5TH TRIENNIAL
ESCOM CONFERENCE
SEPTEMBER 8–13, 2003
HANOVER UNIVERSITY OF MUSIC
AND DRAMA, GERMANY

EUROPEAN SOCIETY FOR THE COGNITIVE SCIENCES OF MUSIC

Abstracts

EXP[e∂r]IENCE
MUSIC IN SCIENCE
SCIENCE IN MUSIC

Edited by
Reinhard Kopiez, Andreas C. Lehmann,
Irving Wolther and Christian Wolf

Institute for Research in
Music Education
Monography No 6

Hanover University
of Music and Drama

Institute for
Research in
Music Education

Abstracts of the 5th Triennial Conference of the European Society for the Cognitive Sciences of Music (ESCOM)

Hanover University of Music and Drama
September 8-13, 2003

Edited by

Reinhard Kopiez, Andreas C. Lehmann, Irving Wolther and Christian Wolf

How to use the Abstract Book

Abstracts are ordered chronologically, grouped by session. To find the paper of a specific author, please refer to the auther index at the end. The auther index refers to first authors only.

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FOREWORD

Dear delegates to the ESCOM5 conference,

Welcome to the 5th Triennial Conference of the European Society for the Cognitive Sciences of Music (ESCOM). This is the first time that an international meeting of this magnitude in the discipline of music psychology takes place in Germany. We are very pleased that this event has drawn such a large number of authors from 34 countries, contributing a total of 270 accepted papers.

ESCOM5 is a conference jointly sponsored by ESCOM and the German Society for Music Psychology (DGM). We are convinced that this effort will be of benefit for both participating societies and will intensify the already existing international cooperations in the field of music psychology.

Some of you will perhaps be surprised that the conference venue is the University of Music and Drama (Hochschule für Musik und Theater, HMT) and not the Hanover University. Unfortunately, as in many other countries, science and art are housed in separate institutions. However, the HMT emphasizes both its artistic as well as its scientific orientation.

This dual artistic and scientific profile is obvious from the mere existence of several institutes of international standing within the HMT: the Institute for Research in Music Education (IfMpF), the Institute for Communication Research (IJK), the Institute for Music Medicine and Music Physiology (IMMM), the Institute for Jewish Music, and the recently founded Study Center for World Music. For further information about the Hanover University of Music and Drama we refer you to our homepage at http://www.hmt-hannover.de. In planning this conference we have tried to combine the scientifc discourse with artistic experiences and musical events. The evening program of ESCOM5 will offer numerous opportunities to gain fresh perspectives on some musical topics.

An event such as the ESCOM5 could never have been realized without the financial support from many different sources. We are indebted to the German Research Foundation (DFG), the Ministry of Scientific Affairs of Lower Saxony, the Sparkassen Foundation, the German Society for Music Psychology, and Professor Klaus-Ernst Behne, President of the HMT who agreed to host the ESCOM5 in Hanover and generously offered the use of the HMT's facilities.

Finally, we wish all delegates an inspiring and successful conference.

The ESCOM5 conference team

Reinhard Kopiez Andreas C. Lehmann Irving Wolther Christian Wolf

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MONDAY

September 8, 2003

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KEYNOTE 1

Timothy Griffiths

Monday 16:00
Room: Kurth (Concert Hall)

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DISORDERS OF MUSICAL PERCEPTION

Timothy D. Griffiths
Auditory Group, Newcastle University, UK
Wellcome Department of Imaging Neuroscience, University College London, UK

Three examples of disordered musical perception will be discussed.

i) Recently a form of congenital agnosia manifest as a deficit in musical perception has been described systematically for the first time 1 2. The early reports suggest particular deficits in the processing of contour and interval. Recent work in our laboratory has corroborated the existence of the condition and the presence of central deficits in the perception of pitch. Specifically, we have identified a deficit in the perception of pitch-change direction with intact perception of pitch-change. I will argue that this constitutes a deficit in the processing of a 'building block' for contour that affects local processing in turn. Cognitive neuropsychological 3 and imaging data 4 suggest that such a deficit in the processing of pitch patterns is a cortical deficit involving superior temporal lobe areas distinct from primary auditory cortex..

ii) A number of recent studies (eg 5) have sought to use musical stimuli to characterise the cognitive style in Autistic Spectrum Disorder (ASD). Models of cognitive processing based on visual perceptual testing, suggest that in ASD there may be differences in the processing of local and global information, and the interactions between them. Previous studies using auditory stimuli have equated global processing in the visual domain with the perception of the contour of pitch sequences. We argue that the global feature of pitch sequences is actually the pattern of pitch direction changes (contour) in association with the absolute pitch values and time points of change. In a recent study of 13 subjects with ASD and 15 age- and intelligence-matched controls we have demonstrated that the global structure defined in this way interferes with the processing of contour in normal subjects but not in subjects with ASD.

iii) Functional imaging suggests a different substrate for the processing of the emotional transformation ('shiver') that can sometimes be produced by music from the substrate for the recognition of music 6. We have recently assessed a subject who lost the 'shiver' produced by certain music following a left hemisphere stroke affecting the insula and amygdala. This suggests that these areas within the network defined in normal subjects are necessary for the emotional effect of the music.

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TUESDAY

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KEYNOTE 2

Tia de Nora

Tuesday 14:00
Room: Kurth (Concert Hall)

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THE SOCIOLOGY OF MUSIC LISTENING IN EVERYDAY LIFE

Tia DeNora
University of Exeter, UK

Music sociologists, ethnomusicologists and social psychologists of music have turned over the past decade to music listening in ordinary life settings. This work has illuminated music's functions across a range of social settings and has helped highlight the importance of music perception as it occurs outside of both the laboratory and the concert hall. This talk will survey recent work on the topic of music listening in daily life and highlight directions and methods for future research. It will focus in particular on sociological methods. While the techniques described are mainly qualitative, they are not presented at the exclusion of experimental or quantitative modes of enquiry which are also of value. In particular the paper will discuss music's role in relation to strategies of social 'control' (i.e., music dissemination practices that are linked to attempts to structure the conduct of others), self-management in daily life and music's role in helping to define social scenes. It will point to some implications for the study of music's social effects and describe new and on-going work in the area. The study of music listening in everyday life will be described in relation to sociological theories of action and emotion and to the 'cultural repertoires' perspective. The argument will be advanced that too much of sociological theory has ignored the non-cognitive aspects of social action and that empirical research on the topic of music listening in everyday life serves to highlight action's aesthetic dimension. Music, it will be concluded, should not be ignored within social theories of structure and agency and thinking about music as a dynamic medium in social life (via grounded studies of everyday music listening practices) helps to advance a richer conception of the sources and structures of social action.

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SYMPOSIA

Tuesday

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SYMPOSIUM

Music therapy

Organizer: Jörg Fachner

Tuesday 9:00
Room: Wellek (315)

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TEMPORAL, OCCIPITAL AND PARIETAL EEG-BRAIN-MAPPING CHANGES IN PRE/POST-THC-MUSIC AND REST

Jörg Fachner
Institute for Music Therapy, University of Witten/Herdecke, Germany

Background

Cannabis (THC) is known to change auditory perception, as many musicians and music listeners report in narratives, interviews and biographies. Audiological studies demonstrated a THC-induced preference for higher frequencies and expanded metric scaling of auditory events.

Aims

Topographic imaging studies on intensity and locality of cerebral processes investigating cannabis and music perception (MP) are not available.

Method

An ethnographic pre/post study was conducted in a habituated naturalistic setting. EEG-Brainmapping Data (28 EEG traces; rest; pre/post music listening; smoked Cannabis 20 mg Δ9 THC) were averaged and treated with a T-test and a visual topographic schedule. Comparisons between Pre/Post-THC-Rest (PPTR), and Pre/Post–THC-Music (PPTM) were performed.

Results

During Post-THC-Rest (PoTR) α-waves decreased; however, compared to Pre-THC-Rest (PrTR) and Pre-THC-Music (PrTM), the Post-THC-Music (PoTM) showed higher α-percentage and -power in the parietal cortex, while other frequencies decreased in power.

T-Test of PrTR and PoTM, further PPTM comparisons elicited a significant change ($p<0.025$) in left occipital area. Comparing PPTM, differences ($p<0.025$) were also found in the right frontotemporal cortex on θ, and on α in the left occipital cortex. During PrTM listening θ-percentage increased but decreased more in PoTM than during rest. In both temporal lobes θ-amplitudes decreased during PoTM as well.

Discussion

Changes in temporal and occipital areas and increasing α-signal strength in parietal association cortex seem to represent an interindividual constant EEG correlate of altered MP and hyperfocusing on acoustic space. α-amplitude changes might represent altered, intensified attention and show a marked similarity to reverse α-findings in studies with gifted individuals. Changes of temporal and occipital areas, both known to be involved in MP might represent altered MP and an intensified insight into the 'space between the notes'.

Conclusion

THC has a measurable influence on cerebral music processing and seems to enhance acoustic perception. Cannabis might provide benefits for the hearing impaired.

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PHILLIPS GROOVE! – INTEGRATING YOUNG CHILDREN WITH AUTISM ON CHILDCARE PLAYGROUNDS

Petra Kern
Institute for Music Therapy, University of Witten Herdecke, Germany
University of North Carolina, USA

Background

This paper describes a project integrating children with autism into a childcare playground. Children with special needs, especially those with autism, require support to participate successfully in meaningful play and social interactions in large spaces and unstructured playtime.

Aims

The paper will focus on a research study conducted with four young children diagnosed with Autism Spectrum Disorder who displayed a lack of interest in interacting with their peers. The goal of the study was to improve their interactions with their classmates in the playground through (a) adding an outdoor music center, (b) songs individually composed for each subject, and (c) the implementation of the intervention by the subject's teachers engaging classroom peers as formal and informal helpers.

Methods

The research questions were: (1) Does the use of a song and the music center increase the duration, frequency and quality of peer interaction on the playground for children with autism, (2) Can the classroom teachers learn the principles important to music therapy, and (3) Will peers participate and model tasks? Using a single-subject experimental design (multiple baseline across four children) the effectiveness of the intervention was evaluated. Data were collected in four conditions over eight months.

Results/Conclusion

The results indicate increases in peer interaction and engagement occurred when supported by adults. The findings suggest that the intervention significantly enhanced the children's quality of peer interaction, engagement in playgrounds, and addressed other therapeutic goals as shown in videotaped sequences.

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MUSIC THERAPY WITH PEOPLE SUFFERING FROM MULTIPLE SCLEROSIS: AN INTERDISCIPLINARY PILOT STUDY

Wolfgang Schmid[1], Mette Kaeder[2], David Aldridge[1], Cordula Schmidt[2]

[1] Chair for Qualitative Research in Medicine, Institute for Music Therapy, University of Witten/Herdecke, Germany

[2] Gemeinschaftskrankenhaus Herdecke, Germany

Background

Patients suffering from a chronic progressive illness like multiple sclerosis experience increasing restrictions in their lifestyle and are forced to cope with the loss of independence, ability to work and a reduced social and financial status.

There is often evidence of low self-esteem, a fear of losing control, social withdrawal and general loss of interest in life.

MS patients also show impairments in their mental and emotional condition, this is a serious burden, and they particularly complain of a restriction in self-expression.

The premorbid competence of MS patients appears to be of much more significance for coping with the disease and its consequences than assumed so far.

Aims

Thus a therapy approach where personality-specific, i.e. individual factors and competences may be taken into consideration and be supported, and where patients are encouraged to remain active or resume activities is indicated.

Method

A controlled pilot study over a period of one year with 20 male and female MS patients explored the specific benefits derived from active non-verbal music therapy using the Nordoff/Robbins approach. A focus was made on personal activity and the discovery of individual resources and limitations.

Another objective of the study is to illustrate a method of how to assess qualitative data collected in music therapy and how to correlate them with quantitative data from standardized interviews on quality of life, self-acceptance, depression and anxiety.

Results

Results will be presented at the conference.

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AUDITIVE STIMULATION THERAPY AST® INTERVENTION IN SUBACUTE AND CHRONIC TINNITUS

Martin Kusatz
Tinnitus Therapie-Zentrum Krefeld
Institute for Music Therapy, University of Witten Herdecke, Germany

Background/Aims

A study at the Tinnitus Therapie Zentrum Krefeld, Germany, explored the efficiency of a multimodal therapy concept (Krefelder Modell) for out-patients suffering from subacute and chronic tinnitus over a projected period of three years. Data on treatment results of 700 tinnitus patients were collected and evaluated in a two-phase study.

Method

Data of the two-week therapy were collected with questionnaires immediately prior to and after therapy, and at a follow-up after 6 months. Apart from anamnestic details, patients were asked for subjective personal evaluation of treatment. In addition, the tinnitus questionnaire (Goebel & Hiller) was employed at all measurement times in phase I (n=155). In phase II (n=545) it was employed prior to and after the start of the therapy.

Results

The efficiency of the entire concept was explored first. Definite improvements were achieved in regard to subjective results. 40 % of patients responded to the question of whether therapy had helped them to cope with ear ringing with "excellent", 29 % with "good" and 16.8 % with "satisfactory".

At a follow-up, patients were also asked about any remaining ear noises from which they were suffering. 3.2 % answered that these noises had stopped completely; 30.8 % indicated that they were free from complaints for some of the time, and approximately two thirds reported continued ear noises over the past six months, which, however, had diminished noticeably.

A comparison of the individual therapy types within the concept showed a surprisingly high share of AST® in the positive result.

Discussion/Conclusion

In comparison with studies into other treatment concepts with hospitalized patients and out-patients, the multimodal treatment concept described above produced noticeably better therapy results.

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PHRASING AS EXPRESSION OF TIME AND TIMING IN IMPROVISED MUSIC THERAPY

Peter Hoffmann
Institute for Music Therapy, University of Witten Herdecke, Germany

Background

In active music-therapy, improvised music indicates important dimensions of a client's performing and being in the world. Against this background a close look at the musical material provides insight for diagnostic understanding and therapeutic development. The musical component phrasing seems to be a meaningful aspect for these areas.

Aims

A doctoral study at the Institute of Music Therapy, Witten/Herdecke University, investigates the concept and significance of phrasing in improvisations by psychiatric patients.

Method

The investigation follows a hermeneutic phenomenological methodology focussing on improvised music. Tape recordings of individual therapy episodes are analysed for creative styles and qualities of structured meanings in the temporal-musical process. The study also includes two investigations by music therapists to proof the qualitative findings.

Results

Findings suggest that the concept of phrasing allows for description of individual aspects of formative creation, orientation within time, relationship with time, and the development of creative intentions within the "musical play". From a musical point of view, the study underscores that psychiatric illnesses can be viewed as disorders of time.

The findings of the study underline the significance of the musical material in music therapy improvisations for diagnostic understanding and clinical work.

Conclusions

Our study supports the view that phrasing within the process of music-therapy may help a regaining of ability to experience and create qualities of time and timing, and may lead to improved orientation, growing autonomy, growing intention in action and an ability to relate to others. In accordance with research findings in physiology, neurobiology, psychology and social studies, the concept of phrasing in music-therapy is an important and meaningful diagnostic and therapeutic tool.

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COMMUNICATION AND DIALOGUE – MUSIC THERAPY WITH PERSONS IN ADVANCED STAGES OF DEMENTIA

Hanne Mette Ridder

Institute for music and music therapy, Aalborg University,Denmark

Background

Persons with dementia suffer a dialogical degenerative disease. It becomes problematic to express basic needs or simple requests, and to feel recognized and understood. This can lead to isolation, resulting in serious secondary symptoms to the dementia disease. Using songs in a music therapeutical setting might enable ways of communication adjusted to the person. The songs in the setting have more functions; they function to structure, motivate, stimulate, and regulate, and finally as means of enabling communication and dialogue.

Aims

The research is trying to investigate if songs have regulative effects and to outline different levels of communication.

Method

The method is an ethnographical process research using Atlas.ti as qualitative research software for the analysis and administration of transcribed data, and using physiological data to validate observational data in a case study design. In a flexible design both quantitative and qualitative data collection methods are used as a rich approach to understanding communication. Primary data: video recordings of 6x20 music therapy sessions, 6x30 5-second-interval heart beat measurements, questionnaires, music therapist's log, medical records. Secondary data: video data transcripts, HR data in session-graphs, HR pre/post data, reduction of video data to 9 minutes for external assessors, and transcripts of external assessors' observations.

Results

- Analyses using the computer software Atlas.ti of qualitative observations done by external assessors suggest six head categories of communicative signals: emotional valence, receptive participation, sociality, active participation, communicative musicality and dialogue.
- Presentation of a catalogue of gestural responses indicates that communication is taking place.
- Physiological data indicate that the songs used in the music therapy have regulative effects on the participants.

Conclusion

Individual music therapy using familiar songs is a valid approach to increase quality of life and to fulfil psychosocial needs in persons with dementia.

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RELATIONS BETWEEN TEMPO PERFORMANCE, EXPRESSIVENESS, AND MUSIC THERAPY OUTCOME

Veronika Busch
Humboldt-University of Berlin, Germany

Background

Patients with chronic pain suffer from "inhibited expressiveness" (e.g. high muscle tonus; inflexible mimic and gesture). The "Heidelberg Model" for music therapy with patients suffering from chronic pain focuses on emotional flexibilisation and enhancement of expressiveness through musical flexibilisation. According to music psychological research reduced expressiveness should especially affect patients' musical tempo and timing performance as important parameters for musical expression.

Aims

The claim by music therapists that musical performance mirrors psychological parameters is questioned. Positive correlations between tempo performance, expressiveness, and therapy outcome would support the claim and might have implications for music therapeutic treatment of chronic pain.

Method

A controlled experimental study with 16 patients receiving music therapy, 21 pain patients not receiving music therapy, and 30 healthy subjects is conducted. Psychological questionnaires measure expressiveness, therapy outcome, pain intensity, and affective pain perception pre, during, and post 20 music therapy sessions. Flexibility in musical tempo performance is assessed by a standardised test with subjects synchronising on an electronic drum to a musical stimulus which changes in tempo. Test design also includes tapping tasks.

Results

Pain patients tend to show less expressiveness than healthy subjects. Therapeutic success and tempo performance are positively correlated to expressiveness. Tempo performance differs with regard to therapy outcome. Best results for synchronising with musical stimulus are found at subjective tapping tempo.

Conclusion

Because the selected musical and psychological parameter are found to be related, it is likely that music therapy supports psychological cure. For the treatment of chronic pain, enhancing expressiveness through active music therapy seems to be effective. Taking the subjective tempo of a patient as a starting point for music therapeutic improvisation supports successful musical communication. Further research into musical parameters is needed to develop specific music therapeutic interventions.

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SYMPOSIUM

Neuroscience of music perception and production

Organizer: Eckart Altenmüller

Tuesday 9:00
Room: Révész (202)

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IS NEUROSCIENCE HELPFUL FOR MUSICOLOGISTS?

Eckart Altenmüller

Hochschule für Musik und Theater Hannover, Institut für Musikphysiologie und Musiker-Medizin, Germany

Research into the neurobiological foundations of music learning and musical performance has developed dramatically during the last decade. The term neuromusical research itself hallmarks the new approach to music and music learning in neurobiology and music psychology. Musicologists hope that neuroscience can help them to understand the ways humans perceive and produce music, Music educators hope that brain research can provide them with arguments against the continuing shortage of public funding of music education, musicians hope that neuroscience can teach them strategies to better perform.

Can neuroscience be regarded as the new "Leitdisziplin" – the leading discipline in musicology?

The aim of the paper is to give a short update of some of the most urgent questions in the field of neuromusicology: Why is music such a powerful stimulus for plastic adaptation of the brain? What is the role of the training parameters that lead to successful learning and plasticity? Can these parameters be exploited in music education or to enhance learning in other domains? Is music processing mainly reflecting the individuals' auditory biography or exist inter-individual constant factors?

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DEVELOPMENTAL ASPECTS OF MUSIC PROCESSING AS MEASURED WITH EEG AND FMRI

Stefan Koelsch
Max-Planck-Institute of Neuroscience, Leipzig, Germany

Numerous studies have investigated physiological correlates of the processing of musical information in adults. How these correlates develop during childhood is poorly understood. The study examined event-related electric brain potentials elicited in 5- and 9-year-old children while they listened to (major-minor tonal) music. Stimuli were chord sequences, infrequently containing harmonically inappropriate chords. Results demonstrate that the degree of harmonic (in)appropriateness of chords modified the brain responses in both age groups according to music-theoretical principles. This suggests that 5-year-old children already process music according to a well established cognitive representation of the major-minor tonal system, and to music-syntactic regularities. Moreover, we show that, in contrast to adults, an early negative brain response was left predominant in boys and bilateral in girls, indicating a gender difference in children processing music, and revealing that children process music with a hemispheric weighting different from that of adults. Because children process the music in the same hemispheres as they process language, our results indicate that children process music and language more similarly than adults do. This finding might support the notion of a common origin of music and language in the human brain, and concurs with findings that demonstrate the importance of the musical features of speech in the acquisition of language skills. Interestingly, fast and automatic brain responses of music-syntactic processing can be observed at an earlier age than the analogous responses for language-syntactic processing. Data obtained from 9 and 10-year-olds with functional magnet resonance imaging (fMRI) indicate that inferior fronto-lateral and posterior temporal cortical areas are involved in the processing of musical information, the pattern of activation being fairly similar when comparing adults and children.

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COGNITIVE NEUROSCIENCE INVESTIGATIONS OF PROFESSIONAL MUSICIANS

Thomas F. Münte
Dept. of Neuropsychology, University of Magdeburg, Germany

Professional musicians practice for many hours and thus stimulate the motor, sensory, auditory, and limbic parts of their brain to an extent that leads us to expect plastic changes of both the processing architecture and the underlying neuronal machinery.

In my contribution I will consider a number of recent studies from our laboratory, in which we have investigated professional musicians. Specifically, I will argue that the specific role or instrument that a musician has shapes the way he processes auditory stimuli. For example, in a group of professional conductors we could demonstrate that the gradient of spatial attention in the periphery of auditory space is much steeper than in pianists or non-musicians. Drummers/percussionists on the other hand could be shown to be better at the preattentive processing of stimuli possessing a complex time structure.

These and other data suggest that musicianship leads to an adaptation of cognitive and brain system that matches the individual needs. I will thus argue that musicians can serve as a model organism for the study of neural plasticity.

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WHAT IS SPECIAL ABOUT THE BRAINS OF MUSICIANS?

Lutz Jäncke

Universität Zürich, Psychologische Fakultät, Institut für Neuropsychologie, Zürich, Switzerland

Musicians are an attractive subject pool in which one can investigate possible cerebral adaptations to unique requirements of skilled performance. There are several reasons for this. Firstly, the commencement of musical training usually occurs when the brain may still be able to adapt. Secondly, at least professional musicians undergo long-term and intensive motor training of complicated uni- and bimanual motor activities. Thirdly, imaging studies from our group as well as other groups have shown that motor learning in the context of musical training can lead to changes in the cortical representation of motor control. Whether the unique musical abilities and structural differences that musicians' brains show are due to learning or whether they reflect innate abilities and capacities that might be fostered by early exposure to music is largely unknown. In this presentation, several studies conducted by our group will be demonstrated that indicate that certain brain regions (corpus callosum, motor cortex, and the medial motor wall) related to the control of uni- and bimanual movements may show some form of adaptation to the extraordinary challenges of musical performance. These adaptations comprise macrostructural and functional changes of the motor areas.

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SYMPOSIUM

Popular music research

Organizer: Günter Kleinen

Tuesday 9:00

Room: Stumpf (E15)

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MOVING INTO THE FIELD OF POPULAR MUSIC – A SHIFT IN SCIENTIFIC CONCEPTS, VALUES, QUESTIONS AND METHODS WITH EDUCATIONAL IMPLICATIONS

Günter Kleinen
University of Bremen, Germany

Background

About 150 years after v. Helmholtz' pionier work about musical acoustics ("On the sensation of sound"), so-called Systematic musicology was developed in the "natural" context of classical music. But by critical review, it has been revealed that the classical canon of European art music has a historic starting point as well as an end, at least in its absolute recognition (cp. Cook). So today, popular music changes music psychology, the horizon of questioning, the spectrum of methods, the results, and consequences.

Aims

Moving from the classical style into the area of popular music causes a shift of our scientific focus. The concepts and methods of research have to be adapted to the new area. The older subjects are seen under new perspectives and scientific paradigms, with implications on music education (cp. Webster).

Main Contribution

The shift concerns topics of high relevance for music psychology, like perception, talent, creativity, hierarchy of tone parameters in music reception, experience of body and rhythm, self taught learning versus formal education, emotions and meanings, evaluation. Especially the frames of reference and the methods of scientific research are enriched by the experience of pop music research in the cultural studies (cp. Frith).

The consequences in music education are remarkable and concern the center of musical learning in schools, i.e. aims, the methods of teaching and learning, the relation to new media, the evaluation of music lessons by students, teacher colleagues, parents, school image, the improvement of general living conditions in schools, the inclusion of outside activities etc. Results of the BACKDOOR-project will be discussed under these perspectives.

Implications

The implications concern music education in schools but also musical learning by individual initiatives and activities in instrument learning and playing in groups or bands (cp. Green).

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CREATIVITY WITH A LARGE 'C' – CREATIVITY WITH A SMALL 'C'

Anja Rosenbrock
University of Bremen, Germany

Background

The central distinction between art music and popular music is frequently seen in the quality of composition. While art music composition is expected to be the work of a 'genius', popular music is often not even considered composed music, but rather a re-arrangement of pre-shaped musical clichés either at random (amateur section) or according to a formula (professional section). Psychologically, this distinction may be reduced to the idea of "creativity with a small 'c' – creativity with a large 'C'" – that is, creativity as an everyday activity available to everyone or creativity as the rare work of a genius.

Aims

The aim of this paper is to suggest a revised concept of creativity and composition in music psychology which extends to the field of popular music.

Main Contribution

One of the reasons why music psychologists largely neglect the field of popular music may be because they do not consider the "creativity with a small 'c'" associated with this field worth the effort: While the 'inexplicable' work of 'genius' is a challenge for psychology, everyday creativity may not hold the same fascination. However, the idea that "creativity with a large 'C'" is inherently different from "creativity with a small 'c'" recently has been questioned by both psychologists and musicologists such as Robert Weisberg (1989) and Nicholas Cook (1990, 1998).

A closer look at processes of inspiration and elaboration suggests that the 'exceptionality' of western art music composition is an idea closely connected to the 'genius myth,' the Romantic concept of creativity. Due to large structural similarities between composition in both contexts, music psychology's disregard of popular music seems largely undeserved.

Implications

See aims.

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THE STUDY OF RHYTHM IN POPULAR MUSIC. APPROACHES AND EMPIRICAL RESULTS

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Institut für Musikwissenschaft, Universität Hamburg, Germany

Background

Recently, cognitive psychology of music is getting more and more involved with popular music. There are new and interesting issues and phenomena to examine, e.g. the perception of timbre and texture, that is very important in certain styles of popular music, or the rhythmic organisation especially in those genres, where the music aims to "move" you emotionally and/or with your body.

Aims

The paper aims to explore the research on the perception, cognition and production of rhythm in popular music (jazz and other African American styles as well as rock and contemporary dance music). I want to summarise the main issues, the theoretical and empirical approaches to rhythm phenomena and, last but not least, I would like to show some perspectives for their further empirical examination.

Main Contributions

Among the main issues there are:

- pulse salience and meter induction: how does it work? Which musical parameters (e.g. timbre, pitch, articulation) contribute to the perception of accents patterns?
- polyrhythmic pattern models as emergent cognitive schemas, stabilised by rehearsal – or polyrhythm as „rhythmic rivalry", rhythmic tension and metric ambiguity;
- metaphoric motion of rhythms and their relation to body movement, dance and emotions;
- perception and production of microrhythmic play (e.g. in swing quavers or snare drum backbeats);
- issues of interactive processes between musicians and/or listeners.

There are several methodological approaches to study those issues: experimental approaches with musicians and listeners (e.g. production experiments, similarity ratings); analyses and measurement of music; qualitative interviews with musicians and listeners (e.g. focused interviews).

Implications

A cognitive approach to rhythm in popular music goes far beyond a better understanding of the popular music styles under question, it may also enhance the models of perception, cognition and production of rhythm.

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HARD ROCK, HEAVY METAL AND PUNK: COMPARING PSYCHOLOGICAL FINDINGS WITH CULTURAL STUDIES ACCOUNTS

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A number of psychological studies – some clinical – have dealt with the interrelationship between the personality of individuals and their affinity to or preference for certain musical styles or genres. Hard rock, Heavy Metal and Punk quite often appeared to be associated with problematic personality traits such as psychoticism or neuroticism (Rawlings et. al 1995). Most of these studies are based on the five-factor-model of personality ('big five') and respective psychological tests such as the NEO Personality Inventory or the Myers-Briggs-Type Indicator (MBTI). In addition, various tests on musical preferences are used, and the results are correlated. However, what appears to be missing is the attempt to understand these musical styles or genres in their cultural dimension. Common approaches in Popular Music Studies would instead try to offer a more differentiated picture where Hard Rock, Heavy Metal or Punk are seen as cultural phenomenona of many dimensions. And even if these studies might contain a number of interviews or observations in the 'scene', an empirical verification is neither included nor intended. Instead, the problem is raised that the results from empirical studies can be instrumentalized in favour of certain political or ideological interests, sometimes even resulting in a call for censorship (Walser 1993, p. 137-171). A 'link' seems to be missing: while cultural studies approaches frequently appear as too speculative for psychologists ('without an empirical basis'), researchers in cultural studies are often turned away by the results from empirical studies which they consider as reductionist and frequently missing the point. In this paper, I will argue that both sides will need to widen their perspective in order allow more interdisciplinary exchange in the future.

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SYMPOSIUM

Emotion regulatory processes and musical development

Organizer: Stefanie Stadler Elmer

Tuesday 15:00
Room: Révész (202)

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WELL-BEING, CHILDREN'S VOCAL PLAY, AND MUSICAL DEVELOPMENT

Stefanie Stadler Elmer
University of Zuerich, Switzerland

Background

By definition, playing implies positive emotions such as gaiety or cheerfulness or well-being. Hence, children's vocal play or spontaneous singing may be assigned similar emotional states. Usually emotions in music are assessed by verbal reports or physiological data. Both methods have severe limitations when applied to children's vocal play and spontaneous singing.

Aim

The aim is to clarify the emotional states related to children's spontaneous singing and to determine the indices that allow to identify emotional states and phases. Spontaneous singing or vocal play is defined as self-initiated vocalisations without any immediate preceding social stimulation for this action. It includes at least some metric timing and/ or extended vowels.

Method

Micro-genetic analyses are applied to children's spontaneous singing recorded on audio- or video tapes. The analyses include structural aspects of singing (lyrics, pitches, timing) as well as behavioural and environmental aspects of the child's activities related to singing.

Results

Descriptive data provide insights into the process of how a child generates and maintains the state of well-being, and how this is expressed. One focus is put on vocal patterns that are repeated or slightly varied. Although it is impossible to repeat an experience, it seems that children are able to use singing unconsciously to recreate previous experiences and emotional states.

Conclusions

Spontaneous singing or vocal play is an excellent means to study children's unconscious competence to generate and maintain positive emotional states. The focus on behavioural indices challenges verbal approaches to emotions, and it shows the weakness of verbal reports or predefined verbal categories to communicate emotions. In addition, emotional states related to singing are discussed from a developmental point of view with respect to the intra-psychic and inter-psychic regulation of emotions and moods.

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FOSTERING THE DEVELOPMENT OF SOCIAL-EMOTIONAL COMMUNICATION THROUGH MUSIC

Christine Plahl
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Background

Music is known to have a potential of establishing emotional and social communication. Music therapy successfully uses this potential for establishing a musical contact and developing a musical dialogue. This kind of preverbal social-emotional communication relates to musical elements in early communication patterns with fundamental importance for emotional regulation, for communication through speech and song and for creativity.

Aims

To evaluate how and to what degree music is able to foster the development of social-emotional communication of multiple handicapped children (n = 12) a clinical intervention study has been conducted in the Center for Social Pediatrics in Munich, Germany. The effect and the process of music therapy has been analysed with a focus on the preverbal communication through joint attention, turn taking and intentional reference.

Method

There has been a multi-method research design with a detailed micro analysis of music therapy video tapes by a computerized category system. On a rating scale the music therapists gave their estimation of experienced contact, emotional state and communicative activity. The status of preverbal communicative development has been tested during the treatment by the Early Social Communication Scales (ESCS). In a semi-structured interview the parents reported the children's communicative development at home.

Results

The results show significant improvements in the ability of preverbal social-emotional communication. This has been demonstrated for all kind of data and is especially impressive for the ability to regulate emotion and behaviour. Here all children developed more intentionality, more intensity and more self-confidence.

Conclusions

The details of the video micro analysis reveal how the music therapist creates the musical environment. This zone of proximal development is characterised by a specific set of musical features and a special form of therapeutic co-regulation.

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THE SOUND OF SONGS WITHOUT WORDS

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Ingo Laufs
Markus Wenglorz
Werner Deutsch
Technical University of Braunschweig, Germany

Background

When singing songs, there is an interaction of music and language. These are the two main forms of culturally acquired vocal bahaviour. To understand more about the role of language in singing, we have studied an exceptional case of a child who sings songs although her language development is completely absent. This is a girl with an autistic disorder (early infantile autism) and severe mental handicap.

Aims

The presentation describes the musical activity of the autistic child, focussing on her implementation of speech sounds in singing.

Method

The study is based on a long-term video documentation of the single case, covering the period from age 3 - 15. The recorded singing events amount to about two hours of audio data or 269 instances of singing covering 28 different songs. Phonetic and musical transcriptions were prepared. The subject's musical abilities were assessed. Her phonetic output was compared with that of normal, developing and disordered speech.

Results

The subject reveals good musical abilities in singing. Her way of handling the model songs, though, is somewhat different from normal song reproduction. As to her phonetic production, the vowels reveal a great similarity to the speech input, but the consonants show striking differences in the inventory and in the relative frequencies of phone types. The subject's consonant production is not typical for any form of spoken language.

Conclusions

The autistic girl's musical ability in singing has developed even in the absence of language. We interpret her deviant sound production as a radical adaptation of speech sounds to musical purposes.

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EMOTION AND PERFORMANCE IN THE DEVELOPMENT OF CHILDREN'S SINGING

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Werner Deutsch
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Technical University of Braunschweig, Institute of Psychology, Germany

Ingo Laufs
Hanover University of Music and Drama, Germany

Background

In the course of a child's singing development, singing in community becomes the usual form of singing, whereas singing alone becomes more of an exception. Singing alone is often connected with self-rating emotions.

Aim

It is our aim to find out the relations between the behaviour of a child that is asked to sing alone and the quality of the ensuing song reproduction. We investigated which different forms of inhibition influence the child's readiness to sing. A second issue is how the motivational attitude toward the singing task is related to the quality of the singing.

Method

A cross-sectional study with longitudinal additions was carried out with 46 children aged 3 to 6 years. The experimental task of reproducing children's songs was embedded in a board game.

The song reproductions were categorized as to whether a song was sung immediately on request, after prompting or not at all. The musical quality of the song reproductions was assessed in terms of completeness, intonation and adherence to musical structures.

Results

Only four children always refused to sing. The remaining 42 children varied in motivation according to situation. There is a relationship between the type of inhibition – disinclination vs. lack of confidence – and the possibility of overcoming the initial blockade. Singing immediately upon request does not necessarily produce better singing results than reluctant singing.

Conclusions

Singing alone in the presence of others is a problem for many children. Situations that encourage joint singing or that enhance the child's self-confidence help reduce overdrawn expectations on their performance to a healthy minimum.

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SYMPOSIUM

Sociology of music

Organizer: Renate Müller

Tuesday 15:00
Room: Stumpf (E 15)

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SOCIOLOGICAL PERSPECTIVES ON MUSIC INVOLVEMENT

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Background and Aims

The sociology of music is the study of the role of music in various cultures, and in today's societies many cultures exist side-by-side. The sociology of music applies and develops sociological theories and methodologies to investigate musical behavior and attitudes as social action. This happens in interdisciplinary dialogue with musicology and music education. Since the field is still characterized by confusion and lack of agreement on such basic questions as subject matter and methodology, this symposium will not provide an overview of the sociology of music. Rather, this symposium focuses on sociological perspectives of music referring to ongoing sociological debates about the role of culture and media in modern societies. The maintenance versus the dissolving of traditional social boundaries is addressed. As a result of such debate, music as a cultural activity appears in a new light: Is music just a means of reproducing social inequality in a "class society"? Or is music a means to overstep social boundaries in an "individualized society" where individuals make their choice between sociocultural contexts to which they want to belong or from which they wish to be set apart? Thus the symposium is theoretically and empirically concerned with people's music involvement in social and cultural contexts of mass media, concert hall, and youth cultures.

Main Contribution

The first step will be to shed some light on contemporary sociological perspectives and the implications for research questions of the sociology of music. Music sociological approaches such as Bourdieu's view of culture, Schulze's idea of the new consumer society, the cultural studies approach and the sociology of popular music, the theory of musical self-socialization and identity construction, and the theory of symbolic exclusion are covered theoretically and accompanied by examples of research studies. One main focus will be the social role of music related to the individuals' appropriation of audio visual symbol systems. Appropriate research methods to investigate music involvement are discussed. Thus a framework will be provided within which the contributions of the symposium are located.

Conclusions

The contributions of the symposium are characterized by the twofold perspective that in modern societies the social use of music may serve as both a means of reproduction of social inequality and a means to overstep social boundaries.

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GENDER DIFFERENCES IN TEENIE-FANDOM: A TEENIE-FAN SURVEY ON MUSICAL INTERACTION IN FAN CULTURAL CONTEXTS

Stefanie Rhein
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Background and Aims

Thinking about teenie-fans, most people have young female teenagers in mind who act fanatically or hysterically whenever their favourite star is in sight and whose musical interaction is generally referred to as passive. These stereotypes of teenie-fandom are challenged by a MultiMediaComputer-survey that takes a different theoretical approach to the phenomenon of fandom: It is looked upon as part of young people's selfsocialization and identity construction and as an active social process in the social context of the fan group. Fandom is understood as being a member of a youth culture that defines itself by a shared musical taste and a specific approach to popular music and is therefore distinct from other groups and persons such as non-fans or adults.

The results of the teenie-fan-study (N = 217) support this theoretical model of teenie-fandom: It can be shown that fans are active users of musical objects, they engage intensively and creatively in a greater variety of musical activities than non-fans. The social context of their musical taste and of their musical activities as well as the appropriation and presentation of expert knowledge concerning their favourite music is more important to them than to the non-fans in the sample.

The results also indicate that teenie-fandom is far from being a mere "female phenomenon" as it is stereotypically assumed: 57,2 % of the 166 participants that refer to themselves as fans are female, 42,8 % are male. The high proportion of male fans makes it possible to investigate potential gender differences among the fans in the sample and to challenge the stereotypes referring to "female" teenie-fandom. In the secondary analysis presented here the theoretical approach will therefore be complemented by a gender perspective on fandom. Whereas the analytical focus of the original study was to compare fans and non-fans concerning their approaches to popular musical objects, the secondary analysis focuses on the question: Does it make a difference if a fan is male or female? The following hypotheses will be tested:

- Fans ascribe gender-specific social meanings to their fandom.
- Male and female fans differ in their approaches to popular musical objects.

Method

217 11- to 15-year-olds participated in the project. They answered mainly closed, but also open format questions on their musical taste, their engagement in musical fan cultures, their use of popular musical objects, and their musical interaction in the peer context. The questions were presented to them as a MultiMedia-questionnaire on the computer. The secondary analysis will be carried out in spring 2003. The conclusions of the secondary analysis will refer to theories of gender specific and cultural contexts of music involvement.

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MUSICAL INSTRUMENT PREFERENCES: GENDER-IMAGES AND GENDER DIFFERENCES

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Background

A part of an empirical study on young peoples' choices of musical instruments is presented. The study has been carried out by means of the questionnaire authoring system multimedia FrAuMuMe. What makes a musical instrument so attractive for teenagers that they want to play it? The study draws on concepts of gender specific aesthetic choices and preferences, and it follows previous research in musical instrument preferences.

Aims

The survey investigates the influence of the musical instruments' sound, appearance and movement of playing as determined by young people. Furthermore, sociocultural images ascribed to musical instruments are assumed to be important. The hypothesis was tested that the appeal of musical instruments varies with the ascribed gender-image. We examined whether the gender-image teenagers ascribe to musical instruments is influenced by sex, educational level, age and instrumental playing as well as by the other factors (see below).

Method

Young musicians as well as non-musicians were interviewed by the multimedia computer. Within an audiovisual questionnaire ten musical instruments (saxophone, clarinet, flute, trumpet, trombone, accordion, piano, keyboard, violin and guitar) were presented by the means of sound examples, pictures and – in addition – by means of video sequences showing the instruments being played. 187 teenagers of different levels of education from the ages of 12 to 18 rated the appeal of sound, appearance and movement of playing of each of the ten musical instruments. To examine the effects of images on musical instruments' preferences, the "need" to be trendy was explored, as well as generation and genderspecific images. To investigate the gender-image of the musical instruments, we asked whether sound, appearance and movement of playing were perceived as being male or female.

Results

The results show that the saxophone is the most appealing instrument to the participants. The saxophone's attraction increases with the level of education. With respect to the saxophone, clarinet, trumpet and trombone, sound is more influential to the instruments' appeal than appearance and movement of playing. The saxophone has the image of being neither an adult specific nor a youth specific instrument. Girls as well as boys ascribe a male specific rather than a female specific quality to the saxophone. But girls are more attracted by the saxophone's sound when they perceive it as female, while boys are more attracted by the saxophone's sound when they perceive it as male.

Conclusions

The study shows that the appeal of musical instruments to young people is far more differentiated than is implied in the assumption of mere gender specifity.

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CONCERT ATTENDANCE AND SOCIAL INEQUALITY

Hans Neuhoff
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Background

Concert attendance forms an important aspect of musical involvement, drawing both on resources of time and money. Furthermore, explicit or implicit norms of behaviour and mutual monitoring of visitors make concerts an important site of cognitive-emotional exchange and symbolic affirmation. Which aspects of social inequality discriminate between audiences of different types of music?

Aims and Method

Audiences of all major musical genres in Berlin/Germany 1999 (20 concerts, N=6500) were investigated with a mainly standardized questionnaire, focussing on social inequality in terms of the recent sociological debate ("conduct of life").

Results are presented for the following features: (1) age, (2) sex, (3) educational and professional status, (4) prime values, (5) social self-assessments. For the SES-variable, ISEI-scores are available for ANOVA and a qualitative classification of professions for correspondence analysis. For the value variable, rated "aims in life" were factorized and cases clustered over factor values to produce four types of basic orientations. Main self-assessments of different types of concert visitors are identified through logistic regressions.

Results

The discussion of results draws additionally on results from 1979 audience research. Age is confirmed as the most important single aspect of social inequality influencing concert attendance. However, cohort- and stage-of-life-effects apply in different degrees to the various types of music. Regarding sex, mainstream Rock (Jethro Tull, REM) appeals equally to young men and women today, indicating strong female appropriation activity over the past 20 years. Deviation from equal distribution of sexes in concert audiences increases with decreasing socio-economic status. Analysis of prime values reveals that similar value structures correspond to different popular musical styles in different cohorts.

Conclusions

Findings are discussed in light of the general theoretical concepts in social structure analysis. Styles of popular music are found to be more instrumental in communicating social difference than are styles of classical music.

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MUSICAL TASTE AND CULTURAL CAPITAL

Andreas Gebesmair
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Background

During everyday interactions we seek to establish new social ties or confirm existing ones using manifest signs of life styles. The ways we behave in certain situations, language codes, common interests, and shared repertoires of cultural preferences serve as resources with which we create mutual respect while excluding those who lack these cultural prerequisites. Since music is one element within this repertoire, it contributes to social exclusion. Or, as the French sociologist Pierre Bourdieu stated: Musical taste as well as other cultural preferences is used as cultural capital in order to control access to high status positions.

Aims and methods

Using data from a representative survey of the German population in 1998 (ALLBUS 1998), the paper will examine two main theses:

First, cultural capital is not only expected to be a commodity that children from high status families "inherit" from their parents, but also, one which upwardly mobile persons acquire during secondary socialization. Hence, the extension of secondary education has broadened the opportunity to acquire cultural capital.

Second, the transformation of the German postwar society has changed the form of cultural capital itself. The orientation on high culture has lost its significance. In a situation of devaluation of traditional cultural hierarchies, the crossing of cultural boundaries between high brow and low brow seems to be more and more a prerequisite for status attainment.

Results and Conclusions

While Bourdieu's central thesis that cultural capital is used in the production and reproduction of social inequalities can be confirmed, nonetheless, the following modifications will be proposed: First, as a result of the expansion of secondary education, the opportunity for acquisition of cultural capital has been extended. Therefore, Bourdieu's reproduction thesis is complemented by a mobility thesis. Second, social exclusion not mainly depends on symbolic exclusion but on the ability to step over symbolic boundaries.

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THEMATIC SESSIONS

Tuesday

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THEMATIC SESSION

Modeling

Tuesday 9:00
Room: v. Hornbostel (130)

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MODELING MUSICAL PATTERN PERCEPTION AS INDUCTION OF ANALOGIES INSIDE A SEMANTIC NETWORK

Olivier Lartillot
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Background

General methodologies for analyzing music — even structuralist ones — implicitly rely on perceptual principles. Indeed, music cannot be thoroughly understood without an appreciation of its communicative value. In fact, all limitations encountered by contemporary approaches of automated musical pattern discovery stem from an insufficient consideration for perception.

Aims

It would be of great benefit, therefore, to develop a computational approach of automated music analysis based on a cognitive modeling of music perception. This first step towards a cognitive understanding of musical pattern perception aims at conceiving a general cognitive system that is able to produce expected results without combinatorial explosion.

Main Contribution

This paper introduces a general computational model of music perception that relies on two main temporal characteristics of music: chronological direction and short-term selectivity. As a result, musical pattern is defined as an aggregation of successive local intervals. Patterns are induced by analogy between a current context and similar past contexts that are reactivated through associative memory. Here, patterns are conceived of as concepts that are actualized in the musical score. This score is represented as a network of notes, which are linked to pattern occurrences that themselves form meta-patterns of patterns. The computational model has to be regulated by general logical principles in order to avoid combinatorial explosion.

Implications

Such an understanding of music perception agrees with subjective experience. Such a computer modeling may offer to musicology a detailed and explicit understanding of music, and may suggest to cognitive science the necessary conditions for a virtual perception of musical pattern.

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CO-ALGEBRAIC MODELING AS AN ADEQUATE MEANS FOR THE REPRESENTATION, RENDERING AND DISCUSSION OF TRANSCENDENTALLY DEFINED AESTHETIC OBJECTS

Markus Lepper

Baltasar Trancón y Widemann

Technische Universität Berlin, Fakultät IV, Institut für Softwaretechnik und Theoretische Informatik, Fachgruppe ÜBB, Germany

Background

Employing modern techniques and technologies of computer-aided data processing in the field of musical analysis and theory essentially has two pre-requisites: (1) There has to be some flexible means of constructing digital, ie. mathematically founded models of the corpus in question, and (2) there must be an open architecture which allows the attachment of arbitrarily defined data to the corpus or to its sub-structures.

Aims

Ideally, any theorist, psychologist, poet, musical scientist, conductor, teacher etc. should be able to annotate (in principle) arbitrary contents to any single "musical event", and to define arbitrary new relations and groupings among events.

Only their domain expertise should be the measure, not the internal algebraic structures of the meta-model.

In practice it turns out that most of the existing representation systems for musical corpora, from academic as well as from industrial origin, do not ideally suit this task.

There are two fundamental deficiencies:

1) The basic meta-model for events (eg. some fixed set of "event parameters" and their domains) is hard-coded in the kernel, without the possibility of transparent extension or exchange. This severely limits expressiveness, esp. in case of avant-garde music using non-standard notations.

2) Partially defined objects can not be treated, so quotient algebras have to be used for modeling eg. pitch-classes without an octave or durations without any pitch. These quotient algebras are only known to the human user, and not integratable into the semantics of the system.

Main Contribution

Our analysis of the nature of the cultural phenomenon "musical score" revealed the necessity of mixing algebraic and co-algebraic data structures.

In our paper we present a constructive approach for explicitely modeling the co-algebraic relations, and make them first-order resident for the language architecture.

This yields

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1) maximum flexibility in the definition of basic parameter structures and possible relations of events,

2) "automatic" polymorphism of evaluation rules,

3) and easy embedding of function-valued parameters.

The latter is needed for two powerful abstractions:

(a) definition of dynamic and context-sensitive calculation rules as data, and (b) exchangeability of interpretations, versions and evaluation results without the need to physically duplicate the constant parts of the corpus.

The mathematical theory is presented and the issues of language design are discussed using concrete examples of application.

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MOTIVE TRANSFORMATIONS BASED ON FINGER MOVEMENTS

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Nokia Research Center, Helsinki, Finland

In this research report a model is presented, which simulates two hand and finger movement types to make harmonic transformations of motives. The results show that this simple compositional strategy without any additional rules is enough to generate plausible music in pattern oriented style which is based on triad harmonies.

Background

In motional composition strategy (MCS) different types of movements are used for different types of harmonic transformations. Two types of (keyboard playing) hand movement have inspired this strategy. In the modelled situation the chordal pitces are played successively, as a pitch pattern. The fundamental types are a) *whole hand moving sideways* where adjacent fingers are successively pressed down, suitable for scaletype movements and b) *hand spreading movement*, two fingers, ex. thumb and little finger, are moving away or towards each other when the hand itself stays in place, suitable for interval type motives.

Aims

To test the model of motion based motive transformations. Possible uses in the music and what is the effect of this compositional method to musical coherence.

Method

To examine this possible relation between certain movement types and music an computer model (MMS) was devised to simulate the composition using motionally oriented strategy. To enable the focusing on the actual dynamic movement processes only simple contextualization (i.e. culturally oriented enhancements) was incorporated.

Results

Several test runs using the model were made to harmonically process precomposed motives. Pieces generated by the MCS-model were generally very homogenous and fluent and motives were harmonically transposed in "natural" ways.

Conlusions

Simple motional composition strategy enhances the coherence in generated pieces and facilitates the harmonic transformation of the motives.

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A MARKOV MODEL FOR CHORALE HARMONIZATION

Kaan M. Biyikoglu
Middle East Technical University, Informatics Institute, Ankara, Turkey

Background

The present work is rooted in Lerdahl-Jackendoff theory, David Cope's early work on chorale composition with EMI, and n-gram models in natural language processing.

Aims

Aim is to study the syntax of harmony, and the interaction of harmony and melody.

Method

An algorithmic harmonic analysis routine, which is reminiscent of Lerdahl and Jackendoff's time-span reduction, is developed to induce the chord progressions from a corpus consisting of 170 Bach chorales. The obtained progressions are annotated according to cadence locations, and then used for the training of a Markov model, which is used for the calculation of suitable chord progressions for given melodies. Both random and the most probable progressions (obtained by Viterbi algorithm) are generated for given melodies. A pattern-matching module, which operates by constraint satisfaction search, generates four-part harmonizations by using segments obtained from Bach chorales.

Results

Work is still in progress. It is observed that, for most input melodies, it is not possible to generate four-part harmonies by using strict pattern-matching criteria. Therefore the pattern-matching module is enriched with rules of voice leading found in harmony textbooks. To ensure proper melodic continuation in voices, a finite state model of melodic dissonances is inferred from the corpus of chorales.

Conclusions

The work is still in progress. A subjective observation is that the most probable progressions (obtained by Viterbi algorithm) always revolve around tonic and dominant chords, and are relatively monotonous when compared with the random progressions obtained by running the model.

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THEMATIC SESSION

Processing musical parameters

Tuesday 9:00

Room: v. Helmholtz (E 40)

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LOW-LEVEL AUDITORY FUNCTIONS AND MUSICAL APTITUDE

Fred Warnke
Wedemark, Germany

Background

Most recently the correlation between low-level functions (LLFs) in the auditory domain - such as pitch discrimination, order threshold, spatial hearing, pattern identification - and language proficiency has become the topic of research. Latest findings indicate that impaired LLFs might be a major cause of dyslexia. It was shown that training impaired LLFs in dyslexic children significantly improved their spelling scores as compared to controls undergoing conventional remedial teaching.

