of ideas of vocal technique. However, this aspect of music instruction has not been formalized or analyzed comprehensively. This research project focuses on how interpretive gesture enhances understanding of musical expression and vocal techniques in musical instruction. Subjects consist of conservatory vocal students

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and instructors in ‘musical’ and ‘technical’ lesson. Qualitative analysis is utilized to develop an understanding of the role of gestural cues, reflecting the importance of embodied cognition in integrating concepts of vocal pedagogy in music instruction and performance. This research should better inform music instruction, as well as assist in the development of tools for analysis of performance that do not introduce confounding variables by conducting research outside of the ‘naturally occurring’ context.

**IMPLICATIONS**

A comprehensive understanding of the communicative process underlying in music instruction cannot be fully undertaken without the consideration of gesture. An understanding of the concepts underlying effective vocal instruction is not complete without also examining the non-verbal communication that underlies these discourses. The researcher uses multiple methods of data analysis as triangulation to ensure the reliability of the conclusions made and to check for coherence and internal consistency of interpretation. (Stiles, 1993)

This paper presents an overview of the methodology used and preliminary results when examining the use of gestural articulation in vocal pedagogy. Qualitative methods are implemented in the study including: thematic coding, interviews and discourse analysis. Within the context of this research study, qualitative research methods provide the necessary tools to study vocal gesture in a context specific and ecologically valid research paradigm. The researcher chose to utilize multiple levels of thematic coding. The first level is grounded in widely accepted research in gestural communication. The second level of coding contextualizes the analysis within the framework of vocal performance and music education. Discourse analysis, post-interviews, and questionnaires are utilized for triangulation to increase the validity of the researcher’s conclusions and to check for representativeness (Miles and Huberman, 1994).

**REFERENCES**


**BIOGRAPHIES**

**Katty Kochman** is a Ph.D. researcher at the Institute of Psychoacoustic and Electronic Music (IPEM). Her research incorporates the development ecological models for the study of vocal performance and embodied cognition in music. She has an M.A. in Music and is experienced in performing operatic repertoire. She has also earned an M.S. in Education, with a background in behavioral analysis and therapy.

**Dr. Dirk Moelants** holds a PhD in musiicolgy from Ghent University, with a thesis on rhythm perception. His focus is on ethnomusicalogical aspects of music perception and performance, based on psychological experiments related to beat and rhythm.

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Prof. dr. Marc Leman holds a PhD in musicology from Ghent University, with a thesis on computer modeling of tonal semantics. His focus is on the methodological and epistemological foundations of (social) embodied music cognition. He is currently Director of the Institute of Psychoacoustics and Electronic Music, Ghent University. He also serves as Head of the Department of Art, Music, and Theater Studies (Faculty of Letters and Philosophy) and is currently a Research-Professor in Systematic Musicology.

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In this paper we investigate the effect of acoustics on the performance of music in the *York Cycle*, which is a series of forty-eight theatre plays that were performed on wagons in the city of York from the fourteenth to the sixteenth century.

The *York Cycle* consists of separate plays that narrate events of relevance to the Christian faith. Each play was the responsibility of a particular guild of the city. The performances were done on wagons that were constructed by the guilds for the occasion and manhandled through the streets of York. The wagons followed a predetermined route through the city and they stopped at ‘stations’ in which the audience gathered to see the performance. Music was an important aspect of these plays, and both monophonic and polyphonic pieces were performed. The plays are known to have included music due to the presence of references in the dialogues, dramatic directions and the inclusion of notated music.

Little is known on how the acoustics of the wagons and the surrounding street space affected the performance of the *Cycle*. It is possible to investigate such effects by using modern...
acoustic modelling techniques, which are referred to as virtual acoustic modelling.

**Background in Virtual Acoustics**

Virtual acoustics can be described as the study of the acoustics of spaces through the design of computer models, which are also used for auralization. Auralization describes the process of rendering audible a particular sound field (Kleiner et al. 1993: 861). It is a computer-aided process whose aim is ‘to recreate the aural impression of the acoustic characteristics of a space, be it outdoors or indoors.’ (Kleiner et al. 1993: 861). In other words, the user can hear the way sound is modified by the characteristics of a space without needing to be in that space, or even without the space needing to exist.

Virtual acoustics is of particular relevance when the space is not accessible or it no longer remains in its original form, which is the case of the performance spaces of the *York Cycle*. It also provides great flexibility, allowing the user to vary parameters such as dimensions, surface materials and positions of performers and listeners.

