Advancing Interdisciplinary Research in Singing

Student and Young Professional Newsletter

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Theme 1. Singing Development: Discovering universals of song acquisition

About Me

Rayna Friendly is a PhD candidate from McMaster University's department of Psychology, Neuroscience and Behaviour in Hamilton, Ontario. As a member of the Infant Auditory Lab, Rayna works under the supervision of Dr. Laurel Trainor: a leading researcher in the field of auditory development and music cognition and perception. Rayna has been singing in school choirs and small ensembles for over 10 years and is currently a member of McMaster University's Vocal Ensemble. In her research, Rayna has extended on her interest of the voice, and of singing, by studying the development of voice discrimination during the first year of infancy, as well as the development of singing ability in young children. Rayna loves working in a field that allows her to combine her interests of psychology and music, and looks forward to interacting with the many vocal specialists at this year's upcoming AIRS meeting!

Vocal Sensorimotor Development and Singing in Canadian First Graders: Examining the relationship between vocal production and perception using the Vocal Auditory Motor Developmental Assessment (VAMDA)

Although singing is a universal human behaviour, we know very little about its development. Several studies in the music education literature and neuroimaging studies of adult singers indicate that sensorimotor integration of vocal production and auditory perception mechanisms are critical to singing proficiency. These studies also indicate that music training and vocal practice are highly related to singing ability. However, it remains unclear how production and perception mechanisms are affected by these factors, and what

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role they play in singing development during childhood. Two classrooms of grade 1 children participated in the study. One group of children received a special music program for one hour per week during the school year, while the other group participated in a traditional music education curriculum. A set of matched auditory perception and vocal production tests (VAMDA) were administered individually to all children: once at the start, and once at the end of the school year. Tests of social competence and cognitive ability were also administered. Testing is still in progress. Preliminary results will be presented at the upcoming AIRS meeting. Results will indicate 1) whether children's singing abilities change substantially over the course of a school year, 2) if the music program facilitates singing ability in comparison.

About Me

Amy Fancourt is a PhD candidate at The University of London, Goldsmiths College, UK. Prior to commencing the PhD, Amy completed a first Degree in Psychology at The University of Durham and went on to complete an MSc at The University of London, Birkbeck College. As part of her MSc she worked under the supervision of Dr Lauren Stewart on a project investigating the development of pitch perception in childhood. As a PhD candidate, Amy is working under the supervision of Prof. Pamela Heaton to study musical cognition in children with Specific Language Impairment. Amy has had a long-standing interest in music and has been singing in church and school choirs for a number of years. In her research, Amy has combined her interest in music and developmental cognitive neuropsychology to study musical perception in typical children and those with impaired language development. Amy is very much looking forward to the opportunity to spend some time at McMaster over the summer to receive training from Dr Laurel Trainor and Dr Christine Tsang in the testing/analysis of singing measures to be piloted with a cohort of English children next year.

Using the Vocal Auditory Motor Developmental Assessment (VAMDA) to assess Vocal Sensorimotor Development and Singing of First Graders in England

One of the enduring questions in singing research is the extent to which perception and production are yoked together in development. A further question is the extent to which the typical developmental milestones for singing perception and production are observed universally in children from around the world. A set of matched auditory perception and vocal production tests (VAMDA) was designed to measure the singing abilities of typical 5 and 6-year old children. The measures are currently being tested on two groups of grade one children from different schools in Canada and are being piloted on a cohort of children in Poland. We plan to use these measures to assess the perception and production abilities of a group of 30 musically untrained 6-year old children in England at the start of the school year. Using these methods to test cohorts of children from around the world will give us an insight into the typical development of singing perception and production cross-culturally, furthering our understanding of the extent to which the development of perception and production abilities implicated in singing are universal. Collaborations with singing researchers internationally within AIRS could lead to the further investigation of the perception and production abilities of typical children at different stages of development from around the world.

Theme 2. Singing and Education:
Teaching singing and using singing to teach

About Me:

Sandra Cornaz is a third year bi-national (France-Italy) PhD candidate with Gipsa-Lab in Grenoble and LFSAG in Turin. Her research study deals with phonetics, Singing-Voice and Acquisition of French as a Second Language. This argument is being developed jointly with Nathalie Vallée (CR1-CNRS), Nathalie Henrich (CR1-CNRS) and Antonio Romano (CR). She is responsible for courses in infant language development, phonetics and general linguistics in the Sciences of Languages Department at the University of Grenoble, *Campus 3* (France). She is also a teacher of French as a Second/Foreign Language since 2003 and has worked in Botswana, China, Germany, Italy and France in differing work contexts; she was responsible for the teaching of phonetics for both learners and teachers. To that end, she used French songs and the singing-voice to enhance perception and production.

Can using "singing-voice tasks" improve outcomes in segmental phonetic and phonological learning of a foreign language?