Aims

It is hypothesized that a similar correlation might exist between certain LLFs and musical aptitude. If such a correlation exists it could be utilized in two ways: First, in order to discover possible musical talents at an early stage of life; second, in order to improve musical education by ameliorating those LLFs in which students show deficiencies.

Method

In a cohort of 392 children, age 5 ... 12 years, 152 of whom played a musical instrument, the following seven LLFs in the visual, auditory and motor domains were assessed:

3.1 Visual order threshold

3.2 Auditory order threshold

3.3 Spatial hearing

3.4 Pitch discrimination

3.5 Auditory motor timing

3.6 Auditory choice reaction

3.7 Frequency pattern test

Results

In four LLFs, the group of 152 playing an instrument achieved significantly better scores than the controls of 240 children playing no musical instrument, namely auditory order threshold, pitch discrimination, auditory motor timing, and frequency pattern test.

Conclusions

So far, the results seem to lead us to the chicken-egg-question: They suggest that either highly developed LLFs improve musical proficiency or that musical proficiency improves LLFs. A third possibility might be a reciprocal facilitation of both. Further studies will be necessary to decide which of the three is most likely.

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TYPE OF MUSICAL TRAINING SELECTIVELY INFLUENCES PERCEPTUAL PROCESSING

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Background

Musical training influences both brain structure and function. Musicians who began their training before age 6 or 7 have a larger left planum temporale or corpus callosum. String players have a larger cortical representation of the left hand. Piano, singing, or rhythm instruction before age 7 improves performance on spatial-temporal tasks.

Aims

To determine how the type of musical training influences perceptual processing in adults.

Method

45 participants were recruited in three groups of 15: non-musician controls (C), percussionists (P), and string players (S). On average, musicians had played for more than 30 years and had had more than 16 years of formal instruction. Four discrimination tasks were presented in random order: auditory duration (AD); auditory frequency (AF); visual duration (VD); visual frequency (VF). Auditory stimuli were 44.1 KHz 16-bit sine waves. Visual stimuli were vertical gratings of sinusoidally-varying brightness convolved with a Gaussian filter. On each trial, a standard stimulus was presented followed by a comparison stimulus differing in duration or frequency. An adaptive staircase procedure made the discrimination harder after correct trials and easier after incorrect trials. Each task ended when 12 errors were made. The median of the last 11 errors was selected to represent each individual's discrimination threshold. Planned comparisons were performed between groups using *t*-tests.

Results

AD: P better than C. AF: S better than C. VD and VF: no differences.

Conclusions

The type of musical instruction selectively influences perceptual discrimination processes. Planned neuroimaging studies will determine the functional basis of these differential abilities.

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PERCEPTION OF TIMBRE DIFFERENCES IN TRUMPETS

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Background

Can it be verified that sophisticated listeners can perceive the timbre differences between trumpets, pitch and other variables being constant among the performances?

Aims

It was the purpose of this study to determine whether there is justification for the various requirements for trumpet players to have more than one trumpet if transposition poses no problems.

Method

The stimuli were recorded by a full-time professional trumpeter in the Los Angeles area. The 24 subjects were university students with trumpet as their major instrument. The taped stimuli (a 30 second excerpt from *Don Juan*), the pitch being constant while the excerpt was played twice on each of the trumpets--B-flat, C, D, E-flat, and the B-flat piccolo. The order of the trumpets used was random.

Results

H_o was "There are no significant differences to be perceived by trumpet majors (both graduate and undergraduate) in the timbres of the B-flat, C, D, E-flat, and piccolo trumpets, where tonality (the trumpeter transposes) and other musical elements remain the same." The raw data were processed to both obtain and check the x^2 (Chi-Square for the group. The tabled value of 35.17> 8.61 (P>.05), indicated failure to reject H_o. For submission-- p. 2 the group, correct responses (ten possible) reflected: Accuracy = 23.7%; Mean = 2.33; Median = 2.00; Mode = 1.00 and 3.00; range = 6.00; and Standard Deviation = 5.9.

Conclusions

Each subject in this experiment, when quizzed by the researcher, expressed confidence in his competency to identify trumpets by sound alone. This did not prove to be the case, as only one subject marked six (out of ten possible) correct responses and none marked five correct--thus, 23 of 24 subjects had less than 50% accuracy. This, along with failure to reject the null hypothesis and the information under Results (above) indicated that, under the given parameters' limitation of this study, there is no *real* validity for requiring trumpeters to have more than one trumpet, when timbre is to be the sole criterion.

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IDENTIFICATION OF MUSICAL CHORDS – REACTION TIMES SUPPORT THE ASSUMPTION OF TWO DIFFERENT PROCEDURES

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Background

The experiment was designed following the experiments of Bharucha & Stoeckig (1986, 1987) and Justus & Bharucha (2002). The identification of chords is seen as problem solving by cognitive procedures.

Aims

The results of the experiment should prove the hypothesis, that the difficulty of the identification is dependant on the distance from the tonality of the probe tone – the farther the distance is (measured in the circle of fifths), the longer the identification would last.

Method

In a speeded decision experiment, 10 male and 10 female music students had to distinguish major and minor chords. The chords were played after a short sequence of random tones, a scale and four chords serving the rules of a cadenza (probe tone technique). The now following chord (target) had to be recognized as minor or major as fast as possible. Each subject contributed 2000 correct decisions.

Results

The expected effect could only be observed for major chords following a major prime and with reaction times longer then 450 ms. The particiation of minor chords either as prime or as target seem to change the center of activation. – Correct decisions with reaction times shorter than 400 ms were not at all systematically affected by the primed tonality.

Conclusions

The author considers separate procedures of information processing: A fast pre-attentive automated procedure and a slower procedure, influenced by expectations evoked by long term memory. These considerations lead to the theory of Pribram (1991), who defined stages of information linked to brain areas: The first stage supplies fast procedures, subcortically and automated – presumably the simple ones as kind of reflexes, the differentiated ones developed by implicit learning. A second stage of information processing is guided by procedures of categorization and chunking, which are affected by remembering and recognition – by primed cognitive representations.

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THE INFLUENCE OF HARMONIC RELATIONS AND TEMPORAL REGULARITIES ON CHORD PROCESSING

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Background

Music perception relies on processing both the tonal relations between pitches and the temporal regularities of their occurrence. Listeners develop expectancies about "What" event is coming next and "When" it will occur.

Aims

The present study was designed to analyze how the two dimensions (pitch and time) influence chord processing and how they are articulated: in interaction or independently?

Method

In two priming experiments, we systematically manipulated harmonic relations and temporal regularities in eight-chord sequences and participants made speeded accuracy judgments on the target (the last chord). The target was harmonically either related or less related to the prime and was played either "on time", "earlier" or "later" than expected. In addition, chords of the prime context were played either regularly or irregularly. In Experiment 1, sequences were played "staccato" in order to make durations of the prime chords comparable in regular and irregular sequences. In Experiment 2, the sequences were played " legato".

Results

In Experiments 1 and 2, both harmonic relations and temporal regularities influenced chord processing with shorter response times for related targets, regular sequences and for targets played "on time" or " later". Only in Experiment 1 did the two dimensions interact: facilitated processing of related targets was observed for "on time" and " later", but vanished for "earlier". The difference between the two experiments suggests an influence of "musicality of performance" with less artificially sounding sequences enforcing the influence of harmonic relatedness.

Conclusion

In conclusion, our results show that chord processing is influenced by harmonic relations and temporal regularities of the prime context. The outcome differs from previously reported interactions between the two dimensions for melody perception. This difference might be attributed to difference in material (melody vs. harmony) and in experimental task focusing on either global judgment or local processing.

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PERCEIVED HARMONIC RELATIONSHIP BETWEEN TONE AND TEMPO: THE EFFECT OF TIMBRE.

David Brennan

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Background

Great Base Theory (Pound) suggests that a perceived harmonic relationship exists between the frequencies of tempo and tone. Although largely untested, this theory forms the basis for the work of a number of 20th century composers and music therapists. Prior to the present study, the authors conducted an experiment employing a stimulus consisting of a tempo click superimposed upon a steady sine wave. Participants reported a significant preference for tone/tempo presentations comprising octave based frequency relationships over those based upon more complex integer relationships.

Aim

The aim of the current experiment is to investigate this preference for multiple octave based relationships between tone frequency and tempo frequency over a wider range of stimuli.

Method

Thirty-two paired comparisons were presented to 16 participants (a complete sample of 128 will be tested and data analysed by March 2003). Participants indicated their preference between two tone/tempo frequency presentations. The relative simplicity of the ratio between tempo frequency and tone frequency was measured as the DV. Tempo stimuli consisted of a tempo click or an iterated noise segment (Warrens' Infratones) and tones were a range of complex waves (both harmonic and inharmonic).

Results

Results of the pilot study (n=16) suggest that the preference for octave based relationships between tone and tempo is maintained over the wider range of stimuli.

Conclusion

These preliminary results (if corroborated by the complete study) lend support to Great Base Theory and suggest that further studies incorporating melodic and rhythmic components be conducted.

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THEMATIC SESSION

Technology and performance

Tuesday 11:30
Room: v. Hornbostel (130)

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SCORE-BASED ANALYSIS OF EXPRESSIVE PERFORMANCE

Simon Dixon
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Background

Many attempts have been made to develop an automatic transcription system, that is, a computer program which produces a musical score directly from audio data. In extracting the score, fine details such as expressive timing and dynamics are ignored. We consider the reverse problem, that of extracting the details of a performance from an audio recording, where the score is used to guide the analysis system. To our knowledge, the only researcher who has addressed this problem is Scheirer, who developed a prototype system in Matlab for his masters thesis. Other related works are the automatic accompaniment systems of Dannenberg and Raphael and the recent score following algorithm of Pardo and Birmingham. By aligning the performance with the score at each score event, these systems are implicitly generating a tempo curve, an important part of performance expression.

Aims

The aim of this work is to extend previous work on beat tracking and automatic transcription by taking advantage of the known score information, in order to develop a robust performance analysis system for solo piano music.

Method

An analysis of single piano tones was performed in order to develop bandpass filters with known response characteristics for piano tones, and these filters were used to obtain accurate estimates of performance parameters after the approximate score position was determined by using dynamic programming.

Results

Results are not yet available. The final paper will contain an analysis of the system on a large database of piano performances played on a Bösendorfer computer-monitored grand piano.

Conclusions

The use of score information facilitates analysis techniques which would not be practical to implement in an automatic transcription system, thus providing a finer analysis of the audio data.

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'ARMCHAIR CONDUCTING' ANIMATIONS FOR MOZART AND SCHUBERT

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Background

Some people respond to music with an internalized gesture rather like a conducting shape. Such conducting does not control a performance; the case is instead the opposite, in that a (real or imagined) performance controls the conducting; hence the term 'armchair conducting'. Gustav Becking (1928) closely studied such shapes, drawing them on paper as composer-specific "Becking Curves". These curves on paper are, however, static; in earlier work I had implemented a computer animation of a conducting shape in an excerpt from Mozart's Piano Sonata K576 III, matched to the sound of a recording by Walter Gieseking. Computing resources facilitating this approach have only recently become available.

Aims

The main aim is to contribute an animation of a conducting shape in an excerpt from Schubert's Moment Musical No. 6, matched to the sound of a recording by Artur Schnabel. A second aim is to look into the problems arising in attempting to test the validity of such animations. A final and more subsidiary aim is to examine the "pulse matrix" proposed by Clynes (1983) in relation to (a) the recorded performance nuances and (b) the Becking curves.

Method

The video track of the animation was prepared with the Matlab(R) computer program by successive approximation to the temporal shaping of my physical gesture. The sound of the recorded performance was added as a separate track. The nuances present in the recorded performance were also measured and analysed.

Results

The animation seems generally successful. Testing the validity of such animations is difficult and will require further work. Clynes's pulse matrix postulates are not confirmed by the present work.

Conclusions

Insights into composer-specific features of the musical beat have been obtained and demonstrated visually, now for two composers. Implications for music education are envisaged.

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FACTORS WHICH MAY AFFECT MUSICIANS' ABILITY TO SYNCHRONIZE THEIR PERFORMANCE WITH CONDUCTORS' TEMPORAL GESTURES

Geoff P. B. Luck
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Background

In order to achieve a temporally coherent performance, musicians playing under a conductor's direction each have to coordinate their individual performance with the physical motions produced by the conductor. This involves being able to recognize which features of these motions convey the pulse of the music, and synchronize their actions as accurately as possible. Previous research suggests that people are able to achieve a high level of synchronization between their movements and those of another person, but that the consistency of this synchronization depends upon a number of factors, such as the physical characteristics of the movements, and an individual's experience at such a task.

Aims

The aims of this paper are as follows. Firstly, to investigate how accurately different groups of people are able to synchronize with a variety of conductors' temporal gestures. And secondly, to look at how differences in synchronization consistency between these groups might be explained.

Method

Participants watched point-light representations of conductors' time-beating gestures, and were required to tap in time with the perceived pulse. The conductor was viewed either from the front, from the side, or rotated 90 degrees about the z axis to create a novel stimulus. Participants also completed a questionnaire designed to elicit relevant background information that was used to classify them into different groups, and from which a number of independent measures were generated.

Results

Results, based on a number of statistical procedures, will be presented which show that synchronization consistency depends upon factors such as an individual's musical training and experience, and the characteristics of the different gestures.

Conclusions

Conductors might benefit from taking into consideration the physical characteristics of the gestures they use, the experience-related characteristics of the ensemble being conducted, and the position of members within that ensemble, when determining the response that their gestures will produce.

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THEMATIC SESSION

Style and stucture

Tuesday 11:30
Room: Révész (202)

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INTER-PARAMETRIC ANALOGY AND THE PERCEPTION OF SIMILARITY IN MUSIC

Zohar Eitan
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Roni Granot
The Hebrew University, Israel

Background

Music theorists (Berry, Rink) and psychologists (Clarke, Todd) have described musical processes as bipolar changes in "intensity" (intensifications or abatements), analogously expressed by different musical parameters. This notion implies that musical gestures whose contours of intensity change are analogous may be perceived as similar, even when these changes are expressed by different parameters. Relevant studies notwithstanding (e.g., by Clynes), the validity of this hypothesis has yet to be studied systematically.

Aims

We examine whether (other things being equal) stimuli presenting analogous intensity contours in different musical parameters are perceived as similar.

Method

Subjects listened to a brief musical stimulus (the standard stimulus), in which intensity in a specific parameter was changed, while other parameters were held constant (e.g., an accelerando, with no change in pitch or dynamics). They then listened to pairs of comparison stimuli (presented in random order), in all of which the parameter varied in the standard stimulus was held constant. Each pair presented contrasting intensity changes in a specific parameter, one member paralleling the intensity contour of the standard stimulus, the other contrasting it (e.g., when the standard is an accelerando, one comparison presents a crescendo, the other a diminuendo). The varied parameters included pitch contour, pitch intervals, inter-onset intervals, dynamics, articulation, and harmonic direction in the circle of 5ths. Stimuli exhibiting combinations of these parameters were also presented. Subjects were asked to rate on a numerical scale how "close in character" is each comparison stimulus to the standard.

Results

Experiment is currently in progress. Results are expected in January 2003.

Conclusions

The hypothesis presented here suggests that analogies between parameters are consequential in shaping perceived similarity in music. If confirmed, it may enhance the study of motivic structure in music, and empirically support current theories of musical gesture.

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RECOGNISING THE COMPOSITION STYLE BY THEMES SELECTED FROM THE "SONATA" REPERTOIRE: A COMPARISON BETWEEN THE MATHEMATICAL MODELING AND THE EXPERIMENTAL PSYCHOLOGICAL RESULTS

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A great number of studies have suggested the possibility of building up a mathematical model, which represents the distance between musical fragments. The most significant works have been focused on melodic similarity, using mathematical functions. Another great number of psychological studies have suggested the existence of an identification process of salient cues like distinctive musical features picked up during the listening. The aim of this work is to compare the results of a mathematical model of musical similarity with the psychological experimental findings. Sixty musical themes (10 and 12 seconds long) were selected from the Sonatas for piano solo, composed by Mozart, Beethoven and Clementi. The musical excerpts were codified into five multivariate numerical arrays, paying attention to encode all significant parameters of each sequence. The distance between musical sequences was calculated using the cross-correlation function. Regarding the psychological experiment, three tasks were planned: 1) familiarization with the sequences; 2) classification of the same musical excerpts in two appropriate categories (X or Y) and 3) evaluation of their "quality of representation" on a scale from 1 to 10. The subjects were invited to classify the sequences as belonging to different categories without any information about the author's name or the pieces' composition style. Three series of forty sequences (i.e. twenty from one composer and twenty from another one) were presented to sixty naïve listeners in a random order. The cluster analysis theory allows us to classify both the mathematical and psychological findings. The results show that: (i) the naïve listeners classify the musical sequences abstracting salient features in relation to musical style differentiations and then (ii) they assess the representativeness' degree to each sequence, confirming the results of the mathematical model.

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STYLE PROCESSING

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Introduction

The musical style processing is difficult to investigate due to different aspects: the complex cognitive strategies that are involved in the elaboration of musical informations, the constructions of experimental procedures that are able to study music as aesthetic phenomenon, and the ambiguity of the elements that define the term 'style' in musicology.

In the recent work 'Le regole della musica', Baroni-Dalmonte-Jacoboni have analysed the style of the baroque composer Legrenzi, and by means of generative grammar, they have constructed a rules system that has been implemented in a software named Legre. Legre, supposedly, 'composes' arias in the style of Legrenzi.

Aims

In this work, different fields of study have cooperated together: the musicological aspects are involved by the analysis of the aria, the generative grammar by the construction of rules system, and the artificial intelligence by the implementation of the rules in the program Legre. The objective of the present study is to verify the stylistic validity of Legre's output by using methods adopted in cognitive psychology. One of the fundamental questions is to determine whether the methods of generative grammar can describe and recreate by computer the style of Legrenzi's arias. Furthermore, concerning the musicological aspect, the data discusses the essence of the concept style.

Method

An experiment has already been made. It involved 30 baroque musicians, who were asked in a same/different listening task to recognize the arias written by Legrenzi among 20 different arias (Legrenzi's and Legre's arias). The theory of implicit learning is the theoretical support during the training phase. A sample of 15 non-experienced baroque musicians and of 15 non-musicians are actually investigated with the same listening task. Furthermore, another 15 baroque musicians are asked to distinguish the style of Legrenzi from Legre's one, only by the analysis of the scores.

Results

The first experiment has demonstrated that the baroque musicians are able to distinguish the composer's aria from the computer's output. They could determine the peculiar features and the differences between the two styles. The data result with the non-experienced baroque musicians and non-musicians will be discussed.

Conclusion

Up to now, the data have proved that it is possible to distinguish between Legre and Legrenzi music. Which style processing modes do the musicians use? And do they recognize the style of Legrenzi thanks to the implicit learning of the training phase or their thorough knowledge of baroque style? The data result with the other musicians and non-musicians will help to determine the rule of the training phase, the pre-existent knowledge, the validity of the generative construction and the musicological definition of the term "style".

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THEMATIC SESSION

Expressive performance

Tuesday 11:30
Room: Stumpf (E 15)

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INTERPRETATION AND CREATIVITY IN CONTEMPORARY PIANO MUSIC

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Background

Much of the published research on expression in performance has focused on the standard (tonal, metric) repertoire, has been conducted under 'laboratory-style' conditions, and has examined only final-state performances rather than the process by which those performances are developed.

Aims

This paper reports one part of a larger project studying the development of a performance interpretation within the repertoire of contemporary piano music, tracing this process from commissioning, through rehearsal, to first public performance. The aims of the project are to explore the processes by which an interpretation develops through rehearsal, is shaped by interaction with the composer, and is presented at the work's first public performance, taking account of the practical and musical considerations which affect real concert performance.

Method

One of three new works, commissioned, rehearsed and performed by a specialist contemporary pianist, will be presented. Interview data with the performer and composer, audio recording of rehearsals and performances, and MIDI data from rehearsals and the first performance have been collected.

Results

The data will be analysed to explore: i) the progressive shaping and refinement of the performer's realisation of the piece from first rehearsal to performance; ii) the performer's approach to some of the particular rhythmic notation used in the piece; iii) the role of instrumental sonority in shaping interpretation - a characteristic that has seldom been considered before in studies of expression and interpretation.

Conclusions

Our intention is that this study will contribute to: i) the still very small body of research that has studied the performance interpretation of music of our own time; ii) an understanding of the particular kinds of decision-making required by contemporary notation; iii) an understanding of the development of an expressive interpretation through rehearsal.

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PIANISTS' INTERPRETATIVE INTENTIONS IN EXPRESSIVE PERFORMANCE

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Background

A large body of previous research has established the general principles of expression in piano performance. However, the variations of the expressive features in music performance need to be investigated in relation to performers' interpretative intentions.

Aims

This study investigated the relationship between a performer's interpretative intention and his/her own performance of a piece of music. The main purposes were to investigate whether music performers' interpretations are different from one another in a piece of music, and whether the interpretative intentions of a performer in the music correspond to his/her own performance.

Method

Five experienced pianists were given a short musical piece in which all expressive markings had been deliberately removed. The pianists were asked to interpret the music by indicating expressive markings on the music score, and perform it on a Disklavier piano. The MIDI data from the recorded performances were analysed in terms of two features of expressive performance: inter-onset timing and dynamics. The expressive markings indicated in the score by the pianists were converted into a numeric form based on a quantification model that relates graphical symbols in the score to timing and dynamic values.

Results

Significant interactions between the individuals and their performances were observed, indicating that the pianists' performances were significantly different from one another. For the timing data, each pianist's performance showed positive correlations with his/her interpretation as well as with the other pianists' interpretations, and for the dynamic data, each pianist showed more positive correlations with his/her own interpretation than with the others' interpretations.

Conclusions

These results demonstrate that the expressive characteristics of a performance relate strongly to the conscious interpretative intentions of performers, but that performers do not have complete awareness of their own expressive strategies.

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QUANTITATIVE ANALYSIS OF TONE QUALITY IN RELATION TO ITS ROLE IN EXPRESSIVE MUSIC PERFORMANCE: A STUDY IN THE ACOUSTIC PROPERTIES OF INDIVIDUAL GUITAR SOUNDS

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Patricia Holmes
Trinity College of Music, Old Royal Naval College, Greenwich, London, UK

Background

There has been much research on different aspects of expressive musical performance, considering factors such as pitch, intonation, loudness (dynamics), articulation, timing (note onset and offset), and timbre. This paper concerns the study of timbre (or tone quality) in recordings of the acoustic guitar.

Aims

The professional solo performer will have developed sufficient technical command to be able to produce a wide range of tone colours. Choices as to what sound will be produced at any given moment will be made according to context and the player's imagination and expressive and interpretative intentions. It follows that since tone production is an essential part of learning to play a musical instrument (at any level), a means of measuring the nature and variation of the sounds produced would be a valuable step towards greater understanding of the nature and potential of tone.

Method

Using spectral analysis techniques (including Fourier transforms and filterbank techniques), this paper seeks to undertake a quantitative analysis of individual musical notes. The instrument considered to be most appropriate for the experiments was the classical guitar, due to the clear onset of the sound, the direct nature of the player's control of that sound and the distinctive tonal qualities of different types of right hand articulations.

Results

Novel filtering techniques were developed to separate the note onset (in this case, the stroke, or duration of right hand finger contact) from the subsequent decay. The acoustic properties of the onset were then parameterised and compared to the time-varying frequency components present during the decay.

Conclusions

By modelling this individual aspect of expressive musical performance, this type of analysis allows the objective study of tone quality. Such measurements will enable an accurate analysis of the tonal elements of performance in a range of contexts.

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THEMATIC SESSION

Melody and computation

Tuesday 15:00
Room: v. Hornbostel (130)

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OPTIMISING PARAMETER WEIGHTS IN MODELS FOR MELODIC SEGMENTATION

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Background

There are few computational models for the segmentation of melodies. All models like Lerdahl's and Jackendoff's GTTM, Tenney and Polansky's 'Temporal Gestalt Perception', Cambouropoulos' 'Local Boundary Detection Model', and the Model by David Temperley rely basically on differences of parameters of successive notes. Those are weighted and linearly combined to give a distance measure, which indicates group boundaries at local maxima or by optimising an accumulated score. None of these models allows the adjustment of parameter weights by empirical data.

Aims

The aim of this work is to show that parameters for segmentation can be learned from empirical data using Iterative Training, a method for learning structured data based on error backpropagation. A linear and non-linear models are evaluated and the learnt weights are compared to the literature.

Method

In an experiment, subjects segmented randomly generated melodies. We used this data to train and test linear regression, a neural network, and a neuro-fuzzy-model based on a full set of parameters (temporal proximity, intensity, tonal proximity, group length, group duration, constant interval direction).

Results

In the experiment the neuro-fuzzy and multi-layer-perceptron models performed better than the linear regression model. The learnt weights show a strong influence of temporal proximity, pitch distance and less of dynamics and melodic turns as could be expected by the literature. Group length and duration also have considerable influence.

Conclusions

The weights of factors temporal proximity, pitch, dynamic accents and constant interval direction can be learned from data and used in a working computational model for melodic segmentation. The learnt parameter weights are generally in accordance with the literature, but automatic learning enables fine-tuning weights to specific purposes and adjusting larger numbers of parameters in a consistent way.

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MUSICAL PATTERN EXTRACTION FOR MELODIC STRUCTURE

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Background

Despite the fact that musical parallelism is considered an important factor for musical segmentation, there have been relatively few attempts to describe systematically how exactly it affects grouping processes (one main problem is that musical parallelism itself is very difficult to formalise).

Aims

The aim of the paper is to formalise processes of musical parallelism and to examine how these affect melodic segmentation. An underlying assumption is that the beginning and ending points of 'significant' repeating musical patterns influence the segmentation of a musical surface. A computational model is built as a means to test the effectiveness of the proposed approach.

Method

A computational model is presented that extracts melodic patterns from a given melodic surface. The discovered patterns are used as a means to determine probable segmentation points of the melody. 'Significant' patterns are defined primarily in terms of frequency of occurrence, length of pattern – additionally, the special status of non-overlapping immediatelly-repeating patterns is examined. All the discovered patterns merge into a single 'pattern' segmentation profile that signifies points in the surface that are most likely to be perceived as points of segmentation due to musical parallelism. The 'pattern' segmentation profile is compared against a 'local boundary' profile (which is based on simple Gestalt principles of perceptual organisation) and it is shown that often the two give different results.

Results

The algorithm is tested on a number of melodies for which the musically intuitive segmentations are taken as a point of reference. Both positive and negative cases are presented; especially cases where there are conflicts between local discontinuities and pattern-relating boundaries are highlighted. Overall, the proposed model gives an efficient formal method for capturing melodic parallelism from which segmentation positions due to repetition can be inferred.

Conclusions

Musical parallelism affects musical segmentation. Computational models of segmentation could incorporate pattern extraction components - such as the one proposed here - for better performance.

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A MODEL OF MELODIC EXPECTATION

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Columbia University, USA

Background

Leonard Meyer (1956), Eugene Narmour (1990, 1992), Steve Larson (1993), and Fred Lerdahl (2001) have published theories of melodic expectation. Experimental inquiries by James Carlsen (1981), William Lake (1987), Mark Schmuckler (1989), Lola Cuddy and Carole Lunney (1995), E. Glenn Schellenberg (1997), Paul von Hippel (2000), and others have suggested paths for the improvement of existing models.

Aims

The paper aims to present an improved model of melodic expectation, usable in analysis and experiments, and capable of providing a basis for inquiry into the affective consequences of expectation violation.

Main Contribution

The study presents a model of melodic expectation based on the interaction of five factors: stability, proximity, direction, temporal position, and hierarchic position. The formulation of each parameter, and the method of their overall combination, addresses issues concerning existing models, including those of hierarchy and temporality, transparency of notational system, real-time realization, and correlation with experimental results.

The model assigns a degree of expectedness to each melodic event, resulting in an easily comprehensible graph of expectational peaks and valleys across a melody's course. An adaptation of Lerdahl and Jackendoff's time-span reduction selects events that influence expectations not only about the immediately subsequent event, but also about more distant ones perhaps three, five, or sixteen notes into the future. A factor informed by Mari Riess Jones' notion of dynamic attending specifies the temporal target of expectations.

Analyses of different scales identify variations in their expectational profiles as a partial determiner of variations in their perceived qualities. Analyses of excerpts by Bach, Mozart and Chopin link expectational occurrences to experienced affect.

Implications

The paper suggests possible directions for empirical investigation. It offers possible links between expectation violation and affect.

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COMPETITIVE VS FEED-FORWARD MODELING OF MUSIC RECOGNITION TASK

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Background

Most of the connectionist models designed for musical stimuli recognition seem to be unrealistic, for two reasons: firstly, because they are based on a tonal a priori knowledge; and because these models do not include a competitive learning phase.

Aims

This work is aimed at verifying how both competitive and feed-forward neural network models classify 4 groups of musical stimuli. On the basis of some previous research of ours, highlighting that salience, operatively defined as redundancy of interval or rhythmic parameters, is one crucial dimension for the recovery of melodies from memory, this research is to demonstrate that musically superficial characteristics are a sufficient basis for music categorization.

Method

Four classes of musical stimuli have been constructed for this purpose, by intercrossing two variables: tonality and salience, both on two levels: presence and absence.

According to these specifications, two series of 48 stimuli have been created by two different musicians. In the learning phase, both a competitive and a feed-forward model have been fed with half of the stimuli randomly split; half between the two composers, the other half used in the test phase.

Results

Competitive models give a much more consistent picture of what cognitive processing is, compared to feed-forward models. Actually a feed-forward neural network is a powerful tool for a variety of perceptual tasks although it shows a lack of psychological reality in typical learning algorithms, and the biological validity suffers from the architecture.

Conclusion

Neural networks can easily replicate human capabilities in a large variety of experimental tasks, even if each model has its own "style". In this case it appeared that the competitive strategy has obtain better results in detecting superficial cues, and in using them to separate and recall incoming patterns. At a generalization level it appears that tonality is an important dimension in the musical acculturation process. However other more superficial variables have to be taken in consideration in music categorization processes by natural and artificial cognitive systems. In this work, salience appeared as a relevant variable for music recognition by naive subjects, and the evidence is strengthened by the fact that the results were collected by means of a set of different neural network architectures.

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UNSUPERVISED LEARNING OF MELODIC SEGMENTATION: A MEMORY-BASED APPROACH

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University of Edinburgh, UK

Geraint Wiggins
City University, London, UK

Background

Music segmentation is recognised as an important step in the abstraction of musical contents and researchers have attempted to explain and formalise how listeners identify such constituent units. Several attempts to model music segmentation have employed Gestalt principles to identify discontinuities in a musical surface, and it is often suggested that some of these principles operate independently of the listeners musical knowledge. Other theories suggest that listeners memorise recurrent features in the music and use this knowledge to carry out musical analytical tasks. Leonard Meyer emphasised the relationship between learning and expectation, where the unpredictability of an event can change its prominence and hence constitute an auditory marker within a sequence of events.

Aims

We conjecture that some of the perceived features responsible for the identification of segment boundaries in melodic sequences can be learned from a corpus of non-annotated musical data. Given this hypothesis, the aim of this research is to develop a computational model that can simulate this learning process and then use the acquired information to predict the location of segment boundaries for a given melody.

Method

The implementation of the proposed model is based on a mixed-memory Markov model. The model is constructed from the regularities found in parametric sequences (pitch and duration based) corresponding to all the melodies in a given training set. Then, for a given target melody, sequence probabilities are estimated from the model and prediction entropy profiles obtained. Further analysis of these profiles reveal distinct intervals of entropy change, between which, we conjecture, segment boundaries are likely to be found.

Results

An on-going study on melodic segmentation performed with listeners, provides segmentation data for a set of melody examples. Preliminary results seem to indicate that the boundaries generated by the model are located is the vicinity of the boundaries indicated by the listeners.

Conclusions

We suggest that salient intra and inter-textual features can be learned from a musical corpus in an unsupervised fashion. We then demonstrate how the acquired information can be used to predict the location of segmentation boundaries in melodies, without any a priori knowledge.

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THEMATIC SESSION

Developing musicians

Tuesday 15:00
Room: v. Helmholtz (E 40)

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ASSISTING ADVANCED MUSICIANS TO ENHANCE THEIR EXPRESSIVITY – AN INTERVENTION STUDY

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[2] Trinity College of Music, Cambridge, UK

Background

1. Different performances of the same piece by the same individuals often have markedly different expressive impact, despite apparently constant intentions on the part of the performers. Why do so many well-rehearsed performances fail to "come alive"? The "Feeling Sound" Project is an attempt to improve reliability and control over expressive performance by (a) pragmatic theory building, (b) instantiation of the theory in an advanced curriculum, (c) empirical testing of the outcomes of the curriculum. This paper concentrates on the latter two elements. (b) involved the instantiation of this theory in a curriculum offered by a music conservatoire to volunteer pianists during the academic year 2002-3. It centred around the acquisition of five linked attentional/perceptual techniques for focusing on increasingly large-scale expressive parameters, starting with single notes and ending with phrases, sections and whole pieces. This curriculum and its development will be briefly outlined. (c) involves the empirical investigation and evaluation of the nature and effectiveness of the psychological changes that different elements of the "Feeling Sound" programme are designed to bring about.

Aims

Data gathered during the intervention at Trinity College of Music (TCM) during the academic year 2002-3 will be presented. This data takes the form of: 1. Qualitative data collected via questionnaires and interviews with students and teachers at TCM. This will focus on the extent to which students have found the project effective in enhancing their performance output, in terms of expressivity and reduced anxiety. 2. Quantitative data based on judgments made by a panel of experts on changes in expressive output.

Method

An experimental group of 20 students received the Feeling Sound Curriculumdelivered in 20 weekly 2-hour sessions. A control group of 20 students received no extra input beyond their normal studies at TCM. All students were asked to give prepared performances of Chopin's Prelude in E minor in an audition situation both before and after the intervention. Expert judges rated the performances on a number of dimensions, and objective analysis of MIDI data from the performances was undertaken. Semi-structured interviews were conducted at two points in the programme.

Results

This paper will concentrate on quantitative data relating to changes in performances of the Chopin Prelude, and related changes in judges' ratings.

Conclusions

The paper will attempt to link individual differences in outcomes to differing levels of "internalization" of the concepts and techniques offered, as revealed through the interviews. Practical and theoretical implications of the study will be addressed.

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ALEXANDER TECHNIQUE AND MUSIC PERFORMANCE: EVIDENCE FOR IMPROVED 'USE'

Elizabeth R. Valentine
Royal Holloway, University of London, UK

Aaron Williamon
Royal College of Music, London, UK

Background

The Alexander technique (AT) is widely used by musicians to enhance performance and prevent misuse. Whilst self-reports testify to its benefits, rigorous objective data have been hard to obtain.

Aims

The aim of this study was to investigate the effect of training in AT in comparison with neurofeedback on music performance, as measured by perceived quality of music performance and use as defined by AT practitioners.

Method

Music students (strings, wind, keyboard and voice) were randomly assigned to training in AT (Group AT; n=10) or neurofeedback (Group NF; n=8). Music performances were videorecorded before and after training. These were randomly ordered and assessed by expert judges, external to the college and blind to students' group membership, for quality of music performance and AT use. Judgements of AT use were made by an experienced musician and AT practitioner, with extensive experience of teaching AT to musicians, on the following scales: head-neck-back relationship, upper limb/back, hips/balance, direction of knees, face and eyes, breathing, fingers, thought direction, inhibition and overall impression/poise. Self-rated anxiety was also measured prior to performance on both occasions.

Results

Following training: group NF showed improvement in quality of music performance; both groups showed a significant reduction in self-rated anxiety prior to performance; group AT showed an improvement relative to group NF on the following measures of AT use: head-neck-back relationship, upper limb/back, face and eyes, fingers, thought direction, inhibition and overall impression/ poise. Singers showed greater improvement than instrumentalists on hips/balance, face and eyes, fingers and thought direction.

Conclusions

Training in the Alexander Technique can enhance use in musicians and this can be demonstrated objectively.

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"SEEING THE BIG PICTURE": PIANO PRACTICE AS EXPERT PROBLEM SOLVING

Roger Chaffin
Gabriela Imreh
Anthony Lemieux
Colleen Chen
University of Connecticut, USA

Background

Experts in many fields approach a new problem by identifying the general principles involved before starting work on details.

Aims

Do expert musicians similarly begin work on a new piece with the "big picture" of the piece in mind?

Method

To find out, a concert pianist recorded her practice of the third movement, Presto, of J.S. Bach's Italian Concerto, commenting as she did so about what she was doing. The comments indicated the main focus of the pianist's attention. The practice showed both what she was attending to and also effects that were more automatic and less deliberate. Practice was transcribed by counting the frequency of starts, stops, and repetitions in each bar and measuring inter-bar-intervals (IBI) during practice performances. These measures were related by multiple regression to features of the music as reported by the pianist for three basic dimensions (fingering, technical difficulties, familiar patterns of notes), four interpretative dimensions (phrasing, dynamics, tempo, pedal), three performance dimensions representing features of the music attended to during performance (basic, interpretative, expressive), and structural dimensions representing the formal structure of the piece.

Results

A "big picture" was already evident in effects of structure and performance cues on the initial sight read performance, and on work on technique in sessions 1-6, even though the "big picture" was rarely mentioned directly in these sessions. The "big picture" was also evident in practice of performance cues in sessions 7-10 and in comments about memorization and structure in the same sessions.

Conclusions

Like experts in other fields, the pianist in this study was guided by a "big picture" which included an "artistic image" of what she wanted to create.

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THEMATIC SESSION

Representing music

Tuesday 15:00
Room: Wellek (315)

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THE EFFECTS OF COMPLEX MUSICAL EXPERIENCE ON THE MENTAL REPRESENTATION OF MUSIC

José Carlos Godinho
Escola Superior de Educação – Instituto Politécnico de Setúbal, Portugal

Background

With the connectionism theory as a background, this study suggests that musical memory relies on complex mental links, which depend on the complexity of the musical experience. In other words, it is argued that children who engage in musical activities which favour varied participation and multiple encoding tend to preserve stronger images of music (with diverse types of information distributed through the brain) than they would do in less complex or more focussed activities.

Aims

The study is, thus, concerned with the effects of complex musical experiences on the strength and organisation of the mental representation of music in Portuguese children of 10/11 years old. The analysis is focused on the context of listening to recorded music in the classroom, with particular regard to strategies of listening through participation. Playing-rhythms-along-with-recorded-music within an instrumental group (Audience-Performing) is therefore the main context of analysis.

Method

An experiment compares two listening conditions with different levels of complexity. A control group (Audience-Listening) listens to a recorded piece of music and follows a rhythmic map. The experimental group (Audience-Performing) listens to the same piece, follows the rhythmic map and plays the rhythms along with the music. After the treatment, both groups are tested on the identification of excerpts from the musical piece, which gives evidence of both the strength and the organisation of the metal representation.

Results

As shown by the results of a *t-test* used to compare the score means of both groups ($t = 8.79$; $p < .01$), the experimental group identifies more excerpts with statistical significance.

Conclusions

The experiment suggests that (complex) situations where children have to attend to several tasks, such as reading, listening and playing tend to favour a differentiated mental representation, which has positive effects on musical memory, both in strength and organisation.

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MUSICAL IMAGERY REPETITION AND MEMORY

Sean Bennett
Cambridge University, UK

Background/Aims

"Musical Imagery Repetition," (MIR) describes the universal phenomenon of music getting "stuck in thought." MIR is precisely defined as previously heard music that, while consciously unintended, repeats uncontrollably and pervasively in thought. While Bennett (2002) has profiled MIR episodes and its "victims," no serious academic research has investigated the functions of this phenomenon or its relationship to human memory until the present study.

Main Contribution

A close examination of MIR episodes suggests that this phenomenon challenges contemporary memory theory. Evidence is presented suggesting MIR transcends the definitional boundaries of implicit and explicit memory systems, and of working, episodic, and semantic memory systems. Additionally, the ability of MIR to act as a mnemonic device, similarities between neurophysiology during REM sleep and MIR, and the ability of MIR to transcend the boundaries of aforementioned memory systems suggest that MIR functions as a memory consolidation device. Humans' high resolution of memory for music and the ability of MIR to transcend boundaries of traditional memory systems also lead to the conclusion that MIR comprises a newly identified memory system, which I explain and call "audio-eidetic" memory. Additional empirical programs of research are proposed to further determine the validity of hypotheses that are raised in the discussion of MIR and memory.

Implications

The present study implies that MIR may indeed have a purpose beyond that of a ubiquitous annoyance for all. If the empirical programs of research proposed verify the hypotheses presented, it would be a breakthrough for understanding from an evolutionary point-of-view why all human cultures possess cognitive architecture for the acquisition of musical information.

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EXPERIMENTAL STUDIES IN MUSICAL IMAGERY: IMPLICIT AND EXPLICIT COGNITION

Freya Bailes
LEAD– CNRS, Université de Bourgogne, France

Background

'Musical imagery' is a term used to refer to the imagined auditory experience of music. A phenomenon of both short- and long-term memory, imagery is experienced as a conscious inner hearing, but one that draws on an implicit knowledge of musical structure. Imagery experiments are described in which both implicit and explicit forms of musical knowledge are tested.

Aims

To adapt implicit priming methods to compare the musical perception and musical imagery of pitch, timing and timbre in familiar music.

To explore the explicit experience of musical imagery

Method

Participants either learned or were tested for prior familiarity with pieces of music pre-selected for their tonal, metrical, or timbral qualities. Each imagery trial consisted of hearing a brief extract of the music, before mentally continuing the piece as if actually hearing it. At a certain moment in the mental continuation (image), either the original or modified music was re-introduced, with the task to determine whether this target seemed to be 'in tune/ out of tune', 'in time/out of time', or the 'same/ different' (depending on the experimental focus). Accuracy and response times were recorded and compared with data for an equivalent perception task in which the music was actually heard up to the target moment (with no necessity to image through a perceptual 'gap').

Results

The veridicality of imagery for different musical dimensions is suggested by the data. The measurement of response time enabled the sensitive detection of behaviour that was different in kind (and not simply magnitude), when imaging and perceiving music.

Conclusions

It is argued that musical imagery and perception are separable but mutually dependent cognitive phenomena.

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THEMATIC SESSION

Absolute pitch

Tuesday 17:00
Room: Wellek (315)

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"LATENT" ABSOLUTE PITCH AND ITS IMPLICATIONS FOR THEORIES OF MUSICAL LONG-TERM MEMORY

Kathrin Hahn
Elke van der Meer
Wolfgang Auhagen
Humboldt University of Berlin, Germany

Background

While absolute pitch (AP, the ability to name or produce tonal pitches without an external reference pitch) is often considered an ability that only few people possess, evidence for traces of this ability in the general population ("latent" AP) has been accumulated, showing memory for absolute pitches in tonal languages, in the production of pop and folk songs, as well as in the production and recognition of familiar classical music. The interpretation of these results leads to more general questions about the nature of musical long-term memory (LTM): Firstly, for musicians, the question arises, whether only symbolically coded pitches (pitch names) can be retained in LTM, or whether there exists also a form of long-term sensory memory for overlearned melodies, unrelated to the possession of AP? Secondly, for musicians and non-musicians (no pitch names available), the contribution of motor memory to the recall of familiar melodies needs to be addressed.

Aims

The aim of this study was to differentiate between a "process" and a "trait" explanation for "latent" AP. A process explanation stresses the importance of familiarity and structure of the learned music, while a trait explanation focuses on individual musical experience and supposes a connection between "latent" and "manifest" AP.

Method

A group of 94 secondary school pupils with varying degrees of musical experience learned a tonal and a modal melody for a short vs. long period of time. Memory for these two melodies was then tested with a recall and a recognition task and compared to the memory for a highly overlearned melody (advertising jingle) as well as with the ability to name pitches (AP test).

Results & Conclusions

Results suggest a combination of the "process" and "trait" explanation: Memory for absolute pitches depends on familiarity and structure of the melody, while there is also an influence of musical background, although no correlations with "manifest" AP have been found.

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L'OREILLE ABSOLUE PARTIELLE DANS LA MÉMOIRE IMMÉDIATE DE MÉLODIES TONALES

Ana Laucirica
Dept. de Psychologie et Pedagogie, Universidad Pública de Navarra, Spain

Quelques auteurs ont constaté que les musiciens avec l'oreille absolue pourraient présenter une plus grande vitesse et facilité pour la mémoire immédiate de mélodies tonales et/ou non tonales. Les musiciens avec ou sans l'oreille absolue présentent des semblables aptitudes cognitives pour réaliser cette activité. Cependant, l'identification du „chroma" chez les sujets avec l'oreille absolue semble contribuer à l'amélioration de cette activité musicale. Ce travail présente une étude empirique réalisée sur 11 étudiants de musique de niveau supérieur : son objectif est de connaître la possible appartenance de ces derniers à quelque type d'oreille absolue et leur rapport avec la mémoire immédiate de mélodies. Lors du test d'évaluation des différents types d'oreille absolue, on a utilisé un instrument dont la validation et la fiabilité, obtenues avec 88 sujets, a déjà été employé dans de précédents tests. Pour le second test, ils ont transcrit un morceau d'une sonate de Vivaldi pendant les intervalles d'une durée de minute que l'on a laissé entre chacune des dix auditions du morceau. On leur a demandé aussi une petite description du processus qu'ils ont utilisé pour réaliser l'épreuve et on a réalisé des interviews à plusieurs sujets interrogés. Les résultats confirment ceux obtenus dans de précédents tests ; toutefois, si l'on considère le petit nombre de sujets que nous avons évalués et la seule audition d'un morceau mélodique, l'apport le plus important se trouve dans les différents systèmes mis en oeuvre pour mémoriser la musique et la difficulté générale pour percevoir les modulations. Il semble que les sujets avec une oreille absolue encore partielle peuvent avoir une plus grande facilité que ceux dépourvus de cette habileté pour la mémoire de certaines mélodies, mais cette facilité peut être présente aussi chez des sujets qui n'ont aucune tendance pour l'identification des sons isolés quand on ne demande pas la hauteur absolue du morceau.

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DEMONSTRATION PAPER 1

Tuesday 11:00
Room: Stumpf (E 15)

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MUSIC AS A MEDICINE FOR THE ADYGHES

Alla N. Sokolova
Institute of Arts, Adyghe State University, Maikop, Russia

Background

Since antiquity, different people have made use of music as a medicine against illness. We consider the medical function of music in typological and specific meanings. These problems are discussed based on the material of the Adyghe (Circassian) traditional culture for the first time.

Aims

The purpose of this study is to define notions and situations which provide music with the medical power in the Adyghe traditional culture, which of these notions are common to all mankind, which are typical of the whole Caucasian region, which situations are unique, and whether the Adyghe music has such an influence on people of other ethnic groups.

Method

The methods of this work include a systematic ethno-phonic investigation of the Adyghe traditional culture. Observations are carried out by an investigator who is impressed in the culture.

Results

Geographical landscape (mountains, mountain rivers), specific flora and fauna of the Caucasus and climatic features have formed certain beliefs about beauty of sounds and melodies and their capacity for medical treatment. Songs with heroic texts help a sick man to carry the pain, identify himself with the images of heroes. Merry dancing tunes allow a man to be distracted from pain, stake out enjoying youth. Medical characteristics are comprised not so much in melodies themselves, intonations, their rhythms, as in people who regard them as curative.

Conclusions

Data on curative magic of music in the Caucasus are included in cognitive ethno-musicology.

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POSTER SESSION 1

Tuesday 11:00
Room: Exhibition (E 50)

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SENSATION SEEKING, MUSIC PREFERENCE, AND PSYCHOPHYSIOLOGICAL REACTIVITY

Urs M. Nater, Monika Krebs, Ulrike Ehlert
University of Zurich, Dept. Clinical Psychology II, Switzerland

Background

The personality construct ‚sensation seeking' (SS) as defined by Zuckerman can be used as an explanation for behavioral phenomena that are wide spread but little understood, such as the preference of arousing music styles. Embedded in a psychobiological theory of personality, SS is closely related to a number of biological variables.

Aims

We hypothesized that subjects with high levels of SS would prefer aggressive and arousing music to peaceful and comforting music and show attenuated psychophysiological reactivity to aggressive and arousing music.

Method

A total of 53 healthy subjects (mean age: 26.13, SD: 3.97; 26 males, 27 females) was examined. For evaluation of SS the german version of the Sensation Seeking Scale V (SSS V) was applied. Heart rate, electrodermal activity, skin temperature, salivary cortisol, and salivary alpha-amylase were assessed during the course of the whole study. After a baseline period, two musical stimuli that were carefully selected and rated in a pre-study as peaceful and comforting (renaissance music) and aggressive and arousing (heavy metal), respectively, were presented on two different days via headphones during 10 minutes in a randomized order.

Results

Preliminary results suggest that subjects with high levels of SS are more likely to rate their psychological state after the aggressive stimulus as less aroused ($r = -.31$; $p < .05$) and more comforted ($r = .32$; $p < .05$) than subjects with low levels of SS.

Psychophysiological and endocrinological parameters have not been analyzed yet and will be presented at the conference.

Conclusions

SS seems to be associated with the psychological experience of aggressive and arousing music. Whether this relationship holds true on a physiological dimension remains to be seen. Implications for research in music preference and music therapy will be discussed.

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MUSIC THERAPY AND VIDEO TRAINING AS METHODS OF DEVELOPMENT OF INTELLECTUAL ABILITIES OF 5-7 YEAR-OLD CHILDREN

Maria Aleksandrovich
Belarusian State Pedagogical University, Belarus

Background

Modern research in the field of psychology of music shows us that listening to the music influences on general child's development, on the processes of emotional sphere forming or intellectual sphere developing.

Aims

The main aim of our research was to figure out the influence of music therapy and video training on the development of intellectual abilities and intellectual operations of 5-7 year-old children. 30 children took part in the research (15 – correctional group and 15 – control group). The research was conducted in 2001-2002, Minsk, Belarus, kindergarten < 5.

Method

During the research *Edinburgh Pictures Test* was used to find out the level of development of intellectual abilities (before and after music therapy) and as therapeutic methods *films «Baby Mozart» and «Baby Bach»* were used. The statistical analysis was carried out in STATISTICA (Wilcoxon Test).

Results

As a result we find out that in correctional group, intellectual abilities' levels were IQ_{med}= *113,2±10,09 (before therapy)* and IQ_{med}= *118,4±9,08 (after therapy)*. So, among 15 children – 14 showed the growth of intellectual abilities. We found positive changes ($T=11$, $p=0,005$). In the control group intellectual abilities' levels were $IQ_{med}=97,27±7,23$ *(first test)* and $IQ_{med}=99,93±9,15$ *(retest)*. Among children in the control group the range of the results was wider, so we didn't find the positive change ($T=40$, $p=0,25$).

Conclusions

Our data allow us to make a conclusion that music therapy and video training give positive results. So, they can be applied in the kindergartens for the development of intellectual abilities of children alongside traditional developing exercises.

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PERCEPTION AND PROCESSING OF MUSICAL SCALE STRUCTURES: A CROSS-CULTURAL ERP STUDY

Christiane Neuhaus
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Background

So far, experimental studies concerning the cross-cultural aspect of music perception have been based on two main approaches: the 'probe-tone method' designed by Krumhansl & Shepard, and the developmental aspect, i.e. the investigation of the stages before, during and after musical enculturation. Compared to those forms of testing, modern methods of brain science have the decisive advantage of measuring activity not only pre-verbally, but also directly and simultaneously while listening to music.

Aims

The current experiment was designed to investigate how members of different cultures will perceive musical scales with various structures.

It is based on recording event-related brain potentials (ERPs) as a method of study.