**Aim**

The aim of this project is to apply virtual acoustics to the study of vocal performances in the *York Cycle*, focussing on how the acoustics of a specific street in York (Stonegate), which was used for the *Cycle*, might have affected music performance.

A comparison between the characteristics of present day and medieval Stonegate is carried out with the objective of analysing whether the effects on music performance were consistent. This will also help determine whether the performance of music in present Stonegate could provide singers with an ‘aural’ setting similar to that experienced by medieval performers.

**Main contribution**

The present project utilises impulse response measurements of Stonegate in order to analyse the characteristics of this space as it stands today. A virtual model of this same space is also used to experiment with the effect of the different positions of performers and listeners. A second virtual model is designed based on the characteristics of Stonegate in the Middle Ages. The results of the different models and measurements are then analysed through acoustic parameters, such as reverberation time ($T_{30}$), clarity ($C_{50}$) and strength ($G$), in order to determine the influence of acoustics on music performance.

The impulse responses sourced through measurements and/or virtual models are convolved with anechoic recordings of different music pieces, to determine how different textures were affected by the characteristics of the space.

**Implications**

Research into the performance of the *York Cycle* is lacking the consideration of acoustics as an important factor in the development of staging techniques. Virtual acoustics can be used as
a tool to analyse how the characteristics of the playing places, might have affected the performances and how staging techniques could have been adapted to make the most of the acoustics of the playing spaces.

The question marks surrounding the staging of the *York Cycle* are many, and it is possible that certain facts will never be known for certain. Nevertheless, it is of great value to create an approximation of what this *Cycle*, which was performed for almost two centuries, *sounded* like.

**References**


**Biography of Contributor A**

*Mariana Lopez* has a background in music and sound design, having been awarded the B.A. degree in Arts with specialisation in Music (University of Buenos Aires) and the M.A. degree in Postproduction with specialization in Sound Design (University of York). She is currently a Ph.D. student at The University of York and her thesis focuses on the use of virtual acoustics to study the performance and perception of the *York Cycle*.

**Biography of Contributor B**

*Dr Sandra Pauletto* has a PhD in Music Technology from the University of York. She was a researcher at the University of York and at Loughborough University and a lecturer at the University of Huddersfield. Currently she is a Lecturer in Sound Design at the Department of Theatre, Film and Television of the University of York. Sandra’s research interests include sound design for the creative industries, auditory displays, sound synthesis and interaction.

**Additional Biographies**

*Dr Gavin Kearney* graduated from Dublin Institute of Technology in 2002 with an honors degree in Electronic Engineering and has since obtained both MSc and PhD degrees in Audio Signal Processing from Trinity College Dublin. He is currently a Lecturer in Sound Design at the Department of Theatre Film and Television at the University of York. His main research interests include spatial audio and acoustic modelling for auditory scene synthesis.
This paper introduces the sound recordings and accompanying photographs and field notes made in the 1950s and 1960s, mainly in India, Bhutan, Sri Lanka Korea, Taiwan and Hong Kong, by John Levy (1910-1976). Levy was an independent English ethnomusicologist, a deep thinker whose personal religious journey embraced Judaism, Islam and Hinduism. He also engaged with Taoist, Confucian and Buddhist scholars in the course of his field collecting work, his radio broadcasts and LP productions. He is recognised as having been the first to introduce certain musical traditions to western audiences; he was able to record rituals and performances in full and at high quality. John Levy was making his recordings in periods of considerable change in several of the countries he visited, where his legacy is of particular value. A series of collaborative projects are now underway in the School of Scottish Studies Archives at the University of Edinburgh, where the John Levy Collection is held, to make his material widely accessible to all with an interest in the religious and musical traditions he recorded.
**Margaret McAllister**  
Berklee College of Music, MA

**Performance and Dissonance in the Two-Part Inventions of J. S. Bach**

The choices made by performers can reveal multi-layered aspects of musical form, in its rhythmic and phrase relationships. How rhythmic events affect compositional structure and musical meaning, are revealed by interpretive choices, specifically, in the sense of how smaller and larger gestures and/or phrase structures, relate to each other and to the whole form of the piece. An understanding of dissonance types, hearing how and where they occur in the form, their rhythmic context, and how they are idiomatically used by a specific composer, is an important aspect of performance studies. Computer analysis of intervallic relationships in the Two Part Inventions of J. S. Bach, are a step toward a deeper level of knowledge and understanding of his work. Analysis of the use of dissonance is especially revealing. Inquiry and creativity are connected, and the irregular fabric of the work can be examined by the performer and interpreted in a conscious and meaningful manner.
Making Sense: Sensory input’s effect on live electronic music performers.