Method

Five German, five Turkish and five Indian musicians listened attentively to four types of heptatonic scales played in an upward movement - the major and harmonic minor scales, the equiheptatonic Thai scale and the Turkish makam Hicaz. Scales were combined in pairs in five different blocks, according to the so- called 'oddball paradigm'. Each block consisted of 45 standard and 15 deviant scales. Bioelectrical responses were registered at electrode placements Fz, Cz and Pz.

Results

Analyzing block 1 (major standard scale versus Thai deviant scale), data analysis revealed a P300 as well as a (non-expected) negative shift in the latency range between 430 msec and 540 msec, named 'processing negativity' (not in the sense of Näätänen's 'Processing Negativity' (dichotic listening task)). The negative shift was generally found after clear pitch identification wherever differences in frequency between the deviant and the standard scale-tone had a sufficient amount.

Furthermore, non-western groups showed a large P300 as a reaction to the first tetrachord. For them, scale-tone 4 has the function of a cognitive reference point and is obviously more relevant than scale-tone 3. For German musicians, Thai-tone 7 caused a violation of the 'leading tone expectancy', indicated by a large P300.

In contrast to German and Turkish subjects, Indian musicians did not respond to the whole scale pattern after having perceived tone 8, as they are used to a combination of upward and downward scale movement, termed 'arohana' and 'avarohana'.

Conclusions

Overlearned listening strategies applied to culturally imprinted scale material had a significant influence on all investigated brain reactions.

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RECITAL

Composed – Improvised

Improvisations on music psychology's favourites

Organizer and host: Katrin Wernke

Tuesday 20:00

Room: Kurth (Concert Hall)

ISBN: 3-931852-66-0
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RECITAL

COMPOSED – IMPROVISED
Improvisations on Music Psychology's Favourites

Tuesday, September 9, 20:00

1.	W. A. Mozart: Piano Sonata in A Major, KV 331, 1st movement		Huihui Shi (piano)
2.	Improvisation on Mozart's Piano Sonata in A Major		Bernd Homann (piano)
3.	R. Schumann: „Träumerei", from Kinderszenen op 15, No 7		Michiko Tsusa (piano)
4.	Improvisation on Schumann's „Träumerei"		Bernd Homann (piano)
5.	F. Chopin: Nocturne No 6 in G Minor, op 15, No 3		Yukie Aiba (piano)
6.	Improvisation on Chopin's Nocturne No 6		Bernd Homann (piano)
7.	L. v. Beethoven: Sonata op 110 in A-flat Major, 1st movement		Michiko Tsusa (piano)
8.	Improvisation on Beethoven's Sonata op. 110		Bernd Homann (piano)
9.	E. Satie: „Gymnopédie No 1"		Roman Rofalski (piano)
10.	Improvisation on Satie's „Gymnopédie No 1"		Bernd Homann (piano)
11.	R. Rodgers: My Funny Valentine (Miles Davis 1956, performed in two versions)	Jazz band	Herbert Hellhund(trumpet) Lorenz Hargassner (saxophone) Elmar Braß (piano) Peter Schwebs (double bass) Oliver Struck (drums)

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BERND HOMANN

Curriculum vitae

1964	born in Edemissen/Peine (Germany) first piano lessons at the age of 5 jazz piano lessons at the age of 13, early focus on ragtime and boogie
1986 – 1990	studies at the Hanover University of Music and Drama: education in jazz-/rock-/pop-piano
1990	graduation
1992 – 1999	prizes at several jazz competitions as a solo artist, played together with the Bernd Homann Quartet and the Bernd Homann/Lars Hansen-duet
1996	cultural promotion prize from the ministry of education and cultural affairs Niedersachsen
1998	prizewinner at the international piano competition „Concour Internationaux de la ville Paris – 2ième Concour de Piano-Jazz/Martial Solal"
2000	concerts and concert tours for the NDR-program „Studio 10", at jazz festivals and with the Goethe Institute program for cultural promotion to Latvia and Lithuania; lecturer for jazz piano at the Hanover University of Music and Drama
2001/2002	concert tours with the Goethe Institute to Lithuania, Denmark, France and Ukraine

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KEYNOTE 3

Helga de la Motte-Haber

Wednesday 14:00
Room: Kurth (Concert Hall)

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AUDIO-VISUAL PERCEPTION: FUNDAMENTALS AND APPLICATIONS

Helga de la Motte–Haber
Fachgebiet Musikwissenschaft, Technische Universität Berlin, Germany

Until ten years ago, perception research mainly focussed on the functioning of one sense in isolation, although in daily life our senses work in conjunction with each other. The eye and the ear process information together. There are many study results which demonstrate how music or speech is understood, which would be relevant only if we were listening through headphones or with closed eyes. But during listening, relevant visual information (movement of the musicians, lip movements etc.) is also processed and the irrelevant ignored.

Audio-visual perception refers not only to multimedia (film, videoclip, internet etc) but this new media has posed a particular challenge to inter-sensory studies in the last decade.

The paper will demonstrate how the audio and the visual interact:

- During the processing of information, the eye can be dominant (e.g. the ventriloquy-effect, increasing loudness by light etc.).
- The ear modifies visual impressions, as in the case of a constant light which seems to flicker due to a rhythmic sequence of tones.
- A few special studies show the McGurk - effect for music (integration of the visual movements of a musician with the heard quality of sound).
- Some interesting results on cross-modality matching will also be presented.

Beyond these elementary aspects, semantic implications of sound and music modify visual impressions, as shown in the many experiments with film music. Special attention will be paid to music video clips where the images also change the meaning of the music. An experiment of my own should demonstrate which aspects of signification depend more on the images, and which impressions are determined by the music.

Finally, after more than 100 years of cross-genre art, audio-visual research has an important relevance for the explanation of aesthetic perception. Beyond the multimedia forms, art (music) today is often conceived with a synaesthetic approach. For example, chamber music works with titles such as "Light", "Lux" ,"Shadow" refer to this cross-modality matching, and a new genre in particular, the so-called "soundart" is multi-sensory by its very nature. Modern aesthetics are centered around the term "perception" (aisthesis) and thus, it seems particularly paramount in today's new media world that the psychology of music and aesthetics draw from each other.

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SYMPOSIA

Wednesday

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SYMPOSIUM

Musical identities

Organizer: Alexandra Lamont

Wednesday 9:00
Room: Wellek (315)

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MUSICAL IDENTITIES AT SCHOOL: AGE AND EXPERIENCE AS DETERMINANTS OF MUSICAL IDENTITY

Alexandra Lamont[2], *David Hargreaves*[1], *Nigel Marshall*[1], *Mark Tarrant*[2]
[1] University of Surrey Roehampton, UK
[2] Keele University, UK

Background

Previous research suggests that musical identities are strongly affected by the contexts in which children experience music-making and opportunities to participate. Situations with more overt music-making opportunities result in more positive musical identities amongst those children involved in the musical activities, but also lead to more negative musical identities amongst children not involved. The current research forms part of a larger project into music in and out of school, commissioned and funded by the Qualifications and Curriculum Authority in England.

Aims

The study aims to illustrate the changing nature of children's musical identities and to highlight how this can be affected by personal, school, and wider social factors. It will explore the potential gap between the children themselves and the musicians they describe, and investigate the factors that children believe are necessary in order to become a musician.

Method

134 children between 8 and 14 years participated in semi-structured focus groups. Three different groups were constructed based on their interest in active music-making: children currently having formal instrumental training ("training"), those who would like to ("aspiring") and those who would not ("non-aspiring"). Participants were asked about the value of music, asked to imagine "a musician" and describe that person in detail, and probed for underlying causes and influential factors in becoming a musician.

Results

Children nominated a wide range of different kinds of "musicians", from classical composers such as Beethoven through celebrity pop musicians to their own music teachers. The influence of television, in particular Pop Idol (a recent UK series), was particularly strong. Many children expressed negative beliefs about their own capacities as musicians and felt either talent, hard work, or luck was responsible for the success of the musicians they nominated. Analysis is still under way and full implications will be presented at the conference.

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MUSIC MATTERS: MUSICAL IDENTITIES AS FUNDAMENTAL MARKERS OF PERSONAL IDENTITIES

Dorothy Miell
The Open University, UK

Raymond MacDonald
Glasgow Caledonian University, UK

Background

This presentation will show how current thinking in social and developmental psychology has influenced conceptions of what might constitute musical identity. It will outline various possible definitions of musical identities, building on our recent work in this area (MacDonald, Hargreaves and Miell, 2002).

Aims

The study described here attempts to uncover the reasons underlying an apparently contradictory state of affairs. How can music, with such a powerful role in young people's lives outside school, be so dismissed when it is taught in the classroom? It is suggested that we need to understand more about the social forces underlying how young people use music, the identity work they do through their involvement with it, and the way it is used as a vehicle for resisting authority, if we are to be more successful in encouraging interest in the subject at school.

Method

Our studies reported here employed in-depth interviews and a longitudinal case study of all members of one rock group to investigate how young men and women (aged 13-16) reflect on their involvement with making music in different environments - both formal (i.e. at school) and informal (i.e. membership of bands). In particular, we were interested to examine the ways in which they saw their musical activities as bound up with the ongoing negotiations between themselves and their friends, other peers, teachers and other significant adults involved in developing their identities and establishing their place in their social worlds.

Results and Conclusions

Music emerged as an intensely personal aspect of young people's lives and also as a powerful vehicle for making social statements (such as to rebel against authority). Whilst the centrality of music to the lives of these young people was evident, the value of trying to bring such passion into the school needs to be balanced by the recognition of the difficulties of doing so.

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THE EMERGING 'PERFORMER' IDENTITY

Karen Burland
University of Sheffield, UK

Background

In examining the development of the professional musician, it is commonly understood that environmental factors, such as the support of significant others (parents, teachers, peers) and type or amount of practice, are significant contributors to musical success. However, alongside these elements, the identity of the individual and how the identity develops and emerges as they approach entry into the profession is crucial.

Aims

The aim of the research project is to better understand the transition from training as a musician to entering the profession. In particular this paper focuses on the emerging identity of the musician and the role it plays in their professional development.

Main contribution

The paper presents quantitative data from a two-year longitudinal study investigating the development of 35 undergraduate conservatoire and university students in their final two years of study. The focus of the current paper is on the conservatoire student, and the data collected in a fifteen-month period traces the progress and development of the musicians. Initial findings suggest that as the individual matures as a musician, so their identity changes. For example, it seems that music has been gradually incorporated into their concept of self - it is used increasingly as a means of self-expression, and provides the respondents with self-confidence. Furthermore, over time individuals develop a strong drive to fulfil their potential and express utter determination to succeed and overcome setbacks.

Implications

The findings reported provide unique insight into the development of the performing musician and, as such, have potential educational implications for our understanding of how to maximise the potential of musicians in training and how to best aid their transition into the profession.

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THE IDENTITIES OF MUSIC TEACHERS

David J. Hargreaves[1], Graham Welch[2], Ross Purves[1], Nigel Marshall[1]
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[2] Institute of Education, University of London, UK

Background

Although many of the apparent 'problems of secondary school music' in UK schools have been addressed from the point of view of pupils' attitudes to what they perceive as differences between 'school music' and 'out of school music', relatively little attention has been paid to this same issue from the teachers' point of view. The ESRC-funded Teacher Identities in Music Education (TIME) project pursues this question by focussing on musical identities: what light can the congruence between the musical identities of music teachers and their pupils throw on the practical problems?

Aims

The TIME project includes a longitudinal questionnaire study which follows intending music teachers through from their pre-service course to their work in post. The two main aims are to investigate changes in their self-efficacy and collective self-esteem as 'teachers' and 'musicians' over this period, and to compare the changes experienced by teachers from different pre-service institutions, in particular University education and music departments, and conservatories.

Method

Approximately 120 pre-service music teachers drawn from the three types of institution are currently completing the first phase of the longitudinal questionnaire study, and will be followed up in Spring 2003.

Results

By spring 2003, the data from the longitudinal questionnaire study will be collected and analysed, and this paper will present the main findings of the analysis. Preliminary comparisons between the three different types of institution suggest some interesting differences, including a relatively higher value placed on levels of performing than teaching skills amongst conservatory students; that students in music departments and colleges who are not considering secondary teaching as a career frequently cite pupil disinterest and poor behaviour as the main reason why; and that students in education departments have high and clear-cut career expectations within music education.

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SYMPOSIUM

Musical expression, computer technology and learning

Organizer: Patrik N. Juslin

Wednesday 9:00
Room: Révész (202)

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MUSICAL EXPRESSION OF EMOTIONS: MODELING COMPOSED AND PERFORMED FEATURES

Patrik N. Juslin
Erik Lindström
Department of Psychology, Uppsala University, Sweden

Background

Research into musical expression of emotions has increased steadily in the last decade. This line of research has revealed a large number of acoustic features that may be used to achieve a particular expression. However, this research has suffered from certain shortcomings. Firstly, only a few emotions have been studied. Secondly, the relationships among different emotional expressions are poorly understood. Thirdly, no study has attempted to model the way in which a music composition and its performance, respectively, contribute differentially to the expression.

Aims

The aims of this research were to (a) expand the number of emotions investigated, (b) analyze the ways in which different emotions cluster together in listeners' emotion judgments, and (c) model how composed and performed features contribute to the expression of a piece of music.

Method

This study consists of two parts. In the first part, professional performers of different instruments (piano, guitar, saxophone) were required to play pieces of classical music in such ways that they would express 12 different emotions. The performances were recorded, analyzed, and judged by 60 musically trained listeners. Cluster analysis was used to capture the inter-relationships among expressed emotions. In the second part of the study, a large set of musical parameters (e.g., mode, pitch, tonality, articulation, loudness) were systematically manipulated in a factorial design using synthesis. Musically trained listeners rated the resulting pieces of music on adjective scales. The relationships between musical parameters and listeners' judgments were modeled using Multiple Regression Analysis.

Results

The analysis is still in progress. Preliminary findings highlight the complex nature of expression in music, reveal systematic relationships between acoustic features and emotions, and show that there are definitive limitations with regard to what musicians can convey to listeners.

Conclusions

The results show that quantitative modeling of various features of emotional expression in music is feasible. The study of several emotions and their inter-relationships is rendered more cohesive by taking both composition and performance into consideration.

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AUTOMATIC EXTRACTION OF PERFORMANCE VARIABLES FROM AUDIO RECORDINGS

Anders Friberg[1,2], *Erwin Schoonderwaldt*[1,2], *Patrik N. Juslin*[2]

[1] Speech Music and Hearing, Royal Institute of Technology, Stockholm, Sweden

[2] Uppsala University, Department of Psychology, Sweden

Background

The analysis of audio recordings is often a time-consuming and difficult task in studies of music performance. Many previous studies have for practical reasons been limited to studying timing in piano playing. Recent studies, e.g., regarding emotional communication, have raised the need for analysis of a more complete set of performance variables, including sound level, timbre, and attack velocity.

Aims

Our aim is to provide a computer algorithm that from an audio file of a monophonic music excerpt automatically analyzes a set of performance variables. The intention is to produce an algorithm that is sufficiently accurate in each estimated variable to be useful for research purposes.

Method

The audio input is first segmented into onset and offset position for each note by means of a combination of pitch detection and sound level analysis. Tones are recognized from the pitch analysis by identifying areas of similar pitch, and from the sound level analysis by detecting substantial dips in the sound level. For each detected tone, the following eight variables are computed: sound level, instantaneous tempo, articulation, attack velocity, spectral content, vibrato rate, vibrato extent, and pitch.

Results

The current algorithm works best with instruments with sustained notes, such as violin, flute, and voice. Preliminary test data using violin and flute indicate that the system has an average note detection accuracy of up to 97%. The algorithm has been used in a computer system for quantifying emotional communication between musicians and listeners. More test results will be given during the oral presentation.

Conclusions

According to the preliminary results, the algorithm has a potential to be useful for research into music performance.

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COMPUTER FEEDBACK AND LEARNING OF EXPRESSIVE SKILLS IN MUSIC: A PILOT STUDY

Jessika Karlsson[1], Patrik N. Juslin[1], Erik Lindström[1], Erwin Schoonderwaldt[2]

[1] Department of Psychology, Uppsala University, Sweden

[2] Speech, Music and Hearing, Royal Institute of Technology, Stockholm, Sweden

Background

Empirical findings from questionnaire research and interviews suggest that musicians regard expressive skills as being of primary importance in music performance. Yet expressive skills are often neglected in music education, perhaps because musical expression involves implicit knowledge that is difficult to convey from teacher to student. Indeed, there is some indication that traditional strategies for teaching expressivity rarely provide informative feedback to the performer. To address this issue, we have created a computer program that aims to improve a student's expression of emotion by providing feedback that allows the student to compare his or her performance strategy with an optimal performance strategy.

Aims

The aim of this study was to evaluate the new computer program in close collaboration with music teachers and performers. The study evaluated both the prospects of computer-assisted teaching in general and the benefits and drawbacks of the new program in particular.

Method

The study combined methods from experimental psychology with usability evaluation. Data were collected through observation, video recording, acoustic measurement (supplied by the program), and structured interview. Three kinds of measures were used to index the usability of the program: (a) performance measures (e.g., did the program really improve the student's communication?), (b) subjective measures (e.g., did the student like using the program?), and (c) knowledge measures (e.g., did the student understand the functions of the program?).

Results

The analysis is still in progress. Preliminary findings suggest that the program is effective in improving music students' communication of emotions, although the usability measures also show that certain aspects of the program can be improved. Students' reactions to the program seem to be partly mediated by their overall attitudes towards computer-assisted teaching.

Conclusions

The proposed program for performer feedback may potentially help to elucidate the elusive relations between the performer's intentions, acoustic variables in the performance, and the listener's impression. Computer-assisted teaching could therefore serve as a complement to traditional teaching, allowing performers to experiment freely with interpretative ideas.

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REAL-TIME VISUALIZATION OF MUSICAL EXPRESSION

Roberto Bresin[1,2], *Patrik N. Juslin*[2]

[1] Speech, Music and Hearing, Royal Institute of Technology, Stockholm, Sweden

[2] Department of Psychology, Uppsala University, Sweden

Background

This work is part of a research project that aims at developing a computer system for teaching students to play expressively – Feedback-learning of Musical Expressivity (Feel-Me). Part of the system is a tool for automatic extraction of acoustic cues that are considered important for the analysis of performance expression. These cues include duration, sound level, articulation, and vibrato. For example, staccato articulation may be typical of a happy performance, while legato articulation may be typical of a tender performance. It is important that music students are trained to control acoustic cues effectively to achieve different expressive performances.

Aims

Results from analyses of acoustic cues can be presented to the performer in a variety of ways, for example in term of graphs or tables representing mean values and deviation curves after a post-processing of the performance. This can be useful for a more analytical understanding of what the performer did. Here, the aim was instead to explore the possibility of providing real-time feedback about a performance (i.e., at the very instant the performer is playing) by using a graphical interface where acoustic cues are presented in an intuitive fashion.

Method

A graphical interface was developed that presents a three-dimensional object on a computer screen with continuously changing shape, size, position, and colour. Some of the acoustic cues were associated with the shape of the object, others with its position. For instance, articulation was associated with shape: staccato corresponded to an angular shape and legato to a rounded shape. The emotional expression resulting from the combination of cues was mapped in terms of the colour of the object (e.g., sadness/blue). To determine which colours were most suitable for respective emotion, two tests were run. In the first test, subjects rated how well each of 12 emotions corresponds to each of 8 colours. In the second test, subjects rated how well each of 8 colours corresponds to each of 12 music performances expressing different emotions.

Results

The graphical interface will be demonstrated during the oral presentation, along with findings from the colour experiments and a usability study that is currently underway.

Conclusions

The tool presented here provides real-time feedback regarding the expressive strategies used during a performance, and offers an interesting complement to traditional teaching strategies.

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N.B.: This demonstraton paper will be presented during the coffee-break in room Révész (202)

A PROGRAM FOR TEACHING OF COMMUNICATION OF EMOTION IN MUSIC PERFORMANCE

Erwin Schoonderwaldt[1,2], Patrik Juslin[1], Anders Friberg[1,2], Jessika Karlsson[1]

[1] Department of Psychology, Uppsala University, Sweden

[2] Speech, Music, and Hearing, Royal Institute of Technology, Stockholm, Sweden

Background

We developed prototype software in the context of a research project on Feedback-learning of Musical Expressivity (Feel-ME). The software can be used by music students to analyze their achievement in communication of emotions in music performance. The prototype contains an implementation of a communication model developed in previous research. It will be used for gathering data in a field study that explores the effect of a novel teaching strategy.

Aims

Our goal was to develop computer software that could provide music students with Cognitive Feedback (i.e. feedback that allows the student to compare a model of his or her utilization of acoustic cues in the performance with an optimal model). The software should be easy to use, even for music students without much experience of using computers. The aim of this paper is to demonstrate the software with appropriate examples.

Method

During a recording session, the music student is asked to play the same melody with different emotional expressions. The software automatically extracts the acoustical cue values from the audio recordings. The relative importance of each cue and the consistency of cue utilization in the student's emotion portrayals are estimated using multiple regression analysis. Comparison with stored listener models (which simulate judgments of the perceived emotional expression) provides detailed information about how the student's utilization of cues can be improved.

Results

The graphical user interface represents a visualization of the circular process of (a) recording, (b) analyzing cues, and (c) receiving feedback. Recording sessions are organized into projects (representing a melody, musical style or composer). The sessions are stored in order to enable the student to monitor his/her progress. The program can be used by students, music teachers, and researchers. Each of these user groups has different permissions in the program. Students, for example, have only access to their own data, while music teachers are allowed to view the data of all users. The program can provide both cognitive feedback and more limited outcome feedback, which will enable us to measure the importance of cognitive feedback.

Conclusions

A previous study indicated a positive effect of cognitive feedback on learning to communicate emotions in music performance. The present prototype will be used for further explorations of computer-assisted learning of expressive skills.

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SYMPOSIUM

Instrumental and vocal music practice

Organizer: Siw G. Nielsen

Wednesday 9:00
Room: Stumpf (E 15)

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SELF-REGULATED LEARNING AND INSTRUMENTAL ACHIEVEMENT

Siw G. Nielsen
Norwegian Academy of Music, Oslo, Norway

Background

Conservatoire students assume most of the responsibility for their own instrumental achievement themselves, and in this manner, the way a music student self-regulates his or her learning in practice becomes a prime determinant of effectiveness. Students can self-regulate their motives for practising and performing, their learning strategies used in practice, and their performance outcomes.

Aims

This paper investigates the relationships between motivational beliefs, learning strategies and instrumental achievement in self-regulated learning of advanced students.

Method

The participants were 130 music students in their four-year undergraduate program in six institutions of higher music education. They were enrolled in the performance, church music and music education degree programs. Strategies and motivational beliefs in self-regulated learning were registered through an adapted version of Pintrich's Motivated Strategies for Learning Questionnaire. In addition, motivational beliefs were registered through an adapted version of Midgley's Students' Achievement Goal Orientations. Instrumental achievement was measured by their instrumental performance grade on their main instrument in their 2nd year of study. An examination concert was the context for giving the grade.

Results

This paper will be a report of work currently in progress. Comparisons between students in different grade groups regarding several types of self-regulated strategies and motivational beliefs will be made. Relationships between types of self-regulated strategies and motivational beliefs will also be explored.

Conclusions

Studying both the strategies students in different grade groups use in practice and their motivational beliefs related to instrumental performance and practising, we anticipate that this study will uncover some of the complex relationships among practice, motivation and achievement in music students studying in higher music education.

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SINGERS' GOALS FOR PRACTICE: VERBAL REPORTS AND BEHAVIOURAL DATA

Jane Ginsborg
Psychology Group, School of Health and Human Sciences,
Leeds Metropolitan University, UK

Background

Musicians' self-reports during and following practice have been shown to be a valuable adjunct to the analysis of behavioural data.

Aims

This paper investigates the nature of singers' goals, and the extent to which singers' explicit verbalisation of their intentions, together with their evaluation of the degree to which they feel they meet them, contributes to the effectiveness of their practice.

Method

Thirteen female singers of different levels of expertise took part in an observational study. They practised and memorised the same new song over a period of two weeks in a series of four to six 15-minute sessions, which were audio-taped. While the singers practised they provided verbal commentaries; they also completed practice diaries at the end of each session. The data from the singers' vocal practice were combined with the data from their verbal commentaries and diaries. These were analysed in terms of goals explicitly stated or inferred, the extent to which they were actually met or met to the singer's satisfaction, and evaluated by the singer.

Results

The results suggest differences between the higher-level practice strategies used by the singers who were quicker to memorise and to give completely accurate performances of the song, and those used by the singers who were much slower to memorise and made the most errors in their final performances.

Discussion

The combination of concurrent and retrospective verbal data with observations of singers' practising behaviours illuminates the extent to which singers of different levels of expertise identify and meet their goals, and evaluate their success, in relation to their speed and accuracy of memorisation.

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CASE STUDIES OF THE PRACTISING BEHAVIOUR OF MUSIC STUDENTS WITH DIFFERING REASONS FOR MUSICAL STRIVING

James M. Renwick and Gary E. McPherson
University of New South Wales, Sydney, Australia

Background

Research in the 1990s delineated the crucial role of deliberate practice for the acquisition of expertise in playing a musical instrument. Work in academic domains has meanwhile investigated the associations between motivational beliefs, self-regulated behaviour, and learning outcomes.

Aims

This study seeks to investigate the links between motivational beliefs and self-regulated practising behaviour in children and adolescents.

Method

The paper presents findings from the second stage of a longitudinal study. In stage one, 678 candidates in graded performance examinations completed a questionnaire assessing motivational beliefs and practice behaviour. In stage two, 20 of these participants were recruited one year later, in order to observe their final preparation for the subsequent annual examination. The participants were selected on the basis of their high or low scores on five factors emerging from an adapted version of Ryan and Connell's *Self-Regulation Questionnaire*. These factors consisted of motives to strive in music learning: internal, social, external, shame-related, and exam-oriented. The observations consisted of one videotaped practice session in each participant's home. Immediately afterwards, the recording was reviewed to obtain verbal data concerning remembered cognitions that had occurred while practising. The behavioural and verbal data were analysed using the software program *The Observer*, in order to investigate behaviours and cognitions related to each participant's motivational orientation.

Results

Analysis of the large data set is ongoing, so the conference presentation will take a case-study approach to illustrate some of the emerging themes. Preliminary analysis confirms findings in the academic domain that higher levels of intrinsic motivation are associated with higher levels of cognitive engagement and use of self-regulated learning strategies.

Conclusions

The mixture of quantitative and qualitative methods used in the study has uncovered a rich body of information that begins to clarify the complex motivational and behavioural nature of young people practising a musical instrument.

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STUDYING PRACTICE QUANTITATIVELY

Aaron Williamon

Royal College of Music, London, UK

Andreas Lehmann

Hochschule für Musik, Würzburg, Germany

Background

The 7-day recall questionnaire has been shown to provide reliable data within the field of exercise psychology, where participants have been asked to reflect on the amount of moderate and vigorous physical activity done within a one-week period. It was hypothesised that such a tool would be valuable for studying the quantity (and eventually the quality) of musicians' practice.

Aims

This paper assesses the reliability and validity of the 7-day recall questionnaire for studying musicians' practice.

Method

In this questionnaire, musicians are asked to reflect on the number of hours spent practising for each day of the preceding week and to indicate whether the total amount of practice for that week is comparable to that of other weeks within the previous month. This information can be obtained for certain types of practice (e.g. physical practice or mental rehearsal) and for work on specific pieces. This study examines the responses of 30 music conservatoire students on the questionnaire (completed each week for four months), as well as on practice diary entries completed over the same period as part of the students' assessment on an undergraduate course unit.

Results

This paper will be a report of work currently in progress. Comparisons will be made between emergent data from the 7-day recall questionnaire and practice diaries entries corresponding to that 7-day period. Relationships between the questionnaire data and measures of performance quality and state anxiety (obtained in an exam performance of two selected pieces) will also be explored.

Conclusions

It is anticipated that the validation of this methodological tool will open up new avenues of study within practice, where direct observation can often interfere with the activity itself and where practice diaries can have variable completion rates.

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SYMPOSIUM

Music learning – the growth of mind and body

Organizer: Wilfried Gruhn

Wednesday 15:00
Room: Stumpf (E 15)

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IS MUSICAL TRAINING REFLECTED BY SACCADIC EYE MOVEMENT?

Wilfried Gruhn[1], Friederike Litt[1], Annette Scherer[1], Till Schumann[1], Eva Maria Weiss[1], Christine Gebhardt[2]

[1]University of Music Freiburg, Germany
[2] Blick Labor, Brain Research Unit, University of Freiburg, Germany

Background

In the context of the debate on music and intelligence or cognitive transfer effects of music, mental speed was introduced as an independent measure of intelligence (g factor model). Here, it could be demonstrated that mental speed and musical activities interact in young children. However, there is no causal link between mental speed and music. Therefore, the question remains open whether or not neurophysiological correlates for musical training and music achievement can be identified.

Aims

The study starts with the hypothesis that musicians who practice from notation and sight read perform a special training for their eye movements and can, therefore, be differentiated from non-musicians. Furthermore, if such a difference can be demonstrated it will be investigated whether this difference remains stable over the life span. For this, collected data from musicians and non-musicians are related to the average score of a large population of the same age group.

Method

70 subjects of 3 age groups (30 subjects 10 years of age, 20 subjects 25 years, 20 subjects 60 years) – half of them musicians, half non-musicians – are measured with respect to their saccadic and anti-saccadic eye movements (standard overlap and anti gap). For this, an infra red beam helmet (ExpressEye, developed by Blick Labor, brain research center of the University of Freiburg) is used for measurements. Data are analysed for reaction time, correct saccades or anti-saccades, mean distribution, and fixation stability. These data are, then, related to general intelligence (Raven Matrices), musical aptitude (Gordon's Advanced Measures of Music Audiation) and rankings of sight reading (six point Likert scale).

Results

Former investigations have shown that there is an increase of achievement up to the age of 20, followed by a continuous decrease with increasing age. Although measurement and analysis are not finished yet, a trend seems apparent that subjects with special musical training perform better on eye movement tasks relative to the average score of their age group. These data will be compared to intelligence and musical aptitude to find out whether there is a correlation between musical training and saccadic reaction time.

Conclusions

If it can be confirmed that music training effects saccadic eye movement, a neurophysiological correlate exists. This may refer to general intelligence as the basic g factor or to music aptitude as a special human property. Further research may focus on the neurobiological effects of music on the brain and its processing structures.

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EFFECTS OF PIANO, SINGING, AND RHYTHM INSTRUCTION ON THE SPATIAL REASONING OF AT-RISK CHILDREN

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Background/Aims

Children score higher on spatial tests following piano instruction. Three studies were conducted to answer three questions: (1) Which cognitive processes are enhanced by piano instruction? (2) Do different types of instruction have differential effects? (3) Are these effects durable and generalizable? All studies involved disadvantaged Head Start (HS) preschool children.

Method

Study 1: Children were pre- and post- tested using cognitive tests following two years of weekly training in piano (P), computer (C) or no training (NT).

Study 2: Children were pre- and post-tested following two years of weekly training in piano (P) singing (S) or rhythm instruments (R).

Study 3: Music children from Studies 1 and 2 (M) were tested at the beginning and end of the school year along with at-risk children not in HS (AR), HS children who had no music (HS), and middle-income children who had no music (MI).

Results

Study 1: P scored higher than C and NT on spatial-temporal tests. Non-spatial tasks were not enhanced. C and NT did not differ on most measures.

Study 2: P and S scores replicated Study 1 and did not differ from each other. R scored higher on temporal and arithmetic tasks than P and S. R, P and S mental imagery scores did not differ.

Study 3: M scores equalled MI's on certain spatial-temporal and arithmetic tests. M scored higher than HS, who scored higher than AR. The effects of Study 2 were maintained. No effects were found for verbal, memory, or reading tests.

Conclusions

Disadvantaged children who received two years of music instruction scored equal to middle-income children on certain spatial-temporal tasks, including arithmetic, two years after instruction ended. Instruction emphasizing different musical components affected different types of spatial tasks. These results suggest that music instruction should therefore be included among the core elements of intervention.

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MUSIC LEARNING: THE CREATION OF MULTIPLE INPUT AND OUTPUT LINKS

Carolyn Drake
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Performing a piece of music is an extremely complex task involving the co-ordination of multiple input and output systems. The musical input may be, for instance, visual (the note on the stave), aural (the sounded event), imagined, or semantic (note name). The musical output may be the performance on the instrument on which it was learned, another instrument, sung, imagined, written, note names given etc.

At the beginning of learning, music performance may involve only one simple link between one input and one output mode, and thus not involve other types of representation or abstract knowledge. However, as musical expertise increases, so do the links between the different input and output modes, leading to an integrated mental representation of the music. The creation of this mental representation obviously involves the input and output dimensions used while learning the piece, but also many other types of musical knowledge and skill. Indeed the resulting abstract mental representation is probably independent of either the specific input and output modes.

We will investigate the hypothesis that the nature of a musician's mental representation of a particular piece of music, or indeed music in general, depends on the way in which s/he has learned the particular piece, but more importantly on the way in which s/he has learned music. More specifically, different musical teaching techniques reinforce links between particular input and output representations. Each musician's mental representation will therefore reflect the particular links that have been reinforced over the years (and of course those that have been neglected).

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YOUNG CHILDREN'S MUSICAL WORLDS: MUSICAL EXPERIENCES AND MUSICAL PREFERENCES IN THREE-YEAR-OLDS

Alexandra Lamont
Keele University, UK

Background

Musical preferences are influenced by a range of individual, social and musical influences, some common within a given culture and others specific to individual cases. Musical preferences are also highly context-dependent, and the interaction between individual, social and musical factors needs to be more carefully considered. Data is lacking in the earliest stages of development of musical preferences, when children begin to make conscious choices about the music they like.

Aims

1) To explore young children's demonstrated musical preferences for a range of musical styles, establishing the individual, social and musical factors that influence these preferences;

2) To examine the range of young children's everyday experiences of music in "real" time, coded in terms of individual, social and musical factors;

3) To explore the relationship between these everyday experiences of music and the demonstrated musical preferences, investigating similarities and differences between individual, social and musical factors.

Method

Fifty children aged 3 to 3.5 years will participate in two studies. The first is an experimental study of musical preferences, involving an interaction between researcher and child using four extracts of music selected to manipulate familiarity (general and specific) and complexity. Total time spent playing each extract will be taken, as a proportion of total playing time, as indicating degree of preference. The second captures young children's real-life experiences of music using an experience-sampling methodology, collecting data over a week from the caregivers of all participants in a range of different situations.

Results

The study took place in early 2003 so results are currently unavailable. Pilot data from the experimental study indicates that 2-3 year olds have both general and specific preferences for music, and this approach will enable an interpretation of how children's earliest musical choices are affected by individual, social and musical factors.

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INSTRUMENTAL PRACTICE AND DEVELOPING MUSICIANSHIP

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Norwegian Academy of Music, Oslo, Norway

Background

Interest and amount of research in instrumental practice has increased greatly in the last decade. More than half of all research on practice in the 20th century has been published since 1990.

Aims

The aim of the paper is to present recent theory and research in instrumental practice. From the last decade, I will present two issues where empirical research has expanded our knowledge of practice, and one theoretical issue.

Main contribution

The three issues are:

- Time. How does "time" enter practice as a variable? Research has addressed three time perspectives: The initial starting age, i.e. the age when a child starts serious study and practice on their major instrument, the accumulated amount of practice at a certain time, and the amount of current practice. These time perspectives are studied in relation to performance level and achievement. In the last ten years, much of this research has been carried out within expertise theory.

- Self-regulation of practice. In the last decade, several studies have analysed practice behaviour within the theoretical concept "self-regulation", derived from cognitive psychology. In this research, the emphasis is on the degree to which individuals are metacognitively, motivationally and behaviourally active participants in their own learning.

- Model and theory development. At a certain stage in the development of a research area, efforts to develop models and theories to structure and comprehend research results will emerge. Research on practice reached this level in the 1990s. I will present two models that address practice activity as a whole (one based on a cognitive systems model, the other based on theories of didactics (educational theory)). In addition, I will present four models for individual practice strategies.

Implications

Implications for instrumental teaching and development will be addressed in the presentation.

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THEMATIC SESSIONS

Wednesday

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THEMATIC SESSION

Tools and algorithms

Wednesday 9:00
Room: v. Hornbostel (130)

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MUSICAL STYLE AND AUTHORSHIP CATEGORIZATION BY INFORMATIVE COMPRESSORS

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ECONA: Interuniversitary center for Research in Cognitive Processing in Natural and artificial Systems, Italy
Marta Olivetti Belardinelli
Dept. of Psychology, University of Rome "La Sapienza", Italy

Background

Musical style and authorship detection is a cognitive human ability, depending on the degree of musical acculturation, experience and emotional sensibility of the listener. Although formal parameters characterizing a musical piece are not well defined.

Aims

This work is aimed to verify how informative entropy of a musical sequence may represent a formal descriptive parameter for musical categorization by evaluating the entropy distribution over the usual stylistic classes as artistic currents, historical periods and musicians' style.

Method

Recently, a novel parameter based on the compressibility of an informative sequence was introduced. The best compression rate of a data sequence is related to the self-similarity of the sequence and then to its complexity. Typical compression algorithms were applied both to audio and MIDI files of musical pieces written by several authors belonging to different stylistic currents. Finally, a distribution analysis of the compression ratios was performed in order to reveal a stylistic clusterization of the musical pieces.

Results

We observed a clusterization of compression ratios around some representative values, by assuming that musical pieces belonging to a specific author or artistic current reveal a similar amount of complexity. Clusters revealed a structured distribution depending on the similarity of artistic currents, providing a natural artistic distance among musical styles. Moreover, musical pieces not included in the previous cluster formation were correctly categorized and attributed to the related author in most of cases.

Conclusion

Formal description provided by entropy analysis may represent a powerful tool for the determination of a uniform class of musical stimuli useful in psychological cognitive tasks. Moreover, it may be related to the ability of a human listener to extract musical descriptive components.

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PITCH SPELLING ALGORITHMS

David Meredith
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Background

Since the 1970s various researchers have developed *pitch spelling algorithms* that attempt to compute the pitch names (e.g. C♯4, B♭5 etc.) of events in 'piano-roll'-like music representations. Such algorithms are used in systems for computing scores from MIDI data. Also, knowing the letter-names of pitch events is indispensible in music information retrieval. For example, the repetition of a motif on a different degree of a scale (e.g., C-D-E-A repeated as E-F-G-E) might be perceptually significant even if the corresponding chromatic intervals in the patterns differ. Such matches can be found using fast, exact-matching algorithms if the pitch names are encoded in the input but not if the input is in a MIDI-like, 'piano-roll' format.

Aims

The aims of this paper are (1) to present a clear picture of the state-of-the-art in the field of pitch spelling algorithms; and (2) to introduce a new algorithm that performs consistently better than previous ones.

Method

Various datasets were compiled, each containing around 40000 notes and consisting of works in a particular genre by a particular composer, varying in style from baroque to jazz. Various pitch-spelling algorithms were run on these datasets and the results were analysed.

Results

All the algorithms correctly notated over 90% of the notes in the datasets. However, no algorithm scored 100% on any dataset. Longuet-Higgins's algorithm, developed in 1976, performed significantly better than some more recent algorithms. Overall, the author's new algorithm made the least number of mistakes.

Conclusions

No existing algorithm can compute the correct pitch name of every note in any sophisticated tonal style. The best algorithms attempt to model the way that pitch names depend on harmonic, voice-leading, rhythmic and motivic factors.

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USER BEHAVIOUR IN THE SPONTANEOUS REPRODUCTION OF MUSICAL PIECES BY VOCAL QUERY

Micheline Lesaffre
Dirk Moelants
IPEM-Dept. of Musicology, Ghent University, Belgium

Background

This experiment is part of a broader research project in the field of musical information retrieval. In order to realize a user-friendly system for searching musical pieces by vocal query, we investigated the behavior of subjects asked to imitate well-known songs from long-term memory and unfamiliar songs after a single hearing.

Aims

We want to analyze the characteristics of the behavior of people who reproduce a piece of music from memory in an intuitive way. This should lead us to a view of preferences for certain methods of vocal query. Additionally we look at effects of musical content, memory, gender and musical background.

Method

73 subjects participated in an experiment in which they were asked to reproduce pieces of music in front of a microphone. No further restrictions were given. In the first part of the experiment subjects responded to titles of pieces they previously indicated as familiar. In the second part entire pieces of music, indicated as unfamiliar, were aurally presented before asking reproduction.

Results

In general, participants asked to reproduce music prefer a melodic use of the text or of specific syllables. Significant effects of gender and musical background were found as well as differences between the reproduction of unfamiliar melodies and the recall of known melodies. Clear relations between user behavior and musical content were found.

Conclusions

User preferences and general characterics of vocal queries aimed at searching specific pieces in a music database are established. These results can serve as a guideline in the development of user-friendly systems for musical information retrieval based on vocal queries.

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FLEXIBLE FRAMEWORKS: THE MULTIMEDIA THESAURUS

Rosemary Mountain
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Background

Despite the prevalence of multimedia content in today's world, there remains a paucity of critical language and analytical methods for investigating results of interacting sounds and images. Those working within artistic collaborations are often frustrated by the lack of common vocabulary for describing essential qualities of an existing or imagined sound.

Aims

The aims of the project are to discover, develop, and refine appropriate means for talking with other researchers about sound in multimodal artworks. In particular, the project is being designed to encourage reflection on the ways in which we might classify sounds, with and without accompaniment by still and moving images.

Main Contribution

The paper will report on a feasibility study for the construction of physical and virtual tools to explore our perception of sound and music, particularly in multimedia contexts. The project is designed to encourage reflection on our ways of classifying sounds, by soliciting different axis labels for classification of a vast library of short sounds and images in a (real or virtual) three-dimensional space. These will include musical and visual gestures, textures, narratives, collages, and excerpts from a wide variety of musical genres and moods. A few short examples will be presented.

Implications

The project is expected to accelerate the progress of understanding of our perception of sound and music in multimedia contexts by directing the attention of the "users" to the way in which they think about music, as well as by exploring the commonality of responses. The research tool itself encourages multiple classification systems rather than searching for a single "best" solution, allows for continual refinement of responses, and welcomes collaborative investigation.

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THEMATIC SESSION

Music therapy

Wednesday 9:00
Room: v. Helmholtz (E 40)

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DOES SINGING PROVIDE HEALTH BENEFITS?

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[3] Institut für Psychologie, J. W. Goethe-Universität, Frankfurt am Main, Germany

Background

Amateur choir singing is a common recreational activity in adulthood, which requires only moderate musical training. Previous research suggests a variety of psychological and physiological effects of choir singing. In particular, significant changes of emotional state as well as increases of specific immune functions have been observed in previous studies.

Aims

The main purpose of this study was to assess the emotional and neurohumoral effects of choir singing. The research question asked whether and to what extent emotional and endocrine responses were attributable to active singing or passive listening to choir music.

Method

Thirty-one participants (23 female, 29 to 74 years of age) were subjected to two conditions, namely active singing versus passive listening (pre-post-design). Measures of emotional effect as well as samples of saliva, for the assessment of secretory immunoglobulin A (sIgA) and cortisol, were taken from each individual.

Results

Significant changes in both subjective and physiological measures were observed. With respect to active singing, there were significant increases in positive and decreases in negative emotional state. SigA significantly increased, whereas mean cortisol values were not affected by singing. Increases of negative emotional state were found in the passive listening condition. Significant decreases of cortisol were found also in this condition, while mean levels of sIgA were unchanged.

Conclusions

These results suggest differentiated neurohumoral responses to choir singing. Taken together, these preliminary results confirm and extent previous findings of positive emotional and immunogenetic effects of group singing.

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PERCEIVED HOLISTIC HEALTH BENEFITS OF THREE LEVELS OF MUSIC PARTICIPATION

Betty A. Bailey
Jane W. Davidson
University of Sheffield, UK

Background

Results from our previous research using interpretive phenomenological analysis (IPA) indicated that participation in group singing generated emotional, social, cognitive and physical therapeutic effects. Participants also suggested that these effects were not realized to the same extent while listening to music.

Aims

Because our participants were from unique choirs comprised of homeless and disadvantaged individuals, it was necessary to further validate our findings with larger numbers of singers in choirs in more common environments.

Method

A pilot survey was developed to determine amateur choristers' perceptions regarding 3 levels of music participation: singing in a choir, listening to music alone and listening to music with others. Participants rated items using a 5-point Likert-type scale. Of the 63 randomized items, 21 items similarly probed each of the 3 participation levels. The participants were 124 singers (96 females) from 3 distinct choirs (church, community, work place). The ages of the participants ranged from 24 to 82 years (m = 52.16). Mean years of voice and instrumental training were .92 and 2.94 respectively.

Results

Although the ratings were generally high, the majority of the items received the highest average ratings in the 'singing in a choir' category. 'Listening to music alone' received the highest average ratings for 6 items. For all but 2 items the 'listening with others' category received the lowest average ratings. When ratings from all items from each participation category were combined to form an overall Holistic Health Rating, active participation in singing received the highest average rating and listening to music with others received the lowest average across item rating.

Conclusions

The survey results indicate that participation in group singing may be more beneficial than less active types of music involvement. The outcomes are consistent with, and will be discussed in relation to, two recent studies utilizing physiological measures, particularly secretory immunoglobulin A (IgA) and cortisol, which found that participation in choral singing significantly reduced stress. Additionally, one of these studies found that listening to music did not have a similar significant effect.

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IMPACT OF INDIAN MUSIC THERAPY ON THE PATIENTS – A CASE STUDY

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Lalit Kala Academy
Sangit Natak Academy
Government of Pondicherry, India

Gowri Kuppuswamy
University of Mysore, India

Background

In India, though Indian Classical music has the highest potential of curative powers among all other musical systems of the world, Music Therapy has not been made use of as a curative agent by clinicians. In others words, Music therapy has not become popular among the patients and the doctors as an accredited form of treatment. The therapeutic powers of Indian classical music lie unexplored even today.

Aims

The main objective of introducing Music Therapy as a form of treatment to the patients to find out how far Music as a therapeutic and healing agent can reduce Stress, Strain, Mental retardation , Pain, Blood Pressure, Sleeplessness, Post-operative effects, depression, anger and other psycho somatic illness etc without administering any form of oral or medicinal treatment. In the long run, the after effects of medicinal applications can be reduced, thereby helping the surviving society towards a healthy atmosphere.

Method

The 130 inpatients of the hospital who were admitted for various illness including problems of stress, strain, blood pressure, heart diseases, mentally retardation, and other functional areas were subjected to phased treatment through Music therapy.

The 130 patients were divided on a random basis after obtaining their preferences for the type of music that they would like to listen to, and were subjected to random hours of listening at various timing and intervals.

Results

The results of the study showed that irrespective of the Musical knowledge and background of Indian Music of the Patients covered under the study, they responded immensely to the music. This showed intensive and definite results and response to the Therapy program which improved their health and distanced themselves from the illness

Conclusions

The study has proved that Indian Music Therapy has considerable effect on the improvement of the health conditions of the patients and can be cured with out administering any drugs and has proved to have no after effects on the metabolism or the organic status of the patients.

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ANOTHER SIDE OF THE ORCHESTRA: AN INTERVIEW STUDY

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Background

An orchestral career has often been looked upon with awe by the public. A contract position with a well known orchestra is highly regarded among players, and often the target of competitive auditions. Yet, orchestral lifestyle is not easily captured from the outside. While some researchers have been able to penetrate group barriers and gain the confidence of orchestra members for a single-episode interview, such data may not portray the issues in a highly valid manner. Moreover, questionnaire data even when obtained from face to face interactions might not touch on emotional issues.

Aims

To survey professional orchestra players via multiple-episode structured interviews following mood induction procedures.

Method

54 professional symphony orchestra musicians (from 4 major British contract orchestras) were interviewed eight times over a 10-weeks period. The interviews were packaged as a sensitivity training program, offered on-site in rehearsal halls, with the backing of national performing arts medicine and counseling organizations. Structured interviews were conducted on an individual basis, and followed abbreviated progressive muscle relaxation exercises employing guided affective imagery and music. The data, in the form of descriptive narratives, were examined using qualitative approaches including content analysis.

Results

The study found 9 attributes perceived as 'gains' to an orchestral career and to stage performances; a similar number of 'risks' and 'costs' were identified and validated. In addition, 'the audience' usually described as an active co-participant in music performances, was more often perceived as playing an adversarial role. Finally, the study indicated that just about half of the musicians assessed their performance abilities on a 'limited' to 'good' level.

Conclusions

The study depicts a differing portraiture of full time contract symphony orchestra musicians than is usually seen in single episode interview studies.

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THEMATIC SESSION

Emotion and cognition

Wednesday 11:30
Room: v. Hornbostel (130)

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INFLUENCE OF SPECIFIC SPECTRAL VARIATIONS OF MUSICAL TIMBRE ON EMOTIONS IN LISTENERS

Alessandra Padova[1], Laura Bianchini[2], Michelangelo Lupone[2], Marta Olivetti Belardinelli[1]
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[2] Centro di Ricerche Musicali, Italy

Background

Musical timbre allows us to recognize different auditory sources. Timbre, as a multidimensional factor, is correlated with the other music parameters and influences defining the elaboration processing of musical material.

Timbre has a central role in contemporary music.

Several studies are meant to investigate how and which timbre characteristics influence music experience. The common timbre variations proposed concern the spectral energy.

Aim

The aim of this study is to investigate musical timbre's effect on listeners'emotions

Method

Expressly for this study, CRM (Centro Ricerche Musicali) created three new pieces characterised by inherited and controlled spectral variation of timbre, by varying not only spectral energy (A), but also spectral structure (B) and spectral density (C), while maintaining under an extreme control: Frequency, amplitude, duration and phase patterns.

Subjects, Italian and French, were divided into three groups (electronic, classic and non musicians) and were presented with 3 stimuli and a list of 8 emotions; the experimental task was that of evaluating the intensity of emotions perceived while listening to the stimuli and the intensity of the general activation.

Results

An ANOVA was calculated. We observed:

- electronic musicians differ from the others
- females differ for the variables "sad" and "scared"
- different emotional responses correspond to timbre variations.

Conclusions

The performance is influenced by:

- timbre variation, in particular an inharmonic sound elicits sadness and disgust
- gender
- musical training

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EMOTION AND COGNITION IN MUSIC: WHICH COMES FIRST?

Suzanne Filipic
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Background

Are emotional reactions to music independent of cognitive processes ? The theories proposed by Francès or Imberty imply that perceiving the key of a piece of music is necessary to perceiving its emotional value.

Aims

The goal of this study was to test whether the emotional reaction or the (implicit or explicit) perception of the tonality comes first when listening to a piece of music.

Method

We used sad and peaceful melodies, written for and tested by Peretz. These melodies were played by a professional pianist. Twelve peaceful and twelve sad melodies were used to create forty-eight pairs of melodies : twenty-four pairs of «same emotion,» half of them being sad, and half peaceful; and twenty-four pairs of «different emotion,» half of them beginning with a sad melody, and half beginning with a peaceful melody. Each series of twelve pairs was made of six pairs of the same key, and six pairs of different keys.

The subjects had to listen to the first melody, and to evaluate whether it expressed sadness or peacefulness. Then, as they started to listen to the second melody, they had to say, as fast as possible, if the second melody expressed the same emotion as the first one.

The experiment was organized in two sessions, with a group of musicians and a group of non-musicians (49 subjects).

We hypothesized that the subjects would calculate the key of each melody before being able to assess the emotion it expressed, and thus, that the analysis of our data would show a key effect on the number of correct responses. We expected a larger percentage of correct responses for the pairs of melodies played in the same key, than for the pairs in different keys. We also expected a key effect on time responses. Moreover, we hypothesized that musicians would answer more precisely than non-musicians.

Results

Our results of the number of correct responses showed a significant key effect, and a significant difference between musicians and non-musicians. The analysis of the time responses showed the same pattern for the key effect, but failed to reach significance.

Conclusions

This study, though preliminary, shows that cognitive processes and emotional reactions to music are not independent processes, and that processing of the key of a piece of music may be necessary to perceiving the emotion it expresses.