Author A: Murphy McCaleb, Birmingham Conservatoire, Birmingham City University
Author B: Tychonas Michailidis, Birmingham Conservatoire, Birmingham City University
Contact: murphy.mccaleb@gmail.com, 07770 522300
Submission Date: 15.4.11
Format: Talk

Background (Author A): musical performance, reflective practice, cognitive psychology
Background (Author B): music composition, computer programming, sound engineering

Aims:
1. To explore how performers experience and understand audio, visual and haptic feedback in live electronic performance.
2. To draw upon both the composer’s and performer’s perspective toward the process of live electronic performance.
3. To suggest compositional approaches that reflect performers’ experience and understanding in live electronic performance.

Main Contribution:
Background: Musicians develop a sensory-feedback relationship with their acoustic instruments due to the existence of aural and haptic feedback (Tanaka 2000). However, both digital musical devices and performance situations involving live electronics do not provide the same level of feedback to their performers. As proposed by Chafe and O’Modhrain, adding haptic feedback to digital controllers should improve performers’ effectiveness when working with live electronics (Chafe 1993; O’Modhrain and Chafe 2000).

Method: A single musical piece involving live electronics will be explored through a series of case studies, involving varying amounts and kinds of sensory input given to the performer. Through reflective practice on behalf of the performer, the authors will investigate the role of audio, visual and haptic feedback on the solo performer’s experience in live electronic performance.

Results and Conclusions: Through examining the performer’s first-person experience of each of these sensory mediums as well as how the resulting musical output is affected, we suggest and methods and considerations for composing and performing with live electronics. As an extension of Chafe and O’Modhrain’s views on the effectiveness of haptic feedback in live electronics, we suggest ways in which this might be successfully executed, in conjunction with other forms of sensory input.

Implications:
1. Explore the possibility of an intimate relationship between solo performer and live electronics, positively affecting the resulting performance.
2. Propose compositional and performative strategies to most effectively utilise live electronics in performance.
3. Develop a greater understanding of the relationship between performers’ mental processes and their received sensory input.
References:
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ley and M. Battier (eds) *Trends in Gestural Control of Music*. [CDROM] Paris: IRCAM Centre
Pompidou.

Biography (Author A):
Originally from Alaska (USA), Murphy McCaleb is a bass trombonist and second-year doctoral
candidate at Birmingham Conservatoire (UK). His research deals with music and cognition, primar-
ily in the way the mind and body interact in performance. Previously, he has focused on trombone
performance, receiving degrees from the University of Alaska and the University of Michigan.

Biography (Author B):
Tychonas Michailidis is a live electronics composer currently based in Birmingham (UK). He is a
PhD candidate at Birmingham Conservatoire, where his research interest lies in human-computer
interaction and how haptic feedback can be explored in compositions. For more information, see
www.tychonas.co.uk
What I Hear in Morton Feldman's *Why Patterns?* and *For John Cage*

Many of Morton Feldman's works are constructed so that the listener has the impression that he or she is hearing the major structures at work in the piece. Or, my impression is that, as I listen, I hear many of the things that are happening musically. Feldman's music lends itself to formalization, and while this may be true of many musical works, the way that Feldman's compositions do this is very distinctive. Although we might speak of his "ear," the way his works are constructed is much more a matter of his attention to our ears. Both *Why Patterns?* (1978) and *For John Cage* (1982) are written for very small ensembles: flute (doubling on alto flute and bass flute), glockenspiel, and piano in *Why Patterns?*; violin and piano in *For John Cage*. Both employ very limited sets of musical material. The same pitch or series of pitches are repeated over and over. Feldman spaces things in time, sometimes spreading things out, sometimes lining things up, sometimes pushing things closer together. Speeding things up and slowing them down, starting and stopping, abrupt or seamless shifts from one section to another, changing relations between instruments, all of these are foregrounded by Feldman or, more strictly, given the context I have chosen, by the performers. One hears patterns, but the interplay between patterns is very fluid. It is as though Feldman foregrounds the transience of music, the temporality of music by repeating, multiplying, and mixing patterns. The patterns themselves are not always easy to translate into conventional musical relationships, but one hears them nonetheless.

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Biography: Kurt Ozment is Visiting Assistant Professor in the Program in Cultures, Civilizations and Ideas at Bilkent University. His dissertation, "Rhetorics of Singularity: The Question of Commentary in the Writings of Theodor W. Adorno, Morton Feldman, Paul Celan, and Roger Laporte," is in the field of Comparative Literature. An article on the visuality of Morton Feldman's scores will soon be published in *CLCWeb: Comparative Literature and Culture*. 
Raising expectations: a composer’s perspective on the relationship between creative practice and music psychology

Jonathan Pitkin

This paper will examine some of the ways in which the composition of a piece of music might be informed by detailed consideration of how the listener is likely to experience it. It will argue that it is possible for a composer to conceive of his work not only as a series of acoustic events, but also as a series of perceptual and cognitive operations to be carried out by the listener.

The author will explain how his own compositions invite the listener to form expectations of what he or she will hear next; to recognise when these have been met or confounded, and, informed by these outcomes, to revise or form new expectations of what is to follow. The author's intention is that this should give the listener the sense of being engaged in dialogue with the composer, who will appear to respond to each expectation as it arises.

In several respects, the assumptions about listening behaviour which these compositions imply (and upon the veracity of which depends the likelihood of their being experienced as the composer intends) accord with the conclusions of recent work in the field of music psychology; in others, they raise questions which have yet to be subjected to the same degree of critical debate and scrutiny. In this way the music on the one hand reflects and creatively exploits our current understanding of the psychology of musical listening, and on the other points out new directions in which we might seek to expand it.

*  

Jonathan Pitkin is a composer and a member of the Academic Studies staff at the Royal College of Music. He was brought up in Edinburgh before going on to study at Christ Church, Oxford, the Royal Academy of Music, and finally for a DMus in composition at the Royal College of Music. His principal teachers have been Christopher Brown and Guy Reibel.

His music has been performed and commissioned internationally as well as across the UK, including at the Huddersfield and Spitalfields Festivals. Performers have included the BBC Scottish Symphony Orchestra and the BBC Singers, and amongst recent works to have received BBC Radio 3 broadcasts are the orchestral pieces Mesh and Borrowed Time, as well as Con Spirito, for piano and Yamaha disklavier, which was shortlisted for a British Composer Award in 2008. Two of his choral pieces are published by Oxford University Press as part of the New Horizons series.

www.JPitkin.co.uk
Prof. Mark Plumbley

Queen Mary College, The University of London

Although music has been "digital" since the introduction of the Compact Disc over 20 years ago, the term "Digital Music" has only recently come into widespread use, as computer and internet technologies have begun to be used to analyse, discover and deliver music and associated information to listeners. Much of this work is about finding out meaningful, semantic, information about the music track, such as the artist, instruments, genre (rock/pop/jazz), lyrics, key, notes, beats, and so on. In this talk, I will explore some of the technologies emerging in this exciting and evolving area. I will also talk about some of our work in the analysis of musical audio signals, including automatic music transcription, beat tracking, audio source separation, and sound visualization.

Prof. Mark Plumbley is Director of the Centre for Digital Music (C4DM) at Queen Mary University of London. His research interests include the analysis of audio and music signals, including beat tracking, automatic music transcription and source separation, using techniques such as neural networks, information theory, and sparse representations. He is Principal Investigator on several current EPSRC grants, including “Information Dynamics of Music” and “Sustainable Software for Digital Music and Audio Research”, and he holds an EPSRC Leadership Fellowship. He leads the UK Digital Music Research Network, is Chair of the International Independent Component Analysis (ICA) Steering Committee, and is a member of the IEEE Audio and Acoustic Signal Processing Technical Committee.
Music performance features and their biological function in tonal music

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Date of submission to CIM11: 31st March, 2011
Desired mode of presentation: talk

Abstract

Background in music theory

Performance expression understood as phrasing and articulation consists in the manipulation of timing, loudness, stressing etc. (Thompson, 2009:188). Therefore, traits such as dynamics and tempo belong to performance features in contrast to structural features which are the arrangements of pitch classes in time. It is connected with the Western tradition of tonal music wherein composers write notes and performers are obliged to interpret them. Traditionally, one of the functions of performance expression is communicating emotions (Juslin, 2001).

Background in biology

The evolution of music as a form of human sound communication is an example of a long lasting process (Mithen, 2006). It means that music results from gradual changes and it is composed of several components of a different evolutionary age (Roederer, 2003). The communicative character of sound expressions among animals suggests that music sounds carry information. Additionally, the evolutionarily old forms of sound expressions, observed in music, must have preserved their biological functions which they serve in animal communication.