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THE TEMPORAL PROCESSING OF MUSICAL EMOTION IN A FREE CATEGORISATION TASK

Sandrine Vieillard[1], Emmanuel Bigand[2], François Madurell[3], Jeremy Marozeau[1]

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[3] UFR de Musicologie, Université de Paris-Sorbonne (Paris IV), France

Background

Music is known to induce strong and varied emotions. Most studies in cognitive psychology have investigated the source of emotion in music (Panksepp, 1995 ; Sloboda, 1991; Schellenberg et al., 2000), the biological foundation of musical emotions (Blood et al., 1999 ; Peretz et al., 1998 ; Peretz and Gagnon, 1999) or the physiological level of musical emotions (Schmidt et al., 2001).

Aims

This study aims both to determine the psychological structure of subtle musical emotion and to investigate the nature of processing involved in emotional judgement.

Method

A free categorisation task, which required the grouping of 27 musical excerpts according to their elicited emotional experience was presented to musicians and non musicians. Two experiments were conducted. Firstly, listeners were asked to perform the task with excerpts of 30s duration. They were asked to repeat the same task two weeks later in order to test the stability of the emotional judgement. Secondly, the time duration of the excerpts was manipulated in order to examine whether reduced hearing (1s duration compared with 30s) would change the way the categorisation was performed. The data obtained were transformed into a 27*27 similarity matrix which was changed into a distance representation by a MDS model in which the excerpts are assumed to possess collectively a small number of psychological attributes.

Results

Our findings reveal a great stability of emotional judgement within and between participants for the condition of 30s duration. This emotional judgement corresponds to a very subtle grouping of musical emotion based on the two usual dynamic and valence dimensions. This ability to group musical emotion is observed both for musicians and non-musicians. Excerpts of decreased duration show that the emotional judgements of non-musicians are more affected by 1s time duration condition than those of musicians. The latter manage to distinguish musical emotion well if the excerpts possess sufficient event density to extract emotional information as valence.

Conclusion

Firstly, the emotional judgement stability within and between subjects demonstrates that musical emotion is a worthwhile object of investigation for researchers interested in the processing of emotion. Secondly, the subtle categorisation achieved by listeners shows that the emotional judgement of musical excerpts goes beyond the simple category know as basic emotion (serenity, sadness, happiness and anger). Finally, the change of categorisation structure produced by excerpts of 1s duration both in musicians and non musicians raises the question of the nature of processing involved in this task. The musical expertise effect and the requirement of a high degree of event density in excerpts of 1s to extract emotional information would support the cognitive view according to which emotional judgement must be mediated by the processing of musical features.

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THEMATIC SESSION

Performance practice

Wednesday 11:30
Room: v. Helmholtz (E 40)

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RESOLVING THE HISTORICAL DOTTING DEBATE: HOW EMPIRICAL INVESTIGATIONS MAY INFORM PERFORMANCE PRACTICE

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Background

The performance of dotted rhythms has received considerable scholarly attention among researchers of 18th century performance practice. The controversy is based on different interpretations of descriptions found in historical treatises and instrumental tutors. The question at the heart of the debate is whether dotted rhythms should be played literally or with an altered dotting ratio and how this might affect musical character. In a previous study we found that the *perception* of dotting depended on an interaction between articulation, tempo and dotting ratio. If perceived dotting was influenced by perceived musical character, in addition to physically measurable dotting ratio, then the debate may be resolved by realising that when performance practice researchers discuss dotting they really mean dotting as a kind of musical character.

Aim

To find out what performance parameters contribute to the perceived musical character of a baroque composition where dotted rhythms are prominent.

Method

Listeners rated the character of thirty-four recordings of Variation 7 from Bach's *Goldberg Variations* by using a modified version of Hevner's adjective list. The physical parameters of the performances were measured with audio analysis software and by subjective judgement. The subjective and objective measurements were then compared.

Results

We found that an interaction of articulation, tempo and dotting influenced the perceived character of a performance with the *dotting ratio* being the *least significant* element because various ratios were found within each expressed character cluster. On the other hand staccato articulation and faster tempo tended to create a 'happy' mood, while legato playing and slower tempo a more 'calm' effect. That is, dotting ratio did not contribute to the character of the piece as much as tempo and articulation, contrary to assertions made by historical musicologists.

Conclusions

It is more fruitful to discuss the performance of dotted rhythms from the perspective of desired musical character (as many historical sources do) and to emphasize the interaction of several performance features than to debate whether altering the dotting ratio is appropriate or not (as 20th century researchers tend to do). Consistent with our previous research, dotting ratio does not seem to necessarily correspond to dotting perception. The present study strengthens this view because dotting ratio is supposed to affect musical character, but in practice it may be one of the weakest contributors.

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EXPRESSIVENESS IN MUSICAL PERFORMANCE: COMPARISON OF NOVICE AND EXPERT-LISTENER PERSPECTIVES

Emery Schubert
Dorottya Fabian

School of Music and Music Education, University of New South Wales, Sydney, Australia

Background

As part of our ongoing research into the perception of baroque performance practice, we investigated the relationship between expert and novice baroque music listeners. There are conflicting theories which have important implications on baroque performance practice and pedagogy. One of these is that experts are the holders of performance knowledge and should guide novices. This suggests that novice listeners will have more varied and less informed views about performance practice. The definition of an expert listener in this study is one who regularly or frequently listens to baroque music, whether as a baroque performer specialisation, or as a non-performing listener, or both.

Aims

To test the hypothesis that expert baroque listeners are more consistent and accurate in their responses to baroque music than novice listeners and to compare the aesthetic judgements of novices with those of experts.

Method

30 experts and 30 novices in baroque music listening made aesthetic responses to several excerpts from J. S. Bach's compositions. For each piece at least two versions were rated.

We estimated reliability of judgement by asking listeners to identify the musical parameters of each performance with respect to articulation, rhythm and phrasing.

Results

Results will be discussed in relation to the findings of the experiment that is underway at the time of writing. Our pilot study with a much smaller sample size suggests that experts tend to agree on the musical parameter ratings more so than do novices. However, there was little difference in aesthetic judgements between the two groups: Both novices and experts agree on which performances were expressive in a baroque style.

Conclusions

Our pilot study result supports hypothesis 1. Our main study will determine with more detail the reliability of this finding. If supported, it would provide evidence to the view that in the study of baroque music, as probably in other styles too, a much greater authority and experimental efficiency can be obtained by employing the services of experienced listeners. The reliability of this finding, and whether large samples of novices could be used as a substitute for these experts remains to be seen.

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SPECTROGRAPHIC AND CALLIGRAPHIC CUES IN THE IDENTIFICATION OF JAZZ SAXOPHONISTS

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Background

Conceptually, it has been common to distinguish two aspects of music performance, what might be called *calligraphic* (i.e., pitch, rhythm, and contour) and *spectrographic* (i.e., timbre, non-quantized rhythm, and expressive gestures such as pitch bend and vibrato). Where scholars have investigated either calligraphic or spectrographic features of jazz, they have failed to examine rigorously which of the features make the performer recognizable by listeners and therefore perceptually unique.

Aims

An experiment is presented to support the hypothesis that well known jazz saxophonists can be recognized by their sound alone (i.e., without any calligraphic information).

Method

Ten volunteers participated in the study. The group was composed of university students and professors who considered themselves jazz connoisseurs. The stimuli consisted of 16 short audio samples drawn from post-bebop recordings. Each excerpt featured a tenor saxophonist playing between 2 and 5 notes while accompanied by a rhythm section. Given the choices of John Coltrane, Dexter Gordon, Sonny Rollins or Wayne Shorter, subjects were asked to identify the excerpt's saxophonist and circle his name on the experiment sheet.

Results

Subjects were very good at identifying the performer playing in the excerpt. The average score was 13 out of 16 correct responses, where a chance level of performance would expect only 4 correct responses. Some of the excerpts were correctly identified by all subjects, and error patterns pointed to stylistic links between the performers.

Conclusions

The results show that spectrographic cues can by themselves reveal a performer's identity. Such findings lead to important implications for jazz education, music analysis, and computational models, since these areas tend to emphasize the calligraphic aspects of jazz. The amount of cognitive "weight" carried by different spectrographic features is discussed.

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THEMATIC SESSION

Aspects of memory

Wednesday 11:30
Room: Wellek (315)

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A MEMORY-BASED APPROACH TO METER INDUCTION

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University of Tilburg, Netherlands

Background

Meter induction has been an important topic in the computational modeling of music cognition for quite some time now (Desain & Honing, 1994). In this research an attempt is made to model how listeners arrive at a metrical interpretation of a fragment of music. There is a vast amount of literature on modeling this phenomenon, using a large variety of computational paradigms. One class of models is based on the Gestalt principles of perception, 'simplicity' or ease of encoding being a key aspect. An alternative to this approach are models based on the notion of 'likelihood', so called memory-based models. The latter stress the role of sheer exposure to music and try to explain structural interpretations in terms of the most probable metrical coding, as opposed to the former approach that searches for the simplest encoding of the input.

Aims

In this paper we will adapt a number of memory-based models (Manning & Schuetze, 1999) for parsing metrical structure. In particular, we will use the models covered by the Data-Oriented Parsing (DOP) framework (Bod, 1998). The DOP framework defines a large class of probabilistic grammars by taking all subtrees from an annotated corpus to form a general Probabilistic Tree Grammar. We will assess in how far these probabilistic grammars offer an alternative to other computational paradigms.

Method

The two corpora used in this study are all National Anthems (105 songs, see Desain & Honing, 1999) and the Essen Folksong Collection (5860 songs, see Schraffrath, 1995). As evaluation method, we used 10-fold blind testing where 90% of the trees of each corpus were used for training and 10% for testing. To establish how well memory-based models scale to different domains, we tested our models also by training on one corpus and testing on the other.

Results

Preliminary results show that the system found correct upbeats in 62% (18.7) (standard deviation between brackets) of the test set of the Anthem corpus. The system assigns structure in the form of pairs of brackets indicating bar and sub-bar levels. The system reached 95% (1.3) precision (correctly found pairs of brackets). The system arrived at 97% (0.7) recall (correct structure it could have found. This is encouraging since this training set is relatively small. Furthermore, only rhythms of size 64 (64 32nd notes) were given to the system to structure. We expect the results for the Essen corpus to be even better. The final results will be presented compared to a number of baseline models used in previous studies.

Conclusions

Memory-based models could say something about the role of musical idiom in meter induction. It might well be that certain rhythmical patterns are a strong clue for a metrical interpretation by a listener, simply because s/he has heard these patterns often in those metrical contexts. As such a memory-based models can be expected to predict the proper metrical interpretation for these often heard rhythmical patterns.

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RECOGNITION OF COMPOSER'S STYLE FROM MUSICAL FRAGMENTS

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A great number of studies suggested that in order to experience the form of musical sequences, a listener must process a mental representation which is based on points of reference (salient cues), that are picked up during the processing. The cues picked up are meaningful and distinctive features extracted from the music. Then they became the starting points in order to identify, compare and evaluate new information with respect to previously acquired knowledge. The present study is aimed at measuring the ability of naïve listeners (youths and adults) in abstracting salient features related to music style (the so called stylistic cues). Eighty musical themes (10 and 12 seconds long) were selected from the Sonata repertoire for piano solo by Mozart, Beethoven, Clementi and Schubert. Four series of forty sequences (for instance twenty from one composer and twenty from another one) were presented to 120 subjects (young and adults, males and females) in a random order. The subjects were invited to classify the sequences as belonging to different categories (X and Y) or style families, without any information about the author's name or the piece's composition style, and to discriminate and evaluate the relationship which may exist between them. Three task were planned for the experiment: the first one considered the familiarization with the material, the second one the classification of the sequences and the last one the assessment of the "quality of representation" on a scale from 1 to 10. The results confirm the hypothesis: naïve listeners classify musical style differentiations and discriminate the four categories on the basis of cognitive patterns corresponding to relevant musical parameters.

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RECOGNIZE THE TUNE? A STUDY ON RAPID RECOGNITION OF CLASSICAL MUSIC

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Dept. of Psychotherapy & Medical Psychology, University of Würzburg, Germany

Background

Why are some compositions recognized by the first bar while others, equally familiar ones require much more time? Quickly recognized pieces may show catchy characteristics at their beginnings. Rapid recognition may also occur due to special contextual or personal knowledge of a piece (e.g., media effects). "Field" evidence from TV and radio game shows (such as "Ö3-Klang" in Austrian broadcasting) suggests that recognition times can be stupendously short.

Aims

This study experimentally dealt with the following questions:

(1) How quickly do subjects recognize classical pieces?

(2) Why are some pieces recognized more quickly than others?

(3) How do personal factors (musical expertise, age, ...) influence recognition speed?

Method

Fifty subjects, all sufficiently familiar with classical music (listeners to orchestra professionals), were presented with the beginnings of 29 well-known pieces (from CD) and asked to stop each tune as soon as possible. To test whether identification was correct, subjects had to sing or whistle a few more bars in order to exclude verbal memory effects. We additionally asked why they had recognized the piece, and about how often they had listened to it (CD, radio, concert, TV, etc.) within the past 12 months.

Results

Average reaction times ranged from 1.1 to 10.4 s. The shortest individual reaction time was 0.1 s ("Thus Spoke Zarathustra"). One participant recognized Gould's recording of the "Goldberg Variations" merely by the first tone. Subjective accounts of rapid recognition included structural and melody characteristics, instrumental timbres, and personal reasons (e.g., "daughter plays it on piano the whole day" – "Für Elise"). Individual familiarity effects generally dominate both structural factors (e.g., triads, large intervals, pompous intros) and personal factors.

Conclusions

Examples of extremely rapid recognition demonstrate that minimal sequences of music contain impressive amounts of (potentially discriminative) information. Future studies should more systematically vary, and also actively modify, structural components and comparatively extend the scope to other styles.

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THE ROLE OF WORKING MEMORY AND SHORT-TERM MEMORY IN SIGHT READING

Ji In Lee
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Background

Sight reading is a functional skill which is required by all musicians, however the differences between individuals in sight reading achievement have not yet been fully explained. Until now, most research has compared different methods of teaching sight reading without providing a feasible theory behind sight reading.

Aims

Sight reading can be divided into 3 stages; information intake, information processing and performance. This paper emphasises the importance of the second stage of sight reading by studying the role of working memory, short-term memory and mental speed in sight reading. This paper demonstrates that working memory and short-term memory capacity and mental speed could be three important predictors for sight reading achievement.

Method

(a) Sight reading task. For the sight reading task, Lehmann and Ericsson's (1993) paradigm of a pre-recorded pacing melody was used. Stimuli consisted of 2 warm up pieces and 5 pieces with increasing complexity. These pieces were taken from existing sight reading literature and a solo part was added. Subjects were required to accompany the pre-recorded violin part.

(b) Memory task. For the measurement of working memory capacity and short-term memory capacity, the procedure used in Oberauer et al. (2000) is used in this paper. Working memory test requires the subjects to do more than one simple numerical calculation simultaneously, which are presented in different active cells on the computer screen. The short-term memory test requires the subjects to recall the correct order of numbers which are shown one after the other on the computer screen. Both tests increase in complexity.

c) Mental speed task. To measure the mental speed, we used the Oswald and Roth's (1987) The Number Connection Test (Der Zahlen-Verbindungs-Test, ZVT). 52 piano students from the Hanover University of Music and Drama served as subjects.

Results

Results from Spearman's rank correlations show a clear relationship between general cognitive skills and sight reading performance. It will be demonstrated that this may lead to a feasible theory behind sight reading achievement.

Conclusion

The main conclusion is that sight reading skill should be explained within the framework of general cognitive skills. Working memory, short-term memory and mental speed are significant predictors for sight reading achievement. The relationship between cognitive factors and acquired sight reading expertise will be addressed.

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PROCESSING OF TONAL INFORMATION IN WORKING MEMORY

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Background

Models of working memory, such as Baddeley's multi-component-model of working memory, have rarely been applied to the field of music information processing. Little is known about working memory mechanisms underlying activities such as listening to music or performing music. Furthermore, it is unclear whether there is an overlap in the functional mechanisms underlying the processing of tonal information and auditory components of verbal information.

Aims

The aim of the present study was to test whether the phonological loop, a subsystem in Baddeley's model of working memory, is responsible for both verbal and tonal information processing. Some researchers have suggested that structural modifications of the model are necessary.

Method

Two experiments were conducted in which subjects had to perform short-term-retention-tasks with tonal and verbal information while concurrently performing verbal and non-auditory tasks. In a third experiment, the retention interval for tonal sequences was varied in order to dissociate passive and active mechanisms involved in the short-term-retention of tonal information.

Results

Applying the dual task method, performance was impaired not only in the verbal condition but also in the tonal condition. A non-auditory task did not influence performance. Similar patterns of results were found in subjects without musical training and in subjects with a medium level of musical expertise. Experiment 3 suggested that retention of tonal information is to some extent based on a passive phonetic store but also on an active rehearsal mechanism.

Conclusions

Results indicate that there is an overlap between working memory functions involved in the processing of tonal and verbal information. Obviously, the phonological loop is responsible for the processing of tonal information. It can also be concluded that both the phonological store and the rehearsal process are involved in the short-term-retention of tonal sequences.

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THEMATIC SESSION

Experiencing emotion

Wednesday 15:00
Room: v. Hornbostel (130)

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STRONG EXPERIENCES RELATED TO MUSIC: COMPARISON OF REACTIONS IN DIFFERENT SUBJECTS AND IN DIFFERENT SITUATIONS

Alf Gabrielsson
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Background

Descriptions of Strong Experiences related to Music (SEM) have been gathered from about 900 respondents aged 13 to 91 years with musical preferences spread across many different genres.

Aims

The overall purpose of the SEM project is to obtain a comprehensive and detailed account of components in SEM and to study their relative occurrence and importance in different groups of participants and under different conditions.

Method

Content analysis of free descriptions of SEM and factor analysis of ratings on questionnaires have resulted in a comprehensive three-level descriptive system including at least 150 different aspects. Using this system as reference allows comparison of SEM between different groups of participants (e.g., men and women, old and young, musicians and non musicians) and under different conditions (e.g. SEM during listening or performance).

Results

Each individual SEM report is more or less unique but certain components of SEM tend to recur, with varying emphasis, in different groups of participants and under different conditions. The general picture of SEM thus displays both similarities and differences. The number of influencing factors seems almost infinite and as they also interact in complex ways, modelling of music experience seems very difficult. It is obvious, however, that SEM is not restricted to any specific musical genre.

Conclusions

Systematic analysis of free descriptions of SEM supplemented by questionnaires reveals the diversity of possible components in the experience of music and illustrates how they may be related to different musical, personal, and situational factors.

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HEIGHTENED AROUSAL INTENSIFIES EMOTIONAL EXPERIENCE WITH MUSIC

Nicola Dibben
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Background

Empirical evidence suggests that peripheral feedback can influence emotion experienced: heightened physiological arousal intensifies emotions felt (an effect variously referred to as misattribution or transfer of arousal) and there is some evidence from facial feedback and posture studies that particular kinds of physiological state can induce the experience of certain emotions. The study reported here is the first to investigated the effect of peripheral feedback on emotional experience with music.

Aims

The study reported investigates the role of physiological arousal in determining the intensity and valence of emotion experienced when listening to music.

Method

Two groups of participants, with different levels of induced physiological arousal, rated four excerpts of music on ten emotion scales, in terms of the intensity of emotions felt while listening to the music, and of emotions expressed by the music. One group took five minutes of vigorous exercise before the listening task, the other group listened to a relaxation tape for five minutes. Arousal levels were measured by taking pulse rates before and after the arousal induction, and at the end of the experiment.

Results

Participants who had exercised reported more intense experiences of emotion felt and perceived while listening to music than the participants who had relaxed. This effect was most consistent for emotion felt rather than emotion expressed by the music.

Conclusions

These results provide evidence that arousal level influences the intensity of emotion experienced with music, and therefore that people use their bodily sensations as information as to the emotion felt and expressed by music. This finding is discussed in relation to psychological and musicological theories of emotion and music.

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EXPLAINING THE EMOTIONAL ENGAGEMENT OF LISTENERS WITH THREE PERFORMANCES OF A SCRIABIN ETUDE

Renee Timmers
Antonio Camurri
Infomus, DIST, University of Genova, Italy

Background

Recent years have shown a growing interest in the emotional response to music and in explaining this response on the basis of musical parameters such as loudness, tempo and musical structure. In continuous measurement of emotional arousal, arousal has been shown to correlate to a considerable extent with the dynamics and the tempo of the performance and with the increase and release of tension within a phrase.

Aims

This study aims to explain listeners' ratings of emotional engagement for three performances of Scriabin's Etude Op. 8 no. 11 by one pianist. This is first done on the basis of a direct correlation between engagement and parameters of the performance. In a second instance, parameters of the musical structure are added and the need for interactions between parameters is investigated.

Method

A master pianist performed the piece at his best and intensely expressive on a Yamaha Disklavier grand piano. Audio and MIDI information were recorded. 24 participants listened to the performances and continuously rated their emotional engagement with the performances.

Results

Preliminary results show that a simple regression model is quite well able to explain the listeners' ratings of emotional engagement on the basis of the measured variables of the piano performance, especially the key velocity of notes. They also, however, show the limitations of this model: 1) the model does well for the entire piece, but not for all individual sections, 2) intercepts are not explained, and 3) there is much more variation in the performance than in the ratings. To overcome these shortcomings, it is necessary to consider the relation between the performance variables and the musical structure and the position of the sections within the piece. It may also be necessary to view the listeners' ratings as an integrated response, rather than a direct mapping or tracking of performance variables.

Conclusions

To explain the emotional engagement of listeners with the performances of the Skriabin piece, it is necessary to not only consider the variations in performance variables, but also their relation to the musical structure. As is known from research on performance, it is the performer's *interpretation of the music* that best explains listeners' responses.

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THEMATIC SESSION

Learning and teaching

Wednesday 15:00
Room: v. Helmholtz (E 40)

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MUSIC LEARNING SEQUENCES BASED ON COGNITIVE APPRENTICESHIP – DEVELOPMENT AND EMPIRICAL EVALUATION

Bernhard Strunz
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Background

Music programs in public schools intend to transmit the attainments of traditional music as part of general education. Students are often not interested in music lessons at school despite their tremendous interest in popular music outside of school. General music teachers have to attract their students' attention by creating interesting learning situations. In this, teachers are left mainly to their own experience because of lack of empirical research in this area. Within current educational psychology, the concept of Cognitive Apprenticeship (CA) explores motivating teaching arrangements in a promising way. Following work by others, this paper uses CA as a "prescriptive", practical suitable theory.

Aims

The goal of this study is to intensify students' classroom experience and achievement applying constructivist principles. Exemplary music learning sequences will be worked out, tested in real classroom settings, and empirically evaluated as to their effects on students' interest and competence.

Method

Standard tests are used to measure cognitive and musical aptitudes of each participant in class. The degree of musical activity is assessed with a self-developed questionnaire. Interest, motivation and quality of experience are evaluated using an inventory based on Csikszentmihalyi's ESF. In addition, lessons are videotaped and evaluated using documentary methods (Bohnsack). Achievement is assessed with validated classroom techniques, focusing on curricular aims and expert strategies.

Results / Conclusions

Data collection is under way and results will be presented and discussed at the conference.

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HOW DOES THE TEACHER MAKE A DIFFERENCE ?

Blanka Bogunovic
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German School, Belgrade, Serbia & Montenegro

Background

This paper is part of a doctoral dissertation which deals with the socio-psychological factors of musical success. The findings show the relevant characteristics of individual instrumental teachers and their role in the students' musical success in the first years of musical education.

Aims

1. The description of teachers' attributes, which constitute instrumental teachers' sociodemographical, professional and personality profile, educational success and the nature of the student-teacher relationship.

2. Revealing a specific correlation pattern between teachers' attributes and different aspects of the students' musical success in instrumental performing.

Method

An empirical longitudinal study (1996-2001) was conducted in 5 specialized music schools in Belgrade. The sample included 105 teachers and 350 of their students, aged 6–12, playing different instruments. The teachers filled in a Questionnaire concerning relevant professional information in the last 6 years and NEO-PI-R (Costa & McCrae, 1995). The parents assessed the teachers' relationships with the students. The criteria of students' success include indicators of school achievement (instrumental mark, program mastering) and performance success (public performance, competitions).

Results

Cluster analysis distinguishes three groups of teachers according to their professional and educational attributes. The first group is highly successful in teaching, has a strong orientation towards it and is not active in performing (31%). The second group consists of teachers who are primarily performers (solo and orchestral players) and who have a high degree in music education (24%). They are basically oriented towards career streaming and do not make high achievements in the field of education. The third group of teachers do not distinguish themselves in any of the two areas (45%). The previous finding, that music instrumental teachers differ from the general population according to their personality dimensions, have been confirmed.

The results show conclusively that highly competent teachers are more relevant for the acquisition of performance skills on the part of exceptional students, whereas certain personal characteristics and cooperative teachers' behaviour are important for different levels of public performance achievements and for the program mastering (classroom setting).

Conclusions

The findings show that the most significant factors of exceptional students' performance success (competitions) are high teaching competence, their continuous advanced teacher training and certain aspects of personality. For a lower level of performance success (public performance) teachers' personality attributes (agreeableness, extraversion and conscientiousness), cooperation with a student and finally teaching competence is of primary significance.

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REFLECTIONS ON RESEARCH INTO INTRA-MUSICAL LEARNING PROCESSES

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Background

In music education research, theoretical perspectives and methods are "borrowed" from other scientific disciplines. Especially in studies on intra-musical learning processes (learning while making music) the complex character of music itself in combination with individual experience requires special theoretical and methodological considerations.

Aims

In this paper, an attempt is made to map out conditions for intra-musical learning processes in order to adapt and develop theory and method for this area.

Main contribution

In intra-musical learning processes, aurally based instrumental craftsmanship is combined with intellectual understanding of written documents, from which music is to be individually recreated. On an individual level, aural (listening), visual (viewing and reading), motor (playing) and emotional (image of the music) aspects are represented. Notation requires an immediate coordination of intellect and emotion in order to achieve musical expression. On a socio-cultural level, musical practice and conventions of expression, as well as traditions of instrumental training are combined.

Implications

This means that an historical, socio-cultural perspective of collective and individual aspects of practice in music and music education are important. So is the prerequisite of individuals. Most important of all, though, is the emotional aspect of music that unfortunately is so difficult to conceptualise. These aspects concern not only the music and the participants in a study but also the researchers, who need to identify their own pre-understanding.

The emotional aspect requires thorough ethical considerations concerning the data collection as well. Interviews and observations might need to be complemented with performed music and gestures used in order to explain emotional aspects that cannot be described in words.

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COMPOSITION IN BRAZILIAN MUSIC EDUCATION

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Background

The problem of the fragmentation of the music curriculum in higher education is discussed. This curriculum usually emphasises specific skills and technical aspects of music and do not attend to the real needs of the students. There is a need of a unifying element in music curriculum which can link musical knowledge. The aural training element could assume this role of integrating the other elements of the curriculum. However, the way the aural training course has been carried out does not allow this integration.

Aims

The main aim of this work is to examine composition as a powerful tool that unifies intuitive and analytical musical knowledge, thus contributing to a holistic approach in the music teaching/learning process in higher education in Brazil.

Main contribution

The activity of making arrangements is regarded as a compositional process and an example in the holistic approach, in which listening and performing are also integrated with composing. In making arrangements, popular music is used successfully as students are greatly familiar with it and, consequently, it promotes great motivation. The role of the teacher is crucial to the aforementioned approach. Accordingly, there is a need for a kind of teacher who is able to promote active and creative engagement in musical experience.

Implications

Teaching music defined solely on a rational intellectual basis no longer corresponds to reality. What is required now is a holistic view, not a fragmented one. Teaching music in a holistic way, in which intuition and analysis are present in a balanced way, ensures that students learn music deeply with more motivation and consciousness. Moreover, it allows the development of more sensitive musicians, more fully aware, and ready to lead more creative tasks contributing to changes in their world.

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CHILDREN'S CONCEPTUALISATION OF MUSIC

Tânia Lisboa
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Background

Music performance requires a variety of cognitive mechanisms and motor skills. However, research on children's musical development has not yet determined how they "picture" (represent) aspects of their pieces and performances in their minds, and how mental representations can guide interpretation and technical achievement.

Aims

This paper relates to issues of mental rehearsal and representation, exploring practising strategies away from the instrument and their consequences in sight-reading and informal performances. It aims at showing how planning, monitoring, and evaluation of learning can be effective at early stages of instrumental development. The paper outlines the processes involved in conceptualisations of music particularly focusing on the variability of practising and teaching strategies.

Method

Over a period of 20 weeks, three young cellists were filmed and interviewed in lessons, practice sessions and informal performances. They learned three different pieces of music, each through a different strategy: 1) by approaching a piece in their usual manner (i.e. mainly playing through); 2) by being involved in a simple analysis of the piece before starting to practise it and by exploring drawings which reflected their "picture" of the piece; and 3) by singing it before playing. They were also involved in a series of practical activities - colouring the score, watching performances and talking about music. The interviews and their playing were analysed in detail. Sight-reading and performances were also evaluated by three external examiners and by the children, five years into the research, when they were interviewed again. The method relied on both quantitative and qualitative analysis of the data.

Results

The results show that children's conceptualisation of music is a complex mixture of explicit knowledge articulated through language, and implicit understanding conveyed through their playing (i.e. declarative and procedural knowledge). This paper shows that mental representation as a form of "musical knowledge" enabled students to assess different performance and practising tasks, to identify task difficulties, to recognise errors and to monitor progress. This study recognises that technical limitations can obscure children's capacity to reflect their musical knowledge in playing and that singing could be seen as a concrete form of musical thinking and as a means of connecting the children's thought with their action in cello playing.

Conclusions

The paper will review a multi-modal approach to practising, highlighting the need for greater resourcefulness when teaching children. The findings have implications for musical education, showing that what children normally do in other areas of their lives could also contribute to forming a schema in music making (i.e. drawing, painting, singing). By nurturing their individuality and stimulating their natural creativity, children's musicality can fulfil its proper role as a vehicle for artistic expression.

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THEMATIC SESSION

Gesture and phenomenology

Wednesday 15:00
Room: Révész (202)

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DEIXIS, INDEXICALITY AND POINTING AS HEURISTIC GUIDES FOR ENACTIVE LISTENING: ROUTE DESCRIPTION, CUE ABSTRACTION AND COGNITIVE MAPS

Mark Reybrouck
Catholic University of Leuven, Belgium

Background

Music cognition has been related traditionally to an objectivist position that conceives of music as a structure or an artefact. The process of dealing with music, however, calls forth a construction of meaning as the result of an interaction with the sound both at a manifest and at an internalized level. This interaction can keep step with the unfolding through time but it can keep distance with respect to the sonorous articulation as well, allowing the listener to deal with music both at the level of sensory experience and of symbolic modeling.

Aim

This paper argues for an enactive approach to dealing with music that brings together the experiential and cognitive points of view. It provides the concept of pointing as a heuristic tool for sense-making, both as a primitive marking system and as a mechanism of selection that can be directed to focal points or more extended time intervals. As such it is related to principles of categorization and cognitive economy. The role of cue abstraction and cognitive mapping must be considered here.

Main contribution

Our principal aim is to apply the concept of deixis and deictic devices to the process of dealing with music. Deictic terms are words that pick out or point to things in relation to the participants in a speech situation. They locate individual elements in context and provide socio-spatio-temporal anchoring. As such they stress the field of pointing rather than the symbolic field of cognition. Introducing these terms in music focuses primarily on the concepts of deictic space and temporal and spatial deixis. Deictic terms, furthermore, are related to the concept of indexicality and the notion of pointing. They entail processes of singling out, as is obvious from the use of pragmatic anaphora (deictic expressions accompanied by a pointing gesture) which allow us to refer back (catadeixis) and forward (anadeixis). In order to do this we must have access to the flow of discourse as a whole, where parts may be re-taken up and anticipated. For doing so the listener can build route-descriptions and cognitive maps which allow him/her to navigate mentally through the music and to compare the actual sounding elements with their imaginative projections.

Implications

Pointing - both as external and internal reconstruction of the sonorous articulation and its focal points - is a heuristic guide for the mental involvement of the listener. It reflects the sensory motor integrations of the listener and offers an alternative to the mere conceptual categorizations as static labelings of objective and external entities. As such, it is a mediating tool between perceptual input and processing by the listener.

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PERFORMED PERCEPTION: WALKING THE METER OF COMPUTER-CONTROLLED PIANO MUSIC

Marco Maria
Humboldt-Universität zu Berlin, Germany

Abstract

A new method for empirical research on rhythmical timing synchronisation through human walking is developed and tested.

Background

Empirical rhythm research usually works with highly discriminated perceptive and motoric preferences, like tapping a finger or a foot to a metronome click while sitting in a chair, e.g. in investigations on a „biological clock". This leads to certain results, but cannot explain how and why our movements are connected to the context of sounding music.

On the other hand, music-educational methods like „eurythmics", dealing with large space body movement like walking the meter on complex sounding structures have led pupils to better knowledge on musical rhythm and timing for over 100 years (Methode Jaques-Dalcroze) with great sucess – even if the pupils do not play a musical instrument! How can this work?

Aims

This methodological exploration included the development of a wireless technological set and a setting for „holistic" rhythm investigations, focussing the senso-motoric processes of human locomotion as an „interface" for research in musical timing perception. We have tested this method and the set empirically in a laboratorial situation by walking the meter on computer-controlled sounding piano-music. The influence of „original-" (strings) and electro- (replicat) acoustical sounding stimulation on the temporal synchrony of the walking has been compared exemplarily.

Method

Subjects of different ages and musical skills were asked in single sessions to walk the meter around a computer-controlled Yamaha grand-piano. Several stimuli were given by automatic performance of the „real" instrument and of its electroacoustical replication (speakers hidden in the piano).

The temporal structure of the gait is indicated through piezomechanical shoes and documentated on hard-disc recording (Ch1), simultanous to the re-recording of the acoustical stimulation at the subject's ears (Ch2). This documentation level is reduced by „beat-tracking" on HLSD-Scores and both timing structure channels are compared by IOI-analysis.

Results

Significant intra-individual constancies in the syncronization-strategy and high-significant inter-individual negative asynchronies (50 to 200msec) were observed.

Subjects reproduced their individual synchronisation „signatures".

Breaks never induced directly nor delayed tempo changes. Trying to keep the tempo after the stimulus-stops, in general a slight accelerando appears.

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Actively trained musicians performed more equal synchronisations than musical laymen.

Different kind of sound-reproducing systems did not lead to significant differences in the synchronisation through the walking.

Conclusions

The recording technology used works precisely (±2 msec) and is now ready for further use in the „field", e.g. of dance education, music therapy or ethnomusical research, etc.

Observed asynchronies coincide very well with the known results in biopsychological rhythm research, which implicates that this investigation can also fit into the current discourses on musical cognition.

Human individuality seems to appear in this study even through a „simple" everyday movement like walking the meter!

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MAPPING THE SOLO SINGER'S STAGE PERSONA

Jane W. Davidson
Music Department, University of Sheffield, UK

Background

There is a new interest emerging in psychological investigations related to how music impacts on the listener and performer in terms of self-identity. Music has been found to regulate mood and have cognitive therapeutic benefits. However, additionally, it has been recently proposed (Davidson, 1997; 2002) that the skills involved in performance are such that they employ specific strategies and require specific preparation. With this in mind, the current paper will pursue the following aims:

Aims

i) To investigate the personal style/self-belief of professional singers from three different Western musical sub-cultures: jazz, pop and classical;

ii) To investigate stage behaviours in terms of musical expressiveness and communication, non-verbal communication and broader social performer-audience interactions;

iii) To develop a theoretical position regarding the solo singer's Œpersona' based on the evidence above.

Methods employed

Aim i) will be addressed in semi-structured interviews and analysed through Interpretative Phenomenological Analysis (see Smith, 1995);

Aim ii) will be addressed using video analysis techniques such as those used by Davidson (2002);

Results and Conclusions

These will be presented at the conference based on evidence from 30 singers. They will be reported in the form of video examples, text content analysis and will be demonstrated finally as the theoretical model (Aim iii).

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MUSICIANSHIP AND NARRATIVITY: MUSICAL PERFORMANCE AS FOCALIZATION

Vincent Meelberg
Leiden University, Department of Literary Theory, Netherlands

Background

Although musical narrativity is a relatively new research area in musicology, much has been written about the narrative aspects of music. But, just as in literary theory, there is no general consensus on how to define musical narrativity and on what its constitutive narrative elements exactly are. Furthermore, the main object of investigation into musical narrativity is nearly always the written musical score.

Aims

In this paper, I want to investigate the role the performer plays in the process of musical narration. In investigating this role, I want to devote special attention to the differences between performances by live musicians and performances by machines, and the implications of these differences for a musical narrativity.

Main Contribution

By using the narrative theory of Mieke Bal, I will argue that the performer fulfills the function of focalizor in a musical narrative, since we perceive the music through the 'eyes' of the performer. I will focus especially on the similarities and differences of the focalizor in music and in literature. After all, music and literature are two different media, so one cannot simply apply theories about literature on music, without taking into account the differences between literature and music.

Implications

The investigation into the role of the performer in a musical narrative will give us greater insight in the way musical narrativity is established. Since performance is an important, and even necessary, element in music, one cannot ignore this element when talking about narrativity in music.

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LA MUSIQUE COMME GESTE SONORE ET GESTE CINÉTIQUE

Michel Imberty
Université de Paris X, France

Leticia Cuen
Centre de Recherche en Psychologie et Musicologie Systématique, France

Background

Le travail que nous présentons tente de vérifier le lien qui peut exister entre le geste en lui-même et le geste sonore, voire le geste musical. Il s'agit donc de comprendre par quels mécanismes la musique nous renvoie toujours, indépendamment des systèmes musicaux et des cultures, à la reconnaissance et/ou au souvenir des états moteurs, cinétiques, physiologiques qui sont à l'origine des sensations et des émotions humaines.

Aims

Après avoir défini le concept de geste (revue de la littérature), nous proposons quelques hypothèses pour rendre compte de la relation entre le cinétique et le sonore. On s'attache notamment à l'étude des composantes expressives du geste par rapport aux affects catégoriels, en montrant comment certains gestes musicaux ou leurs composantes dynamiques (vecteur dynamiques) renvoient aux cognitions émotionnelles et affectives (affects de vitalité).

Method and results

Dans une seconde partie, nous présentons, à titre d'illustration des hypothèses théoriques qui constituent le principal objet de cet exposé, quelques résultats d'analyses gestuelles réalisées à partir de pièces musicales choisies en exemple; l'interprétation de ces analyses est confrontée à la théorie des affects de vitalité et des vecteurs dynamiques. D'autre part les résultats de ces analyses sont confrontés à d'autres résultats obtenus à partir de faits de questionnaires proposés aux auditeurs qui auront écouté les oeuvres musicales choisies, et aux contenus d' interviews réalisées auprès de créateurs gestuels, voire auprès de mimes.

Conclusions

Bref, nous montrons à travers les résultats obtenus que la matière expressive de la musique est gestuelle: nous ne pouvons pas parler de la musique ni du geste sans faire référence à la directionnalité du geste, à son degré d'énergie, à la construction dans le temps qui y est liée, à sa spatialité, et à l' intensité des différentes composantes qui articulent soit la microforme, soit la macroforme de l'expression musicale humaine.

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DEMONSTRATION PAPER 2

Wednesday 11:00
Room: Stumpf (E 15)

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EXTRACTION OF AURALLY RELEVANT PARAMETERS

Peter Daniel
Cortex Instruments GmbH, Regensburg, Germany

VIPER, a new tool for the VIsual PERception of sound signals, will be presented. Requirement for the visualization of sound is a signal analysis modeling the information processing of the ear. The first step of the signal processing implemented in VIPER calculates an auditory spectrogram by a filter bank adapted to the time- and frequency resolution of the human ear. The second step removes redundant information by extracting time- and frequency contours from the auditory spectrogram in analogy to contours of the visual system. In a third step contours and/or auditory spectrograms can be resynthesised confirming that only aurally relevant information was extracted. The visualization by contours intuitively allows us to grasp the important components of a signal. Contributions of parts of a signal to the overall quality can be easily auralized by editing and resynthesising them. Resynthesis of time contours alone allows e.g. to auralize impulsive components separately from the tonal components. Further processing of the contours determines tonal parts in form of tracks. Audible differences between two versions of a sound can in addition be visually inspected in VIPER through the help of auditory distance spectrograms. Applications are shown for various music and speech signals. For further information see http://www.cortex-instruments.de.

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POSTER SESSION 2

Wednesday 11:00
Room: Exhibition (E 50)

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ON THE INVOLVEMENT OF PHONOLOGICAL WORKING MEMORY IN THE PROCESSING OF RHYTHMS

Andreas Haas
Christof Zoelch
Ruth Schumann-Hengsteler
Catholic University of Eichstätt-Ingolstadt, Germany

Background

The study addresses the role of phonological working memory in the processing of musical rhythms in children and adults.

Aims

The aim of our study was to disentangle structural aspects within a rhythm that affect performance. This was obtained by varying aspects within the presented rhythms which are considered relevant to phonological working memory performance. Variations consisted of complexity and absolute duration of the rhythm as well as the usability of strategies. Furthermore we investigated the relation between these factors and the development of rhythmic ability.

Method

60 Children aged six to ten years and 21 adults participated in the study. Each subject had to reproduce auditorilly presented rhythms and to discriminate two rhythms that were presented immediately one after the other. A span procedure was applied. The rhythms varied along the dimensions *complexity* (simple/ complex), *duration* (short/ long) and *metric organization* (metric/ non-metric).

Results

Firstly, a general age effect could be found for both conditions (reproduction and discrimination). There was also a main effect of complexity, meaning that the simple rhythms could be reproduced and discriminated more easily than the complex ones. Furthermore in the simple condition, metrical rhythms were easier to discriminate than non- metrical ones, whereas within the complex condition, the discrimination of non-metrical rhythms was easier. It didn't make any difference whether the duration of the rhythms was normal or temporarily expanded (by the factor 1.4). Results indicate that an analogue to the phonological *word length effect* within the processing of rhythms could not be found. The effect of complexity as well as the age differences indicate that short-term memory strategies seem to play a crucial role in the processing of rhythms.

Conclusion

We assume that several strategic factors of phonological working memory as well as age related changes in capacity influence rhythm processing.

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IN-STORE MUSIC: IMAGES OF SELLERS RELATED TO THEIR LISTENING BEHAVIOR

Marek Franěk
Department of Music Education, University of Hradec Králové, Czech Republic
Pavel Muzik
Department of Musicology, Charles University, Prague, Czech Republic

Background

Positive evaluation of in-store music influences perception and appreciation of in-store atmosphere. While appropriate music can positively affect consuming behavior, inappropriate use of music can annoy customers. It was found that exciting music (loud music, fast tempo) increases the level of arousal, but does not increase consumption or amount of purchasing.

Aims

The aim of the present study was to investigate factors influencing images of function of in-store music. It was hypothesized that tolerance for excessive use of music in public spaces might be influenced by music education, everyday listening customs, and general tolerance to noise.

Method

Sellers (N = 130) from various types of stores were questioned. The questionnaires were distributed in stores of various staff around the Czech Republic. Participants were asked about their images of functions and effects of in-store music, their musical preferences, musical education, recent musical activities, everyday listening habits, and tolerance to various kind of noise (traffic, industry, music etc.).

Results

It was found that the sellers in general were positive to in-store music. Although in-store music in the majority of cases was not carefully selected and controlled by the participants, they do not believe that music could annoy customers. Although they suppose that music constitutes a positive atmosphere in a store, they do not believe that music could influence customers' behavior. Analysis of their everyday listening customs revealed that the participants from large towns and cities tend more frequently to listen music as much as possible than people living in smaller communities. Despite the fact that they are annoyed by traffic and industrial noises, they are quite tolerant of music from the vicinity, noisy neighbors or for instance, to signals of mobile phones. The data revealed interesting relations between evaluation of infant crying and music from neighborhoods. Those who are more annoyed by infant crying are tolerant of music from the neighborhood and vice versa.

Conclusion

The data illustrated positive images of sellers about in-store music. There are various factors which might influence a positive approach to overuse of background music in public spaces and in neighborhoods. At present, such factors are not entirely known. It might be that they are linked with preference of recent urban lifestyle.

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CUES FOR PERCEIVING A KEY OF A MELODY

Rie Matsunaga
Jun-ichi Abe
Department of Psychology, Hokkaido University, Japan

Background

Listeners perceive a key of a stimulus melody whether or not they can consciously name it. Some studies (e.g., Krumhansl, 1990) have shown that key perception is affected by pitch set. Our previous studies (Matsunaga & Abe, 2000, 2001) have shown that key perception is constrained by pitch set and may be determined by characteristics of its temporal sequence.

Aim

We explored specifics of the temporal sequence that would serve as cues in determining a specific key in a melody.

Method

Four AP musicians listened to 450 pitch sequences and identified the most plausible key. These 450 sequences derived from the same pitch set [C, D, E, G, A, B] but differing in its temporal sequence. This pitch set could be interpreted as diatonic tones of either of the following keys: C-major, G-major, e-minor, and a-minor. The duration of each pitch was 0.6 s, for a total of 3.6 s per sequence.

Results

All pitch sequences were predominantly identified as C-Major, G-major, e-minor, and a-minor. Particular pitch sequences were judged as C-Major (or G-Major) consistently among participants. We found possible sequential cues in AP listeners' perception of C-Major (or G-Major). Since a point of similarity exists between possible cues of C-Major and those of G-Major, key perception appears to be determined by the combination of earlier, rather than all, input pitches in the melody.

Conclusion / Implication

A generalization of our study may reveal a pattern of sequential cues for other pitch sets.

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EVENT-RELATED BRAIN RESPONSES TO SOUNDS OF MUSICAL INSTRUMENTS AND HUMAN VOICES

Roni Granot[1]
Daniel Levy[1,2]
Shlomo Bentin[1]
[1] Department of Psychology, Hebrew University of Jerusalem, Israel
[2] Dept. of Psychiatry, UCSD, La Jolla, California, USA

Background

In previous reports we described a centro-frontal scalp-recorded event-related potential (ERP) particularly sensitive to human voices (VSR). This potential peaked at about 320 ms from stimulus onset and was significantly larger in response to tones sung by human singers than to identical tones produced by a variety of musical instruments (Levy, Granot & Bentin, 2001; in press). Whereas similar in scalp distribution and latency to the Novelty P3 and P3a components, the VSR is elicited under different antecedent conditions and modulated by attention. Therefore we suggested that it may index a voice-specific process such as speaker identification, or may indicate a more general orienting response to significant (as opposed to novel or rare) auditory events.

Aims

In the current study we examined whether a potential similar to the VSR would be elicited in musicians by their own instruments.

Method

We recorded ERPs while professional musicians (wind, brass and string players) and non-musicians heard series of instrumental and vocal sounds (including the musicians' own instruments), while monitoring for piano tones.

Results

As in previous studies, vocal sounds elicited a distinct VSR in all subjects. However, no distinct components were elicited in the musicians in response to their own instrument. In addition, the P300 response to target piano tones was earlier and larger in musicians than in musically naive participants.

Conclusions

A possible interpretation of the results obtained in this study is that the VSR is, indeed, associated with a voice-specific process. Alternatively, the sounds of musical instruments may not be as categorically salient as the human voice, even for musicians specializing in their production.

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PROBABILITY OF INCOMING CHORDS AND EXPECTATION FOR CHORDS

Nart Bedin Atalay
Middle East Technical University, Ankara, Turkey

Background

Perception of relations between chords in isolation and in progressions were explained with a connectionist interactive activation model, named MUSACT (Bharucha, 1987). MUSACT represents the end-state of the learning process involved in the perception of chords. There have been various studies which investigated this learning process, by means of exposing artificial neural networks to chord sequences (Bharucha & Olney, 1989; Bharucha & Todd, 1989; Tillman et al., 2000). Yet, these networks were trained only with between-key chord sequences, the order of the chords in a given sequence were semi-random and only the probability of the occurence of certain chords were predetermined. Hence, the training set was not representative. Furthermore, some psychological and neuropsychological findings have been reported (Horton, 2002; Koelsch et al., 2000; Tekman & Atalay, 2002), which suggest sensitivity to the structure of chord sequences, an information absent in MUSACT.

Aims

In this study I would like to investigate the limits of posessing information about probability of incoming chord(s) in chord progressions for expectation of chords in isolation and in sequences.

Method

To extract the statistical information from chord sequences, a recurrent neural network was trained. Training set was set up in such a way that it included secondary dominants and temporary modulations. In addition, by using different representational schemes for chords, different constraints were put into the architecture of the network.

Results

Research is still continuing

Conclusions

Research is still continuing

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RECITAL

Trân Quang Hai

Overtone singing

Wednesday 20:00

Room: Kurth (Concert Hall)

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Program will be announced

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TRÂN QUANG HAI

Biography

Trân Quang Hai was born on 13 May 1944 in Vietnam. He is a talented musician and a renowned voice teacher specialised in overtone singing since 1970.

For several years, he also attended seminars on ethnomusicology at the School of High Studies for Social Sciences (he got the MA and Ph. D degrees), and acoustics with Prof. Emile Leipp.

He plays 15 or so musical instruments from Vietnam, China, India, Iran, Indonesia and Europe. Since 1966, he has given over 2,500 concerts in 50 countries, and has taken part in a hundred or so international traditional music festivals. He has taken part in radio and television broadcasts in Europe, America, Asia, Africa, and Australia. He has been working for the National Center for Scientific Research (CNRS) in France since 1968, and is now attached to the Department of Ethnomusicology of the Musée de l'Homme (Paris). He was a lecturer on South East Asian music at the University of Paris X – Nanterre (1988–1995).

Apart from his artistic activities, he is also interested in musical research. He has improved the technique of spoon playing and of the Jew's harp. In 1970 he found the key to the technique of overtone singing. The film „Le Chant des Harmoniques" (The Song of Harmonics) which he co-produced with Hugo Zemp, and in which he was the principal actor and composer of the film music, has won four awards at international scientific film festivals in Estonia (1990), France (1990), and Canada (1991). He is considered as the greatest specialist in overtone singing in the world. He has written numerous articles on Vietnamese and Asian music (New Grove Dictionary of Music and Musicians, New Grove Dictionary of Musical Instruments, Algemeine Muziekencyclopedie, Encyclopaedia Universalis). He has also recorded 15 LPs and 2 CDs (one of which obtained the Grand Prix de l'Academie de Disque Charles Cros in 1983). He has composed hundreds of popular songs. His musical experience is very varied: contemporary music, electro-acoustical music, improvisation, film music. He continues to preserve and develop traditional Vietnamese music (numerous new compositions for the 16 stringed zither dàn tranh). He has more than 7,000 persons who have learned the throat singing style with him from 60 countries around the world.

He has received a Gold Medal for music from the Asian Cultural Academy, and honorary doctorates from the International University Foundation (USA), and the Albert Einstein International Academy (USA). He has obtained more than 20 prizes and international awards. He was nominated President of the Jury of the Khoomei Throat Singing Festival (Tuva, 1995). He obtained the Cristal Medal of the National Center for Scientific Research (France, 1996). He was also President of Honor of the Festival d'Auch: Eclats de Voix (1999) and the Festival de Perouges/Au Fil de la Voix (2000). He was member of the Jury of the Song Contest 2000 „A Song for Peace in the World" in Roma (2000). In 2002, he received the French Legion of Honour from the French President Jacques Chirac.

He is the only Vietnamese to have taken part as a performer or composer in such great historical events as the Australia's Bicentenary celebrations (1988), the Bicentenary of the French Revolution in Paris (1989), the 700th Anniversary of the Birth of Switzerland (1991), the 350th Anniversary of the Founding of Montreal (1992), the 500th anniversary of the discovery of America (1992), the 600 Years of Seoul-Korea (1994), the Jubilee of the King of Thailand (1996), the 1,000 Years of Trondheim in Norway (1997).