Aims

The main aim of the study is to indicate that the music performance features are not music-specific. Another objective of the investigation is to demonstrate that the basic function of the music performance features is to manipulate the emotional states of the listener.

Main contribution

The invention of Western music notation seems to reflect the ability to perceive temporal and pitch relations as separate, stable and comparable patterns which is impossible in the case of dynamics. The memory of patterns enables the recognition of specific musical structures written by the composer which are unambiguous information for the performer (Bamberger, 2005). However, lack of stable and distinct categories of dynamics and tempo allows the performer some freedom of interpretation. This dichotomy reflects two different components of music: the one which is evolutionarily old, indiscrete and present in many sound expressions as well as the one which is evolutionarily young, discrete and music-specific (Merker, 2003). Despite the fact that performance features carry information about emotional
states of the performer, they are also used as the tools of manipulations (Krebs & Dawkins, 1984). The biological function of these tools consists in affecting the minds of other animals in order to, for example deter them, attract them sexually or arouse in them the need for cooperation. It is also suggested that music performance features are homologous with some prosodic features of speech (Patel, 2008) which evolved as a communicative tool before language and music.

**Implications**

A better understanding of the biological functions of performance expression can change the traditional approach in music pedagogy in which the effective usage of performance features is neglected. The knowledge of the manipulative effectiveness of performance features and the awareness of their influence on the listener’s emotional states can facilitate music performance. Apart from that, the non music-specificity of performance features cast a new light on the adaptability of music.

**References**


**Biographies of authors**

Piotr Podlipniak – assistant professor at the Department of Musicology at Adam Mickiewicz University in Poznań. He received his PhD from Adam Mickiewicz University in 2005. His main areas of interest are the biological sources of human musicality, emotional
communication by means of music, musical cognition and methodology of musicology. He is author of the book _Universalia muzyczne_ [Musical universals] (Pozna\_\_, 2007), and a numbers of articles. In his musicological research, he refers to such academic disciplines as cognitive science, evolutionary psychology and cultural anthropology.

Edward Jacek Gorzela\_czyk – professor at Kazimierz Wielki University in Bydgoszcz and Polish Academy of Science in Warsaw. His main fields of research are psychiatry, neurology, neurobiology and neuropsychology. His research areas are Parkinson’s disease, schizophrenia, cognitive function, biocybernetics and biochemistry. He is an author of the book _Memory, consciousness, language_ (Pozna\_\_, 2000) and co-author of _Illustrated Chemical Dictionary_ (Pozna\_\_, 2006), _Illustrated Biological Dictionary_ (Pozna\_\_, 1993), _Illustrated Physical Dictionary_ (Pozna\_\_, 1998) as well as many scientific articles. His additional qualifications are Medical doctor (MD), molecular biology (MSc); medicine (Ph.D.). He is a member of ‘Cost Action B27 Electric Neuronal Oscillations and Cognition’ (ENOC).
Reconstructing the Familiar: The Relationship between Creative Process and Perception within My Recent Music

The purpose of this paper is to illustrate how the author uses the reorganization and reconstruction of familiar sensory information in his music to alter awareness or understanding of conventional sound environments. To demonstrate this, the author will examine approaches to compositional craft in his works: Carillon for Sacha (1991) for solo piano, The Sweet Light of Day (1999) for clarinet and string quartet, Colouring in the Sky (2003) for alto saxophone and orchestra, The 47th Theorem (2005) for piano solo, The Groove Machine (2007) for four electric guitars and The Heavenly Muzak Machine (2010) for one vibraphone and four players. This examination will illuminate how aspects of tonal harmonic language, common practice rhythm, conventional melody, texture and well-known music forms are manipulated to disengage familiar sound materials from common practice function. Notably through this process the author will show how recognizable music materials such as a 1970’s ACDC classic rock riff and the Chopin Piano Sonata No.2, Opus 35 are reconstructed by the composer to create different interpretations, understandings and meanings for the performer and the listener.
The Given Note: Music, Attentiveness and the Enactment of Meaning

Authors’ names and affiliations:

Mr. Jason Dixon, University of East Anglia.
Dr. Férdia Stone-Davis, Independent Scholar.

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Presentation format: performance-paper (performance features two hurdy-gurdies, great bass recorder, voice and electronics).

Proposal:

This collaborative paper and performance (thirty minutes) will focus on a setting by Jason Dixon of The Given Note by Seamus Heaney. It explores the piece’s structural features, demonstrating how these facilitate not only attentive listening but the enactment of musical meaning, which in this instance is concerned with the process of experiencing and attempting to render experience intelligible.

Attention will be paid to the multivalence of the poem’s meaning: the story is recounted of a fiddler who retrieves the Port na bPúcai, a tune barely perceptible to others. The poem gestures towards Heaney’s attempts to translate his experiences into words in order to communicate them. It embodies a particular attentiveness to experience, one of perceiving the world afresh and striving to articulate this.

Thereafter, the music will be considered. Herein, there is a sense both of straining to perceive and of articulation of that which is perceived. A wash of sound issues a call to attention; a substantial period elapses before the live hurdy-gurdies enter, encouraging focused attention and anticipation of what follows. The live line is fractured and there is a sense of straining to hear, perceive and make intelligible; any clarity is diffused by the resonances of the pre-recorded material.

The voice is embedded within the music, vocalising the attempt to perceive that is enacted by the music. It is only towards the end that the Port na bPúcai surfaces, sitting above the previous hurdy-gurdy melody and giving sense to the initial apparent incompleteness of its line.

Biographies:

Jason Dixon is an Irish composer currently completing his PhD in composition at the University of East Anglia. His work explores issues of language, perception and memory in music. More recently he has been focusing on the Irish storytelling tradition and its place in contemporary Ireland.

Férdia Stone-Davis holds a doctorate from the University of Cambridge and a Masters in music performance from Trinity College of Music, London. She is an inter-disciplinary academic working in music, philosophy, and theology. Her recent book is Musical Beauty: Negotiating the Boundary between Subject and Object (Cascade, Wipf and Stock, 2011).
**Listening to Recitative**

How do we listen to Italian comic opera recitative? Recitative originated in the late 16th century as a novel vehicle for the rhetorical delivery of text. By the 18th century, opera audiences had assimilated its musical language. Composers had at their disposal an armamentarium of well-understood compositional devices for setting recitative text to music. I have developed a taxonomy of these devices under the broad headings of rhythm, melody, harmony and key. It was common at the time more than one composer set the same libretto into an operatic work. For example, Giovanni Battista Pergolesi and Giovanni Paisiello both set Gennaro Antonio Federico's short comic libretto: *La Serva Padrona*. This raises the question of whether, by a differential application of the compositional devices, composers could imply different dramatic parameters from the same recitative text. I will respond to this question by presenting a comparative analysis of a number of excerpts of recitative from these two works. The analysis strongly suggests that the composers have implied different characters, with contrasting emotions and intents, through their musical settings of the texts. A different relationship between the two principal characters is also implied. The methodology developed for this study may be of interest to those wishing to better appreciate the musical language and dramatic function of recitative in the Baroque and Classic periods. The insights gained may also be of assistance to those involved in performance of works from these periods.

Larry is currently completing a Master of Philosophy in Music Performance at the Australian National University. In 2009, he completed a Bachelor of Music, majoring in voice performance. Full-time music study has been a relatively late change of direction, his former employment being as a medical practitioner. He has a Masters in Health Administration, and still works part-time in this field. He has performed in many local opera and music theatre productions, most recently as Uberto in Pergolesi's comic intermezzo *La Serva Padrona*. He currently plays in the Canberra Mandolin Orchestra, and has played jazz guitar in small and large ensembles. His particular interests include the Italian language, comic opera of the Baroque and Classic periods and music technology. On completion of his current course, he hopes to commence work towards a PhD in a related area.
Musical Learning through Listening: Comparing Western and non-Western Approaches

Listening is the basis of music learning. The ability to hear accurately and respond intelligently is critical to the development of good musicianship. This paper explores fundamental differences in the learning (and performance) of Western and non-Western music. Two scenarios are compared, a violinist preparing for an ABRSM examination and a ‘rebab’ (Malay fiddle) player preparing for a 'Mak Yong' (Malay traditional theatre) performance. It compares how these two instrumentalists are trained and extrapolates the manner in which the purpose of performance significantly influences the process of preparation. It discusses learning theories and illustrates two situations, ie. The violinist learning (and performing) by reading music notation and the ‘rebab’ player learning (and performing) by listening (aural tradition) and visualising. It argues that a different order of learning is engaged, the former initiated by the cognitive domain (analysing the notes/thinking) and the latter initiated by the affective domain (analysing the sounds/movements).