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THURSDAY

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KEYNOTE 4

Simha Arom

Thursday 9:00
Room: Kurth (Concert Hall)

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PERCEPTUAL AMBIGUITY IN THE TRADITIONAL MUSIC OF CENTRAL AFRICA

Simha Arom
Laboratory Langues-Musiques-Sociétés from CNRS, Paris, France

One may say that in the traditional music of Central Africa ambiguity is omnipresent. Ambiguity concerns the constituent parameters of the organisation of time as well as those of pitch, blurring on both domains the perceptual orientation of the observer foreign to the culture under consideration.

Organisation of time: on its majority, the music of this region is cyclic. It obeys a regular periodicity based upon an entire and even number of equidistant and non-hierarchical pulsations, which, for the most part, are not materialised : between the period and the pulsation, there is no intermediate marker that would be the equivalent to a regular strong beat.

The rhythmic events produced in this music can, or can not, contain accents. When they have accents, two possibilities may occur : their distribution is regular – but regularly contrametric (offbeat) – or their spacing is irregular.

In the numerous repertoires which are devoided of any accentuation, the rhythmic organisation is based on the opposition of timbres, or even only on the contrast between durations.

In all cases, the perceptual orientation is not easy.

Organisation of pitch: the most widespread scale in this region is the anhemitonic pentatonic, which is not well-tempered. The tuning of the instruments is deliberately ambiguous, to which the buzzing of vibrating elements is added. This two phenomena render the perception of the degrees of the scale extremely difficult to apprehend. Yet, at the same time, these phenomena confer to the instruments more melodic resources.

Two other principles, that concern the melodic configurations, must be mentioned : the principle of commutation – that consists of substituting two or more sounds in a given position of the cycle ; the principle of mutation, that allows every piece to be performed in any of the five possible configurations of the pentatonic scale.

All these phenomena contribute to create and maintain a constant tension. Therefore, ambiguity may be considered as a constituent principle of this music.

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SYMPOSIA

Thursday

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SYMPOSIUM

Music and the eye

Organizer: Andreas C. Lehmann

Thursday 10:30
Room: v. Helmholtz (E 40)

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BECOMING A PIANIST: AN FMRI STUDY OF MUSICAL LITERACY ACQUISITION

Lauren Stewart
Institute of Cognitive Neuroscience, London, UK

Background

When a child or adult starts to play the keyboard, a significant part of the initial musical training is devoted to learning to read musical notation. Musical pieces which, at first sight, appear meaningless in their written form, will eventually be translated into a recognisable melody. Just as written language becomes meaningful and even compelling to read, so does musical notation. But how does this happen? And what brain regions are recruited for this process in the aspiring pianist?

Aims

To measure functional brain changes before and after the acquisition of music reading skill from scratch using an implicit and an explicit music reading task.

Method

Musically naïve subjects performed both tasks before and after they had been taught to read music and play keyboard to grade 1 (Associated Board, UK). fMRI results were analyzed separately, for the pre-training and post-training sessions using Statistical Parametric Mapping Software.

Results

Subjects showed learning-related changes in activation in bilateral superior parietal cortex and left supramarginal gyrus for the explicit and implicit music reading tasks, respectively. A common learning-related activation change was seen across both tasks in superior parietal cortex.

Conclusion

In music reading, the information which is relevant for performance is contained in the position of the note on the stave and musical performance relies on the use of this positional information to guide selection of the appropriate keypress. Hence the activation of bilateral superior parietal (within the dorsal stream) in the explicit music reading task is entirely consistent with the idea that music reading involves a sensorimotor translation in which the spatial characteristics of musical notation are used to guide selection of the appropriate keypress. The supramarginal gyrus activation seen in the implicit music reading task is consistent with this area's suggested role in "motor intention". During the course of training, subjects learned to make specific keypresses in response to particular musical notes. The visual appearance of musical notes, post-training, may be automatically and unconsciously interpreted as an instruction to act. The study serves to illustrate the power of culture, and specifically music, to shape brain function.

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EYE MOVEMENTS IN READING, PICTURE INSPECTION AND MUSIC READING – WHAT DO WE KNOW?

Niels Galley
University of Cologne, Institute of Clinical Psychology, Germany

Reinhard Kopiez
Hanover University of Music and Drama, Germany

Background

While there is extensive literature on eye movements during the reading of a text or inspection of pictures (Rayner, 1995) there are only few reports about gaze behaviour during music reading (Lehmann, 2002). Yet musical sight reading implies an interesting experimental approach to the study of cognition, because vast amounts of input information must be handled and connected to complex output sequencing. This necessitates highly structured encoding as well as execution processes characterised by anticipation and expectation beyond the low level control of input features.

Aims

This paper provides a critical assessment of existing eye movement research in music reading and compares music and text reading to arrive at new research questions.

Contribution

In reading a text, WHERE decisions are mostly controlled by low level processes while WHEN decisions are more influenced by top down processes the longer the fixation durations last. In text reading, most data speak for a low level positioning process: non-optimal landing positions increase the probability of a second fixation on a word, for example. It is unknown if the perceptual span in music reading is more open to the vertical dimension while ordinary gaze progression is less predominant. Fixation durations are more influenced by comprehension i.e. matching to long term memory content, for example high frequency words need 242 ms and low frequency words 264 ms fixation duration. Regressions, i.e. leftward directed saccades in reading are rare and often found in difficult texts; perhaps a sign for the re-evaluation of expectations. Regressive saccades are more often seen in musical reading and mostly interpreted as an indicator of unusual time sharing processes.

Conclusions

Possible new designs for future research in musical reading experiments are proposed.

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THE EFFECT OF MUSIC ON THE PERCEPTION OF A SHORT FILM'S NARRATIVE STRUCTURE: HOW THE EARS TELL THE EYES WHAT TO SEE

Klaus Ernst Behne
Hanover University of Music and Drama, Germany

Background

The effects of music on the viewing of films/videos have been demonstrated in numerous empirical studies. In most cases, the film excerpts used were silent pictures with often rather stationary camera angles (faces, landscapes), so that the effects could as well have been demonstrated with photographs (as in the oft-mentioned Kuleschow effect).

Aims

The goal of the experiment reported here was to test if the use of different sound tracks would influence the audiences' interpretation of the narrative structure of a short film.

Method

337 students, aged 11 to 17 viewed one of two versions of a short film (about 4 minutes in length), differing only in their soundtracks. The musical backdrop was either a piece of popular music with a tense middle-part or taken from J. Brahms' "Hungarian Dances." Subjects were asked to provide short story lines for the film and judged their impressions of the protagonist on rating scales.

Results

The qualitative data revealed an influence of the two types of music on the interpretation of events, and a cluster analysis of the rating data yielded large differences between versions that could not be explained by demographic variables.

Conclusions

Future research should pay more attention to the effects of music on the narrative aspects of films and take into account the biographies of media users when trying to explain individual differences in the interaction of eyes and ears.

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CHANGES IN AFFECTIVE REACTION: DELAYED VS. ADVANCED SOUND IN MUSIC VIDEO CLIPS

Mirjam Schlemmer
Technical University of Berlin, Germany

Background

Research on audio-visual perception suggests that sound may lag behind pictures for up to 200 ms without being perceived as delayed. In contrast, advanced sound can be detected as out of synchrony much earlier (80 ms). In everyday-life we are used to sound lagging behind its visual equivalent especially at long distances, because sound travels slower than light, whereas sound often anticipates sight on TV, where it is used to cover up sudden changes creating 'invisible cuts'.

Aims

This paper will present data from a study designed to investigate participants' affective reactions towards delayed and advanced sound in music video clips. Various features such as tempo, cut frequency and visual content differ between the clip extracts used in the study. The main question is whether or not affective reactions change when the sound is moved out of synchrony with the cut (backwards, forwards).

Method

Excerpts were taken from 10 different pre-existing music video clips to prepare different versions for presentation. Besides the original version of each excerpt, the study included versions with delayed and advanced sound. Participants were asked to rate the excerpts on bipolar adjective scales. No group of participants rated different versions of the same clip.

Results

Results show a tendency of participants to rate advanced sound versions as "better" than delayed sound versions. Similar rating differences occur among different evaluative adjectives.

Conclusions

The implication of this research is, that even though participants show a wider tolerance towards delayed than advanced sound, they seem to prefer advanced sound reminiscent of film cutting. The presented paper will more clearly define the influenced and uninfluenced bipolar adjectives.

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SYMPOSIUM

Timbre and its perception

Organizer: Christoph Reuter

Thursday 10:30
Room: Wellek (315)

ISBN: 3-931852-66-0
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STREAM SEGREGATION AND FORMANT AREAS

Christoph Reuter
University of Cologne, Germany

Background

For simultaneous playing of timbres characterized by their formants, the following principles could be observed:

1.) blending: timbres with equivalent main formant areas blend homogeneously.

2.) partial masking: timbres with non-matching formant areas are perceived separately.

These two principles are corroborated by the instructions in many orchestration treatises.

Aims

The conclusion could be drawn that the position of formant areas would lead to similar results in the case of successive tones such as in stream segregation experiments: If that was the case, then a melody with alternating timbres would either be split in perception into two different melodies (if the formant areas were distinct) or would be heard as one sole melody (if the formant areas were equivalent).

Method

In order to test this hypothesis, melodies were played, switching from one tone to the next between the timbres of two instruments. Additionally, alternation of timbres was also employed using timbres whose formant areas had been purposely displaced using formant shifting software.

In an auditory experiment, 30 subjects were asked to judge whether the sound examples consisted of one sole, continuous melody or if they were hearing two separate melodies perceived as two latent, distinct parts.

Results

In almost all cases featuring equivalent formant areas most of the subjects perceived one sole melody. Differing formant areas predominantly led to the perception of two different streams. Comparable results can be found in the literature on stream segregation.

Conclusions

1.) Alternating timbres with equivalent main formant areas tend to produce one sole, continuous melody in perception.

2.) Alternating timbres with non-matching formant areas tend to produce two distinct melodies in perception.

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VOICE PRINTS AS A TOOL FOR AUTOMATIC CLASSIFICATION OF VOCAL PERFORMANCE

Claus Weihs
Uwe Ligges
University of Dortmund, Germany

Background

In order to find objective criteria for the assessment of the quality of vocal performance, time series of voice generated vibrations (so called waves) were measured in a standardized experiment (Weihs et al., 2001).

Aims

We are interested in properties of such time series related to performance quality aspects of single tones like purity of intonation, vowel purity, vibrato intensity, solidity of tone, and softness / brilliance of tone.

Main Contribution

Based on a segmentation of the waves into notes (Ligges, 2000 and Ligges et al., 2002), the individual tones are judged from the estimated periodogram of the sung notes. Intonation accuracy is estimated by the halftone distance from the ideal tone. In order to analyze the the aforementioned quality aspects, we consider the widths and the heights (amplitudes) of the periodogram peaks corresponding to the fundamental frequency and the first twelve overtones. From this, formant intensity and amplitude variation of the different overtones are derived.

Implications

From these measures we derived so-called **voice prints** characterizing the voices and clustered the voices into groups of similar voice type. This way, it was possible for example to separate the professionals from the amateurs (Güttner, 2001).

Voice prints for vocalists are compared to corresponding **instrument prints** of selected instruments. Construction and comparison of voice and instrument prints are demonstrated.

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DOUBLE-REEDS IN THE WIND CAPSULE – TIMBRAL CONSEQUENCES OF THE MISSING ACCESS OF THE MUSICIAN

Jobst P. Fricke
Musicological Institute of the University of Cologne, Germany

Background

The Bernoulli principle is responsible for the sound of woodwind and brass instruments, as well as for the singing and speech voice. Connected with the periodic opening and closing of the (double) reeds or lips is a characteristic cyclic structure of the spectra of these tones.

However, the Bernoulli principle is not responsible for the frequency-constant position of the spectral maxima and minima, which are typical for the (double) reed instruments of the modern orchestra.

Aims

In the case of modern double-reed instruments, sound organization is controlled by the musician because he can influence the movement of the double-reeds and the air-flow pressure with his lips. If this controllability is made void by the use of a wind capsule, the spectra should not have frequency-constant maxima. It is the aim to prove this with wind capsule instruments.

Method

Tones from the scales of a Krummhorn, Kortholt, Rackette and Rauschpfeife have been analyzed via FFT and compared with reference to their spectral envelopes.

Results and Conclusions

The proof that the spectra of these instruments have irregular or pitch-dependent structures instead of frequency-constant maxima and minima, leads to the conclusion that the removal of the wind capsule did not only enable a new dynamic play for the musician, but also a completely new and constitutive feature of the timbre.

The principle of pitch-independent formant areas, which is not at all natural for double-reed instruments, was realized here. Without this principle, the differentiation and blending of timbres of the instruments of the modern orchestra would not be imaginable.

In the renaissance age, the voice differentiation of instruments playing together followed another principle, which consists of phenomena such as residue, stream segregation and continuity illusion.

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TIMBRE AND PITCH OF RUSSIAN CHURCH BELLS

Irina Aldoshina
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Background

Since the 9th century a distinct style of performance on Russian church bells had been created, in which the leading role belonged to rhythm and harmony rather than melody. As there is a trend nowadays to revive this art, while the technology to build and tune these bells has been lost in the Bolshevik era, the research on their acoustic parameters, the methods of their tuning as well as their timbre and pitch has a special relevance.

Aims

The aim of this research is a new complex of works on recording, storing, restoration and analysis of sound examples of Russian church bells, using modern digital technologies including spectral and statistical processing, to determine their peculiarities and acoustical characteristics.

Method

The recordings and acoustic analysis of bells built between the 16th and the early 20th century were either made on the belfries of actual churches or in museums of Northwest and Central Russia. Because of the above mentioned loss of technology, most bells built since the Bolshevik Revolution comply to the Dutch tuning, which creates a significantly different timbre.

Results and Conclusions

The analysis of statistical data for Russian church bells shows that the deviation from Dutch tuning is rather considerable. The rate and character of decay processes depend on bell's sizes, form, material, place, method of strike and others. Spectral measurements show that the most ancient Russian church bells have many very tight-spaced doublets (two or more closely spaced partials), which produce their specific timbre during the decay process.

Moreover, the analysis of the nodal lines on the surface of most big church bells shows that these lines move during the sounding, which results in the effect of a "floating" sound, a special type of amplitude modulation. The reason for this effect is the nonlinear vibration of the bell's shell under the strong clipper strike.

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SYMPOSIUM

Rhythm, metre and timing

Organizer: Michael Grossbach

Thursday 10:30
Room: Stumpf (E 15)

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INFLUENCES OF TEACHING METHODS ON MUSICAL RHYTHM REPRESENTATIONS: A DC-EEG LONGITUDINAL STUDY

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[2]Staatliche Hochschule für Musik Freiburg, Germany

Background

Knowledge about the possible influences of teaching strategies on cortical representations of acquired abilities is sparse to non-existant. This especially holds true for very complex tasks which can principally be taught either procedurally, like a first language in children, or explicitly as with mathematics for example. More commonly though, both methods are combined with a prevalence for one or the other mode.

Aims

The goal of this study was to elucidate influences of teaching strategies on the cortical representations of musical rhythm as measured with DC-EEG.

Method

Three groups of musically naive subjects underwent a weekly training (six weeks, once a week for 90 minutes). The procedural group (L1, n = 6) acquired implicit knowledge about rhythm by, for example, clapping rhythmically structured sequences under the guidance of a teacher. The explicit group (L2, n = 6) was addressed on an intellectual level by presenting musical scores of audio examples, providing rules and naming conventions to distinguish between different temporal structures in music. A third group (controls, n = 7) were lectured on the neuroscience of music. The two music teachers were lecturers at the Hanover University of Music and Drama, the neuroscientist was a neurologist at said institution. Before the first and after the last lesson, subjects were given 80 pseudo-randomized trials of rhythm tasks in a same-different experiment. During the experiment DC-EEG with 32 electrodes (10-20 system) was recorded.

Results

Preliminary analyses revealed no performance difference between L1 and L2, but a clear advantage of both groups over the controls. Electrophysiological data seem to point toward a centrally focused activity in the L2 whereas the L1 group showed a slight preponderance to the right hemisphere.

Conclusions

From the performance data, the null hypothesis that both teaching strategies yield comparable rhythm expertise in the subjects could not be rejected. The more holistic approach to rhythm understanding in the L1 group could possibly explain the stronger activation of right hemisphere networks compared to the explicitly instructed L2 subjects.

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MODELING IMMANENT DURATIONAL ACCENT IN MUSICAL RHYTHM

Richard Parncutt
University of Graz, Austria

Background

A durational (or IOI) accent can be either immanent (evident from the score) or performed (expressive), and either predurational or postdurational. Performed durational (agogic) accents occur when an event is lengthened or delayed relative to schematic or veridical expectation. Regarding immanent accents, predurational accents precede long IOIs and mark downbeats (e.g., a half-note preceded and followed by quarter-notes), and postdurational accents follow long IOIs and mark phrase/group beginnings. Predurational accents predominate at fast tempi and within phrases, postdurational at slow tempi and between phrases.

Aim

To clarify the psychological nature of durational accents and their quantitative dependency on the IOI preceding and following each event, and to incorporate the result into a quantitative model of rhythm perception.

Main contribution

Predurational accent depends on echoic storage, the short-term "memory" for speech syllables (duration around 1 second). Postdurational accent depends on the psychological present or working memory, necessary to comprehend a linguistic phrase (duration several seconds). In a quantitative model, these two accent types combine to produce an overall estimate of durational accent, and further combine with phenomenal accentuation due to changes of loudness or timbre. The resultant temporal pattern of accents is then put through a pattern recognition algorithm that is confined to the psychological present (plus hysteresis). The output is a set of implied pulses, perceived metres, and metrical accents, all with continuously varying salience.

Implications

A suitable quantification of durational accent and periodic pattern recognition enables the cyclic model of Parncutt (Music Perception, 1994) to be adapted for real-time application and to systematically account for grouping accents. The model also links the dominance region of pulse perception (centred near 600 ms) to the functional relationship between pulse salience and durational accent.

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MUSICAL STRUCTURE, LISTENER ORIENTATION, AND TIME PERCEPTION

Annekatrin Kessler and Richard Parncutt
University of Graz, Austria

Background

Jones and Boltz (1989, 1993) proposed that a clear musical structure helps listeners predict future musical events and hence accurately perceive musical time. According to Fraisse (1963) and Ornstein (1969), poorly structured stimuli contain more perceptual elements and therefore seem to last longer.

Aims

Jones' and Boltz's experiments focussed on synthesized melodic fragments. We investigated whether their finding generalises to real music (excerpts from commercially available CDs) and musically typical durations (longer than a few seconds).

Method

In Experiment 1, 15 listeners of mixed musical background heard 20 musical excerpts and rated their predictability, variability, closure, tempo, pleasantness and familiarity, as well as their own musical experience and their arousal and attention during the experiment. They also estimated the duration of each excerpt in seconds. Stimuli included examples of minimalism, classicism, atonality, jazz and non-western music. Each listener heard the excerpts in a different random order. Experiment 2 was identical except that the musical excerpts were played for 3 minutes instead of 30 seconds, and a new group of listeners participated. In neither experiment did any listener guess that all excerpts had the same duration.

Results

Jones and Boltz predict that duration estimates are most accurate for highly predictable excerpts. Our listeners' estimates were most accurate for medium predictability (and medium variability). Fraisse and Ornstein predict overestimation of duration for unpredictable excerpts. Listeners of our Expt. 1 (30 s) tended to underestimate, of Expt. 2 (3 min) to overestimate duration.

Conclusions

The loss of accuracy for highly structured stimuli may be explained by Berlyne's complexity theory: highly structured stimuli are not necessarily preferred. The idea that accuracy depends on attention, which in turn depends on preference, is not, however, supported by the data, in which there was no correlation between self-appraised attention and perceived duration.

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TIMING RHYTHMS WHEN TEMPO CHANGES

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Background

Finger tapping at a given tempo, self-paced or in synchrony with a metronome, is an experimental task that offers fascinating possibilities for studying the temporal dynamics also underlying more complex behavior like music performance. This is due to the analytical framework introduced by A. Wing and A. B. Kristofferson, which helps explain how temporal precision in self-paced performance is limited by variability from central and from peripheral sources.

Aims

In my presentation, I will briefly sketch extensions of the basic model to self-paced rhythmic tapping, and to synchronized performance, which can serve as a model for cooperative timing. Recent theoretical and experimental studies have shown that synchronization with a metronome subject to tempo perturbations can be accounted for surprisingly well by a linear phase correction mechanism, whereas no evidence has been found for competing models based on period correction. How well do these models predict tracking a metronome that undergoes large systematic tempo changes as in accelerando or ritardando?

Main Contribution

Skilled subjects (amateur musicians) tried to keep synchrony with a tone sequence that smoothly transformed from a constant initial to a constant final tempo; the onset of the transition phase could be signaled or not. In both accelerando and ritardando, subjects systematically first lag, then lead, then lag the metronome again, a pattern not predicted by current period correction models. However, augmenting the phase correction model by the assumption that subjects monitor the tone-tap asynchronies for starting and stopping a linear period correction mechanism can account for these findings. Recent studies from my lab extend these findings to rhythmic synchronized performance.

Implications

These studies contribute to our understanding of the mechanisms underlying complex timing skills, and offer new tools for quantifying the temporal precision of non-expressive aspects of musical performance.

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PENDULAR CALIBRATION VERSUS TAP-TEMPO INPUT: STABILITY – ACCURACY

Warren Brodsky
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Background

Research on tempo perception has investigated if everyday ordinary listeners find some tempos more enjoyable than others, if they can notice discrete differences in pace, if they can remember rhythmic speed over prolonged periods of time, and if music is imagined in the same cadence as when it is heard aloud. In general, listeners have been seen to be fairly consistent in their tempo judgments and preferred tempo rates. Yet, these findings from single-session experiments are not consistently confirmed in multiple-session studies, and most studies have employed perceptual metronomic adjustment tasks (pendular calibration).

Aims

The current study was designed to investigate 'tap-tempo input' as subject response mode for both perceived and imagined music.

Method

Eighty-one undergraduates participated in one of three experiments. Experiment 1 questioned if a single correct tempo measurement emerges from repeated listening to recorded music, and if the method of subject-response (pendular calibration vs. tap-tempo input) affects accuracy. Participants were repeatedly exposed to a block of 15 music items in 4 sessions (2 sessions per mode) scheduled at 4 day intervals. Experiment 2 assessed learning effects, and explored pendular interference. Participants were repeatedly exposed to a block of 15 music items at 2 sessions scheduled at 4 day intervals. Experiment 3 questioned if silent singing (imagining) familiar songs occurs in the tempo of the original listening. Participants chose a block of 2 tracks (1 each on 2 CDs brought from home), first imagining and then hearing aloud each of the selected pieces, repeated on a second session scheduled at 7 day intervals.

Results

The findings show that responses via tap-tempo input to perceived music were consistently more stable and significantly more accurate than response via pendular calibration. In addition, the study confirms that musical imagery retained tempo information from the original listening.

Conclusions

The results support previous findings which suggest that tempo representations are highly accurate, and that music imagery of familiar songs contains explicit tempo information. Furthermore, the study indicates that motor production responses (tap-tempo input) are more representative of tempo perception and reproduction than perceptual metronomic adjustment responses (pendular calibration).

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THEMATIC SESSIONS

Thursday

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THEMATIC SESSION

Singing

Thursday 10:30
Room: v. Hornbostel (130)

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MELODIC CONTOURS AS A CONNECTING LINK BETWEEN PRIMATE COMMUNICATION AND HUMAN SINGING

Inge Cordes
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Background

Any probing of the question whether music, which is exclusive to humans, is an entirely new phenomenon or whether there are unknown connections with vocal communication typical of previous stages in phylogenesis, requires searching for early musical signs in human development. Universally, parents use distinct, simple pitch contours in order to transmit emotional messages to the preverbal child. Their spontaneous appearance, triggered by the presence of an infant, indicates genetic predisposition.

Aims

As the melodic element plays an important part in singing, the melodic contours used in motherese were to be investigated as possible starting points for the melodies of songs. Additionally, possible connections to animal acoustic communication were to be researched.

Method

Different forms of melodic contour serve different purposes, and their composition depends on social context. To establish the possible similarity between melodic contours and the pitch contours of human melodies, four song-categories were chosen which are linked to comparable social situations: praise-songs, war-songs, songs to arouse attention and lullabies. Corresponding ethnic songs from different cultures were analysed with regard to whether they contain pitch contours which correspond with those used in motherese.

On the basis of ethological findings, the characteristic features and functions of primate calls and those of the different forms of melodic contours were compared.

Results

The supposed correspondence of pitch contours in songs to the melodic contours of motherese proved to exist.

Primate ethological literature has shown parallels to exist between essential kinds of calls which are also at humans' disposal. This gave rise to the theory that in humans' prolonged period of progeny care the melodic contours must have evolved from the corresponding call classes of the modern human's ancestors. This requires further corroboration.

Conclusions

Music, especially singing, can be assumed to have developed from earlier forms of vocal communication whith melodic contours as a connecting link.

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PREFERENCES FOR "A CAPPELLA" AND ACCOMPANIED SONGS: A STUDY WITH INFANT LISTENERS

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Background

Recent research has demonstrated that infants are sophisticated listeners, who exhibit some clear auditory preferences. Preverbal infants are not only drawn to human voices, but are also very attentive to parental speech and songs that are directed to them. When it comes to music, consonant and high-pitched versions of songs are said to be among infants' preferred musical selections. These findings are in synchrony with the materials commonly used in early childhood music education programs. Notwithstanding, to date little is known about infants' preferences for musical texture.

Aims

The purpose of this study was to investigate whether 8-month-old infants held preferences for two versions of a children's song: "a cappella" and accompanied.

Method

The participants were 31 normal and healthy infants (17 girls, 14 boys) with a mean age of 8 months. Infants were tested individually on the Headturn Preference Procedure (HPP), as described by Kemler-Nelson et al, (1995). Test stimuli consisted of 8 different excerpts of a Chinese song sung by a female child and collected by ethnomusicologist Francis Corpataux (see Ilari & Majlis, 2002). Among these excerpts, 4 were in "a cappella" version and the remaining 4 included the vocal melody with a complex accompaniment. Each excerpt was presented twice to each infant, totalling 16 excerpts in the entire test series.

Results

Infants showed a preference above chance levels for the "a cappella" over the accompanied version of the song.

Conclusions

Our results indicate that infants have clear preferences for and can discriminate between simple and complex musical textures during the first year of life. Implications for music education will be discussed during the conference.

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'REVERSE-ENGINEERING' THE HUMAN VOICE: EXAMINING THE ADAPTIVE PREREQUISITES FOR SONG AND LANGUAGE

Nicholas Bannan
International Centre of Research in Music Education, University of Reading, UK

Background

This research represents the modelling of vocal development and potential in three categories so as to devise means of examining how the specific attributes of human vocality evolved. Assuming singing to be universal and instinctive, the hypothesis is proposed that musical communication represented the bridge between animal communication and human language (sometimes referred to as 'the continuity paradox'). Ontogeny is interpreted in the light of phylogeny, whereby it is proposed that language exploits neural structures adapted for communicative interaction whose purpose may have been different from speech and the effects of which were closer to what we would term Music.

Aims

A tripartite model of vocal potential is developed, drawing on: archaeological evidence of primate and hominid anatomy; the communication of modern primates; and the anatomical and neurological features of singing in living humans. This is related to a time-line for the evolution of the prerequisites for the eventual expression of which the modern vocal mechanism is capable.

Main Contribution

Referring to key evidence in a variety of disciplines, this study sets out to re-analyse the available data from the viewpoint of voice research informed by specifically musical properties of human vocality in addition to language capacity.

Implications

'Reverse-engineering' human singing involves unravelling the various selective pressures which may have endowed advantages at different points in the 6 million year evolution of the human voice. The study illustrates how both adaptation and exaptation played a part in a complex process involving natural, sexual and group selection. Implications for further research and possible outcomes in music therapy and pedagogy are also suggested.

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MUSIC-RELATED EXPERIENCES OF GIRLS IN THE THIRD REICH

Anne Niessen
Universität Siegen, Germany

Background

The research project "Music-related Experiences of Girls in the Third Reich" ("Musikbezogene Erfahrungen von Mädchen im Nationalsozialismus vor dem Hintergrund musikerzieherischer Intentionen") focused on (non-persecuted) girls in Nazi Germany whose situation was quite unlike that of boys because of different roles and educational goals. This topic had hardly been investigated.

Aims

The overall question of the research project was: Which music-related experiences were made by girls in Nazi Germany in the tension between music education and their individual (musical) biography? The empirical results should contribute to a theory of music-related experience, to the history of music education and of its gender aspects.

Method

Contemporary sources were interpreted by classical hermeneutic methods. 13 Women who were girls in the thirties were investigated by using methods of Biographical Research; the analysis of the guided narrative interviews (about 30 hours duration) based upon the "Qualitative Inhaltsanalyse" (Philipp Mayring) and the "Sozialwissenschaftliche Paraphrasierung" (Thomas Heinze).

Results

Music education for girls in the Third Reich was taken in for political aims. Its effect and great influence upon the girls is mirrored in the interviews. Music in this context was not an independent power, but because of its emotional strength it supported certain trends and images and thus contributed to the girls' education.

Conclusions

The term "music-related experience" ("musikbezogene Erfahrung"; Hermann J. Kaiser) which was used in this context seems to be very reasonable to record individual experiences with music in empirical qualitative research. Furthermore, this kind of research allows description of the term in more detail so that a close link between a theoretical term and a qualitative research project was achieved.

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THE PROFESSIONAL DEVELOPMENT OF YOUNG MUSICIANS: FIRST RESULTS OF THE ALUMNI-PROJECT

Heiner Gembris
Daina Langner
IBFF, University of Paderborn, Germany

Background

The transition from music academy to job market is a critical situation in the career of professional musicians. Every-day observations, statistical material and empirical studies show that the job market for musicians has been subject to a structural change during the last few years, consisting on the one hand particularly of a reduction of (tenure) positions in orchestras, whereas on the other hand the number of applicants is rising. At the same time it can be seen that the gainful employment of many musicians is based not only on one single position but on a number of different jobs that may not be related to music either.

Aims

The present study (Alumni-Project) deals with the following questions: How do the musical careers of professional singers and instrumentalists develop after their education at the music academies? To what extend are the graduates able to find jobs in the music job market? How well do the demands of professional life match the qualifications acquired at the music academies? What consequences can be derived from our results to improve the education of musicians?

Method

A questionnaire has been administered to a total of 2080 graduates from 7 music academies all over Germany. Until due date November 25, 2002, 648 questionnaires have been returned.

Results and Conclusions

Presently, the data have not yet been evaluated. We will be able to report results and conclusions in the coming months.

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THEMATIC SESSION

Timing and rhythm

Thursday 10:30
Room: Révész (202)

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APPRECIATION OF JAZZ AND OTHER GROOVE-BASED MUSIC AS A FUNCTION OF TEMPO

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Background

Tempo is one global property of music performance that affects the listener's experience. For example, fast tempi are often related to happiness and intensity, and slow tempi with sadness and solemnity. However, musicians' intuitions are sometimes that only one specific tempo is acceptable for a given piece of music. Such an optimal tempo may ultimately bear on basic perceptual aspects, for example event duration or density.

Aims

To show how music experience is affected by altering the tempo determined by the artist or producer.

Method

Stimuli were original recordings of ensemble music (jazz, ethnic, and "radio chart-style") and versions of these in which the tempo was altered by –10%, –5%, +5%, or +10% by means of DSP software, thus preserving the original pitch. Listeners rated 14 adjectives in response to each music example.

Results

As a function of tempo ratings of rapid and intensive decreased while ratings of calm decreased. Ratings associated with aesthetic or musical evaluation, such as good, groovy, and swinging were lower for decreased tempi but unchanged or insignificantly increased for increased tempi. The original or +5% tempo received the highest ratings for some combinations of adjectives and music examples.

Conclusions

The notion of optimal tempo found support for some music examples and by the fact that although tempo was linearly related to adjectives associated with speed, ratings of evaluative adjectives were not systematically higher for any altered tempo. The question remains whether optimal tempo is determined by the melody or other structural properties of the composition, the musical arrangement, or a specific pattern of performance variability.

[1] Part of this research was supported by The Bank of Sweden Tercentenary Foundation through a grant to Alf Gabrielsson.

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PERCEPTION OF SYMMETRIC AND ASYMMETRIC METERS BY LISTENERS FAMILIAR AND UNFAMILIAR WITH ASYMMETRIC METERS

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Middle East Technical University, Ankara, Turkey

Semra Kurt
Hacettepe University, Turkey

Zehra Peynircioğlu
American University, Washington DC, USA

Background

Models of rhythm perception typically make reference to hierarchical frameworks in which time is divided into intervals nested in each other. It is required or preferred that time intervals at the same level are of equal durations and durations of intervals in neighboring levels are related by simple integer ratios. Both of these rules or preferences are violated in asymmetric meters that are used commonly in the music of certain geographic areas.

Aims

The aim of the study is to determine whether listeners familiar with musical idioms that use asymmetric meters frequently perceive such meters by trying to fit them into symmetrical metric frameworks or have schematic representations for such asymmetric meters.

Method

Melodies are presented twice, either keeping the meter same or changing it, in order to obtain same/different judgments from listeners. Changes in meter include changing a symmetric meter into an asymmetric one, changing an asymmetric meter into a symmetric one, and changing both kinds of meters into rhythms that do not fit any metric organization. The logic of the design is that changes from temporal organizations that fit mental frameworks to those that are deviations should be more noticeable than changes in the opposite direction. The goal is to collect data with the same material from two populations, one familiar with asymmetric meters and one unfamiliar with them.

Results

Data collection is in progress.

Conclusions

Based on whether listeners familiar with asymmetric meters perceive changes from symmetric to asymmetric meters as deviations and changes in the opposite direction as resolutions into more coherent patterns, and whether the two groups of listeners show different patterns of performance we will be able to reach conclusions about universality of mental frameworks based on symmetric hierarchical divisions of time.

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TEMPO AND LOUDNESS ANALYSIS OF A CONTINUOUS 28-HOUR PERFORMANCE OF ERIK SATIE'S COMPOSITION 'VEXATIONS'

Reinhard Kopiez
Marc Bangert
Eckart Altenmüller
Hanover University of Music and Drama, Germany

Werner Goebl
Austrian Institute for Artificial Intelligence, Vienna, Austria

Background and aims

This study fills a significant gap in music performance research, namely the analysis of long-term performances. The importance of performance analysis from a global perspective is demonstrated, using an uninterrupted recording of Erik Satie's 'Vexations' performed by one pianist over almost 28 hours.

Method

In a single case study, the MIDI and acoustical data of the performance are analysed in order to explore changes in tempo and loudness. Additionally, EEG data were recorded to reveal the influence of different states of consciousness (alertness, drowsiness, trance) on tempo stability. Finally, a new method of performance visualisation will be demonstrated.

Results

The performer's changing states of consciousness (alertness, trance, drowsiness) were seen to exert a strong influence on tempo and loudness stability. Tempo and loudness remain stable over the first 14 hours of alertness. The state of trance begins after 15 hours and shows a destabilisation of tempo, folowed by uncontrolled deviations in loudness. However, the stability of tempo and loudness was affected by states of consciousness in different ways: control of tempo diminished earlier than control of loudness. The integrated view of tempo and loudness changes over the entire performance shows independent variations: faster does not mean louder.

Conclusions

It could be demonstrated that the analysis of long-term musical performance and the development of adequate analytical tools remains a challenge for performance research. The visualization of performance data showed large-scale periodicities in timing and dynamics..

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ASYNCHRONY VERSUS INTENSITY AS CUES FOR MELODY PERCEPTION IN CHORDS AND REAL MUSIC

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Background

In expressive piano performance, pianists bring out the melody by playing it louder and by playing it sooner than the accompaniment (melody lead, Palmer, 1989, 1996; Repp, 1996a; Goebl, 2001). In this contribution, we investigate perceptual aspects of this phenomenon. In previous research on the perception of tone salience in dyads, we found that loudness is the dominating cue, asynchrony has only marginal influence (Goebl & Parncutt, 2002).

Aims

In a multi-voiced context, we investigate the relative perceptual salience of individual voices that are shifted back and forth in time and varied in intensity simultaneously. We are interested in how much each of these cues is responsible for the perceptional salience of a tone or voice. In comparison to our previous work, we extend the stimulus material to three tone chords in order to study the perceptual salience behaviour in different vertical positions in a chord. Studies on the detection of pianists' errors revealed that outer voices tend to receive greater perceptual attention than inner voices (Palmer & van den Sande, 1993; Palmer & Holleran, 1994; Repp, 1996b). Another perceptual explanation of the melody lead phenomenon is the streaming hypothesis according to Bregman's theory of auditory scene analysis. To test this hypothesis, the stimulus material is extended to sequences of chords and to an excerpt of real music.

Method

In the first experiment, three-tone piano chords are presented to the participants in which one tone is increased and decreased in intensity (five steps from –14 to +14 MIDI units) and shifted in time backwards and forwards from -55 ms to 55 ms in five steps. This target tone is indicated by an acoustical primer that sounded one second before the chord. The participants have to rate how loud the target tone sounds to them on a 7-point scale. To avoid streaming over stimuli, two chord types are used (always with the same major sixth in the higher two tones) and their pitch is randomly shifted one semitone up and down. The second experiment uses the identical setup, but with sequences of five chords per stimulus. In the third experiment, the first nine bars of Chopin's Ballade op. 38 are used with the upper voice and a middle voice as two possible melodies. These two voices (as indicated by different colours in the score) are varied in timing and in intensity as before and the participants have to rate which of the two voices attracts their attention more, again on a 7-point scale.

Results & Discussion

The experiments are currently in progress. Results will be presented at the conference.

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SUBLIMINAL RHYTHM PERCEPTION

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University of Dortmund, Germany

Background

During the past decade, evidence of dissociation between conscious and nonconscious information processing has emerged from the study of normal Ss and brain-damaged patients. In the field of visual perception, latest research (O. Neumann 1998) proves that subjects gave correct motorical responses to visual tasks without being aware of the discrimination. (direct parameter specification). This was also confirmed by measurements of lateralised evoked potentials

Aims

The phenomenon of direct parameter specification can also be shown in experiments with acoustical stimuli,.e.g. in the field of rhythm perception:

Method

60 untrained Ss have to listen to simple melodical examples under different conditions: a) examples with a change in tempo b) examples with a subtle change in rhythm e. g. from 3/4 to 6/8 measure and c) example with an obvious change in rhythm e.g. 4/4 to 3/4 measure. During the performance of the task the skin resistance response (SRR) and the Electroencephalogram (EEG) are recorded. The Ss are asked whether they are able to notice these changes.

Results

The phase reactions of the skin resistance repsonse correspond to the structure of musical events. The evoked potentials of the EEG show changes in the tempo as well as in the rhythm structure of the musical stimuli. This is also true for Ss who pointed out not to have noticed any changes in tempo and rhythm.

Conclusion

These results coincide with the results of Neumann who believes in a phenomenon of direct parameter specification which is connected with a differentiation of functions between a dorsal and ventral processing cord.

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DEMONSTRATION PAPER 3

Thursday 10:00
Room: Stumpf (E 15)

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TAPPING THE *TACTUS*. A MEASURE OF RHYTHMIC ANTICIPATION

Silvia Malbrán
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Synchrony is defined as a group of events that coincide in time.

A particular form of synchrony is rhythmic synchrony .It can be described as the ability to perform a chain of events (sounds movements, etc.) in phase with an external rhythmic pattern (chosen or imposed).

This kind of action required temporal information that is conceptualized in terms of perceiving and processing groups into units (*gestalten*) and as internal clocks.

Results obtained in a sample of musicians tapping the *tactus* (metronomic accuracy) will be presented. The test consisted of tapping the pulse in an informatics environment according to the beats with a musical fragment (MM 110, 126 and 141).

The results shows i) delay is the most commonly observed tendency ii) anticipated responses are less frequent; iii) strict onset responses are infrequent. Subjects obtained in tempo 110 more onset accuracy and more negative synchronization than in tempo 141. The higher level of synchrony is in tempo 110

Temporal variability is a *function of duration.* Previous studies show that to be greater in wide intervals than in narrow ones. Our study shows the greatest variability when the tempo is faster, and it is also higher in the mean tempo: variation values are dependent on the tempo.

The highest synchrony point is observed at 7-8 seconds after the starting and later the lack of adjustment to the stimulus increases.

The study shows some cases that can be considered "clinic" with a) a high delayed mean in the three tempi (113 ms., 152ms and 164,5ms (in different tempi) b) a very high mean in the slowest tempo (148ms) c) a very high mean in the fastest tempo (231ms). These data suggest that sometimes practice is not enough, and probably indicates personal lack of adequacy to the tempo.

Anticipation seems to be a critical trait of rhythmic synchrony.

Synchronic performance represents the theoretical limit of anticipation.

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POSTER SESSION 3

Thursday 10:00
Room: Exhibition (E 50)

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EXPERT LEARNING IN THE DOMAIN OF JAZZ GUITAR MUSIC

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Andreas C. Lehmann
Hochschule für Musik Würzburg, Germany

H. Gruber
Universität Regensburg, Germany

Background

Although the acquisition of expertise and expert learning has been investigated in many different domains, we have little information about the domain of jazz music performance, which seems to be more entrepreneurial than that of classical music.

Aims

We try to adapt the notion of "deliberate practice" (Ericsson et al., 1993) to explain expert learning in jazz and compare it to the classical music domain.

Method

Subjects were six expert jazz guitarists and twelve sub-experts (jazz guitar students). A biographical questionnaire was administered to obtain retrospective data about the subjects' musical developments, professional lives and achievements, and amounts of deliberate practice at different stages of their development.

Results

While classical musicians generally start playing their instruments during childhood, the jazz musicians interviewed only started playing and practicing during their early teens. Classical musicians typically receive lessons when they start playing their instruments, while our experts did not start taking lessons until their late teens. The experts showed far more engagement in demanding training activities than the sub-experts. The important role of the teacher for classical musicians was less pronounced for our jazz musicians, who defined their own learning goals and means of attaining them, including working with recordings of famous musicians.

Conclusions

In general it is possible to adapt the notion of deliberate practice – previously developed in the area of classical music – to describe expert learning in the domain of jazz music. The main difference is that individuals here start their instrumental training relatively late, often lack the institutional support found in classical music, and therefore have to rely more on their intra-personal resources in attaining their goals.

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SELF-REPORTED PERFORMANCE GOALS PREDICT ACTUAL PRACTICE BEHAVIOUR AMONG ADULT PIANO BEGINNERS

Andreas C. Lehmann, Silvia Papoušek
Hochschule für Musik Würzburg, Germany

Background

The numbers of adult instrumental beginners are soaring, yet published research on this group is still lacking. Also, practice has been recognized as a central aspect of skill acquisition and individual differences in efficiency of practice have been documented in child beginners. To date, no study exists about the practice behavior of adult beginners.

Aims

This study investigates the motivation of adult piano students and searches for links between motivational antecedents and practice behavior.

Method

A preliminary survey study was undertaken with 39 piano students (ages 19 to 74), assessing their goals and motivations in instrumental music. The questions dealt with their achievement goals and desire for recreation/relaxation. We found large individual differences regarding subjects' achievement goals. Subsequently, subjects with particularly high and low achievement expectation scores were videotaped during typical practice sessions in their homes. The video sequences were analyzed for proportions of activities qualifying as deliberate practice.

Results

The survey revealed that subjects' performance expectations were related to the reported duration of practice, with more ambitious persons reporting longer practice times. In the analyses of the videos we found a very strong association between observed deliberate practice activities and self-reported performance expectations. Subjects with high performance goals displayed a great variety of deliberate practice behaviors occupying major portions of the practice session, while subjects with low expectations did less so.

Conclusions

The strong link between self-reported achievement goals and use of deliberate practice behavior shows how instrumental learning in the absence of a teacher is guided by self-imposed goals to either reach certain levels of mastery or simply to enjoy oneself.

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A VALIDATION OF THE EMOTIONAL MEANING OF SINGLE INTERVALS ACCORDING TO CLASSICAL INDIAN MUSIC THEORY

Hella Oelmann
Bruno Læng
Department of Psychology, University of Tromsø, Norway

Background

According to ancient Indian music theory, intervals evoke specific emotional states. In Western culture philosophers, musicologists, and psychologists discuss various aspects of music and emotions. The debate whether emotional meanings are universal is still going on.

Aims

This study investigates whether an interval is attributed to a specific meaning within Western culture and, if so, whether such meanings show agreement with the meanings ancient Indian music theory presupposes. If one finds a high degree of agreement, it would support the view that universal human ideas in the attribution of musical meaning do exist.

Method

The study used a questionnaire similar to Osgood and Tannenbaum's semantic differentials. The participants (N=29) assessed four natural intervals (major second, major third, fourth and fifth) in sine waves with the same fundamental tone, heard through headphones. Each interval was heard four times for two minutes in different combinations according to a Latin square design. The participants were divided into three sub-groups according to their music expertise: 'Professionals', 'Amateurs' and 'Naïves'.

Results

The participants rated the meanings of the intervals in a surprisingly consistent and reliable way. A repeated-measures Analysis of Variance performed on the ratings of the meanings of the intervals according to our scales, revealed highly significant main effects and, most importantly, a significant interaction between Interval and Meaning.

Another ANOVA performed on the averaged standard deviations of each participant's ratings, reflects these as highly reliable. 'Professionals' as well as 'Amateurs' showed much fewer variable ratings than the 'Naïves'.

There was substantial agreement between the choice of adjectives given by the participants and those attributed to the same interval according to classical Indian music theory.

Conclusions

The results indicate that participants from Northern Norway agreed to an impressive degree on a specific meaning for a distinct interval. These meanings also corresponded closely to those indicated by ancient Indian music theory. Hence, these meanings seem to be relevant for the emotional experience of musical intervals of humans across cultures and time, and thus might be universal.

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ONTOLOGY OF SPACE AND TIME IN ART AND CULTURE: STUDY OF SPACE IN MUSIC

Svetlana A.Serkova
Adyghe State University, Maikop, Russia

Background

Many explorers in various fields of knowledge interpret historical evolution as a change of the analytical (temporal) and synthetic (spatial) periods expressing different types of assimilation of the information. The end of the 20th and the beginning of the 21st centuries belong to the synthetic period. In this connection the actualization of problems of space and time as a generalizing philosophical category is objective.

Aims

The purpose of the given research is to reveal differences in ontological characteristics of space in various culture types, national schools, epochs, and also to interpret manifestation of space in art from standpoints of idea, type of development, form, and values of members of the text.

Main Contribution

In the history of development of culture and art a number of epochs conterminous on dominance of the spatial factor were detected: medieval culture of Japan, the beginning of baroque in Western-European culture and impressionism in the beginning of the 20th century. Parallels exist between the first and the last historical periods. Each type of culture (Egyptian, Greek, Arabian, Indian, Asian, Western-European, etc.) has its own spatial first symbol, which is defined by beliefs. Each ethnic type is the bearer of qualities of space, namely of an environment, geographic landscape, place of residence, that is mirrored in behavioral performances, and also culture and art, which is confirmed by the last researches in the field of musical psychology.

Implications

This paper suggests a new approach to studies of the ontology of space in works of art from geographic, ethnic, philosophical, conceptual, axiological, hermeneutic, structural, and other standpoints.

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RECITAL

Lydia Kavina

Theremin

Thursday 20:00
Room: Kurth (Concert Hall)

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THEREMIN RECITAL

Lydia Kavina (Theremin)

Karla Haltenwanger (Piano)

Percy Grainger	Free Music #1 for four Theremins (Theremin and Playback)
Claude Debussy	Clair de Lune (Theremin and Piano)
Claude Debussy	Romantic Waltz (Theremin and Piano)
Charles Paul	Palestinian Song and Hora (Theremin and Piano)
César Franck	Sonata for Violin and Piano (arrangement for Theremin)

Lydia Kavina	Suite for Theremin and Piano
Jorge Antunes	Mixolydia for Theremin and Playback
Jorge Campos	Glissandy for four Theremins (Theremin and Playback)

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LYDIA KAVINA

Biography

Lydia Kavina (b.1967) is composer and one of the rare professional thereminists as well as theremin teacher today. The granddaugher of Leon Theremin's first cousin, she was the inventor's last protegee. She began studying the instrument with him at the age of nine, and she was concertizing by age fourteen. Since then, Kavina has given around 700 performances on the instrument in Russia, Europe, U.S.A., Brasil, Israel and Japan.

She studied musical theory at the Moscow Music Academy and composition at the Tschaikovsky State Conservatory in Moscow. She was on the lecture staff of the Moscow Glinka Museum (Central State Museum for Music Culture).

Today Lydia gives regular lessons on the theremin at the Theremin Center, the studio of electronic music at the Tschaikovsky State Conservatory in Moscow. She has served as Master Teacher in Russia, Germany, England and in the U.S.A.

She played in musicals by Tom Waits „Alice" in Thalia Theater, Hamburg, and „Black Rider" in Cologne, in „Baehlams Fest", Opera by Olga Neuwirth, in Vienna, Hamburg and Lucern. She played theremin part in soundtrack for films „Ed Wood" by Tim Burton, and „eXistenZ" by David Cronenberg. She played also with BBC orchestra and London Philarminic Orchestra.

Lydia Kavina's repertoire encludes classical pieces as well as original works for theremin with orchestra, piano, string quartet and electronic, pop and experemental music. Her own works have significantly extended the repertory. Her theremin cocerto „The Four Seasons" was premiered by the Boston Modern Orchestra. Kavina recorded two solo CDs and made an Instruction Video „Mastering the Theremin".

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FRIDAY

September 12, 2003

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KEYNOTE 5

Björn Merker

Friday 14:00
Room: Kurth (Concert Hall)

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IS THERE A BIOLOGY OF MUSIC, AND WHY DOES IT MATTER?

Bjorn Merker
Department of Psychology, Uppsala University, Sweden

Background

There are many reasons to regard human music as a biological adaptation, chief among them being the cross-cultural universality of the ritualistic use of music in human group settings. In every culture known to ethnography or history, humans have gathered in groups to sing and dance together. So characteristic is this behavior of humans that it belongs among the so-called diagnostic features of our species, along with our upright walk, big brain and language.

Aims

The biology of music will be surveyed, and the consequences of regarding music as a biological adaptation will be explored.

Main contribution

The music featured in group rituals tends to be rhythmic, i.e. to base itself upon the even subdivision of time through the musical beat or 'tactus.' This simplest of all structural elements of music turns out to provide surprising leverage for unlocking the biological secret of human music. The capacity to entrain to an isochronous pulse is unique to humans among the higher animals, but occurs in lower animals in a pattern that permits a reconstruction of why and how humans evolved their capacity to "keep time together." Given this reconstruction, a number of structural features of music such as its ubiquitous use of orthogonal discretization of spectro-temporal space can be given a natural interpretation, with far-reaching consequences for our understanding of the role of music in our subsequent evolutionary and cultural history.

Implications

The above perspective suggests, among other things, that it was on the path of song that early humans overcame the barrier to the evolution of language posed by the sophisticated communicative system of animal calls. In effect, neither human nature, nor the nature of music, can be properly understood without placing human music in biological perspective.

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SYMPOSIA

Friday

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SYMPOSIUM

Music, musicians, and the psychology of music

Organizer: Kacper Miklaszewski

Friday 9:00

Room: Stumpf (E 15)

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SAME WORDS PERFORMED SPOKEN AND SUNG: AN ACOUSTIC COMPARISON

Jaan Ross
University of Tartu, Estonia

Background

In a recent study (Ross & Lehiste 2001), we described the way in which the prosodic structure of a language is modified in singing. We chose Estonian folksongs as the topic, since a) Estonian is a language that uses durational differences for signalling lexical and grammatical distinctions, and b) Estonian folksong melodies are monophonic and mostly isochronous, which simplifies the investigation of rhythm and meter.

Aims

The aim of the current project is to compare the phonetic realization of identical words in speech and singing, produced by different performers. Such a study is made possible by the fact that archival recordings of Estonian folksongs contain the same texts both sung and spoken by several persons. The aspect of interest is the question whether the acoustic transformation that the words undergo in singing is the same for different performers.

Method

The acoustic duration of segments was measured from parallel broad- and narrow-band spectrographic representations. The boundaries between successive segments were verified auditorily when necessary.