The paper further argues that pedagogical, interpretive and performance issues arise when a new generation of primarily Western-trained musicians with some non-Western music experience are engaged to teach traditional music. A thorough understanding of the different tuning systems, temperaments, learning approaches and performance practices are necessary to preserve the authenticity of the genre studied. Yet, it is this younger generation of performers-instructors who promote the exploration of new sounds by combining Western and traditional instruments in cross cultural music making. This dichotomy undoubtedly adds to the richness of creativity and diversity.

Valerie Ross is an established composer and music educator. Her works have been performed in many countries including premieres at Darmstadt International Institute for New Music and ISCM World Music Days. Specialising in cross cultural music, Valerie has received compositional awards from Rockefeller Foundation (‘Serbelloni’), Commonwealth Foundation (‘Tatagatha’) and Japan Foundation (‘Embattled Garden’). She is Head of Postgraduate Studies, Music Faculty, Universiti Teknologi MARA, Malaysia. A Visiting Research Fellow at the Institute of Musical Research (2010), Valerie has authored several publications and serves on the editorial board of refereed journals. She is a Visiting Fellow at Churchill College, Cambridge (2011).
Preference, Emotion and Music

Understanding how music is connected with emotion can be informative for the performer who is interested in moving the listener. But why do so many of us like music that makes us feel emotional? The last two decades of music psychology research has seen the development of a strong interest in emotion-in-music research, and raised some matters that are controversial and unresolved. For example, is liking and preference itself a kind of emotional response? Is it possible to explain mechanistically an attraction to music that makes us feel negative emotions such as sadness and grief? One solution to these questions is proposed by applying principles of cognitive psychology. I will argue that emotions can be felt without real-life displeasure through the activation of a 'dissociation node'. This node switches off pain circuits, allowing many other nodes to be activated, without negative consequences. As formulated by Colin Martindale, activation of more nodes generates more pleasure, as well as associated experiences such as ‘awe’ and ‘absorption’. This explanation points to a caveat regarding how we can better understand both preference and emotion in music: According to the linguistic and philosophical work by Colombetti and Charland, the two terms can be conceptually teased apart by being thought of as 'affect valence' and 'emotion valence' respectively. Positive affect response (enjoyment, preference, awe etc.) to music is explained by the cognitive principle of dissociation, while negative (sadness, grief) and positive (joy, excitement, serenity) emotions are the specific emotion nodes that are activated in the dissociated (music listening) state. Implications for music research are discussed.
Prof Judith Shatin\textsuperscript{1} & Prof Michael Kubovy\textsuperscript{2}
University of Virginia: 1Department of Music, 2Department of Psychology

**Musical Necklaces: The Art and Science of Temporal Organization**

In this joint talk, cognitive scientist Michael Kubovy will talk about his research on competing organizational principles that govern the perceived downbeat in ambiguous metrical patterns. These circular patterns, which mathematicians call necklaces, are fundamental to rhythmic organization in many types of music. Composer Judith Shatin will discuss how these kinds of ambiguous patterns play out in a series of her compositions in which rhythmic ambiguity is a focal element.
Dr Razia Sultanova

University of Cambridge

In my research I have tried to answer the question whether rituals, largely performed in female communities of Uzbekistan, are of musical or poetic nature. Women gather together to recite mystical poetry, alternating it with prayers and blessings to mark every important life event (birthday, rites of initiation, weddings or funerals). I faced the necessity of employing special computer programs for sonic analysis in order to be able to take a visual approach to the development of the sound. Founded at IRCAM (Institut de Recherche et Coordination Acoustique/Musique, Paris), 'Audiosculpt' is a computer programme which helps to identify the sonic nature of sound, aiming to reveal a difference between 'said' and 'sung' voice elements. Use of 'Audiosculpt' in my research helped me to find that female rituals are a domestic music phenomenon performed inside of Uzbek houses. It is well known that music creates community, when performed (Askew, 2002) and rites of passage are one of its most common forms.

Dr Razia Sultanova, Fellow of Cambridge Central Asia Forum, University of Cambridge, is a graduate of Uzbek State Conservatory and of the Moscow State Conservatory, where she completed her PhD in musicology. She has taught musicology and ethnomusicology at Uzbek State Conservatory, Moscow State Conservatory, Goldsmiths College and SOAS, University of London, and at Leeds University. Her primary areas of research are Central Asian and Middle Eastern music, Islam and music, and gender and music. For the last fifteen years she has been conducting intensive fieldwork in Afghanistan, Turkey, the Caucasus, and the Central Asian republics (Uzbekistan, Tajikistan, Turkmenistan, Kyrgyzstan, Kazakhstan), publishing many articles in English, German, French, Chinese, Russian and Uzbek. Her recent publications concern the musical traditions of the Islamic world, at present produced by I. B. Tauris as a monograph ‘From Shamanism to Sufism: Women and Islam in Central Asian Culture’. She also edited ‘Sacred Knowledge: Schools or Revelations’. Master-Apprentice Music Training in the Turkic Speaking World for Lambert Academic Publishing, Germany.
Abstract

[T]he measure of a living thing’s potential interactions is its ability to transform the effects of one sensory mode into those of another.