Results

The results show that the acoustic patterns of spoken words are systematically changed in singing. However, there were differences between singers in performing the adaptation: certain singers were more consistent than others in transforming the spoken text into the sung version.

Conclusions

The phonetic structure of the language is greatly distorted in singing, as far as one can judge from the repertoire of the old Estonian folksongs. The transformation of the spoken pattern into the sung version may be quite consistent across different samples. The new patterns seem to originate from the metrical and rhythmical structure of the music - in this case, the rhythm and melody of the folksongs.

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PERCEIVED IDENTITY OF POLISH FOLK SONGS

Slawomira Zeranska-Kominek
Institute of Musicology, Systematic Musicology Department, Warsaw University, Poland

Background

Tune identification is a basic component of musical information processing. For psychological research purposes it is assumed to be a universal, species specific, cognitive ability of the mind that is not variable socially or culturally. However, tune identification implies man's auditory knowledge acquired through experience and learning. The latter depend on the social model of musical communication, hence on the socially accepted musical identity concept. In oral cultures people are identity sensitive - they will always recognise a tune originating in their own culture and will usually tolerate a change of its parameters, providing that it does not exceed the limits of their tradition. Tunes which do not meet the identity criteria are immediately and mechanically rejected as being "different" or "alien". This phenomenon, frequently discussed in ethnomusicological literature, is very seldom explored by music psychologists.

Aims

The above research aimed at (i) identifying the criteria which determine the process of recognising folk songs which have a range of local and individual variants, and (ii) examining the extent of tolerance towards alterations of the parameters which are crucial to the tune identification process.

Method

39 experienced folk singers from south-eastern Poland were chosen for the research. They were asked to assess a dozen or so variants of songs selected from the region's popular folk repertoire. The songs, recorded over the last 50 years, are rather diverse in terms of melodic-rhythmic structure and performance style. The research method combined an informal interview and a "same-or-different" test.

Results

Statistical analysis of the data was performed to study the degree of acceptance of the variants by all study participants as well as by the each of the six groups separately. Four variants were rejected by study participants as being different to the original songs. Among the remaining eight variants, four had a really high level of acceptance while for the remaining six the acceptance level was somewhat lower, and we considered it moderate.

Conclusions

We consider obtained results as moderately satisfactory, primarily because we were unable to sufficiently control the type and extent of modifications in variants of original songs. Our experiment included "natural" transformations of songs, with a lot of attention paid to preservation of their musical and emotional context. Such an approach makes it difficult, often even impossible, to manipulate musical processes freely, and consequently does not allow the designing of an experiment that could be more conclusive.

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TONE CONSTELLATION: A PERSONAL SPATIAL SCALE PRESENTATION. SEARCHING FOR AN ALTERNATIVE APPROACH TO TEACHING MUSIC THEORY

Vera Milankovic
Milena Petrovic
Jelena Petrovic
Faculty of Music, University of Arts, Belgrade, Serbia

Background

In order to free students from a restricted view offered by standard notation, which does not reflect the sound, not even the most common phenomena, we embarked upon a four phase project "Searching for an alternative approach to Teaching Music Theory'

1. Feeling i.e. seeing (FS) tone positions during Solmization scale singing (SSS)
2. FS basic cadences
3. FS changes of hierarchy of tones when varying rhythm in a given melodic sequence
4. FS changes in tonal hierarchy varying melodic and harmonic rhythm

This paper deals with Phase one

Aims

To encourage students' imagination in understanding and analysing music both written and heard, concentrating on listening in an uninhibited way.

Method

First year students majoringin:

music pedagogy (28), composition (3), conducting (2), musicology (3), and piano (1) were involved in major SSS (Scale Singing using Solmisation syllables) both ascending and descending) in groups and individually. In order to complete the investigation, they were later requested to try major SSV (Scale Singing, one Vowel at the time both ascending and descending) individually. The additional testing was to check if vowels used in solmisation syllables affected tone positions. During SSS and SSV the participants were expected to locate tones they sing within their body and around them in three dimensional space.

Results

1. SSS both in groups and individually shows better results in locating tones in space than within their body.
2. SSV shows almost no affect that solmisation vowels have on locating tones

Conclusion

Students feel/imagine scale tones mostly in space and less within their bodies. The functionality of scale positions is much more significant than the effect of the vowels involved in the solmisation

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PSYCHOLOGICAL FOUNDATIONS OF SUCCESS IN LEARNING MUSIC AT ELEMENTARY SCHOOL AGE

Ksenija Rados[1], Panta Kovacevic[1], Blanka Bogunovic[2], Tanja Ignjatovic[3], Gordana Acic[4]

[1] Department of Psychology, Belgrade University, Yugoslavia

[2] Music School "Slavenski", Yugoslavia

[3] Music School "Mokranjac", Yugoslavia

[4] Music School "Vuckovic", Belgrade, Yugoslavia

Background

The paper presents results from a large Belgrade Institute of Psychology five-year longitudinal research project, which examined the role of personal and environmental variables in student success during the early stages of formal instrumental study.

Aims

The purpose of the study was to investigate relationships between relevant psychological characteristics, some attributes of family background and main components of music success in order to increase our understanding of music competence determinants at the beginning of individual instrumental tuition.

Method

The participants were 993 students (664 girls and 349 boys) aged 6-12, across five specialist music schools in Belgrade. Parents' sample included 512 males and 506 females. Numerous instruments were administered to gather the information about personal and socio-psychological characteristics of the subjects. Music aptitude, cognitive and psychomotor measures, motivational and personality attributes were included, along with family indicators of musical stimulation, music study encouragement and parental involvement while learning music. The criteria for musical success covered a) aspects of scholastic achievement (instrumental and solfeggio mark, examination assessments, teachers' ratings of students' progress and program mastering) and b) performance success (public performances and competitions).

Results

The hypothesis of qualitatively different, yet mutually associated aspects of musical success is confirmed. It has been found that within ability domain, musical ones are most influential and related primarily to school achievement. Support given by mothers and fathers is different, but encouragement and involvement of both parents are closely associated with performance success. Motivational components are also strongly linked with music achievement, as well as with some students' personality traits relevant for achieving high levels of competence.

Conclusions

Together the results demonstrate that for higher levels of performance achievement the child's family background is crucial, followed by motivational aspects. Musical abilities are the third most necessary factor, but not sufficiently so. To turn music potential into efficacy, adequate motivation provided by the family and encouraging parents are critical.

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RESEARCH ASPECTS RELATED TO PERFORMANCE: DOES THE HARPSICHORD SOUND FADE OR DECAY QUICKLY?

Maris Valk-Falk
Hans-Gunter Lock
Estonian Academy of Music, Estonia

The interpretation of the means of expression in performance springs from the harpsichord sound and its environment (i.e. the ornament classes, tone classes) depending on the function of harpsichord either as a solo instrument or an ensemble instrument. The aim of this research is to analyse the duration of harpsichord tone. For that, the tone contour analysis is used as one of the current statistical methods. Thus, it is necessary to proceed from the components comprehensible to hearing such as the pitch, duration, sound intensity and the timbre, as well as their relation to each other in formal structure (i.e. short time analysis and realtime analysis). As the initial source for analysis, unconnected tone samples of separate value played with different durations, and different touch of fingers by the same harpsichord player, are used. The tones were played on Italy's cembalo with strings used from the same set. Also, mono recording technology has been used (1 AKG C 414 microphone) and Pro Tools digital recording software. For analysing segments, Audio Sculpt 2.02 beta for OSX Macintosh has been used (FFT parameters for fundamental frequency 1 Hz, sampling frequency 44.1, and the window size 220500). Observations of the samples taken confirmed that the tone's spectral qualities are not conditioned by the nature of either mechanical or cognitive finger touch. In the study we removed 130 samples from the existing 325 ones in our initial source which left 195 samples to be analysed. We used the following conditions of spectrum analysis: (1) the sonogram analysis of sound intensity spectrum, (2) identifying of tone through the fundamental frequency, (3) determining of the intensity of the fundamental and the partials.

From the analysis of the signals of different length we can see the harpsichord tone dividing into four segments described by the model ADSR (Attack, Decay, Sustain, Release) of typical analog synthesis. In the attack, the fundamental rises quickly to the maximum intensity. The climax is followed by the rise of the partials whereas the distance of the partials from the fundamental does not determine the intensity of partials in the scale. The time of the partial attack regarding the fundamental tends rather to depend on the tone's acoustic qualities and less on the touch of fingers. For the decay, the realtime spectrum analysis proves to be more vital: the sound intensity spectrum (i.e. the relation between time, frequency, and amplitude) shows decrease in the duration of the sound. The intensity of tone also decreases with the increase of the pitch frequency scale. Based on the information gained, the sustaining of tone is characterised by the existence of two or more decreasing plateaus on the time-axes. The phase of release starts with an additional attack where the tone intensity grows a little. The boundaries between decay and sustain are more ambiguous than the boundaries between attack and decay, and between sustain and release. When interpreting the plateaus not as a swift extinction, but as a slow fading of the harpsichord sound, analysing the phases of decay and sustain, the performer is left with enough interpretive alternatives to choose between stylistic features (e.g. ornament classes, tone classes, articulation etc.).

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ROUGHNESS AND DISSONANCE OF MUSICAL DYADS

Andrzej Miskiewicz
Tomira Rogala
Chopin Academy of Music, Warsaw, Poland

Background

Dissonance of musical dyads arises due to rapid beats between the harmonics of complex tones. In psychoacoustics, the sensation produced by rapid beats is called roughness. Roughness is the main psychoacoustic correlate of dissonance. It is generally accepted that roughness and dissonance of two simultaneously sounding harmonic complex tones reach their minima when the tones are related by a simple frequency ratio so that certain harmonics of the upper tone coincide in frequency with harmonics of the lower tone.

Aims

The purpose of the present study was to determine the roughness of dyads that formed various musical intervals.

Method

Roughness of 35 dyads composed of harmonic complex tones was assessed by absolute magnitude estimation. The dyads formed musical intervals ranging from a unison to an octave, in various scale systems. The judgments of roughness were obtained in individual listening sessions from 16 students of music.

Results

Results demonstrate that roughness substantially varies with the interval's frequency ratio, what is a well-known phenomenon. A new finding is that many equally-tempered intervals are perceived as less rough than the corresponding Just intervals, i.e., dyads whose fundamental frequencies are in simple ratios. This finding may be explained by the effect of slow beats that are produced between the harmonics of two tones when the interval's frequency ratio slightly departs from exact simple ratio. Slow beats are heard as fluctuations in loudness and produce a pleasant quality of sound.

Conclusions

Roughness of dyads decreases below the values obtained for Just intervals when the interval slightly departs from exact simple frequency ratio, so that fluctuations in loudness produced by slow beats can be heard.

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PERCEPTION OF SELECTED MUSICAL INTERVALS IN FULL FREQUENCY RANGE

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Background

Perception of musical intervals at very low and very high frequencies required thorough investigation. The same concerned the relation between ratio-pitch scale and octave interval.

Aims

The aim of the research was to estimate across full frequency range the sizes and accuracy of selected musical intervals imprinted in long-term memory of musicians. Another aim was to estimate how far doubling and halving pitch by musicians and non-musicians coincide with an octave interval.

Method

In Experiment 1, twelve musicians tuned 10 times in random succession the pure-tone, upward-directed, context-free melodic intervals of a prime, a major second, a pure fifth, and an octave. This task was replicated at random order in 9 octave frequency ranges within 32-12.000 Hz.

In Experiment 2, sixteen musicians and ten non-musicians in 9 octave registers produced melodic pitch distances in two ways: (a) the pitch of the second tone doubled or halved the pitch of the first tone, (b) the second tone was an octave higher or lower than the first one.

Results

Melodic octaves are enlarged by about 12 cents across lower-tone frequencies 63-500 Hz. At 32 and 1000 Hz the enlargement is about 15 cents and at 2 kHz grows to 25 cents. At 4 and 6 kHz octaves are decreased by nearly 50 cents. Melodic fifth is constantly increased and major second constantly decreased. Doubling pitch means tuning an interval within the category of an octave.

Conclusions

1. As a result of present and previous research it may be concluded that octave enlargement is a part of general psychological tendency to increase large intervals like 5ths, 6ths, 7ths and 9s.

2. The observation that doubling pitch means tuning an octave has serious consequences for psychological scale of pitch.

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THE INFLUENCE OF INTENSITY OF MUSICAL INVOLVEMENT AND TYPE OF MUSIC ON MUSICAL EXPERIENCES

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University of Debrecen, Hungary

Background

According to former observations and questionnaire studies, the degree to which one can be involved in music is characteristic of a person. There are differences between high and low musical involvement considering music preferences, music-listening customs, and the role of music in everyday life. Their experiences while listening to music should be different, too.

Aims

The aims of the present research were to discover whether the experiences of music-listening show differences depending on the intensity of musical involvement and type of music.

Method

First, intensity of musical involvement was measured by the Musical Involvement Scale among 400 university students in Hungary. High and low-level participants (N=120) were chosen for the experiments. Subjects listened to one of three musical pieces (a classical, an easy-listening or a techno-music) alone, in a darkened room. They reported about their experiences in a free report, in an interview, and they filled in the Phenomenology of Consciousness Inventory. Reports were content-analysed by software and compared considering intensity of involvement and type of music by means of MANOVA test, like the results of PCI.

Results

We found significant differences between high and low participants and between the three musical pieces, too. Experiences were individually different, but within groups there were great similarities. High-level participants reported trance-like experiences much more frequently than did low-level participants and PCI showed greater changes in consciousness. Low-level participants reported about relaxation in most cases. Liking of music influenced the experiences of low-level participants only.

Conclusions

Musical experiences are individually different, but show great consistence depending on the intensity of musical involvement and type of music.

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THE EFFECT OF MONOTONOUS DRUMMING ON SUBJECTIVE EXPERIENCES

Csaba Szabó
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Background

Rhythm is a very important characteristic of music. Listening to rock music, youths sometimes experience a trance-like state. In shamanism, the voice of drums was used for inducing trance. Rhythm is very effective, but it is not clear how it effects our experiences.

Aims

The aims of the present research were to measure the effects of drumming on subjective experiences, and to identify the way the rhythm effects experiences.

Method

Subjects were sitting in a comfortable chair while a monotonous drumming from a tape was presented to them. While listening to drumming, they were involved in an imagery task. The control group was given the imagery task but without drumming. After the experiment, the Phenomenology of Consciousness Inventory was administered for measuring subjective experiences further; subjects were interviewed about their experiences. The content analysis of the interviews was made by the Atlas ti. program. Subjective experiences measured by the questionnaire were compared to experiences of an alert and a hypnosis group.

Results

Results show that listening to drumming while being involved in the imagery task, subjects experience an altered state of consciousness. This state differs significantly from the alert state and very similar to the experiences in hypnosis. If subjects are involved in the same imagery task but without drumming, their experiences do not differ significantly from the alert state. Content analysis of the interviews show that subjects' experiences were influenced through associations, similar to the way it happens in indirect hypnosis induction techniques.

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TOWARDS THE ANALYSIS OF NARRATIVE FILM AS INTEGRATED ARTISTIC MULTIMEDIA TEXT

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Background

According to the contemporary point of view in film studies the unity of artistic text is constructed of both visual and acoustic means of expression, and the filmic meaning emerges from their interaction. The present analysis of a film as multimedia text is based on encompassing the interaction of image, speech, nondiegetic and diegetic music, noise, special effects (e.g. echo), silence. All these filmic means of expression are equally subordinated to the narrative, and, in turn, mediate the narrative meaning.

Aims

On the example of an Estonian feature film Ukuaru (1973, directed by Leida Laius, original score by Arvo Pärt) we aim towards film analysis as specified above, focusing on the role of film music's composition, and montage of music and image in the construction of compositional unity as well as the interpretation of film as integrated artistic text.

Main contribution

In search of a method to analyze narrative film as integrated artistic multimedia text we turn to the field of semiotics (structural model of filmic narration, chronotopic analysis). We distinguish between two levels of narration and, accordingly, two levels of narrative meaning. One is associated with the story told (i.e. principal level of narration). The other is associated with authors' conception of the story, its "message", since it is a characteristic feature of a narrative artistic text to point to something universal through telling a specific story. Both of these meanings are simultaneously communicated through the composition of filmic means of expression and their montage in film. Through analyzing the composition and montage of music and image we: 1) demonstrate the isomorphism between the syntactic and semantic structure of Ukuaru narrative; 2) explain music's significant role in bringing forward the nodal points of attention relevant for understanding the compositional integrity of the artistic text, and framing the interpretation of conceptual meaning.

Implications

There are two types of filmic meaning in which construction music can participate, and from the musical point of view we can speak of two types of feature films: the ones where music mainly functions on the primary level of narration (music "illustrates", "interprets" the plot); the ones where music's functions proceed essentially from the conceptual perspective (e.g. Ukuaru).

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QUALITY ASSESSMENT OF MUSICAL INSTRUMENTS – EFFECTS OF MULTIMODALITY

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Anders Askenfelt
Dept. of Speech, Music and Hearing, Royal Institute of Technology, Stockholm, Sweden

Background

A musical instrument is a device for producing musical tones. Therefore engineers traditionally associate the quality of the musical instrument with the quality of the tones it produces. In turn, the quality of the tone is determined by its acoustical parameters. In this deterministic logic, it is quite possible to judge the quality of the instrument by the parameters of its tones, provided the relations between them are known.

The playing comfort and tone quality of a musical instrument from an engineering point of view are usually assigned to different design units of a musical instrument (e.g. key action vs. sound unit in pianos), therefore for instrument designers it is desirable to have musicians/experts separate the mechanical and acoustical quality.

Aims

We want to show that this separation is not reliable under normal playing conditions due to psychological reasons. Practical ways of avoiding the problem are discussed.

Main contribution

Experimental data presented suggest non-additiveness of the performer's impressions of the musical instrument quality obtained simultaneously over the auditory and kinaesthetic sensory channels. Cross-modal interference is a plausible explanation for why musicians confuse these impressions. Multimodal perception of a musical instrument by the performer and listener is analysed.

Implications

a) Improving procedures of quality assessment in the musical instrument industry;

b) Solving on a psychological level the classical controversy between musicians and physicists of touch dependence of a piano tone.

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AM I IN TUNE OR NOT?

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Estonian Academy of Music, Tallinn, Estonia

Jaan Ross
University of Tartu, Estonia

Background

Singers may sometimes deviate from the correct intonation patterns. It is not always evident why this kind of deviations happen.

Aims

The present study addresses the issue of whether a singer is aware of how accurate her/his intonation is (or was) during the performance.

Method

Thirteen singing students were asked to perform a vocal exercise which consisted melodic intervals of the size of one, six and seven semitones. After the performance, each subject was asked to indicate by memory which notes she/he was able to intone correctly and which not. As the third step in the experiment, the subjects had to listen to their own performance again and, as previously, to indicate both the location of the intonation errors as well as their direction. The equally tempered tuning was used as a reference system.

Results

Some subjects were unable to perform the task altogether while the standard deviation for other subjects was never more than 14 cents. Minor seconds were performed more accurately than tritones. Those intervals which the singers selected out as mistuned during the immediate post-experimental interviews were not different from the other performed intervals in a statistically significant manner. The magnitudes of reported mistunings were, statistically, significantly greater than the magnitudes of other, unreported mistunings, after the subjects listened to their own performance.

Conclusions

The singers' ability to perceive their own intonation errors is worse during the performance itself when compared to their ability to do the same during the subsequent listening to their recorded performance. The ability of correct intonation is largely dependent on the skills and training of the performer.

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SYMPOSIUM

Musician's medicine

Organizer: Hans-Christian Jabusch

Friday 9:00
Room: Révész (202)

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TREATMENT EVALUATION IN MUSICIAN'S DYSTONIA USING OBJECTIVE QUANTIFICATION TOOLS: FOLLOW-UP AFTER DIFFERENT THERAPIES

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Background

Musician's dystonia is a task-specific movement disorder which presents itself as a loss of voluntary motor control in extensively trained movements. So far, the degree of the disorder has mainly been estimated by visual inspection and comparison of video documentations. Due to the lack of a reliable quantification method, follow-up examinations were difficult to assess and evaluation of different therapies was hardly possible.

Aims

Two different techniques have been developed for quantification of musician's dystonia. The aim was an evaluation of treatment effects in affected musicians.

Methods

1) For assessment of dystonia in pianists, a MIDI-based software has been developed to analyze irregularities in scale playing. Velocities, tone durations, inter onset intervals and tone overlaps were derived for all individual notes of C-Major scales played in a standardized tempo. Mean standard deviations of the respective parameters were calculated.

2) For quantification of focal dystonia in non-keyboard musicians (e.g. string and wind players), a computer based three-dimensional movement analysis system has been utilized. Standardized movements of affected hands were captured by digital high-speed video cameras and finger movements were tracked by a computer. Parameters such as velocities and accelerations of phalanges were analyzed.

Quantification methods were used for follow-up examinations in musicians with dystonia during treatment with Botulinum Toxin-A or during pedagogical retraining.

Results

Therapies such as injection of Botulinum Toxin-A or pedagogical retraining resulted in relief of symptoms in musicians with focal dystonia. In pianists, scale analysis revealed a significant decrease of irregularities in scale playing after treatment. In non-keyboard musicians, movement analysis demonstrated initial alterations in acceleration behavior of affected fingers as well as substantial improvement after treatment.

Conclusions

Quantification tools allow us to monitor the development of movement disorders on the instrument and to display encouraging treatment effects of pharmacological and pedagogical treatment approaches.

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TREATING FOCAL DYSTONIA – A NEW RETRAINING THERAPY FOR PIANISTS

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Berlin, Germany

Introduction/Background

Despite growing scientific knowledge, F F Focal dystonia in pianists is remains complex movement disorder illness that has to be considered under various aspects which may have dramatic impact on the careers of affected musicians from a variety of angles. Different treatment approaches (pharmacological, physiotherapeutic, psychotherapeutic) have been reported and may improve the situation to a certain extent.

Aims

There are already many different medical treatments (psychological, using physiotherapeutical and pharmacological interventionsorthodox medecine) available that can bring some substantial improvement. A very important complement or even alternative to the above treatments is a focused and individual rehabilitation program taking place on the instrument under pedagogical supervision. The aim was to clarify whether this rehabilitation program might be an effective treatment for focal dystonia in pianists at the instrument itself.

Method

Through specially developed easy exercises at the instrument, a so-called 'deprogramming phase', five pianists suffering from focal dystonia were treated according to the following retraining program:

During the so-called 'deprogramming phase', incorrect dystonic movement patterns and signs of muscular imbalance were identified in affected hands of pianists. During the 'deprogramming phase', frequent repetitions of individually adapted exercises were performed in the slowest tempo. A basic 'correct' posture of the hand is established using easy exercise. This allows us to determine which basic movements of the instrument playing are incorrect. Then follows, in a second phase, strengthening of weak muscle-groups and the acquisition of an internal representation of simple movements, achieved using special physiotherapeutic exercises by which we focus on the redevelopment of the muscles. Therefore teamwork with physiotherapists is absolutely essential. By the 'redevelopment of the muscles', we mean a restructuring process of the muscles using only natural and (from a physiological point of view) optimal movements (as compared to other methods). The third part of the whole retraining therapy course starts after establishing a muscular equilibrium and control of exaggerated involuntary flexion, and can begin as soon as the hand has recovered a significant part of its natural balance. During this procedure, basic constituents of piano technique were re-established during the 'reprogramming phase'. The patients then have to revise their whole instrument technique as they require, after the 'deprogramming phase', a new 'programming phase'.

The whole retraining process is filmed under visual feedback monitoring utilising a digital camera. Using a digital camera and a monitor on the piano, visual feedback of the hands' movements from different perspectives serves not only for control

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of finger movements, but additionally, it aims at the establishment of new, functionally intact visual-sensory-motor neuronal connections.

Medical supervision was provided by the Hannover Institute of Music Physiology and Musician's Medicine.

Results

The presentation will consist of video documents from the past years, a study made in collaboration with the Hannover Institute for Music Medicine shown demonstrating the method and the resulting substantial improvements of symptoms in the five pianists who have been doing this retraining. After taking part in the retraining, they had regained the ability to control the hand and finger movements allowing them to perform technically difficult literature which had not been possible before, avoiance of compensatory movements is much higher, allowing them to play difficult passages without subsequent problems.

Conclusions

By pedagogical retraining, it is possible through a specific retraining program at the instrument to help pianists with dystonia succeed in remarkably improving the abilities to control their hands and in going back to a professional level of instrument playing. Further research will be necessary to objectively evaluate different treatment options for focal dystonia in pianists.

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THE SYMPTOM OF PERFORMANCE ANXIETY IN RELATION TO ARTISTIC DEVELOPMENT

Maria Sandgren
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The symptom of performance anxiety is always an obstacle for the artist's endeavour. Although the symptom can be described objectively in terms of physiological and cognitive variables, the psychological meaning might differ qualitatively to a great extent. The obstacle to good achievement always occurs in a context consisting of various processes and factors. The obstacle turns the artist into an under-achiever instead of over-achiever which may have serious consequences. The artist's greatest professional concern is his or her positive development. There are many obstacle to overcome. The problem arises for the caregiver to make the proper diagnosis for the proper treatment. However, the artist's symptom can be due to work overload, marital problems, musical challenges, childhood issues etc. In each case, maladaptive processes have contributed to the symptom and its presence. It is beneficial to look at the symptom from a wider scope.

The concept of artistic development is based on the assumption that at each state of development or process, organized structures of "elements are the results of previous processes and forms, at the same time, the basis for current processes (Magnusson, 1999). Quantitative and qualitative studies with opera singers and classical dancers indicate that the artistic development is shaped by individual characteristics (personality, motivation), psychosocial factors (meetings with significant others, roles/musical pieces, family life) and phases (positive musical experiences in childhood, age-related issues, learning of specific skills). There is a constant interaction taking place between social world, individual characteristics, certain life and artistic phases. These factors and interactions promote on one hand change in terms of progress, insight and failure, on the other hand stability in terms of maintenance of adaptive processes. The occurrence of obstacles can be interpreted as a sign of maladaptive processes and factors. Among the group of very successful opera singers, early signs of outstanding musical or singing skills were not noted. A discussion about obstacles and facilitating experiences for artistic growth and development will follow.

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HEALTH CONDITIONS AND HEALTH ATTITUDES OF MUSIC STUDENTS AT THE BEGINNING OF THEIR STUDIES

Claudia Spahn, S. Strukely, Andreas C. Lehmann
Freiburg, Germany

Objective

The present study investigates the prevalence of general and major subject-related health problems as well as the health attitudes of music, psychology, medicine, and sport students at the beginning of their studies. The hypothesis was to be examined that music students begin their studies with manifest symptoms more often than other students. No decisive differences were expected between music students and other students regarding health attitudes.

Method

247 music students (199 students of the Freiburg Conservatory, semesters 1999-2003) and 48 students of the Würzburg Conservatory, winter semester 2002-03), 266 medical students, 71 psychology students, and 71 sport students spending their first semester at the University of Freiburg in the winter semester 2002-03 were investigated by means of a questionnaire. The return quotas of the partial samples were between 74% and 96%, so that representativeness may be assumed. Health conditions were ascertained by means of the Giessen Symptom Questionnaire (GBB), the Hospital Anxiety Depression Scale (HADS), and individual questions related to the major subject (EPI Questionnaire). Health attitudes were ascertained by means of the Questionnaire on Health Locus of Control (KKG).

Results

25% of the music students indicated current playing-related symptoms (EPI). In the GBB, the music students indicated significantly more physical symptoms (total score) than the medical and sport students. Psychology students did not differ significantly. In the HADS, on the depression scale 8.4%, on the anxiety scale 35.5% of the music students were in the borderline or conspicuous range. Significantly more music students than other students showed values of anxiety which were in the borderline or conspicuous range. By contrast to the second hypothesis, students with differing major subjects differed in their health attitudes. Significantly more music students than medical, psychology and sport students are deeply convinced that they can exercise influence on their own health.

Summary

The higher prevalence of health problems in music students compared with other students requires specific prevention and health promotion measures for music students.

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SYMPOSIUM

Ethnomusicology

Organizer: Simha Arom

Friday 11:30
Room: Révész (202)

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A COGNITIVE APPROACH TO THE STUDY OF MUSICAL SCALES IN POLYPHONIES OF CENTRAL AFRICA

Simha Arom
Laboratory Langues-Musiques-Sociétés from CNRS, Paris, France

Some 15 years ago, a new method for the study of the untempered pentatonic scales of Central Africa was applied to the tuning of traditional xylophones. The idea was to find an interactive simulation device, which would allow different xylophonists to play the music of their respective ethnic groups.

The recent development of most sophisticated acoustical computerised equipment has enabled us to enlarge the framework of this kind of interactive experimentation and adapt it also to vocal music, be it monodic or polyphonic. For two years, we have been investigating in situ – Cameroon – the untempered scales used by the Bedzan Pygmies in their contrapuntal songs and by the Ouldeme in their hocket instrumental polyphony.

After the papers of N. Fernando – related to problematic and methodology – and F. Marandola – about the application of these experiments and their results –, I will emphasise the experimental impact and resources of such interactive methods.

I will examine successively:

- What types of interaction occur during the experimental procedures : 1) between the musicians, and 2) to what extent the use of these methods can change the relationships between the investigators and the musicians.
- How could this methodology be efficient for the comprehension of any orally transmitted scalar system, be it vocal or instrumental.
- The outlook of the use of interactive experiments, not only in ethnomusicology, but in a general manner to any cognitive process related to a musical system.

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THE STUDY OF NON-TEMPERED SYSTEMS : PROBLEMS AND METHODOLOGY

Nathalie Fernando
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In the oral traditional cultures of Central Africa, scales are non-tempered and present some remarkable properties. In Bedzan Pygmies' vocal polyphony for example, the same piece presents a wide mobility of the tuning of the scale degrees from one version to the next, or can be sung either with a tetratonic or a pentatonic scale. In Ouldeme instrumental polyphony, the pentatonic scale which is observed in the low register is not reproduced identically in the higher register, and the octave does not seem to be the frame which structures the entire scale.

When studying such scales, two problems related to measurement and verbalisation occur.

1. Measuring the intervals which separate each degree as well as their margin of production is not satisfactory in the area of musical scales : such measurements merely reflect possible actualisations, but they do not give us access to the model of the scale system. In other terms, they do not enable us to explain the manner in which the system works and its indigenous conception.

2. In such traditional oral cultures, the rules which underline the musical system are rarely verbalised : abstract concepts like "scale", "degree" or "interval", are not just non-verbalised, they are practically unverbalisable ; there is indeed conception, but not conceptualisation. This is why the scale cannot be isolated as a distinct element of the musical system and only exists for the musicians through its materialisation in the polyphony.

Thus, the study of musical scales requires the use of interactive experimental methods. This seems the only way to catch the principles on which these scales are based. Pioneering work in the field of tuning of xylophones and gamelans has been conducted in Central Africa and in Indonesia by Simha Arom since 1989. I will show the innovative ways which the recent development of most sophisticated computerised equipment have enabled us to enlarge the framework of interactive experimentation by adapting it to Bedzan Pygmies' vocal polyphonies as well as hocket instrumental polyphony of the Ouldeme of Cameroon.

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INTERACTIVE EXPERIMENTAL METHODS IN THE FIELD: APPLICATION AND RESULTS

Fabrice Marandola
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The principle of the methods that we have developed is to make the musicians actors in the experiment, able to react immediately to the proposals of the investigators and to provide modifications of them, directly or indirectly. The goal is to arrive progressively at a model of the scale system used by the community; in other words, to reveal the collective mental representation that the holders of a tradition have of their musical scale.

For Ouldémé flutes, we had to work with several instrumentalists each playing with two flutes. In collaboration with acousticians of Ircam (Paris), we built a set of electronic flutes managed by a MIDI-system. Each flute was equipped with a breath-controller – driving a physical-model synthesis of sound – and two buttons – pressed by the flutists themselves to change the pitch of the sound.

For vocal polyphony of Bedzan Pygmies, the method used requires equipment and software for multi-track digital audio-recording, sound signal analysis-synthesis and analysis and formalisation of the musical language. Briefly described, the first phase involves the simultaneous recording of all parts of a polyphonic song. Each part can then be analysed separately: the measured observation of the pitch fluctuations must allow for the formulation of hypotheses concerning the size of the intervals, their distribution and the determination of classes of intervals in the musical scale. All of the parts are then modified – as a function of these various hypotheses – to reconstitute the polyphony, without modifying the timbre of the singers' voices nor the metric and rhythmic structure of the polyphony.

The next step involves proposing these various hypotheses to the musicians by simulation of traditional performance conditions. Thus, we can analyse their reaction to the proposed scale and thereby formulate new hypotheses.

By the application of such methods in the field (cf. video examples), it appeared that the scales are based on a system of reciprocal constraints between intervals of triads and tetrachords as structuring frames, rather than on the division of the octave into several types of intervals.

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THEMATIC SESSIONS

Friday

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THEMATIC SESSION

Music theory

Friday 9:00
Room: Wellek (315)

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THE EMPIRICAL EVALUATION OF A MATHEMATICAL MODEL FOR INNER METRIC ANALYSIS

Anja Volk (Fleischer)
Technische Universität Berlin, Germany

Background

This paper introduces an experimental research approach on the relationship between a musical composition and its performance exemplified on *metric structures*.

Aims

A theoretic notion of *metric coherence* is to be tested empirically by applying it to analyses as well as within listening experiments. The latter use performances shaped on the basis of metric analyses in order to investigate the influence of different degrees of metric coherence on the perception of these metric structures within musical performances.

Method

The RUBATO-Workstation models the *transformative process* from the score into the physical reality of sounds on the basis of analytical data and the method of applying analytical weights in order to shape the performance. The notion of metric coherence is based upon the model of *inner* metric analysis implemented in RUBATO, which studies the metric structure of the notes without considering the time signature and bar lines. In order to gain a description in how far metric weights might help to shape a performance that elucidates the metric structure listening experiments have been conducted. Drum rhythms were played with various structures of *accentuation*, arising from metric weights of different degrees of coherence.

Results

The notion of metric coherence gives surprising insights into the understanding of metric architectures of compositions. A higher degree of coherence is detected within those works, which are typical representations of the accent scheme given by the time signature. Furthermore, metric weights of a higher degree of coherence led to a more convincing interpretation regarding the question in how far the metric structure was expressed properly.

Conclusions

The suggested music-theoretic notion of metric coherence is suitable for the description of the metricity of compositions and for transferring structural aspects to listeners.

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THE SEMANTIC DIFFERENTIAL AS A METHOD FOR COLLECTING ESTIMATIONS OF CHORDS

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Background

In most studies on nontraditional chords, the subjects have been asked to make similarity estimations. The idea that chords can be rated one by one on bipolar verbal scales comes from the semantic differential. Semantic differential has been applied to musical stimuli, but in only two studies have semantic scales been applied to nontraditional chords.

Aim

The present study aims at examining the use of semantic scales for collecting ratings of pentachords. One aim is to analyze factors guiding subjects' estimations of chords. Another aim is to examine the subjects' consistency with themselves and with other subjects. Yet another aim is to examine the importance of the order of the test items and the semantic scales.

Method

A test was done in which pentachords were rated on semantic scales. From the data thus obtained, distances were calculated between chords, and the data of distances were analysed by multidimensional scaling. The subjects' consistency with themselves was examined in a control-chord test. The importance of the order of the chords was examined by dividing the subjects into three subgroups; each subgroup heard the chords in a different order. Additionally, the scales were tested in three different orders.

Results

The multidimensional scaling analysis revealed a three-dimensional solution. The three dimensions were interpreted as ‚consonance-dissonance', ‚the lowest pitch', and ‚the placement of the inner pitches'. The subjects' consistency with themselves was found to be high. The order of the test items or the order of the scales was not found to affect the ratings.

Conclusions

A clear connection was found between the factors found in the present study and those found in the similarity estimation studies. Hence, the study confirmed findings made in earlier studies. The clear results and the subjects' high consistency also indicates that semantic scales are appropriate for measuring chords.

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CADENTIAL CLOSURE VS. TONAL CONTENT AS INPUT FOR REDUCTION

Bengt Edlund
University of Lund, Sweden

Background

In language, clauses and sentences are held together and combined by means of syntactic rules, whereas paragraphs and larger textual sections emerge as coherent due the shared content of their constituents. Tonal music has units at seemingly corresponding levels, but at least according to current ideas of tonal reduction, they are syntactically defined by means of tonal closure: music is conceived of as a hierarchical structure of ever more encompassing cadences. Given the analogy between language and music, it appears that reductional analysis does not respect demarcations corresponding to full stops in language.

Aims

Applying the notion of 'full stop' to music implies that the coherence of large units should depend on conspicuous events and their relationships (the "tonal content") rather than on the cadential framework. It also means that tonal reduction, whether it proceeds bottom-up in the way we actually listen or is undertaken in a top-down fashion, has to make a halt and change its approach at the level of full stops. Furthermore, admitting the importance of syntactics for understanding low-level linguistic units and their musical equivalents, it must be acknowledged that meaning is predicated on content rather than on framework — there might thus be a scope for bottom-up reduction relying on tonal content as its input.

Main Contribution

These ideas will be demonstrated and preliminarily tested on a short piece of music.

Implications

If reduction in terms of tonal content proves to be feasible and rewarding, it will obviously emerge as an important complement to tonal reduction as currently practised.

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EXPRESSION AND DEEP STRUCTURE: THE INCIDENCE OF PERFORMANCE IN MUSICAL ATTENTION

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Background

Literature about music perception and cognition explains that surface components vie with underlying voice-leading, generating expectations of continuity and thus eliciting a particular way in which listeners pay attention to the stream of musical information. Similarly, performers would operate on the same features in order to communicate their interpretation of the conflict between structure and surface. In previous experiments, a click detection technique was used with the aim of studying the listener's response to the prolongational structure of musical synthesized excerpts, without expressive features. Evidence of the representation of prolongation as a constituent structural unit was obtained. However, the click detection technique has barely been used in studies using expressive music performance. It is assumed that this technique might contribute to studying the listener's response to the performer's communication of the underlying voice-leading.

Aims

1) To provide evidence about the incidence of performance in the communication of prolongational representation of the musical piece at a local level and 2) to explore further sensitivity to prolongation during musical attention, applying the click detection technique to stimuli with expressive features.

Method

Excerpts of musical pieces belonging to the western tonal art music repertoire were selected from the literature on Schenkerian analysis. A panel listened to different well-known commercial recorded versions of the musical excerpts and assessed them in terms of their projection of the analysis of the underlying structure.

Clicks were superimposed in different focal points of hypothetical conflict between the surface and/or the underlying voice-leading component. A click detection test was run in which subjects (N=30) listened both to expressive and deadpan synthesized versions of each fragment and pressed a key as soon as they detected the click. A distraction task was included requiring quality estimation of expressiveness of each fragment.

Results

Subject's Reaction Time (SRT) was measured in milliseconds. It is assumed that differences in the excerpts will influence the SRT. Results are currently being processed.

Conclusions

Implications for the analysis of listener's experience of prolongational structure are discussed according to representational theories.

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THEMATIC SESSION

Speech and music

Friday 9:00

Room: v. Hornbostel (E 40)

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STEPS TO A COMMON DESCRIPTION OF MELODY IN MUSIC AND SPEECH

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Background

There are two modes of melody, the "plain" in speech and the "stylized" in music. Although characteristic differences show up between these modes, a partially unified competence can be assumed on which melody processing is based. As a complement, there are common principles of structure applying to melody in music and speech.

Aims

A description of melodic structure will be represented, equally applicable to music and speech materials. The description is based on the Kiel Intonation Model (KIM; Kohler 1991), but also consults other approaches to intonation, and includes concepts of emotion research, music psychology, and music theory.

Main contribution

Essential traits of an intonation-based approach to melody will be worked out:

(1) The notions of melody viewed as tone sequence and of melody viewed as tonal motion are set apart.

(2) This distinction leads to the assumption of two forms of melody processing, local processing, directed to features of contour, and holistic processing, directed to the tonal reference space.

(3) Melody arises from accent based patterns.

(4) Intonational universals are considered.

(5) The relations between the plain and the stylized mode of melody are discussed.

Considering these five aspects, a model of melodic syntax will be set up that has a linguistic and a musical manifestation, which allows a formalized mutual assignment of intonational and musical patterns.

Implications

The parallel representation of the linguistic and the musical mode of melody yields a comprehensive conceptualization of melodic structure. This representation can also be implemented in a computer assisted analysis of musical signal data. A musical labelling system analogous to prosodic labelling has already been constructed and has been tested for read and sung speech data. The intonation-based approach to music may be useful for performance analyses, for research on the declamation of texts in music, and for didactic purposes.

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CATEGORICAL AND LINGUISTIC ASPECTS OF MUSICAL PITCH SPACE

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Background

Recent years have seen significant amounts of research into the relationship between spatial cognition and language describing spatial phenomena. The relationship of linguistic to nonlinguistic representations of space has been shown to be interesting in both cognitive and developmental ways. These results suggest that similar phenomena may exist in the relationship between music and the spatial language used to describe it.

Aims

This study investigates the way in which musicians perceive and categorize musical pitch space. It seeks to understand the relationship between more intrinsically musical understandings of pitch height and the linguistic terms and categories used to refer to these musical understandings. Further, it assesses whether musicians' perception of pitch height bears the same relationship to language about music found in the relationship between spatial cognition and language about space.

Method

Musically trained subjects heard 11 pitches, equally spaced over approximately five octaves, in three different timbres. They categorized each pitch as low, medium low, medium, medium high, or high, and represented the height of the pitch on a line on a computer screen.

Results

Statistical analysis of the results give several clear results with many implications. Musical pitch space is readily perceived as ordinal, less readily as metric. Ordinal judgments of pitch space are relatively insensitive to changes in timbre. Subjects readily form categories for grouping pitches together into registers. Within categories, subjects' judgments show systematic biases and no ready relationship to a priori linguistic categories for musical register.

Conclusion

Musicians use language easily to describe musical pitch, but their musical perceptions and the language used to describe them seem to be structured differently.

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THE EFFECT OF HARMONIC CONTEXT ON LEXICAL DECISION IN VOCAL MUSIC

Bénédicte Poulin, Emmanuel Bigand, Philippe Lalitte, Ronald Peereman, Arnaud Rey
Laboratoire d'Etude de l'Apprentissage et du Développement, CNRS Université de Bourgogne, France

Background

An experiment using a phoneme monitoring task showed that a harmonic context influenced the processing of sung phonemes (Bigand, Tillmann, Poulin, D'Adamo, & Madurell, 2001).

Aims

The main goal of this study was to investigate how harmonic structure can influence the processing of words in vocal music.

Method

Eight-chord sequences sung by four singers were presented to the participants. We manipulated the semantic relation between the last word and the previous linguistic context (*the giraffe has a very long neck* versus *the giraffe has a very long foot*). We also manipulated the harmonic function of the last sung chord in the musical context (*a related tonic chord* versus *a congruent but less related subdominant chord*).

The participants performed a lexical decision task in which they had to quickly decide if the target (the last lyric of the sequence) was a word or a nonword.

Results

There was a main effect of the semantic relationship, the words semantically related to the linguistic context were processed faster than the words that were semantically unrelated. There was also an interaction between the semantic and the harmonic relationship. The related target words were processed faster when they were sung on a tonic chord rather than on a subdominant chord. This effect is not replicated for the unrelated target word.

Conclusions

Our present study showed that manipulating the harmonic structure of a musical sequence influences the processing of words even when the participants are not asked to pay attention to the music. This suggests that the processing of words and musical sounds is not independent, but interacts at some level of processing.

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THE INFLUENCE OF CONTEXTUAL INFORMATION: DISCOVERING SIMILARITIES IN MUSIC AND LANGUAGE PERCEPTION BY MEANS OF ERPS

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Max Planck Institute of Cognitive Neuroscience, Leipzig, Germany

Background

There is an ongoing debate whether or not music and language share similar cognitive processes. One major underlying reason for this debate is that in comparison to music, language shows a well described subdivision of processes from phonological up to phrase processing. It is therefore important to define a compatible experimental question for both domains.

Aim

Our aim was to find event-related brain potentials (ERPs) correlating with specific processing stages in music and language and might allow to differentiate underlying cognitive processes.

Method

Familiar idioms and melodies were utilized to test contextual effects at different processing stages in language and in music. Correct idiomatic language phrases were contrasted with phrases containing a violation at the end of the phrase (literal and semantically incongruous). Similarly, correct familiar melodies were contrasted at phrase endings with a counterpoint or a harmonic shift. All stimuli were rated to differentiate between high and low familiar language and music stimuli. For each domain, we recorded event-related brain potentials at 56 electrodes from 24 subjects. The stimuli were auditory presented.

Results

ERP data for both the language and music condition show a negative deflection during the first 300 ms as a result of unexpected phrase endings. Thereafter, the violation of musical context resulted in a long lasting negative shift, whereas in language, violations elicited a N400. The negative shift was most prominent for the counterpoint condition for more familiar melodies, and varied as a function of familiarity. We propose that this component reflects the effort to integrate a probable continuation of a familiar melody. However, the N400 in the language study varied as a function of both familiarity and semantic violation.

Conclusion

We suggest that the early negative component might reflect a perceptual process connected to phonological as well as singleton selection modulated by expectancy, whereas the later potentials might reflect modality specific reactions to music and language violations.

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THEMATIC SESSION

Listening research

Friday 9:00
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AUDIOPHILE DRIVERS: HOW LISTENING TO MUSIC AFFECTS DRIVING

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Background

The automobile is the most popular and frequently reported location for listening to music. Yet, not much is known about the effects of music on driving. Does music simply entertain drivers? Or, perhaps music arouses and/or distracts drivers?.

Aims

The study explored the effects of music tempo on PC-controlled simulated driving among everyday drivers – with and without formal musical training.

Method

48 drivers (20 musicians and 28 non-musicians) participated in one of two experiments. Each participant simulated driving activity for 120 minutes, during which they were exposed to 4 conditions: no-music, slow-tempo music (40-70bpm), medium-tempo music (85-110bpm) and fast-tempo music (120-140bpm). Simulated driving occurred on both city-boulevard and interstate-highway environments. Descriptive data, psychophysiological measures, clock speed, speed estimates, and traffic violations were collected per participant in each condition.

Results

The study found that music tempo consistently affected both simulated driving speed and speed estimates. Furthermore, the tempo of background music consistently affected the frequency of virtual traffic violations, including: disregarded red lights, lane crossings, and collisions.

Conclusions

While the investigation was based on a virtual simulated environment which can not guarantee the attention requirements equivalent to real driving, the study points to an under-researched area of human behaviour. The number of music-related automobile fatalities is not a known statistic. Police investigators, traffic researchers, music psychologists, and drivers themselves are not mindful of the risks associated with listening to music while driving.

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THE EUROVISION SONG CONTEST – A STUDY ON A MUSIC-FOCUSED FAN CULTURE

Irving Wolther
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Background

The Eurovision Song Contest (ESC) is the largest international contest for popular music in the world. Since 1956, the show has rallied a considerably high number of fans all over Europe. The study's focus is on the characteristics of the German fan-community.

Aim

The aim of the study was to empirically verify the results of a study by Heinz Moser (1999) on the ESC fan culture in Switzerland with regard to their consistency and transferability to the ESC fan culture in Germany. In addition, it was hoped to gain knowledge and insight into the original build-up of the Song Contest fandom as a music-focused fan culture.

Among others, the following theses of Moser were to be verified:

- According to the terminology of Gerhard Schulze (1992) the Song Contest fans can be assigned to the "Harmony Milieu" due to the popular hit song ("Schlager") nature of the Contest.
- ESC fans are mostly gay and specifically seek a sense of belonging and nearness in the fan club.
- Fandom is directed at social intercommunication; the formation of the fan club includes a „moment of revelation" as a time-wise definable turning-point for the true fan.
- Above and beyond Moser's assessment, the question of corresponding socializing influences in the origins of the Song Contest fandom were to be analysed.

Method

The study is based on interviews with 208 Members of OGAE-Germany, the only ESC fan club in Germany at the time of the study. By means of an anonymous four-page questionnaire, data on the demographic structure of the German fan community was collected, and also information on the fan's requirements and expectations in respect to the Eurovision Song Contest and its fan club.

Results

- Most of the interviewed subjects are between 30 and 40 years old. 94% are men, 52% single.
- 55% obtained school matriculation and of these, more than half are university graduates.
- Musical interests lie mainly in the direction of national and international pop music.
- The Eurovision Song Contest is not considered to be a hit-song contest ("Schlagerwettbewerb") by the majority of the fans (68%).
- The voting procedure, the international character and the variety of languages are key features of the Contest.
- For the majority of the members (84%) the fan club is used as an information source. The possibilities of social intercommunication are

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considered important but only 25% of those interviewed actually take advantage of them.

- Interest in the Song Contest began in most cases prior to puberty (peak values between 8 and 11 years).
- In 29% of cases, interest was aroused through parents.

Conclusions

These results show a picture contradictory to that of Moser:

- All milieu-induced signs (age structure, level of education, daily aesthetic) indicate that Eurovision Song Contest fans belong to the "Self-made Milieu", to use Schulze's terminology.
- There is no evident scientific connection between Eurovision Song Contest fandom and being gay. Nevertheless similar social requirements can be assumed.
- The high proportion of men in the club can perhaps be explained by the Song Contest's specific structure as a „male TV programme", according to the definition of John Fiske (1987).
- For certain pronounced Song Contest fans, social intercommunication with other fans, respectively fan club membership, is not a necessity. The feeling of being a fan exists even in isolation.
- A moment of revelation is to be found in the childhood experience of one's first Eurovision Song Contest and for most of those interviewed, this is the starting point of their fan career. Of considerable importance here is the parental socialization influence.

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MOTION EXPERIENCES IN CLASSICAL AND POPULAR MUSIC

Clemens Wöllner
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Humboldt-Universität Berlin, Germany

Background

Evidence for the significance of motion experiences in listening to music stems from philosophical, music-theoretical, psychological, and neurobiological research. These different disciplines seem to focus on various aspects of motion in music, which can broadly be categorized as (a) apparent motion based on grouping and Gestalt principles, (b) virtual spatial motion in electronic music, (c) metaphorical motion, and (d) bodily movement reactions.

This paper attempts to investigate the relationship between structural features of the music, bodily responses and perceived metaphorical motion. Interactions with emotional experience, familiarity and preference are also addressed.

Method

Twenty participants (musicians and non-musicians) listened to five popular and five classical pieces of music either primarily based on pitch (melody, harmony) or on timing (rhythm, beat) aspects as judged in a pilot study. Employing a naturalistic paradigm, participants were simply asked to tap their foot to the music if and when they felt like doing so. The mean number of taps in relation to the total number of beats (tapping rate) and the starting time for the tapping were analysed. Physiological measures (GSR, heart rate) and a number of questionnaire items were also recorded.

Results

In general, musical examples with salient timing features as compared to pitch features caused a significantly higher desire to tap (questionnaire) for the classical examples and stronger bodily movements (tapping rate) for the popular examples. Furthermore, whereas participants tapped at a higher tapping rate with the popular musical examples ($p<0.001$), the classical examples were more frequently associated with aspects of metaphorical motion such as gestural experiences. While the variables 'familiarity' and 'preference' showed significant correlations with the tapping rate across all musical examples, no such relationships were found with the mean tempo.

Conclusions

The results suggest that specific factors of the music may elicit bodily movement reactions and lead to differences in the perception of metaphorical motion aspects. Tapping to music in a naturalistic setting is different from metre finding tasks and offers insights into a common but complex way of bodily responses to music.

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REGULARITY AND FORECASTING OF MUSICAL TASTE[1]

Dan Gang and Daniel Lehmann[2]
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Background

We describe the core technology of a system used to learn automatically the musical taste of a user. This technology, together with search services, is part of sophisticated listening stations located in retail shops and proposed to e-commerce and m-commerce vendors, in particular the cellular market.

Aim

The following paper introduces data, methods and results of a research that was conducted to learn some aspects of regularity and forecasting in musical taste.

Method

Information is gathered from chosen subjects: they rate a plurality of songs, describing indirectly their musical taste or preferences. The information is analyzed and reveals some patterns of regularity of the musical taste of the subjects. Based on this information we can predict with good accuracy the tastes of customers known only by a very small sample of their preferences. For example, if 30 subjects have rated a relatively large catalog of songs (a few thousands), given a small (a dozen) arbitrary set of songs rated by a new listener/ subject, it is possible to forecast successfully (with about 80% success rate) his rating for other songs of the catalog.

Results

1. A number of subjects (from 28 to 32) have been asked to reveal their personal taste on a catalog of songs (2200 to 5570 songs). To this aim the subjects provided ratings of songs on a scale of five values: from strong dislike to strong approval. The ratings were collected easily from the subjects and were found to contain a high degree of regularity and consistency in describing the subjects' preferences. Repeated ratings by the subjects for sub-set of the songs were found very consistent with differences of about 10% and with low standard deviation (almost all changes in the ratings were of one scale level).

2. A matrix d(i,j) whose entries are "pseudo-distances" for each pair of songs was built. The distance between songs i and j is small if typical subjects who like song i also like song j, while subjects who dislike song i also dislike song j. Using a small but fixed number of subjects, each of whom rated a large part of the catalog, allowed us to build a very detailed "pseudo-distances" matrix (as opposed, for example, to gathering information from a large number of subjects who rate only a small portion of the catalog). We assume that, if the pseudo-distances express the ratings of a large enough group of diverse enough subjects, a pseudo-distance between song i and song j close to zero reliably means that most persons who like song i also like song j.

3. Given a matrix of pseudo-distances d(i,j) and a vector of ratings (i.e., the learning set), of some arbitrary songs (S1..Sn) by a new

[1] Protected by pending patent

[2] Prof. Daniel Lehmann is on leave from the Hebrew University, Computer Science Institute.

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subject, it is possible to forecast successfully his rating for a new song i. The predicted rating for a song i is: the weighted average of the ratings for songs S1..Sn, where the rating of song Sm (m=1..n) is weighted by a quantity that is inversely proportional to some fixed power of d(m,i). We present data supporting the claim that, even with a number of subjects as low as 15 the method described above provides a reasonably successful prediction. The quality of the forecasting for a new user is a function of the size of the random sample he has rated, the number of subjects used to build the pseudo-distances, and their variety.

Conclusions

The method developed here combines two different types of information to predict the rating the user would give to each musical item considered. The first type of information features ratings of songs reflecting the taste of the user. The second type of information involves a number of listeners who rate a large number of songs of the catalog. The fact that an algorithm to forecast personal musical taste can be developed is evidence of the deep structure of regularities in regard to musical taste. This work can provide an initial quantification and qualification of the complex relations among listeners, the musical pieces and the musical taste.

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THEMATIC SESSION

Ethnomusicology

Friday 11:30
Room: Wellek (315)

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WHERE IS THE BEAT?: COMPARISON OF FINNISH AND SOUTH-AFRICAN LISTENERS

Petri Toiviainen
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University of Jyväskylä, Finland

Background

Listeners' ability to perceive pulse is assumed to relate both to the conventions of the musical system in one's culture and to the factors independent of the culture. A number of previous studies have investigated pulse perception, but the interplay between culturally dependent and independent factors has not been greatly studied.

Aims

The aim of the study was to investigate the degree to which familiarity with a musical culture affects pulse perception. More specifically, the aim was to study whether the accuracy of predicting perceived pulse with data-driven (bottom-up) computational models of pulse perception depends on the listeners' cultural background.

Method

Excerpts of 16 African and 16 European folk songs were presented in two separate blocks to South-African (N=19) and Finnish (N=20) listeners. The subjects were instructed to tap to the pulse using a MIDI controller connected to a computer.

Results

Overall, the groups displayed similar tapping behaviour. There were, however, some differences between the tapping phase and period, especially with certain African melodies. Preliminary results suggest that data-driven models reached a higher prediction rate for stylistically unfamiliar than for familiar melodies.

Conclusions

The results suggest that stylistic knowledge may give rise to pulse perceptions that cannot be accurately predicted with a purely data-driven approach.

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MUSIC AND MEMORY IN CHINESE FOLK SONG PERFORMANCE

Frank Kouwenhoven
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Background

Over the past sixteen years, much of our on-going field research on folk songs in China has focused on monothematic song regions. We try to answer questions like: why do certain people sing all the lyrics they know to only one, or a small handful of tunes ? What does music mean to them in such a sharply delineated context ? And what can we learn, if anything, from such limiting circumstances, about the way in which the brain shapes, reshapes, remembers and reproduces music ?

Many Chinese rural regions harbour only one (or at best two or three) prefered tunes to which all the local folk singers sing all (or most) of their lyrics. This situation may be rare in many other parts of the world, though it is not entirely unfamiliar – 'monothematic' folk song regions are known to exist, or to have existed, among Balto-Finnic and Finno-Ugric peoples, in parts of Russia and the Ukraine, and in American Indian communities, amongst others. In China, the phenomenon is remarkably widespread, and part of a living tradition.

Aims

Monothematic song regions offer an ideal laboratory for research on the reproduction and actualization of melodies. The limited nature of the musical material and the potential for endless repetition offer attractive conditions for comparative study, and for musical experiments with singers (who may be fed with deliberately modified or 'distorted' versions of tunes, to test their responses).

Method

Transcription and computer analysis of repeated performances. Performance experiments with singers, as indicated above.

Results

In this presentation it will be argued that many basic features of Chinese folk melodies are in fact directly determined by the nature of the mnemonic tools and brain mechanisms involved. In other words, a number of memory processes can be 'read' and identified directly from the contours of the tunes. Meanwhile, our experiments in dialogue singing seem to indicate that the singers CAN be influenced in their own performances by exposure to 'wrong' melodies, but only marginally so.

Conclusions

We think that the (historical) social and psychological functions of the songs inhibit a large degree of tune variation, and will set out to explain why.

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PERCEIVING AND REASONING ABOUT MUSICAL STYLES AND THEIR LISTENERS: THE ROLE OF SOCIAL IDENTITY

Hasan Gürkan Tekman
Nuran Hortaçsu
Middle East Technical University, Ankara, Turkey

Background

Musical preferences play a role in constructing and presenting identity. Group membership information is used in inferring musical preference. Musical preference, in turn, reflects on expectations and evaluations about others.

Aims

One aim was to show that members of two student organizations related to two musical styles (Turkish folk music and rock) perceived their own musical style and listeners of that style more positively than the other style and its listeners. A second aim was to show that group members used information in a way that would maintain their perception of the two groups.

Method

Members of two student organizations, one promoting Turkish folklore and the other organizing student bands that play rock music, were given questionnaires. Participants were asked to describe Turkish folk music and rock music, listeners of these styles, and themselves on scales that had been developed in an earlier study. In addition, in a task modeled after Wason's selection task, participants were asked to rate how relevant different peaces of information were for judging the truth of statements that attributed positive or negative qualities to listeners of Turkish folk music and rock.

Results

Although there was some consensus about which qualities described the two styles of music and their listeners better, members of the two groups tended to exaggerate differences that were in favor of their group and minimize differences that were in favor of the opposite group. In the Wason task, participants showed greater willingness to look for confirmatory information when examining statements that attributed positive qualities to their own group and negative qualities to the other group compared to the opposite cases.

Conclusions

Interest in musical styles is one way of defining social identity. Musical preferences affect how people perceive musical styles and their listeners, and also how people use information in reasoning about listeners of different musical styles.

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ONE MICROPHONE AT THE MUSICIAN´S EAR: SPECIAL RECORDINGS OF THE MALAWIAN FRICTION BOW

Manfred Bartmann
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Background

Ten years ago Auhagen and Gätjen proposed a new way to record the sounds of musical instruments by putting a microphone at (or very close to) the musician´s ear. This method considers the musician as a part of his instrument. Because it is him who continuously tries to optimise its timbre while playing it, his ears are considered the most reliable places to learn about the preferred parameters of sound. Apparently a more direct approach like this is required when dealing with foreign musics. Ethnomusicological field recordings are usually played back to the informants, but often lack the opportunity to have different positions of the microphones evaluated by the informants themselves.

Aims

- To set up a more direct approach to idiocultural conceptions of sound.
- To have the analysis guided by the informants´ idea of sound.
- To establish a more reliable recording standard for comparative purposes.

Method

Special 2-channel recordings of the playing of Moya Aliya Malamusi (Malawi), spectrographic analysis, special filterings (STx software package, Viennese Institute for Acoustic Research), special videos in order to have motional aspects taken into consideration, field experiments.

Results

Signals recorded „at the ear" tend to be preferred by the musicians. Analysis reveals that formants appear more pronounced in these recordings. High frequency as well as noise components are diminished.

Conclusions

This recording method is salient for musics that are chiefly relevant to the musician himself - such as mouth bow music. Beyond these genres, it is generally useful to elucidate sound conceptions, especially the intended figure/ground relations, from an intracultural point of view.

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SAMGITA-SASTRA AND SASTRIYA SAMGITA: THE'SCIENCE OF MUSIC', 'SCIENTIFIC MUSIC' – THE INDIAN PERSPECTIVE

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Background

Music theory, in India, is referred to as ‚samgita sastra', the ‚science of music'. Classical music, on the other hand, is called ‚sastriya samgita' or ‚music according to the science', i.e. music that follows the rules laid down in sastra, in the science - or theory - of music. So far so good, but problems arise as soon as we encounter other types of music not explicitly included in the category of ‚scientific' (read: classical) music, but nevertheless based on the same ‚science' (read: theory)as classical music. This is the case with many styles of devotional music, especially with the music of the Vaishnava temples and communities whose genres are in many cases regarded as the origin of that which is nowadays known and established as classical music.

Aims

The present paper shall investigate the aspects of science and theory in Indian musicology. Concrete examples pertaining to the North Indian dhrupada tradition in both its classical and devotional branches shall serve to illustrate the argument. Further reference shall be made to the South Indian kirtana form as both part of the devotional repertoire and the classical tradition of Carnatic music.

Main contribution

The main contribution of this paper is theoretical explication on the basis of Indian music theory as reflected in both musicological treatises and performance practice. Audio-recorded examples and/or sung demonstration of dhrupada compositions in both classical and devotional versions shall serve to demonstrate the practical implications of the theoretical facts.

Implications

The concrete implications of music theory being perceived as a science (rather than a mere theory), and what consequences does this bear on the immediate execution of ‚scientific music' will be examinded. The question as to whether or not the common appropriation of the Indian ‚sastria sangita' and its English translation as ‚classical music' is justified and tenable, too, will be of interest.

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PERCEPTION AND RESPONSES TO SCHEMATA IN DIFFERENT CULTURES: WESTERN AND ARAB MUSIC

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Background

Many studies have examined aspects of perception and response, but mainly with Western material and Western subjects. Here we want to contribute to filling this gap.

Assumptions

- Much of musical talent and listening to music, like mathematical aptitude, is expressed in the form of skill at uncovering schemata that are formulated unconsciously in our minds.
- The specific (unconscious) "selection" of natural and learned schemata (manifested in various principles of musical organization) reflects the "aesthetic ideal" of a period or culture.
- The basic variables of cognitive activity are difference/similarity and salience/non-salience, which are influenced by the listener's background and types of schemata.

Aims

- Immediate: to examine the analytical aspect of music perception experimentally, addressing the characteristics of the schemata, musical culture, musical knowledge, and mathematical aptitude
- More general: to increase our understanding of the meaning of the schemata in terms of types of experiences

Method

We carried out an experiment on the responses of 75 Arabs and Westerners, with various amounts of music education, to Arab and Western music, which have very different ideals and schemata (represented here by patterns in various categories), and to series of numbers.

Tasks: Repeat each numerical pattern (20 altogether) in writing; compare musical patterns in pairs (33 Western and 16 Arab) and mark whether they are very different, similar, or identical; explain how the musical patterns are similar or different; to sing 20 patterns; specify the strategy used in both music and mathematics

Results

The results indicate that the subjects' responses are influenced by all of the factors investigated. They pointed to the importance of the analytical aspect, confirmed the significance of the groups of subjects, and produced an interesting hierarchy among the schemata in terms of the responses of the subjects as a whole and of the various groups.

Conclusion

Further research is required, but already the experimental findings support the hypothesis regarding the sources of influences on musical perception and memory and strengthen the hypothesis that the selection of schemata is not the result of conventions.

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DISSONANCE AND TONALITY: THE ROLE OF TIMBRE IN MELODIC RELATIONS

Deirdre Bolger
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Background:

In investigations of the origin of tonal hierarchies of musical cultures the phenomenon of dissonance has been considered of central importance. However, it seems that the use of this phenomenon in such investigations has proved unsuccessful and as yet no direct link has been made between the perceptual phenomenon of dissonance and the development of the tonal hierarchy of a musical culture. The many models of sensory dissonance that have attempted to account for the preferences of a musical tradition have only proved valid to a certain extent before breaking down in the face of actual musical practice and real listening conditions. So the question beckons; how useful a concept is dissonance in an investigation of the evolution of a musical culture's tonal hierarchy?

Aims

This paper proposes that dissonance is only one of several aspects of timbre that emphasises harmonic relationships. It will present a number of examples of scales and pieces from non-western music that show how particular instrument timbres contribute to musical structures.

Main Contribution:

It is argued that the relationship between the expressive possibilities of an instrument reflected in measures of timbre and scales are fundamental to the nature of melody in musical practices worldwide.

Implications

The above proposal does not totally discount the contribution of dissonance but instead proposes that its contribution is significant as an intrinsic property of an instrument's timbre. The suggestion is made that the tonal hierarchy of a musical culture develops through the exploitation of the timbre space of those instruments central to the music of a particular tradition.

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AN ATTEMPT TO SEGMENT A NENETS' MELODY: INSIDE AND OUTSIDE VIEW

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Background

The report will discuss different principles in segmenting the Forest Nenets' melodies. The Forest Nenets live in Siberia, they are representatives of the circumpolar culture. My own background for the perception of folk music comes from old Estonian runic tunes. If I analyzed Forest Nenets' music by using this experience, I would come to conclusions that would be considered wrong by the representatives of the Nenets culture.

Aims

The report aims at showing how the musical thinking of Forest Nenets differs from those structural patterns that correspond to European music.

Method

Experiments and interviews with Forest Nenets' informants were used.

Results

My informant and I tried to segment the song with irregular structure, proceeding from both the music and the text. It appeared that the identification of the melody line as a structural unit in the Forest Nenets' song might pose a problem. It is often difficult to find the place where one melody line ends and the next one begins. As we used different principles of segmentation we also got different results.

Conclusions

It seems that it is important for the representatives of the Forest Nenets' culture what the singer wants to say and not how he is going to shape it into a song. In my own (Estonian) traditional culture it is rather vice versa.

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THEMATIC SESSION

Brainfunctions and music

Friday 11:30

Room: v. Helmholtz (E 40)

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FUNCTIONAL ANATOMY OF PITCH MEMORY IN PERFORMANCE MATCHED GROUPS OF MUSICIANS AND NON-MUSICIANS

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Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA

Background

Most pronounced functional differences between musicians and non-musicians have been found in perisylvian brain regions using various functional brain mapping techniques while subjects perform musical tasks. It is unclear whether differences in performance, different cognitive strategies or structural brain differences account for these between-group functional differences.

Aim

We wanted to determine whether functional brain differences in a pitch memory task still exist when a group of musicians and non-musicians were matched with regard to their performance score.

Method

20 subjects (10 musicians and 10 non-musicians) underwent functional magnetic resonance imaging using a new variation of a sparse temporal sampling technique while performing a pitch memory task (comparing the first tone with the last or second last tone in a sequence of 6-7 tones). The pitch memory task was contrasted with a motor control condition. Non-musicians were selected from a larger group of subjects in order to match both groups with regard to percent correct responses.

Results

Both groups showed a similar activation pattern in perisylvian brain regions involving the superior temporal gyrus and the supramarginal gyrus. Non-musicians showed stronger activation of the prefrontal and superior parietal regions while musicians showed strong posterior temporal/ inferior parietal activation. Contrasting both groups directly with each other revealed that musicians activated more the right supramarginal gyrus while non-musicians activated more the right superior temporal and superior parietal lobe.

Conclusions

These results indicate between-group processing differences since performance was similar between both groups. While musicians seemed to use more short-term auditory storage center (e.g., supramarginal gyrus), non-musicians relied more on primary and secondary auditory areas within the superior temporal lobe, multimodal sensory association regions in the superior parietal lobe and prefrontal memory areas in order to perform this pitch memory task.

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STRUCTURAL BRAIN DIFFERENCES BETWEEN MUSICIANS AND NON-MUSICIANS

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Dept. of Psychiatry, University of Jena, Germany

Background and Aims

Musicians learn complex motor and auditory skills at an early age and practice these specialized skills - such as translating visually presented musical symbols into motor commands with auditory monitoring and performing fast and independent movements of fingers and hands – extensively (often for many hours per day) from childhood through their entire careers. Whether or not these specialized skills lead to or rely on pre-existing structural brain differences compared to non-musicians is not known.

Method

Three groups of subjects underwent high-resolution magnetic resonance imaging and were compared with each other on a voxel-by-voxel basis. All musicians were keyboard players. We classified professional musicians (keyboard players) as those whose main profession it was to be a musician (performer or teacher). They had a mean daily practice time of more than 2 hours. They were compared with amateur musicians with a mean daily practice time of about 1 hour, and non-musicians that were matched with regard to gender, handedness, and overall IQ with the two musician groups.

Results

We found gray matter volume differences in several motor as well as auditory and visual-spatial brain regions on both sides of the brain comparing professional musicians with matched amateur musicians and non-musicians.

Conclusions

These multi-regional differences might represent structural adaptations in response to long-term skill learning and repetitive rehearsal of these skills. This explanation would be supported by finding a strong association between structural differences, musician status, and practice intensity, as well as by a wealth of supporting animal data showing structural changes in response to long-term motor skill acquisition and practice.

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TRAINING NON-MUSICIANS ON A MUSICAL TASK – AN FMRI STUDY

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Background

Several studies using various brain mapping techniques showed differences in auditory processing comparing musicians to non-musicians. It is unclear whether these differences are due to differences in brain structure or intensive musical training.

Aims

The aim of this study was to determine brain changes in non-musicians associated with learning an auditory musical task and to compare trained non-musicians with musicians performing the same auditory musical task.

Method

Seven non-musicians (training group) underwent fMRI-scanning twice (separated by 5 days of auditory training) while performing a pitch memory task. Subjects listened to a sequence of 6-7 tones lasting 4.5 seconds and were required to make a decision whether the last tone or second-to-last tone compared to the first tone (depending on a visual prompt) was "same" or "different". The control condition was a rest condition with alternating button presses after a visual prompt. Using a variation of a sparse temporal sampling technique, a set of 24 axial slices (4x4x6mm voxel size) was acquired after each auditory stimulation (TR = 17 sec.) with varying the delay time between auditory stimulation and MR-acquisition over a 7sec interval. Non-musicians significantly improved in their percent correct responses after the training period. The training group was matched for gender and performance score to a group of musicians who underwent the same fMRI-experiment.

Results

In comparing the non-musician group prior to the training sessions with the musician group, we found more bilateral superior temporal gyrus activation in the non-musician group. Comparing both groups with each other after the training sessions showed that the activation pattern in the non-musician group was more similar to the musician group; nevertheless, the non-musician group had even stronger left-sided temporal activation than the musician group. A performance difference between non-musicians and musicians was present prior to the training sessions, but not afterwards.

Conclusions

A greater left hemispheric lateralization of the auditory activation pattern seems to occur with training non-musicians in a pitch memory task, making the activation patterns more similar between trained non-musicians and musicians. This would lend support to the notion that functional differences between musicians and non-musicians are due to training and are not due to pre-existing differences in either brain anatomy or function.

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MUSIC LISTENING PRONENESS MODERATES THE EFFECTS OF EYES-OPEN VERSUS EYES-CLOSED MUSIC LISTENING ON EMOTION-RELATED SUBJECTIVES AND ELECTROCORTICAL RESPONSES

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Background

Listening to music often takes place in a place where what we see is not connected to what we hear (e.g., listening to music at home). Thus it may be argued that listening to music with eyes-closed may generate a more music-focused listening experience, because the visual stimuli that is not related into the music is blocked.

Aims

The purpose of the present study was to compare the emotion related responses to listening to music with eyes-open and eyes-closed. It was hypothesized that listening to music with eyes-closed would generate a more intense experience and elicit more imaginary activity than listening with eyes-open.

Method

Electroencephalography (EEG) from F3, F4, C3, C4, P3, P4, T7 and T8, electrocardiogram (ECG), electrodermal activity (EDA) and electromyography (EMG) were recorded continuously in right-handed subjects with eyes-open and eyes-closed during rest periods and during listening to pieces that differed in terms of valence (i.e., positive-negative) and arousal (i.e., high and low). Participants rated their emotional mood instantly after each music piece using 5-point scales that consisted of 16 adjectives chosen from the emotion-circumplex. Background factors (e.g., gender, age, and music listening habits) were collected before the experiment.

Results

At present, more data is still being gathered. However, the preliminary results suggest that self-reported emotion tend to be more intense in eyes-closed than in eyes-open condition. It was also found that subjects seem to experience the listening to music with eyes-closed as less negative than listening to music with eyes-open, as indexed by the corrugator supercilii (CS) facial muscle activity. With regard to brain activity, listening to music with eyes-closed generated higher frontal and parietal alpha activation in subjects than listening with eyes-open, as compared to the relevant resting conditions.

Conclusions

Most of the EEG studies use eyes-open conditions. However, the present study suggest that when using auditive stimuli, the eyes-closed listening may give more valid results.

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BRAIN DC POTENTIAL CHANGES OF EMOTIONAL DECISIONS DURING EMOTIONAL BACKGROUND STIMULATION

Thomas Geiss-Granadia
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University of Vienna, Institute for Environmental Health, Austria

Background

Long term recordings of brain DC potentials are discussed as an indication of cortical activation, and are therefore of interest in relation to emotion. In Addition the quantitative aspect of brain DC potentials and the aspect of lateralisation in relation to mental resources is discussed.

Aims

Purpose of the investigation was to examine the effect of emotions induced by music on DC potential change during emotional decisions.

Method

By means of a pretest (n=100) three types of music were chosen to induce either positive (Pachelbel, „Canon in D Major"), neutral (brown noise) or negative (Praxis, „Rivet") emotions. Participants consisted of 36 non-musicians. A repeated measure design was chosen, where participants were confronted with the three emotional conditions in consecutive, permuted order. After 2 minutes listening only, subjects had to evaluate their mood using the MDBF (Mehrdimensionaler Befindlichkeitsfragebogen) followed by a period of 8 minutes listening to music combined with presentation of 99 pictures of the IAPS (International Affektive Picture Set) randomised to their emotional content (positiv, neutral, negativ), each lasting 2.5sec. Participants had to evaluate the pictures on a scale concerning their subjective emotional impact. Additional anxiousness was rated by means of the STAI (State-Trait-Anxiety-Inventory).

Results

Preliminary results showed changes in the DC potential over time. During the emotional evaluation of pictures DC potential was positive compared to the baseline. Comparing persons affected by musical background stimulation showed differentiated DC potential changes related to mood as opposed to persons not affected by emotion. Independent of involvement negative musical stimulation (first 2min) showed a 100µV negative DC-shift whereas a positive DC-shift was found in response to „neutral" music.

Conclusions

Results suggest that individual differences of music perception were reflected by changes in Brain DC-potential.

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BRAIN DC POTENTIAL CHANGES INDICATE A MOZART EFFECT

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Background

Improved performance in spatial temporal tasks was observed after listening to Mozart´s sonata (K.448). This short-term enhancing effect was termed as the „mozart effect" and received widespread attention. There have been some attempts to replicate this effect with positive and negative outcome and there is still controversy over the mozart effect.

Aims

This study aims to monitor changes of the brain DC potential while listening to Mozart´s sonata compared to other acoustical excerpts.

Method

Thirty eight non-musicians were exposed to four acoustical conditions in consecutive order, each 10 minutes in length, consisting of Mozart´s Sonata (K. 448), Albinoni´s Adagio for Organ and Strings, Schubert´s Fantasia for Piano (D940) and brown noise. During the first 5 minutes of music presentation participants listened passively, during the second half they rated the preference of music as well as annoyance and filled out a questionaire of mood (MDBF).

Results

Repeated ANOVA for DC potentials showed a location related negative DC shift while listening to Mozart whereas during Schubert, Albinoni and brown noise, participants showed a positive potential change. Ratings of preferences as well as annoyance showed significant effects. All music excerpts were more highly rated in preference compared to noise and also as less annoying compared to noise. Ratings of MDBF revealed no differences in mood, alertness and excitation between music excerpts, but for all compared to noise.

Conclusions

This study suggests empirical evidence of the Mozart effect on brain activity. As neither rated preferences nor annoyance rated arousal nor mood accounted for the observed pattern of cortical activity, the fundamental reasons for the Mozart effect remain unexplored. However, changes in the brain DC potential while listening to Mozart´s K.448 indicate enhanced cortical activation.

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HARMONIC PRIMING IN AN AMUSIC PATIENT

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Background

Harmonic priming studies have provided evidence that the processing of a target chord is influenced by the harmonic relatedness between target and preceding prime context. In the harmonic priming paradigm, participants make speeded accuracy judgments on a perceptual feature of the target without explicitly judging the manipulated harmonic relations. Facilitated processing of related targets have been observed for musician and nonmusician listeners, an outcome pointing to the implicit nature of tonal harmonic knowledge and the robustness of the involved processes.

Aims

In the present study, I.R. – a brain-damaged patient exhibiting amusia without aphasia – was tested with the harmonic priming paradigm using both a phoneme-monitoring task and a timbre discrimination task.

Method

The task was to decide as quickly and as accurately as possible whether the target was sung on the phoneme /i/ or /u/ (Experiment 1), and whether the target was played by one of two musical timbres (Experiment 2). The target was the last chord of eight-chord sequences, and it was either strongly related to the prime context (i.e., having the function of a tonic chord) or less related (i.e., a subdominant chord).

Results

For both tasks, I.R.'s data replicated harmonic priming effects that have been previously reported for healthy college students: target chord processing was faster in harmonically related than in less related contexts.

Conclusions

The data of this amusic patient mirror data patterns that have been observed with aphasic and prosopagnosic patients: priming paradigms provided evidence for an influence of semantic relations and of unrecognized faces on target event processing. Our present findings in the music domain suggest that implicit knowledge of harmonic structures might remain intact and accessible, even when explicit judgments and overt recognition have been lost.

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MUSIC PERCEPTION IN PATIENTS WITH DEMENTIA DUE TO ALZHEIMER'S DISEASE

Demetre Yannou[1], Stavros Baloyiannis[2], Anastasia Kostaridou-Eukleides[3]
Grigorios Kioseoglou[3], Erifili Damianou-Marinis[1], Despina Klonari[1]
Evangelia Nakopoulou[3], Katerina Tzedaki

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[2] 1st Department of Neurology, Aristotle University Thessaloniki, Greece
[3] Department of Psychology, Aristotle University Thessaloniki, Greece

Background

This study investigates the music perception of Alzheimer (AD) patients. Although the clinical syndrome of Alzheimer's disease is characterized by an acquired decline of cognitive function, current bibliography suggests that musical activities are preserved while other cognitive functions fail.

Aims

In our research, we tested the reaction of AD patients in simple music units and sound parameters as well as in complex music patterns and melodies.

Method

Three different groups of subjects were tested: A group of 30 young adults (20-30 years old) used as a base line, a group of 16 individuals (67-77 years old) diagnosed as having probable Alzheimer's disease of mild to moderate levels, and a group of 30 normal elderly adults (67-77 years old) used as a control group. Both AD patients and normal elderly adults were examined in the MMSE test. The experimental material consisted of eight tests divided in two levels, which correlate the perceptual organization of simple and complex stimuli.

The first level consisted of four tests that examined the group's ability to perceive differences in frequency and timbre as well as differences in rhythmic and volume patterns. The second level consisted of four non-familiar melodies, which were composed so as to examine the group's cognition ability of disruptions in the continuity of rhythm, melody, volume and timbre.

Results and Conclusions

Statistical analysis using Pearson's Correlation Coefficient in the group of Alzheimer's patients showed a significant positive relationship between MMSE test results scores and the number of correct answers on particular music parameters in the second level. Participants with higher MMSE scores provided more correct answers regarding the perception of differences in volume and timbre.

A mixed design ANOVA 3x4 (groups x tests) showed that AD patients tend to give less correct answers to all the tests of the first level in comparison to the other groups. Tukey's Multiple Comparison Test gave a similar difference for all the music parameters in all the tests of the second level.

Regarding the correct answers provided, a statistically significant interaction was found between the tests and the participants' groups: Alzheimer's patients exhibit a decrease in the number of correct answers regarding mainly the perception of differences in volume and rhythm.

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THEMATIC SESSION

Listener response

Friday 11:30
Room: v. Hornbostel (130)

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MUSICAL PREFERENCES OF ELEMENTARY SCHOOL CHILDREN

Heiner Gembris
Gabriele Schellberg
IBFF, University of Paderborn, Germany

Background

Children start to develop their individual musical preferences already prior to puberty. In elementary school age an openness for different styles of music can (still) be observed, which Hargreaves (1982) has called "open-earedness".

Aims

This study deals with the following questions: To what extent does open-earedness still exist with elementary school children? How does it change in the course of the elementary school years?

Method

By means of a questionnaire specially developed for elementary school pupils, children were asked their opinion on various musical genres. A total of 591 children (300 m, 291 f) between the ages of five and thirteen rated their likes or dislikes of eight short pieces of music (approx. 1 minute) of different styles (classical music, pop music, contemporary avantgarde and ethnic music).

Results

The results show that age related changes in preferences regarding all types of music are highly significant ($p = .000$, Kruskal-Wallis). With increasing age, all kinds of music were judged more negatively. All in all, pop music received the most positive evaluation. The age of seven or eight seems to denote a boundary, the transgression of which is marked by a rapid decrease of open-earedness. Boys and girls differ significantly in their ratings of all types of music. Girls tend to evaluate pop and classical music more positively than boys, whereas examples of contemporary avantgarde and ethnic music gain better acceptance with boys.

Conclusions

The results show that especially the first two years of elementary school as well as preschool education should be used for manifold music experiences so that children become acquainted with the widest possible range of music.

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PERCEPTUAL SALIENCE OF GROUPING STRUCTURE BY VARIOUS PERFORMERS OF "LA TERRASSE DES AUDIENCES DU CLAIR DE LUNE" BY DEBUSSY

Janet M. Joichi
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Background

Debussy's „La terrasse des audiences du clair de lune" is a piece that presents multiple viewpoints with respect to grouping structure and climax. Performers of this work have considerable freedom to shape a listener's perception of grouping structure and arrival, based on a number of plausible structural interpretations.

Aims

The purpose of this investigation is to examine listeners' perception of salience-near moments in the piece open to multivalent interpretations. The musical issues of bipartite or tripartite form, and arrival or delay are raised. We considered the interpretive choices available to performers, how performers shape significant moments in the piece particularly with respect to dynamics and timing, and how listeners perceive emphases made by different pianists.

Method

Music graduate students listened to the entire piece, then to an excerpt performed by three different recording artists. They then evaluated strength of emphasis at predetermined grouping boundaries. These boundaries divide the piece into two or three parts, as well as influence a sense of climax and arrival. After each trial, subjects described their observations in a brief interview.

Results

Listeners responded most readily to dynamics, tempo, and articulation as performance indicators of salience. They agreed upon varying emphasis in interpretations by certain recorded artists, and also upon the significant role of the performer in communicating an interpretation.

Conclusions

In a piece with open-ended interpretive possibilities, particularly with respect to grouping structure and arrival, the performer appears to have significant influence over the perceived architecture of the piece.

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TEMPO CHANGE AND INTERPRETATION PREFERENCE

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University of Sheffield, Music Department, England

Background

Classical music is interpreted in different tempi. In all interpretation there is tempo variation. These tempo variations are an important aspect to bring the music come to life. Are these tempo nuances dependant on the basic tempo? If tempo in a performance is changed, will the tempo nuances scale proportionally, or will such a manipulated performance sound "wrong"? This test was made to see how manipulated performances were assessed compared to the originals.

Aims

In this experiment we tested if and how the preference for interpretations changes when tempo in the performances was changed. Subjects were asked to identify which performances were manipulated in tempo, and also to make a rating of different performances, both original and manipulated.

Method

10 professional musicians participated. They heard five pieces of classical music on CD (piano and orchestral), each in six interpretations. Half of these interpretations were manipulated in tempo, the tempo manipulations being either 20% faster or 20% slower than the original. All tempos were within the tempo range normally heard in performances. The participants were asked to decide which performances were manipulated, to describe the performances (optional), to rate each performance (1-10) and finally rank each of the six performances of each piece.

Results

The identifying of the manipulated versions, were not much better than random guessing (55% correct). However, in ranking and rating, the original interpretations in most cases scored better than the manipulated versions.

Conclusions

The results are somewhat ambiguous. On one hand the identification of manipulated performances showed a low level of accuracy. On the other hand, four of the five performances ranked on top were original performances, and average ranking and rating was in general better for originals than for the manipulated versions. In 14 of the interpretations where both the original and a manipulated version was included, ten of the originals were regarded best, only four of the manipulations scored better than the original.

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THEMATIC SESSION

Creativity

Friday 15:00

Room: v. Hornbostel (130)

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THEORETICAL PERSPECTIVES ON DESIGNING A STUDY OF INTERACTION

Anna-Lena Rostvall
Stockholm Institute of Education
Royal College of Music in Stockholm, Sweden

Background

Not much is known on a scientific level about the interaction in instrumental teaching. Nor do we know how the teacher-student interaction affects the students' opportunities to learn. One reason for the lack of knowledge based on empirical studies could be the theoretical and methodological difficulties involved in studying such multifaceted data.

Aims

This paper discusses the theoretical underpinning of the methodological decisions made in an on-going Swedish research project on interaction and learning. Data consists of 12 hours of video recorded instrumental lessons in high schools and teacher training colleges. Video recordings create enormous amounts of multimodal data, and many choices have to be made about how to represent, describe, analyse and interpret data systematically.

Main Contribution

The perspective created in the study reflects the researchers' views and values concerning empirical research: Since instrumental teaching is a complex social phenomenon with a long history, it is difficult to study and discuss the outcome of music teaching from theoretical perspectives that do not reach beyond an individual level. On the other hand, sociological macro models of explanation or theories about the historical context where the institutional routines have evolved, can not provide analytical concepts for analysis on a micro level, where teachers and students interact.

Implications

The main object of the paper is therefore to discuss how multiple compatible theories are combined in the current study for application to different theoretical levels. These levels show continuous movement from the close-up description of how teachers and students act and interact, over a systematic analysis of the patterns of interaction, and finally move on to an interpretation on a macro level of why they are interacting the way they do.

The paper discusses how the three levels of theories can be combined to elucidate our understanding of teaching and learning processes in terms of interaction.

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A THEORETICAL BASIS FOR HUMAN CREATIVITY

Jane Masters
Music Department, Reading University, UK

Background

This paper constitutes part of the theoretical basis for a study proposing to investigate the possibility of measuring the vocal improvisations of musically trained and untrained populations.

Aims

The purpose of this paper is to define creativity as a fundamental characteristic of the human personality, from a variety of disciplinary standpoints. It will describe necessary cognitive processes, interactive relationships and other factors that might encourage or inhibit the creative process.

Main contribution

Creativity is arguably one of the most sought after of human capacities and yet also the most nebulous and least understood, and may occur in any domain where an individual is able to perceive a problem, and conceive of and plan a solution in advance of executing it. It is broadly defined as the ability to create novel ideas from existing material and is a phenomenon which exists through the agency of the unique processing tool of the imagination, itself central to the human advanced intellect and higher consciousness. It is memory, a vital feature of the imagination, which informs an individual's perceptions and makes his discoveries personal through the possession of a personal consciousness of identity.

Every human mind is able to connect often hitherto unrelated ideas and draw new meaning or insight from resulting new relationships through symbolic thinking and analogy based on previous knowledge. The resulting new insight will change future perceptions and understanding and, where it radically breaks away from accepted conventions in a society, it may challenge commonly held paradigms of understanding. Innovation, by definition, is dependent on the presence of existing ideas and requires verification as such by the society from which it comes. Thus, both innovation and value are considered, in Western culture, to be essential elements of the creative process and product.

Implications

Such theoretical considerations will contribute to a study that seeks to address the issue as to whether degrees of musical creativity, as expressed through vocal improvisation, can be differentiated.

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MUSICAL IMPROVISATION AS A TYPE OF ACTION

Silvana K. Figueroa
University of Konstanz, Germany

Background

The aim of my presentation is to reflect upon musical improvisation from the perspective of the sociological theory of action, which has in the past tended to conceive of the notion of human action as a rational „composed", conscious type of human behaviour which is meaningful for the subject and which works according to the principle of a goal-means-scheme.

Aims

My paper will demonstrate that this conception of action is not sufficient for an understanding of how we act.

Main contribution

Musical improvisation can be defined as the simultaneous composition and execution of music; one of its fundamental characteristics is its contrast to the principles of construction and rational planning which dominate the traditional idea of composition in western music. The improviser typically plays in an „unprepared" and spontaneous way, which is the defining feature of improvised music: its absence of predetermination. I will examine the main characteristics of improvising in music to demonstrate that there are other types or aspects of human action that have been neglected in the social theory of action, despite its potential fruitfulness as a means of understanding spontaneity or creativity in our behavior.

Implications

Gaining a deeper knowledge of musical improvisation has decisive consequences for the sociological theory of action, especially in the following fields: 1) in the conflict between deterministic theories of action that emphasize the (socially) learned patterns anchored in how human action is carried out vs. theories of action that emphasize human freedom and spontaneity in order to explain human behaviour; 2) in terms of the presence and weight of rationality in (the theory of) action; 3) in the classic question regarding the emergence of novelty and spontaneity in human action.

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THE PULSE OF COMMUNICATION IN IMPROVISED MUSIC

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Background

The study of live human communication has, in recent years, led to a focus on our musical beginnings. These have been defined as an innate 'communicative musicality' evident from infancy. The co-ordination of behaviours in oral music such as folk and jazz; offers the researcher who studies the act of 'music making' a window to view the source of temporal competence and expressive intentional co-ordination.

Aims

To study the rhythmic co-ordination of sounds between jazz musicians improvising together and examine how 'shared pulse' is generated, negotiated and maintained.

Method

A quantitative method has been developed to examine the rhythmic co-ordination of sounds between two jazz musicians improvising together within 'blind improvised duets', that is improvisations mediated by instrumental sound alone. Micro analytic techniques developed in the study of mother-infant communication and the general principles of perceptuo-motor control have been applied to process the musical behaviour in digitally recorded sound.

Patterns of synchrony are determined after a measure of the changing loudness of sounds has been produced by acoustic analysis. Then graphical and statistical algorithms are applied to perform 'tau coupling analysis'. This measures the control of approach to points of synchrony, defined as simultaneous loudness peaks in musical sound.

Results

The findings give a quantitative description of 'shared control' in the musical dialogue, and offer a means of tracking emotional and/or intentional aspects of musical gestures, both for each individual and in their mutual co-ordination.

The interpretation of these findings in terms of structural elements of synchrony in the musical narrative lead to a new theory of 'shared pulse', and how it is generated, perceived and maintained through joint activity in expressive behaviour.

Implications for a general theory of narrative competence in collaborative musical performance are considered, and proposed as a basis for a new approach to the study of music.

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THE EFFECTS OF COMPUTER-MEDIATION AND PHYSICAL SPACE ON COLLABORATIVE MUSIC COMPOSITION

Fred Seddon

Mathilda Joubert

Psychology Discipline, Faculty of Social Sciences, The Open University, Walton Hall, Milton Keynes, UK

Gisle Johnsen

Music Interactive Technology, Bergen, Norway

Background

Previous studies have investigated the effects of computer-mediated scientific problem-solving tasks in relation to the same task performed in non-computer environments. Other previous studies have also investigated the effects of collaboration during music composition tasks. Few, if any, have investigated the effects of collaborative music composition in relation to computer-mediation and physical/cross-cultural environment.

Aims

This study aims to reveal differences in modes of communication, composition strategies adopted and the impact upon the resulting compositions, when adolescents engage in the same collaborative music composition task in three separate environments: 1) non-computer based composition in the same physical space, 2) computer-based composition in the same physical space and 3) computer-based composition via email across two cultures.

Method

In the first two conditions adolescents worked in pairs in the same physical space to compose a musical piece using either typical 'classroom instruments' or a musical keyboard linked via MIDI to a computer with a researcher-modified music composition program installed. In the third condition, adolescents worked in a school in the UK with similar computer-based equipment and collaborated with adolescents in Norway also using similar computer-based equipment. Collaboration during composition took place via email facilitated by a researcher-developed computer-based composition program that enabled full email communication of both the music and interactive dialogue. In the first two conditions the collaborative composition process was captured by videotape recordings and in the third condition by videotape recordings and copies of emails exchanged by the participants.

Results

Results revealed differences in the modes of communication, composition strategies adopted, and in the compositions produced in relation to the 'environment' the pieces were composed in.

Conclusions

If potential advantages for global collaboration in cross-cultural music projects are to be accessed we must be aware of the effects that technology can have on the process and the product of such collaboration. More research into this area will be required in the future.

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THEMATIC SESSION

Musical development

Friday 15:00
Room: Révész (202)

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MUSIC AND THE FOETUS: A COMPOSITIONAL FRAMEWORK FOR FOETAL STIMULATION

Leonard Heydenrych
Patricia Holmes
Trinity College of Music, London, UK

Little is known about how music is perceived by the unborn child. However, although the physical and physiological response of the foetus towards music can be measured, the possibilities of potential benefits to the foetus from stimulation by music remain largely unexplored. By enhancing foetal neuronal development through transnatal auditory learning,[1] this paper seeks to demonstrate that individual elements of musical structure might in themselves be of some benefit.

Fundamental to this present study is evidence that all normal foetuses respond to sound from thirty-three weeks' gestation and most respond at twenty-seven weeks.[2] Prenatal programmes exposing the foetus to music (as opposed to sound impulses) have also been conducted. These suggest that the foetus can actually respond to music and that musical stimulation of the foetus can have a beneficial influence on both mother and child after birth.[3] In addition to this, a study by Woodward et al. showed definite foetal heart-rate response to music.[4] Although from these earlier programmes it is not clear whether individual features of musical structure could have specific influence, other studies have shown foetal preference for certain musical styles[5] and provided evidence of prenatal learning through music.[6] If the foetus is able both to discriminate between styles and also to remember music, it might then be possible to test the effects of different elements of musical structure.

To this end, the results from trials carried out by Trehub et al.[7] are also valuable. These demonstrate that infants under nine months of age do actually react positively to certain elements of musical structure; most particularly to perfect intervals, certain aspects of harmony and to 'natural' phrasing. This current study aims to discover whether similar musical features, such as a pure melodic contour and the 'tremolo effect' might also stimulate the foetus.

Music has been composed specifically for this purpose and examples are given.

1 Moon, C.M. & Fifer, W.P., (2000)

2 Gerhardt, K.J. & Abrams, R.M., (2000)

3 Shelter, D.J. (1989) & Montemurro, R.N.R., (1996)

4 Woodward, S.J. (1992)

5 Olds, C., (1985)

6 Hepper, P.G., (1988)

7 Trehub, S., Schellenberg, G. and Hill, D. (1997)

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SCHEMATIC CONNECTIONS BETWEEN TWO ARTISTIC MODES: AN EMPIRICAL STUDY OF MUSIC AND VISUAL ART

Pepy Michaelides
The Pedagogical Institute, Nicosia, Cyprus
Institute of Education, University of London, UK

Background

The author's research examines classroom compositional activities when children are exposed to a visual stimulus. The author's main line of argument reflects her assumption that a stimulating encounter with a visual phenomenon (that is, a painting) may affect mental representation in positive ways and may result in producing more 'developed' and 'meaningful' music compositions. The above is supported by a theoretical framework based on relevant literature on music and painting sharing common, 'dynamic' qualities, linked with issues raised in theories of mental representation and schema, and viewed in the light of connectionism.

Aims

The author's research sought to identify shared schematic properties between two artistic modes, namely, music and painting, in a proposed classroom methodology, through the investigation of compositions by children given verbal instructions on one hand, and compositions by children given verbal instructions and exposed to a painting on the other.

Method

Fieldwork was carried out in primary and secondary schools in Cyprus between February and March 2001. Triangulation was employed and the data collected included children's compositions, children's written texts and interviews with the children. A random selection of children's compositions drawn from 298 items of 'control' and 'experimental' groups was assessed by independent judges using Swanwick and Tillman's Spiral Model (1986). Both the judges' assessments and the consistency of the judges' reliability were analysed quantitatively. Children's written texts and interviews were analysed qualitatively.

Results

Compositions of the experimental groups were more 'developed'. Additionally, children's written texts and interviews produced a substantial body of evidence regarding the participants' 'sophisticated' reactions towards the proposed classroom methodological approach.

Conclusions

The findings strengthen and illuminate the author's argument, as children's music products were more 'coherent' and music composition was facilitated. The pedagogical significance and educational implications are highlighted.

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CHILDREN'S PERCEPTION OF SIMILARITY RELATIONS IN MUSIC

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[2]University of Sheffield, UK

Background

Music theory provides elaborate accounts of similarity relations in music, yet experimental studies in psychology have struggled to demonstrate that listeners are aware of the theoretical relationships between parts of pieces of music. This has only been demonstrated for listeners with musical training, or who are explicitly instructed in the categorisation processes required, or are very familiar with the specific piece of music; in most situations listeners categorise musical events based on surface similarities such as dynamics or melodic contour.

Aims

The current research addresses some of the methodological problems demonstrated by previous research. The focus on children's perception of similarity relations enables this study to explore the effects of age and of musical training, independently and together, on listeners' sensitivities to various levels of similarity in music.

Method

The research piloted a new technique of free sorting of musical extracts alongside a more conventional attribute ranking task, both using a computer interface, in order to explore how children perceive similarity relations in music. Participants were 71 children aged between 5 and 12, with three levels of instrumental musical training (Suzuki-trained, Standard-trained and non-trained). The music used was Haydn's string quartet Op 50 no. 4, in a familiar idiom but an unfamiliar piece of music to the participants.

Results

Both training and age have significant effects on how children perceive similarity. Older and more trained children use more intermediate and deep level features, alongside surface features, as similarity criteria, whilst younger less experienced participants rely mostly on surface features.

Conclusions

There are differences in children's perception of similarity according to both development and level and type of training. This supports the new explanation-based theories in psychology as an explanation of similarity perception in music, since listeners do not use attributes in a logical and ordered way.

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DEVELOPING CAPACITY AND MUSIC COGNITION IN CHILDREN: RELATIONAL COMPLEXITY AND TRANSITIVE INFERENCE USING PITCH AND DURATION

Kate Stevens
Melinda Gallagher
MARCS Auditory Laboratories, University of Western Sydney-Bankstown, Australia

Background

This experiment investigates an aspect of Halford's (1993) theory of cognitive development in the auditory domain. Halford conceptualises the development of children's thinking and understanding as an increase in cognitive capacity and ability to deal with problems of increasing relational complexity. Relational complexity refers to the number of independent relations that need to be processed in parallel to solve a problem or complete a task. Working with visual, spatial and verbal stimuli, Halford and his colleagues have demonstrated that children aged one year can perform unary level tasks, at around two years can perform binary level tasks, by age five can perform ternary level tasks, and by age eleven most can accomplish quaternary level tasks.

Aims

The aim of the experiment is to test predictions of Halford's theory of cognitive development in an auditory context.

Method

Patterns that differed in relational complexity were composed and presented to children in the form of analogical reasoning and transitive inference tasks. The sequences consisted of pitch- or duration-based relations.

Results

As hypothesized, children's ability to perform the tasks of increasing relational complexity was predicted by their age. Additionally, duration-varying patterns were responded to less accurately than pitch-based patterns at unary and binary levels.

Conclusions

The results support a mental models view of cognitive development and the relevance of relational complexity, processing load and conceptual chunking in audition. Theoretical and practical implications for considering auditory cognition in general, and music perception, production and learning in particular, in terms of relational complexity and chunking, are discussed.

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CHILDREN'S AURAL PERCEPTION AND POLYPHONIC MUSIC: AN EXPERIMENTAL STUDY

Mary Stakelum
Mary Immaculate College, University of Limerick, Ireland

Background

A review of the literature in developmental psychology and music education reinforce the multi-faceted nature of listening to music, incorporating the physiological, psychological and acoustic in the listener as well as stylistic and organisational structures inherent in the music. How these apply to the development of musical perception in the young child is of particular interest in this study.

Aims

The aim of the experimental study was to investigate the development of listening skills in children and in particular their ability to apprehend polyphonic music. The null hypotheses of the experiment were as follows:

First, that children will not be able to attend to two melodies presented simultaneously and recognition of criterion melodies will not be better than would occur by chance;

Second that ability to attend to two melodies is not developmental and no differences between age groups in numbers of recognitions will be observed and

Third, that recognition will not be affected by the pitch interval separating the standard and criterion melodies – a wider interval of separation will not bring better recognition.

The criterion task constructed for the experiment was the ability to hear the lower melody of a passage in which two melodies were sounded simultaneously.

Results

The first and second hypotheses were rejected. The third null hypothesis was not rejected and it was concluded that increased separation of the standard and criterion melodies did not enhance the audibility of the latter.

Conclusion

The experiment confirmed that ability to attend to two parts simultaneously is present in seven year olds with a plateau appearing to be reached at around ten years of age.

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DEMONSTRATION PAPER 4

Friday 11:00
Room: Stumpf (E 15)

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THE GROUP ONLINE RESPONSE DIGITAL INTERFACE (GORDI) AS A TOOL FOR ONLINE MEASUREMENT OF MUSIC PERCEPTION

Reinhard Kopiez
Christian Wolf
Hanover University of Music and Drama, Germany

Background

In recent years online measurement of music perception and sensation has become a significant paradigm in the investigation of human information processing under realtime conditions. For example, Madsen & Frederickson's (1993) development of the „Continuous Response Digital Interface" (CRDI) and Schubert's (2001) „Emotion Space Lab" (ESL) demonstrate the usefulness of such a device for the online measurement of music sensation. However, existing devices can only be used in procedures with a single subject or a very limited number of participants. The GORDI is a further development of a device first applied by Gerlach & Hemming (1994).

Aims

In this demonstration we will show how group online measurement of up to 16 subjects can be realized by a combination of a low cost MIDI converter and a sequencer software. By using GORDI, we can easily increase the number of test subjects.

Method

The GORDI is based on a 16 channel drum-to-MIDI converter which is attached to a standard sequencer software (Cubase). Subjects listen to a soundfile to be played from the sequencer and hold a push button in their hand for indication of particular events (e.g. wrong notes, phrase boundaries or ‚chills' induced by music). A push of a button is recorded as a discrete MIDI event on the sequencer's tracks. Recordings of subjects' markers synchronized with the original stimulus can be played back as a response feedback. This demonstration of GORDI will use stimuli from the Janata et al. (in press) experiment on online detection of wrong notes (socallec ‚tonal pop-outs') within a continuously modulating melody.

Results

We will demonstrate that GORDI is a useful, low-cost and easy to handle tool for the efficient data collection in groups of subjects. By exchange of the stimulus' soundfile, the device can easily be adapted to different research questions. Its intuitive handling by subjects and investigators make it ideal for applications in music psychology as well as for informal classroom demonstrations.

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POSTER SESSION 4

Friday 11:00
Room: Exhibition (E 50)

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"DIGITIZE IT!": ON THE DISCRIMINABILITY OF ANALOG VS. HIGH-SAMPLE-RATE DIGITIZED MUSIC RECORDINGS

Fridolin Stolz[1]
Oliver Vitouch[2]
Emil Lubej[1]
[1] Dept. of Musicology, University of Vienna, Austria
[2] Dept. of Psychology, University of Klagenfurt, Austria

Background

Audio archives all over the world are starting to digitize their audio material. Critics of digital audio technology maintain that digitization will always result in a loss of quality even if "state of the art" A/D and D/A converters are used.