- Brian Massumi

This paper focuses on the role played by listening in solo improvised music. Specifically, it is concerned with accounting for the processes of reflection-in-action and creative decision-making in the practice-as-research of its author, and the models of intelligibility that apply.

As researchers, how are we to articulate ‘a sense of’ the experience of solo improvised performance, from the position of an improvising performer his/herself? In what ways is the practice of listening different for such an artist, compared with that of the members of their audience? And how does that listening figure in terms of the ‘bigger picture’ of an artist’s ‘embodied’ performance practice? What role, or roles, does listening play in an improvising musician’s expert practice, and how does it ‘interact’ with the artist’s other senses, also necessarily involved in the event of performance – for example, the visual and the tactile senses?

The philosophical writings of Gilles Deleuze and Brian Massumi, I will argue, provide us with a useful means of accounting for the processes at work in the event of performance. Deleuze’s (Spinozan) late-20th-Century concept of affect, as developed in certain of his key texts, (and extended by Massumi), provides us with a way of understanding the relational and affective dynamics of live performance practice more particularly. If listening has historically been considered by music researchers to be an essentially ‘passive’ act, this paper will introduce a new, dynamic, dimension of listening as it applies to a performance practitioner: that of listening’s affective potential, where listening is considered as one ‘element’ in the complex ‘composition’ of expert performance practice.

2 Specifically, a solo piano concert I gave in Paris in 2010.

3 For the purposes of this paper, these are: *Spinoza: Practical Philosophy*; *A Thousand Plateaus* (with Felix Guattari); and *Francis Bacon: The Logic of Sensation*. All were published in the early-1980s in the original French.

4 *Parables for the Virtual.*
Philip Wigham, Carola Boehm

Manchester Metropolitan University, Cheshire, UK

The BaserBow: an Instrument based on the Exploration of the Concept of Mimetic Participation for the Development of Multi-Modal and Multi-Gestural Devices

The focus of this research enquiry was to explore how the interactive experience between a performer and his/her tools can be further enhanced and refined beyond current state-of-the-art equipment by aligning the design of multi-gestural and inter-modal midi controllers to support empathetic, mimetic participation. It included the development of a controller, based on guitar, and using sensors to detect gestural parameters. The driving factor behind the design of the instrument was the concept of mimetic participation i.e. that to some extent it is in our nature to imitate gesture including those of musical performances (see Trevarthen, 2004; Malloch 2004). One of the design influences of the controller was to exploit this natural instinct to imitate and ‘join in’, but also to explore the bidirectional influences of cross-modal perception of hearing (McGurk & Macdonald, 1976)

The visual aspect of the controller informs the audience and its relationship to the performer and controller, enabling the empathetic, mimetic participation, producing an immersive and shared experience. “We experience patterns of exertion by way of mimetic participation, and in this way it is as if we are acting - acting in a way that is more or less isomorphic with the sound producing actions heard (and seen)” (Cox 2006:53).

This prototype has been built to examine gestures that are involved in the initiation of the sound and the subsequent manipulation and modulation of timbres. This paper will demonstrate the instrument, and cover the context around mimetic participation, inter-modality, and gesture and explore future potential developments.

References


Philip Wigham graduated at Salford University, in Popular Music and Recording, and has been involved in performance and composition for over ten years as a freelance musician. His fascination for music technology began at an early age engaging in overdub cassette recordings, and later synthesisers, electronic drums and computer technology. He tutors drum-kit and piano for Ashley Music School, and is presently undertaking postgraduate studies in Contemporary Arts, at Manchester Metropolitan University Cheshire, UK.

Carola Boehm is Head of Department, Contemporary Arts at Manchester Metropolitan University Cheshire, UK and has held previous positions at the University of Glasgow and Mainz, the Conservatory of Music in Hannover, and the Royal Conservatory of Music in Den Haag. She holds degrees in music, computer science and electrical engineering and has been lecturing and researching in the area of music and music technology for more than 20 years.