Aims

This study aimed to test if expert listeners (audio engineers) are able to detect potential impairments in high-quality digitized audio material. This was accomplished in a setting with direct pair-wise comparisons of analog music sequences and their digital transformations.

Method

An analog source (vinyl) was digitized in real-time (24 bit / 192 kHz with dCS converters) and converted back to analog. Three music samples from different genres (rock/pop, jazz, and classical music; maximum length 25 s) were presented via headphones, five times each, in an A/B pair comparison task (blindfold test with trial-by-trial reference). A was always the analog version; B was either A-repeated or A-transformed. Subjects with professional expertise in the field of audio recording had to judge which version they heard ("twin" or transformation).

Results

Omnibus performance was at chance level across all 15 comparisons (mean hit rate 7.2). Performance was slightly better, however, and significantly differed from mere guessing in the classical condition (25 s excerpt from Antonin Dvořák's "Slavonic Dances"; mean hit rate 2.9 out of 5).

Conclusions

Results demonstrate that even expert listeners cannot reliably discriminate between analog and high-quality coded digital audio material. Still, distinctiveness and task difficulty seem to depend on the type of music, or more precisely on the specific characteristics of the respective audio sequence.

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"AUDITORY IMPRINTING" IN SHAPING AN INDIVIDUAL'S MUSIC WORLD

Valeriy G. Mozgot
Adyghe State University, Maikop, Russia

Background

Each individual as a carrier of a certain ethnicity has a mechanism of "auditory imprinting".

Aims

The purpose of the paper is to show the role of auditory imprinting in the shaping of the musical world of the individual as the most important psychic component presenting needs, values and ideals.

Main Contribution

Auditory imprinting is a mechanism which fixes in his or her mind key tunes, chants, musical motives and phrases typical of a given ethnic group as it exists in a concrete locality with a given landscape under certain natural conditions. This is the way a child and even a baby accumulates its first musical and auditory impressions. This process takes place at an early postnatal sensible period and though limited in time, predetermines one's constant striving and attachment to the music of one's "own" people for the rest of one's life thus playing a decisive role in shaping the music world of each individual.

Implications

The development of the music world of a personality depends on the interplay of such factors as ethnic self-consciousness, mentality of the peoples (of the North Caucasus), their ethnic feelings and prejudices, habits and interests, national taste. Any attempt to form the national identity without due regard to the sphere of an individual's music world is futile and even fraught with danger for it may have destructive consequences (such as national animosity, conflicts and so on).

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IN SEARCH FOR OBJECTIVE EVALUATION OF SELECTED FACTORS PREDICTING SUCCESS IN MUSICAL PERFORMANCE – A PILOT STUDY

Kacper Miklaszewski
Ruch Muzyczny, Warsaw, Poland

Wojciech Jankowski
Chair of Psychology of Music, Warsaw, Poland

Zygmunt Pawlowski, Marek Zoltowski
Chair of Audiology and Phoniatrics, Chopin Academy of Music, Warsaw, Poland

Background

When evaluating students' progress, music teachers frequently refer to behavioural aspects of musical performance, hoping that correct usage of playing apparatus is a necessary condition for proficient musical production. Thus extended experimental foundations for diagnosing breathing disturbances in singers and musicians playing wind instruments would help teachers in evaluating a student proficiency level as well as in planning cure exercises.

Aims

A pilot study was administered to verify possible ways of correlation teachers' evaluations of vocal and wind instrumental performance with registered breathing and pulse rate irregularity.

Method

Performances of songs by Mieczyslaw Karlowicz (N=5), and items 7, 8 and 9 taken from the *Watkins-Farnum Performance Scale* (N=5) were audio recorded, and the parameters of two breathing factors (chest and diaphragm movements) and blood pulsation were registered on a computer disc. Music recordings were evaluated by groups of music teachers (N = 12 and 16 for songs; N = 6 and 5 for wind music). The teachers marked beats in printed music on which they observed specified errors, which included shortcomings in (1) *appoggio*, (2) *passaggio*, (3) *legato*, (4) text delivery, and (5) music related breathing for songs, and (1) sound quality, (2) passing to another register, (3) sound attack, and (4) breathing for winds. These evaluations were projected against plots representing an acoustical form of the performance (sampled SPL), movements of chest and diaphragm, and the pulse. All dimensions were co-ordinated on the level of a musical beat. The inter-judge consistency was estimated, and clusters of error markings were examined against the behavioural parameters by a team of music educators and a medical doctor.

Results

Depending on the composition, 39 to 56 percent of errors marked in songs formed clusters of marks given by three or more teachers. In wind music 47 to 85 percent of errors clustered at particular beats of music. Remaining error markings dispersed over compositions forming no clear patterns. Breathing disorders depended upon the subject's musical advancement. Most commonly, a lack of synchronisation between the chest

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inhalation phase and diaphragmatic movements was diagnosed, frequently accompanied by a paradoxical diaphragmatic movements. Blood pulsation changes were less frequent. In several cases clusters of musical errors coincided with the breathing irregularity. However, no patterns have been disclosed suggesting that breathing disturbances generate musical errors.

Conclusions

The method of paralleled observations seems to be promising but still needing elaboration. Particularly, a set of correct breathing graphs should be collected and classified to serve as the reference for various incorrect instances. Thus examination of performances by professional musicians is planned at the next stage of the study.

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ATTITUDES OF PRE-SERVICE MUSIC EDUCATION MAJORS TOWARD ELECTRONIC PORTFOLIOS

Geoffrey A. Reynolds
University of Vermont, Burlington, USA

Background

Portfolios are used to facilitate learning at all levels of instruction. Research indicates that pre-service teacher's attitudes and values toward portfolios are positively affected when they are taught the details of portfolio management and required to create them.

Aims

This exploratory study sought to determine pre-service music education students' attitudes toward electronic portfolios.

Method

Participants (N = 7) were enrolled in an elementary methods course at a New England university. The university requires all education majors to create and be evaluated on a professional portfolio. All portfolios must contain the following elements: a theme, a résumé, National and State Standards for education, lesson plans, a personal educational philosophy essay, and evidence of assessment during field observations and student teaching.

The researcher selected the Macromedia software program *Director 8.5* to create the electronic portfolio. *Director 8.5* allows the user to create powerful interactive and multimedia environments that can be burned onto CDs and DVDs or uploaded to the Internet. Participants completed three *Director 8.5* tutorials in order to learn basic navigation and capabilities of the program. The researcher required students to create a working template of their portfolios using this program. Toward the end of the semester, students presented their portfolios to the class and were assessed based on the template articulated in the syllabus. During the penultimate class, participants completed a Likert-type survey created by the researcher. The survey asked students to indicate their level of agreement with each statement.

Results

To determine student's responses toward electronic portfolios, the research ran frequency counts on each statement. Results of the survey indicate that participants have very positive feelings toward electronic portfolios. In addition, students seem to value electronic platforms.

Conclusions

Although the results are generally favorable, students expressed negative feelings towards learning the software. These included the inability to transfer what was learned in the tutorials to the portfolio template and frustration toggling between the tutorial screen and a working template. Solutions to these challenges are discussed.

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A PILOT STUDY OF DYSLEXIA AND MUSIC IN A CONSERVATOIRE SETTING

Paula Bishop-Liebler
Institute of Education, London University UK

Background

Within dyslexia research a number of theories have emerged to explain its occurrence. Phonological deficits seem to play a primary role although contention remains as to the exact nature of these deficits. Two possible causes have been recently suggested: a dysfunction in transient auditory processing caused by a deficit in magnocellular processing, and a deficit in cerebellar processing creating a global deficit in the ability to process automatically.

Whilst dyslexia research has generally centred on literacy, anecdotal evidence has accumulated to suggest that dyslexics, whilst often having a good ear, have difficulty processing musical information.

Aims

A pilot study is being conducted with conservatoire students, using a specially designed questionnaire, with assistance from the British Dyslexia Association Music Board, to investigate their behaviours and learning strategies in reading and writing text and music and to identify the instance of dyslexic type problems within a complete conservatoire population. Detailed case studies will then further explore these learning behaviours.

Method

A structured questionnaire was chosen so that a large number of students (n=700) could be targeted and in order to gain information about the connections between dyslexia and musical learning. Conservatoire level musicians were used as there is an expected level of proficiency in reading and processing music compared to the general population. The reading of music has also been targeted rather than all aspects of musical learning, as this is another possible benchmark area which can be quantified and directly correlated with text reading skills from dyslexia research.

Results

N=700 questionnaires were distributed with a response rate n=86 (12.29%). Data analysis and evaluation is ongoing at present, the outcomes of which will be presented.

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SATURDAY

September 13, 2003

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KEYNOTE 6

Holger Höge

Saturday 9:00
Room: Kurth (Concert Hall)

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TENDENCIES IN EXPERIMENTAL AESTHETICS

Holger Höge
Department of Psychology, University of Oldenburg, Germany

Background

The term 'aesthetics' has been coined by the philosopher Alexander Gottlieb Baumgarten as early as 1750. As a philosophical discipline the field remained occupied by philosophers and art historians until the mid 19th century. In 1876, however, experimental aesthetics was founded by Gustav Theodor Fechner (1801-1887) as a field of psychological inquiry.

Aims

The basic aim of empirical aesthetics (this is the broader term for 'experimental aesthetics') was and still is to give a scientific basis for theorizing on the reception and production of the arts and aesthetic phenomena in general. Although there is a methodological tradition (principles of psychophysics) new methods have been used to get insights into the field. The aim of this paper is to show some lines of development.

Main Contribution

Some of the new trends came from outside empirical aesthetics, mainly from psychology, of course. One of these aspects is a tendency to consider ecological factors, another one is the growing interest in creativity and brain research.

Implications

As the traditional starting point of the field was visual aesthetics the museum had been treated with more attention than before, i.e. the places of the exposition and reception of the arts received more interest. On the other hand, some of the empirical results have influenced traditional fields of aesthetics, i.e. there is an export of knowledge to the philosophical area of aesthetics.

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SYMPOSIA

Saturday

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SYMPOSIUM

Appropriating music

Organizer: Elena Ungeheuer

Saturday 10:30
Room: v. Helmholtz (E 40)

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REPORT ON A RESEARCH PROJECT: "TATORT MUSIK" – HOW EXPERTS APPROPRIATE MUSIC

Elena Ungeheuer
University of Bonn, Germany

Background

Empirical studies of how people appropriate cultural topics are actually undertaken in the field of cultural studies, here mostly focusing on the mass-reception of mass-media. Against this approach my recent project is more interested in individual basic conditions of the mental representation of music on a high level: How do experts appropriate a certain piece of music, having already an idea of what music is in general and having already developed strategies of how to gain knowledge about music?

Aims

By investigating professional strategies in appropriating music the following questions will be reflected: Can typical strategies of appropriating music by experts be found? Are there typical mixed forms? Can we see correlations between appropriative strategies, individual everyday life strategies and professional strategies?

How can we define "listening to music" in relation to the complexity of our activities in the service of the music before, during and after listening.

Method

In the research project „Tatort Musik" appropriative strategies are operationalized by means of three types of multimedia presentation of the same piece of music, i.e. „Gesang der Jünglinge" by Stockhausen. The analytical issue presents a listening score („Hörpartitur"), the narrative issue offers a dynamic databased tool of historical documents and the manipulative issue provides the user with multimedia applications (animated audio-visual graphics) in order to allow the reconstruction of parts of the music. The expert´s way to explore "Gesang der Jünglinge" by means of multimedia presentations will be digitally recorded. Personal data will be obtained by questionnaires.

Results

Results of the test (Testreihe) will be achieved in the first months of 2003 and be presented at the symposium.

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HOW TO ELABORATE AN INTERPRETATION OF STOCKHAUSEN'S MIKROPHONIE I

Pascal Decroupet
University of Liège, Belgium

Background

Since 1998, I have participated in performances of Stockhausens live-electronic piece Mikrophonie I (1965). Since the goal was not to simply reproduce the moments-arrangement according to Stockhausen's version, we had to come to a profound understanding of the formal strategies implied in this open-form-composition.

Aim

Since the indications in Stockhausen's score are both verbal and graphic, but not based on a common sign code, it was necessary – through an analysis of Stockhausen's own realisation – to come to an understanding of the rules, which are at the basis of Mikrophonie I as work of art. Thus analysis helped by the interpretation of one specific, preexisting reading of the rules – Stockhausen's version – to reconstruct/construct the significance of the rules in their most abstract form, which were to become the foundations of a new version.

Method

The theoretical background concerning the "Momentform"-concept was explored to analyse Mikrophonie I. During the preparation of the performance, the point consisted in producing the verbally determined sounds according to a precise rhythmic notation, to combine them polyphonically in the tutti-sections, and in choosing a specific moments-connections to realise a form-process which would respect the overall plan given by the composer (of which his own version is only one possible realisation).

Results

Different decisions taken during the working-process led to a version of Mikrophonie I first performed in Brussels on April 2nd 1998 in a coproduction of the ensemble Hermes (Antwerp) and the Centre de Recherches et de Formation musicales de Wallonie (Liège) that was clearly different from what listeners were used to hearing as Mikrophonie I, but which nevertheless had these typical Stockhausen-features concerning timbre-preoccupation, time-articulation and formal gesture.

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THE RECONSTRUCTION OF CREATIVE PROCESSES AS A MEANS OF COMPOSITION (IANNIS XENAKIS' *S. 709*)

Alan Fabian
Hochschule für Musik, Köln, Germany

Background

In spite of its wide diffusion, computermusic is still lacking concepts of didactical mediation. As a composer and in the context of my dissertation at the academy of music in Cologne (Prof. Susanne Rode-Breymann) I am interested in building a bridge between the practically trained insider-knowledge about computermusic and how to listen to it and the horizon of "normal listeners". The reconstruction of compositional procedures may be a chance for the listener to understand electroacoustic music by discovering coherences of sound-composition and musical material.

Aims

The improvement of understanding music by reconstructive activities will be experimentally tested in the case of an algorithmic composition. In that sort of composition-technique a composer formalizes most of his creative impulses in combination with his individual tools of working. Therefore reconstruction should allow us to gain an insight into the cognitive profiles of artistic processes.

Method

In the experimental test, listeners will be asked to talk about their experiences while listening to the piece of music before and after a given analysis, to get information about the value of the described analytical perspective. Besides the analysis of compositional sketches and the analysis of listening itself, the algorithmic procedures of the choosen composition will be focussed on the experimental test. The process of realisation gives perspectives concerning the process of working as well as coherences of sound-composition.

Results

Results of the test will be collected in early spring 2003.

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DU DISCOURS ANALYTIQUE À L'ANALYSE EN ACTE

Jean-Louis Leleu
Université de Nice, France

Background

Les musiciens professionnels adoptent des comportements très divers quant au rapport entre l'analyse des œuvres et l'interprétation elle-même. Au recours à l'analyse de type académique, que les conduit souvent à pratiquer la formation reçue dans les institutions de type Conservatoire, certains opposent une démarche purement intuitive, qui peut se révéler plus riche. S'agissant de l'orchestre, où la responsabilité des choix d'interprétation revient au chef, se pose à celui-ci le problème de la communication : comment obtenir telle manière de conduire le discours musical, etc., en évitant le recours à une explication verbale.

Aims

Le travail que je fais depuis 12 ans avec le Quatuor Parisii comme conseiller artistique (et donc oreille extérieure) m'a conduit à élaborer différentes stratégies afin de faire prendre conscience aux musiciens de l'importance de tel ou tel élément structurel sans passer par le discours analytique. Le but de mon exposé sera de donner quelques exemples de ce type de stratégies, basées sur le lien étroit entre geste instrumental et explicitation musicale. L'expérience montre que l'on touche là à des points auxquels la formation même des instrumentistes a d'ordinaire pour effet de les dispenser de réfléchir.

Method

L'une des stratégies les plus efficaces consiste à montrer l'importance du geste concret (conduite de l'archet notamment) grâce auquel peut être mis en relief de façon visible, et par là donné à voir en même temps qu'à entendre, un élément essentiel de la texture musicale. Cette explicitation par le geste a un effet en retour sur l'auditeur, conduit à discerner visuellement en même temps qu'auditivement ce que lui révèle cette forme d'analyse en acte.

Results

Le propos sera illustré par des exemples significatifs, tirés en particulier de quatuors de Beethoven que j'ai travaillés avec le Quatuor Parisii (la Grande fugue, l'opus 131, etc.).

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SYMPOSIUM

Aspects of singing – Birth to three

Organizer: Susan Young

Saturday 10:30
Room: Révész (202)

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THE SPONTANEOUS VOCALISATIONS OF TWO- TO THREE-YEAR-OLDS IN DAYCARE SETTINGS

Susan Young
University of Surrey, Roehampton, London, UK

Background

There have been several prior studies of young children's spontaneous vocalisations in free-play and arising from these a broad similarity of findings. However, in the detail of the findings there are differences and ambiguities. Furthermore, most studies have focused on three- to five-year-olds attending kindergarten and nursery education; younger children are less represented. Methods of data collection and analysis have been determined, for the most part, by an interest in identifying the emergence of conventional song forms and young children's developing ability to sing. These foci have biased studies away from a concern to understand children's spontaneous singing as situated activity within the context of their general play in everyday settings.

Aims

This small-scale study aimed to provide information which would assist in the process of extending and clarifying the findings of earlier studies. In particular, it aimed to do this by collecting information from younger children (2-3 years old) and information which contextualises spontaneous singing within play.

Method

The regular occupants (six to eight children) of the playroom for two- to three-year-olds in a daycare in London UK were observed during a free play period of approximately one hour over a sequence of six weekly visits. Details of their spontaneous vocalising, together with details of their general play activity, were collected. Categories were generated from a process of comparing this information and cross-referring the emerging categories with those generated from prior research.

Results and Conclusions

The observational data was analysed into categories of vocal play which are similar to those which have emerged from prior studies. There were some variations which, it is proposed, are mostly attributable to the younger ages of the children observed and to the differences in the methods adopted by this study. The emphasis on studying spontaneous singing as a situated activity drew attention to its multi-modal connections with the child's body movement, the movement of toys and to its role within social interactions with others.

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MOTHERS' ATTITUDES TO SINGING TO THEIR INFANTS

Alison Street
Susan Young
Johannella Tafuri
Beatriz Ilari
CIRME, University of Surrey, Roehampton, London, UK

Background

Mothers' infant-directed singing has been analysed acoustically in laboratory settings and has been found to express emotion through its repetitive melodic contours and engaging sound quality. This study is contributing to the current stream of interest in this area by investigating mothers' attitudes and perceptions of their singing in home settings. Although mothers seldom consider themselves as singers, the relatedness of singing has been seen to have an impact on their relationship with their infants, and upon their own self concept. This abstract refers to the survey, the first part of a study which involves observations of maternal singing and interviews.

Aims

This survey aims to find out to what extent mothers use infant-directed singing as part of their caregiving routines and how they perceive the functions of their singing. It aims to investigate singing in the home and how it is used both intentionally and spontaneously.

Method

A questionnaire is given to100 mothers with infants under one year old. A balance of closed questions, rating scales and open-ended questions are used to elicit information about:

- Age, sex and position of infant in the family;
- Mothers' attitudes and experiences of singing;
- Recognition of the inflence of their singing on their infants;
- Purposes of singing to infants.

Results

In the pilot questionnaire with 14 respondees, scores showed positively that mothers recognise that singing has purposes, both in relation to their infants' responses and to how mothers feel about themselves.

Conclusions

On the basis of the pilot, it is anticipated that the report of the main survey will show that infant-directed maternal singing is used for a variety of purposes related to both handling in daily routines and to expressions of emotion.

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SINGING AND LISTENING TO MUSIC WITH INFANTS: AN INTERVIEW STUDY WITH CANADIAN MOTHERS

Beatriz Ilari
McGill University, Montreal, Canada

Background

For many centuries, parents and caregivers across the world have been singing to their babies. The way parents and caregivers sing to their infants is distinct from other performances and is often called infant-directed-singing or IDS. Lullabies and playsongs are often cited as the two most common forms of infant-directed-singing. The literature suggests infant-directed-singing to be important in the development of attachment between infant-caregiver dyads, and also in the reduction of infant stress levels. Nowadays, listening is also said to be part of infant-mother routines. Despite the growing interest for music in early infancy, little is currently known about the uses of music in the lives of infants and their caregivers in naturalistic settings.

Aims

The aim of this study was to investigate the current status of musical practices of infant-mother dyads, including a full report of singing and listening activities.

Method

Semi-structured interviews were conducted with 100 mothers of infants aged between 7 and 9 months in Montreal, Canada. Interviews were conducted in English, French, Spanish and Portuguese. Mothers answered questions on their educational and musical background, musical preferences, beliefs regarding the uses of music with infants, singing and passive listening behaviors with their infants.

Results

Most mothers reported singing and listening to music with their infants, although singing was more popular than listening. Occupation, previous musical experiences, and culture emerged as determinant factors in mothers' uses of music with their preverbal infants. Lullabies and playsongs emerged as the favorite styles sung and heard by mothers and their babies.

Conclusion

Contrary to the notion that the overuse of background music, modernization, and changes in lifestyles have reduced maternal singing activities to infants (see Papousek, 1996), this study found singing to be the preferred musical activity of infant-mother dyads. Overall, maternal beliefs and uses of music with infants seemed to be quite stable and stereotyped, as well as dependent upon mothers' previous musical experiences, occupation and cultural background. Early childhood music educators could consider these issues to prepare their lessons more adequately.

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MUSICAL STRUCTURES IN SPONTANEOUS SONGS OF CHILDREN AGED TWO TO THREE YEARS

Johannella Tafuri
Conservatory of Music, Bologna, Italy

Background

Following the studies on spontaneous singing by Sundin and by Pond (some of the earliest), many other researchers studied this behaviour paying attention to various aspects: contexts, functions, originality, modalities etc. Since all these studies were carried out with children educated „normally", we wondered what would happen in the case of children musically accompanied since prenatal life.

Aims

In order to answer this question, we decided to pursue a longitudinal research project spanning from the 6th month of prenatal life until the 6th year. The main goal of our **inCanto** Research Project is therefore to verify the musical abilities (to sing in tune, to invent songs etc.) developed by children exposed to an appropriate musical environment during the above mentioned period and if these skills are attained earlier than within the general population. The present study deals with the melodic and rhythmic structures used by children in spontaneous songs.

Method

We organised a weekly course of music for 119 mothers-to-be and for their children after birth, principally based on singing, listening, playing percussion instruments and moving. The mothers were requested to sing and listen to music daily at home, to complete and return daily diaries and to give us the recordings of children's vocal production. In the stage presented here we analysed the melodic and rhythmic structures of the spontaneous songs produced at the age 2-3 years.

Results

We classified the songs produced by 25 children as 'imitative' (repetition with invented words) or 'original'. The latter category included monologues and proper songs. In the imitative songs children showed a surprising ability to respect rhythm and melody, while in the original production, the rhythm and melody were more amorphous in monologues and more structured in songs; rhythm tended to be better structured than melody.

Conclusions

The results reveal that before 3 years of age, if the family environment is strongly supportive of the activity of singing right from the beginning of life, the physiological, perceptual and cognitive mechanisms can be ready for the use of certain musical structures in invented songs.

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SYMPOSIUM

Tempo and memory

Organizer: Wolfgang Auhagen

Saturday 10:30
Room: Stumpf (E 15)

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PREFERRED TEMPI OF IMAGINED COMPOSITIONS

Wolfgang Auhagen
Musikwissenschaftliches Seminar der Humboldt-Universität zu Berlin, Germany

Background

Until now it has not been clear whether or not the acquisition of a special motor-program by playing a composition is a prerequisite for giving a precise idea of an appropriate tempo.

Aims

The aim of the experimental study was to find out whether musically trained persons have stable tempo preferences of well-known compositions even without having played these compositions and without listening to them while determining the preferred tempo.

Method

The scores of 8 well-known compositions for keyboard instruments by J.S. Bach and W.A. Mozart were presented to 3 different groups of subjects: a) subjects who had played these compositions, b) subjects who had not played them, and c) subjects who could not play them. Subjects were asked to imagine these compositions and to adjust an electronic metronome to that tempo of the beat which seemed to be the most appropriate. The display of the metronome was hidden. Subjects had to do this task 5 times on different days. Two measures of dispersion were used: the quotient "MM max / MM min" and the quotient "MM 4th session / MM 5th session".

Results

The intrapersonal dispersion of the preferred tempi was different for the 3 groups, with those subjects who had played the compositions showing the lowest dispersion and those who could not play them showing the highest dispersion. However, differences between those who had played the compositions and those who had not played them were not significant. Differences of dispersion obviously became smaller in the course of the experiment with low dispersion between the fourth and fifth values. Preferred tempi of the three groups differed significantly only with very few compositions.

Conclusions

Playing a composition does not seem to be a prerequisite for stable tempo preferences, at least with well known compositions. However, the acquisition of special motor-programs contributes to specifying tempo preferences.

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MEMORY FOR TEMPO: HOW PRECISE DO WE REMEMBER TEMPO OVER TIME?

Rasmus Reed
Stavanger University College, Norway
University of Sheffield, Music Department, UK

Background

In studies published in 1994 and 1996, Levitin and Cook asked students at Stanford University to hum pop melodies that they knew well, trying to imagine the sound of the record. The students, most of whom had little or no musical background, reproduced the melodies in pitch and tempo very close to the pitch and tempo of the original record.

Aims

The aim of the experiments was to investigate whether a similar exactness in tempo and pitch could be found in other situations, and also to examine the stability over a period of time. The effect of different musical styles and of musical training by the participants was also examined.

Method

10 persons listened to 10 melodies from a CD and were asked to remember the tempo and pitch of these melodies over a period of time. The melodies were from different musical genres; classical melodies, pop-melodies and well-known songs. The participants then reproduced these songs once a day for a week. Their efforts were recorded digitally and analysed for tempo and pitch. One month later the same melodies were sung again once a day for a week and again analysed. In a follow up study two years later, five of the same persons again sang the same melodies once a day for a week, but this time they had no recording at the start giving the "target" tempo.

Results

Findings indicate great stability in tempo, but variances from person to person and from melody to melody. Interestingly, it seems like each participant shows great stability in most songs, but considerable instability in tempo in one or a few songs. These songs seem to be different from person to person. The ability to hit the given tempo (given on the CD) varies considerably from melody to melody. The stability in pitch was also good, but often being stable in key other than the original.

Conclusions

It is generally assumed that as few as 1 in 10,000 has perfect pitch. The findings by Levitin and Cook, and basically confirmed in this experiment, seem to indicate that "ordinary people" do have an ability to remember tempo and pitch more precisely than formerly assumed.

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SHORT-TERM MEMORY FOR TEMPO OF METRONOMIC SEQUENCES

Marek Franěk
Hana Fabiánová

Czech Environmental Institute, Prague, Czech Republic

Background

Although music psychology has at its disposal a large body of knowledge about short-term memory for pitch, to date we have no similar information about short-term memory for tempo. Our previous studies have addressed the problem of short-term memory for tempo of metronomic sequences and demonstrated, how memory decays as a function of duration of a retention interval and tempo zone.

Aims

The present research is devoted to (1) the effect of a tempo zone on short-term memory for tempo of metronomic sequences and (2) memory interferences between a base tempo and an additional temporal sequence.

Method

In Experiment 1 participants heard short metronomic sequences with IOI's of 500, 600, and 700 ms (base tempo). Subsequently, a short metronomic sequence in an additional tempo was presented. After the retention interval the participants were asked to recall the base tempo by tapping their fingers. The additional tempo was either equal to the base tempo or faster/slower than the base tempo (there were four different temporal ratios between the base tempo and the additional tempo). The similar paradigm was employed in Experiment 2, in contrast base tempi with IOI's of 300, 400, 500, 600, and 700 ms were used.

Results

The error of memory recall was the smallest in the intermediate tempo with IOI 600 ms. The additional temporal sequences impaired memory recall, but their effect differed with particular base tempi. In all base tempi it was found that the additional tempo, which was twice as fast as the base tempo, caused deceleration of a memorized tempo, while the tempo, which was twice as slow as the base tempo had the opposite effect. Experiment 2 is still in progress.

Conclusions

The interference between additional and base tempo caused a contrast effect: a fast additional tempo led to deceleration of memorized tempo and vice versa. The effect of tempo zone can be understood in terms of the "interval of indifference" with the most precise performance in the zone of intermediate tempi.

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DANCE MUSIC, MOVEMENT AND TEMPO PREFERENCES

Dirk Moelants
IPEM-Dept. of Musicology, Ghent University, Belgium

Background

Research on tempo preference showed evidence for the existence of a preferred tempo slightly above 120 bpm. This tempo can be associated with the most natural speed for the human body, it is as if the body is a resonator that starts to move under the influence of an external force: the beat of the music.

Aims

Investigating tempi as perceived in dance music, we will simultaneously try to confirm the existence of a preferred tempo and to provide some further insight. Clearly not all music has a a tempo of between 120 and 130 bpm. We will see if other tempo distributions can be associated with certain styles and if there is an evolution through recent history.

Method

We collected data from so-called bpm-lists: lists used and compiled by DJs containing the tempi of their records. Since these data are necessarily perceptually relevant, the whole set of data can be seen as the results of a big experiment on tempo perception. We will investigate the distribution of the tempi, compare lists focussing on different musical styles and look at the evolution of the distribution through the years.

Results

We see that the general distribution of the tempi shows a clear preference for tempi around 130 bpm (close to preferred tempo) and a large majority of the tempi (> 90%) falls within the 'tempo-octave' 80-160 bpm. This confirms earlier findings. However, some lists, associated with certain musical styles, show clearly different distributions, with peaks around clearly different tempi.

Conclusions

Whereas most dance music follows and evokes our natural movement, some musical styles want to elicit a different type of expression associated with longer (slower) or shorter (faster) movements. This is explained by the association of some tempi with specific types of repetitive movement. It thus provides a link between musical and gestural expression.

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THEMATIC SESSIONS

Saturday

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THEMATIC SESSION

Methodological approaches

Saturday 10:30
Room: Wellek (315)

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ARTT – A TOOL FOR TRANSCRIBING AND ANALYZING VIDEORECORDED INTERACTION

Tore West
Stockholm Institute of Education
Royal College of Music in Stockholm, Sweden

Background

This paper discusses a tool for analysing video data utilized in a research project on interaction and learning in instrumental teaching. The paper will discuss the design of the research methods in the project, focusing on close-up transcription of multimodal teacher-student interaction and systematic analysis of patterns of interaction and learning.

Aims

In the main study, 12 hours of video recorded interaction in instrumental lessons in high schools and teacher-training colleges in Sweden will generate three levels of results. A detailed micro-level transcription of speech, music and gestures will be analysed, for interpretation on a macro-level. Theoretical concepts from different, yet compatible, fields will be applied on each level.

Main Contribution

The large amounts of data generated, together with a systematic representation, description, analysis and interpretation create the need for an efficient tool to handle the data. The tool will render it possible to view the digital video on the computer screen, synchronised to a spreadsheet containing connected fields for transcribing and coding interaction in different modalities. The spreadsheet will be programmed to facilitate the recognition of patterns in the interaction, as well as more quantitative modes of output.

Implications

An ambition in the project is to make the research process transparent, in order to facilitate critical reading, as well as reproduction of the study. This also reflects an ethical ambition to aid in following the transformation of the actions of the informants through the processes of transcription and analysis, to the presentation of results and discussions of implications for practitioners. Another ambition is to make research related methods accessible to teacher-training programs, professional development programs in schools, as well as to practitioners and an interested public. This is an important reason for developing a tool for analysis utilising widespread office software, rather than a dedicated video analysis software package.

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THE IMPORTANCE OF METACOGNITION RESEARCH IN MUSIC

Rita Aiello
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Aaron Copland School of Music, Queens College, CUNY, Flushing, USA

Background

Over the last twenty five years research in metacognition has become increasingly important. Metacognition addresses one's own cognitive awareness, and affects critical thinking, learning efficiency, and problem solving. In addition, it improves the acquisition, comprehension, retention, and application of what is learned. To date there has been relatively little research that has investigated the metacognitive strategies of performance students. Traditionally, classically trained performance students are taught using a model that is based mostly on imitation. By and large, many performance students learn to play their instruments by observing the studio teachers and trying to implement the teachers' performance suggestions. Although the behavioral nature of this model has produced excellent musicians, research has shown that studio lessons tend to leave relatively little room for questions on the part of the student.

Aims

This paper discusses the value of conducting metacognitive studies in music. Moreover, it illustrates ways in which performance students could develop their own metacognitive awareness and strategies.

Main Contribution

Research has shown that some beginners and intermediate performance students seem to lack definite, clear plans on how to practice their instruments, and how to integrate aspects of their musical knowledge. It is suggested that introducing students to metacognitive awareness and metacognitive strategies could help them learn more effectively.

Implications

It is recommended that seminars on metacognitive strategies become part of every music students' curriculum.

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RECONSTRUCTING HISTORICAL LESSONS: TEACHING MUSIC IN THE 1920S AND 1930S

Andreas Lehmann-Wermser
Heinrich Nordhoff High School, Wolfsburg, Germany

Background

The time after World War I was marked in Germany by a rapid development of music education as new theories, materials and policies were distributed. While publications have been discussed broadly, almost no research has been done on everyday music teaching in higher education.

Aims

Therefore an attempt was made to gain an understanding of the conditions, methods and results of music education as they were perceived by the students participating, i.e. the relationship between the state of theory in music education and its actual practice.

Method

17 narrative interviews were conducted with 14 persons aging from 72 to 90. A corpus of 120.000 words was analyzed on the basis of the Grounded Theory. Categories were identified to describe classroom activities as well as the perception of educational processes.

Results

Teaching music in higher education schools turned out to be rather conservative in topics and methods making little use of the achievements of "progressive" contemporary music education. However, low professional standards could not be made responsible for this as it has been supposed by general histories of music education in Germany. On the contrary, music teachers appeared in the corpus as well-trained and competent persons. The lessons were successful in terms of an introduction and long-lasting participation in bourgeois musical life. Part of that success can be explained by the conformity of contents and values of school and family culture.

Conclusions

In-depth interviews appear as a useful method of reconstructing historical music teaching as well as basic processes of music socialisation. For the historical period in question success or failure of teaching music cannot be understood by merely looking at classroom processes, but only in the context of the introduction of the students into musical culture as a whole.

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GESTURE AND LANGUAGE: ASPECTS OF RHYTHMICAL AND METRICAL EDUCATION IN MUSICAL TEACHING

Silke Lehmann
Hamburg University of Music and Drama, Germany

Background

Dealing with the problem of rhythmic and metric stability in musical practice has its origin in observations made during lessons of instrumental teaching: there are children or even adults, who, while playing, show noticeable difficulties keeping the correct rhythm.

Aims

Musical lessons require a method suitable to learn the skills of rhythm and meter. As a starting point, this not only has to happen on a cognitive basis, but also with special regard to the physical dimension of rhythm. Approaches from "Elementare Musikerziehung", which include physical exercise (especially body percussion) and language (e.g. language of rhythm according to Kodály) prove themselves very promising.

Main contribution

To find out about the aspect of rhythm in physical behaviour, a description of motor development is necessary. In this connection, language can be defined as movement of the articulators. In the process of language learning, it is necessary to verify the importance of rhythm as a prosodic characteristic and to honour its function already starting with the earliest sounds. These approaches refer to psychology of development, ethology as well as phonology. Research in psychoanalysis finally brought knowledge about rhythmical synchrony of language and gesture and its function in cognitive processes.

Implications

Abilities of movement and of making sounds already exist for a long time, before cognitive skills start to develop. Language of rhythm and body percussion fall back on ontogenetic patterns of behaviour laid down early and thus function as a perfect approach for a concept in music pedagogic.

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THEMATIC SESSION

Aesthetics

Saturday 10:30
Room: v. Hornbostel (130)

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OBJECTIVISM AND STRUCTURE-BUILDING IN MUSICAL COMPREHENSION

Erkki Huovinen
University of Turku, Finland

Background

Many theories of musical perception and understanding rely on an objectivistic premise, according to which there is a class of "correct" structural interpretations for most musical stimuli. This assumption is often implicit in the methods used for the evaluation and presentation of the results.

Aims

My aim is to point out some of the problems in the objectivist view, and to discuss one alternative approach as regards the relationship between the musical stimulus and its structural interpretations.

Main Contribution

In analogy with Morton Ann Gernsbacher's account of language comprehension, both pitch perception and musical time perception may be understood as involving a process of mental structure-building. In this process, the listener attempts to interpret new stimuli in relation to the mental structures that he or she has built as a response to the previous stimuli. In music, these mental structures can be seen as being inherently centric in nature (highlighting the role of perceptual centerpoints such as downbeats and tonal centers). Such an account may challenge some of the common objectivist presuppositions behind theories of musical perception. This is because many different structural interpretations of the same musical stimulus will become possible, but also strictly incompatible with each other. I will argue that the structure-building account is more "true to the facts" than the general objectivist position, and that the latter has gained its popularity mainly because it simplifies research methodology.

Implications

The structure-building framework addresses the perceptual integration of musical stimuli on a local level, but it could also have (mainly negative) consequences for the perception of large-scale musical structures. It also appears that the account could serve as motivation for computer-aided studies of musical perception and cognition.

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THE BREATHING OF TIME IN(TO) MUSIC

Rosemary Mountain
Concordia University, Montreal, Canada

Background

Music takes time to unfold and modulates the time that it occupies. Various factors that influence our perception of musical time have been proposed by researchers in different fields, usually presented in abstract form.

Aims

Factors that have an effect on our perception of time in music include density of information; presence or absence of pulse, beat, metre, and other periodicities; specific tempo and its modulation; expectation and its thwarting; and the role of memory. The current paper explores ways in which these ideas can be given concrete form, and to what extent their effect on time perception could be calculated.

Main Contribution

Atonal, unmetred, irregular- and multi-metred passages of twentieth-century and non-Western music present structures which can be appropriately examined in terms of density of activity. The degree, rate, and frequency of contrast become significant and can be thought of in terms of information density, a factor influencing time perception. The role of memory, whereby a musical figure stirs a recollection of other material from the same or a different work, indicates that we often employ a non-linear listening. Another influence arises from the listener's changing focus from one temporal level of activity to another. Configurations maximizing such influences can be written into a composition and are also affected by performance.

Implications

From a composer's point of view, learning how to "speed up" and "slow down" the listener's time tracking mechanism would provide a powerful shaping tool for a composition's formal structure. Researchers in the cognitive sciences could benefit from considering a wider variety of musical structures as material for testing some of the hypotheses suggested in this paper.

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VARIOUS MEANINGS OF THE TERM 'MUSICAL PHRASE'

Neta Spiro
Cognitive Science Center, University of Amsterdam, Netherlands

Background

The term 'phrase' is commonly used in, and is essential to, many musical spheres, be they those of analysis, theory, performance, or modelling. However, the term is ambiguous on two levels: theoretical and practical. On the theoretical level, musicians have different definitions of the term. On a practical level, even if a similar definition of the term is used, different musicians, or even the same musician, may delineate phrases differently. In this paper an attempt is made to tackle the first level as a preparation for exploring and modelling the processes involved in the second. It investigates the different definitions and features presented by musicians of various backgrounds, from the artistic to the scientific. These include, music theorists (e.g. Keller), music analysts (e.g. Schenker), performers (e.g. Casals, Callas, Gould), theorists using formal and linguistic approaches (e.g. Lerdahl and Jackendoff), computational musicologists (e.g. Bod, Temperley) and experimental psychologists (e.g. Deliege, Palmer).

Aims

To explore the various definitions, features and meanings of the phrase, to identify the commonalities, and differences between them and understand their reasons.

Main Contribution

The different meanings of the term phrase cause an ambiguity in the understanding of its theoretical and practical uses. For example, music theorists and analysts in general define the term using relatively deep musical structures, such as underlying harmony (e.g. Rothstein, Schenker). Sometimes this results in very long phrases. Discussions of approach to performance concentrate on surface features and the phrases they describe are generally shorter (e.g. Bazzana). In contrast, some computational musicologists use theories that concentrate on human information-processing such as categorical perception and gestalt laws (e.g. Bod). The full paper will present a more comprehensive review.

The understanding of the term phrase will contribute to a more systematic approach to this musical feature and the investigation of the processes involved in phrase identification and performance.

Implications

The results of this study would be used as a first step in the formalisation of the definition of the term 'phrase'. This in turn will affect the procedures used in the analysis and description of the processes involved in our perception of phrases in music. The conclusions may be relevant to linguistic and visual perception.

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THE EMOTIONS IN SCHUBERT'S LIED "FRÜHLINGSTRAUM" AND THEIR RELATION TO MUSICAL ELEMENTS

Luis Estrada Rodríguez
Universidad Nacional Autónoma de México

Background

The expressive qualities of music are a classical theme of musico-philosophical thought. One of its most studied aspects is how music expresses emotions by means of musical factors such as melody, rhythm, harmony, tempo, dynamics, and others.

Aims

This paper presents the relationship between each of the parts of Schubert's Frühlingstraum Lied, the text of which reveals a certain emotion. It also explores how changes in the emotions described in the text reflect changes in musical factors. A comparison of three interpretive versions is also included.

Main Contribution

Basically, the text of the poem "Frühlingstraum" presents three contrasting emotions: the joy of the character who dreams of spring (compasses 1-14 and 44-58), fear upon awakening to the sound of cocks crowing in a dark and cold atmosphere (compasses 15-26 and 59-70), and finally, the melancholy of finding himself in winter, longing both for spring and for his beloved (compasses 27-43 and 71-86).

The relationship between the music and the emotions described in the text is explained through the changes that occur within the three parts of the Lied: in tempo, etwas bewegt, schnell-langsam; in harmony, consonant – dissonant – consonant; in melodic line, with recurring sounds in the second part, as well as in dynamics: pp-mf, f, ff-pp.

This paper works towards a more precise definition of the musical characteristics of the different parts of the Lied.

Implications

There is an evident relationship between the changes in the text, emotions and musical factors. The versions of the three singers coincide in atmospheric changes with different emphases.

Understanding the emotions implied by the texts is a great aid towards the correct musical interpretation of similar works.

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APPENDIX

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TAKAO UMEMOTO

1921-2002

On September 13, 2002 at the age of 80 passed away professor Takao Umemoto, past president of the Japanese Society of Music Perception and Cognition, one of the leading world researchers in the domain of music psychology.

Takao Umemoto was born in Kyoto on October 10,1921 as a son of a Buddhist monk who was also professor of psychology and who loved music. So Takao learned music from early childhood and played piano throughout all his life.

In 1945 Takao Umemoto entered Kyoto University and graduated in psychology in 1952. He got Ph.D. in Education in 1966 and worked at Stanford University in cooperation with E.R. Hillgard, G.H. Bower, and in contact with G.A. Miller, J.S. Bruner and D.A. Norman. After returning to Japan he became professor of psychology at Faculty of Education, Kyoto University. After retiring from there in 1985 he became professor at Konan Woman's University, and lectured in music psychology until 1995.

Professor Umemoto organized the Society of Music Perception and Cognition in Japan, was it's first president (1988-1994) and organized the first International Conference on Music Perception and Cognition in Kyoto (1989). He performed important work in various fields of experimental psychology and music psychology. Many of his students have become leading psychologists in Japan. In the years 1975-1985 he served as a Journal Editor of Psychologia. Among his books several concerned music psychology. These were: Music Psychology (1966), Research in Music Psychology (1996), and Music and Children (1999).

Mariko Osaka and Andrzej Rakowski

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CALL FOR PAPERS

8th International Conference on Music Perception and Cognition

We are pleased to announce that the 8th International Conference on Music Perception and Cognition (ICMPC8) will be held at Northwestern University in Evanston, Illinois, USA, August 3-7, 2004. The biennial ICMPC is the world conference on music psychology and related disciplines.

The 2003 ICMPC conference follows meetings of the music perception and cognition research community in Kyoto, Japan (1989), Los Angeles, U.S.A. (1992), Liege, Belgium (1994), Montreal, Canada (1996), Seoul, South Korea (1998), Keele, U.K. (2000), and Sydney, Australia (2002). ICMPC8 will be sponsored by the Society for Music Perception and Cognition (SMPC), the European Society for the Cognitive Sciences of Music (ESCOM), and the Asia-Pacific Society for the Cognitive Sciences of Music (APSCOM), ex-officio members of the conference advisory board. Other participating societies include: the Australian Music & Psychology Society (AMPS), the Japanese Society for Music Perception and Cognition (JSMPC), the Korean Society for Music Perception and Cognition (KSMPC), and the Argentine Society for the Cognitive Sciences of Music (SACCOM). ICMPC8 will be hosted by the Northwestern University School of Music and the SMPC, with faculty affiliated with NU's Music Cognition, Music Education, and Music Technology programs serving as members of the conference organizing committee.

The venue for ICMPC8 is the School of Music at Northwestern University (music.northwestern.edu). In view from the conference site are the beautiful Lake Michigan shoreline and downtown Chicago, with its vibrant cultural life and many musical opportunities.

CONFERENCE STREAMS

The focus of ICMPC8 is interdisciplinary discussion and dissemination of new, unpublished research relating to the field of music perception and cognition. The conference will have relevance for university and industry researchers and graduate students working in psychology, music theory and composition, psychophysics, music performance and education, music therapy and music medicine, neurophysiology, ethnomusicology, developmental psychology, linguistics, artificial intelligence, and computer technology.

SUBMISSION OF PAPERS

Submissions are invited for: (1) spoken papers, (2) poster presentations, (3) demonstration papers, and (4) symposia. The deadline for submissions to ICMPC8 is December 1, 2003. Spoken papers, posters, conference proceedings, and publications will be in English. Details of submission format, procedure, and deadlines can be found on the conference web site (www.northwestern.edu/icmpc/).

LOCATION

Northwestern University is located on the west coast of Lake Michigan. The beautiful township of Evanston is the first suburb north of the Chicago city limits, just twelve miles north of downtown. The Chicagoland area is served by two major airports (O'Hare and Midway), making travel to and from the

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conference convenient and easy. The conference venue and local lodging sites are conveniently located, with public transportation in and out of Chicago and surrounding areas readily available using the "El" (elevated train system).

FURTHER INFORMATION

Visit the ICMPC8 web site or contact the conference chair, Dr. Scott D. Lipscomb, by email at lipscomb@northwestern.edu. We look forward to welcoming you to Evanston in August 2004!

Scott Lipscomb, Conference Organizer
Richard Ashley, Robert Gjerdingen, & Peter Webster, Conference Organizing Committee

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ZUR DEUTSCHEN GESELLSCHAFT FÜR MUSIKPSYCHOLOGIE

Die Deutsche Gesellschaft für Musikpsychologie e. V. (DGM), zu der etwa 200 Mitglieder gehören, hat sich die Aufgabe gestellt, die musikpsychologische Forschung und die Diskussion musikpsychologischer Fragen zu fördern. Sie unterhält Kontakte mit verwandten Organisationen des In- und Auslandes. Die Gesellschaft erfüllt diese Aufgabe, indem sie internationale und nationale Tagungen und Begegnungen organisiert sowie fachrelevante Veröffentlichungen und Schriften veranlaßt und publiziert (z. B. das Jahrbuch „Musikpsychologie", das als Vereinsorgan alle Mitglieder kostenlos erhalten). Der gegenwärtige Vorstand der Deutschen Gesellschaft für Musikpsychologie besteht aus:

1. Vorsitzender:	Prof. Dr. Reinhard Kopiez
2. Vorsitzender:	Prof. Dr. Heiner Gembris
Schriftführerin:	Dr. Claudia Bullerjahn
Schatzmeister:	Prof. Dr. Christoph Louven

Weitere Informationen über die Gesellschaft, ihre aktuellen Aktivitäten und Publikationen sind auf der Homepage der DGM zu finden, unter http://www.music-psychology.de. Wir stehen Ihnen gerne für weitere Fragen (auch bezüglich einer Mitgliedschaft) zur Verfügung.

ABOUT THE GERMAN SOCIETY FOR MUSIC PSYCHOLOGY

The German Society For Music Psychology (DGM) with its about 200 members strives to foster research and discussion of issues pertaining to the psychology of music. It maintains professional contacts with related national and international organisations. The society pursues its goal by organising national and international conferences and meetings, and by initiating and providing relevant publications (e. g. members receive the yearbook „Musikpsychologie" as part of their membership benefits). The current governing board members are:

President:	Prof. Dr. Reinhard Kopiez
Vice president:	Prof. Dr. Heiner Gembris
Secretary:	Dr. Claudia Bullerjahn
Treasurer:	Prof. Dr. Christoph Louven

Further information about the German Society For Music Psychology, its activities and publications is provided on the society's web page at http://www.music-psychology.de. Please feel free to contact us for any additional information including membership.

DGM website:
http://www.music-psychology.de

DGM
Deutsche Gesellschaft für Musikpsychologie e.V.

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INFORMATION ABOUT THE EUROPEAN SOCIETY FOR THE COGNITIVE SCIENCES OF MUSIC (ESCOM)

PURPOSE

ESCOM is a non-profit organization that seeks:

- to further theoretical, experimental and applied research and teaching in the cognitive sciences of music which are defined as those that study the perceptual and mental processes underlying musical experience and activity,
- to increase and diffuse knowledge of music perception and cognition and to promote its practical applications, and
- to encourage European and international communication and cooperation within the field of the cognitive sciences of music; this field is considered to include those sub-disciplines within musicology, music theory, psychology, acoustics, neurophysiology, philosophy, mathematics, artificial intelligence, education and any others that have as their central focus the cognitive sciences of music.

ACTIVITIES

The Society's activities include:

- encouraging the scholarly, educational and practical development of the cognitive sciences of music by holding regular meetings,
- furthering publications in music cognition, organizing educational programs,
- seeking means to support young researchers in their training and research activities,
- performing public relations work and maintaining relationships with other national and international organizations that share its main goals.

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MEMBERSHIP

To be eligible for active membership of the Society, an individual shall have shown interest in the aims of the Society through research, publications, or training. Membership falls into one of the following categories:

- Full Member: must reside and work in a European country.
- Student Member: students of institutes of higher education taking n relevant courses.
- Affiliate Member: individuals eligible for Full membership but not primarily residing or working in a European country.
- Sustaining Member: individuals, corporations, or organizations who give major donations to the Society.

Only Full Members have the right to vote on resolutions presented to the General Assembly and to hold office in the Society.

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Conference on Interdisciplinary Musicology

Graz, Austria, 15 – 18 April 2004 *http://gewi.uni-graz.at/~cim04/*

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fax: +43 316 380-9755 email (administrative): sieglinde.petzl@uni-graz.at

Call for Papers

CIM04, the first Conference on Interdisciplinary Musicology, will be held in Graz, Austria from 15 to 18 April 2004. It will be a forum for constructive interaction between and among subdisciplines of musicology such as acoustics, computing, cultural studies, education, ethnomusicology, history, psychology, and theory/analysis. We will especially promote collaborations between the sciences and humanities, and interdisciplinary combinations that are new, unusual, creative, or otherwise especially promising. All abstract submissions will be anonymously peer-reviewed by international experts. The deadline for abstract submission is **31 October 2003**.

The conference is hosted by the *European Society for the Cognitive Sciences of Music* (http://musicweb.hmt-hannover.de/escom) and the *Department of Musicology, University of Graz* (http://www-gewi.uni-graz.at/muwi). The various subdisciplines of musicology are represented by the conference's *participating societies*.

Graz is an ideal location for a conference on interdisciplinary musicology. Its three universities include departments of musicology (covering historical and systematic musicology); composition, music theory, music history and conducting; music education; ethnomusicology; aesthetics; early music and performance practice; jazz research; electronic music and acoustics; and telecommunications.

CIM04 is not only about the many subdisciplines of, and approaches to, the study of music - it is also about direct interaction between scholars with contrasting backgrounds who come together to solve common problems emerging from that study. It is about the collaborative collection of convergent evidence. It is about climbing walls and crossing bridges.

Welcome to CIM04!

Conference on Interdisciplinary Musicology
Graz, Austria, 15-18 April 2004 http://gewi.uni-graz.at/~cim04
Richard Parncutt, conference director (parncutt@uni-graz.at)

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