Music has a positive impact on learning processes. In linguistics, the positive role of music in the perception of prosodic features has been pointed out, and a recent study has shown that the segmentation of words in a foreign language is facilitated by sung sequences. In the first ongoing study we aim to investigate, by using fourth regular 2-hours sessions and a 3-hours validation, whether singing-voice tasks could help to improve the learning of French Phonemes. For comparison purposes, a traditional phonetic method was slightly modified to introduce singing-voice tasks. The preliminary observations show that the subjects who were taught with additional singing-voice tasks learn faster than those who were not, and the overlap of acoustic scattering is less important. Based on these results and those of several other ongoing experimental studies, we have developed an original method for teaching/learning and assessment in corrective phonetics courses in a foreign language supported by speech therapists, language teachers and singers.

In that goal, we made a research study about the better musical bases, which should be adapted to the teacher's phonetic aims. We chose to give priority to vocalizes and ditties in our approach, because they have the characteristic to be easily memorized. In order not to use an artistic material with distortion and to adapt vocalizes and ditties to the didactic needs, we had created entirely new ones, especially formulated for the didactic of the French phonemes and their allophones. That composition work needed a close collaboration between teacher and artist, the aim being to propose an interesting and original didactic tool of phonetics, but keeping all the characteristics of the vocalize or the ditty. Those ditties were tested in an experimental study, which consisted in a French phoneme categorization task with native Italian learners. The experiments we are running now aim to underline the role of the singing-voice on the categorization of French vowels for Italian native speakers. Our goal is to examine the impact of Duration and pitch in the perception of unknown or little-known phonemes. This study is

expected to start in May and June 2011 in Italy.

About Me:

Christopher Roberts is a Ph.D. candidate at the University of Washington, USA. As a Kodaly-inspired elementary school music teacher, Christopher has long been interested in the development of children's singing skills. In particular, Christopher is interested in the study of children's informal music-making practices and the types of musical behaviors with which they engage outside the realm of adults.

An Examination of Internet-Based Resources of Children Singing Throughout the World

The movement to honor and value children's voices has gradually gained steam over the last two decades, and the rise of the Internet allows interested parties to not only read about children's natural music-making experiences, but also to hear children, singing and laughing and engaging in the musical play that is part of the essence of their childhood. My project surveyed available online resources, to determine the scope and variety of websites containing music of children singing in their natural contexts, with minimal interference by adults. Over fifty websites were examined, and five met the criteria: Smithsonian Folkways, the American Folk Song Collection at Holy Names University, the Florida Folklife Project of the Works Progress Administration, The Association for Cultural Equity, and The Archival Sound Recordings of the British Library.

Each website is described, first in broad overview, then with specific sections explaining the overall musical content available on the site followed by particular attention to the musical content of children. Following the description of each website, the transcribed songs from the site are posted, along with relevant information available on the website. Links for all songs are included. After all five sites are described, a classification system is provided. Thirty-four songs are transcribed, representing 15 countries and 23 cultures. Tessituras and ranges vary widely, with the *Inuit Children's Song* ranging from A, to E while the Canadian children on *Trois Fois Passera* sing notes from A flat to E flat.' Most songs fall into duple meter, but the prevalence of asymmetrical or mixed meters can also be found in 12 of the 34 songs. The most common text subject is violence or death, while other topics include animals/nature, food, and work/occupation.

About Me:

Andrea Emberly is currently a Postdoctoral Fellow in Music at the University of Western Australia where she is working with Winthrop Professor Jane Davidson on several research projects on childhood and singing. Andrea became involved with AIRS through her PhD research in ethnomusicology on children's music in South Africa, supervised in part by Professor Patricia Campbell at the University of Washington and Professor Caroline van Niekerk at the University of Pretoria. Since joining AIRS Andrea has been leading the students and young professionals group where they have been exploring possibilities for cross-theme collaborations and engagements.

Children's Singing in South Africa and Australia

At present I am conducting research on several projects that explore the intrinsic relationship between singing, music, art and dance. In particular, I am interested in how children foster personal and communal identity based on their relationships to musical arts within their particular communities. I have been continuing research with children in rural South Africa since 2007 and in urban and rural Australia since 2009, most recently in remote communities in the Kimberley region of Western Australia. In addition I have been building a research project on the role of singing in refugee children's lives in Western Australia, examining the ways in which singing can contribute to refugee children's health and wellbeing.

My research spans many of the AIRS themes and subthemes and I am interested in continued collaborations that explore the ways in which singing and engagement in musical arts practices contributes to children's cultures.

About Me:

Johanna Devaney recently completed her PhD in Music Research at the Schulich School of Music of McGill University under the supervision of Prof. Ichiro Fujinaga. Johanna's dissertation focused on intonation in Western art music. In July, Johanna will start a post-doctoral fellowship at the Center for New Music and Audio Technologies (CNMAT) at the University of California, Berkeley under the supervision of Prof. David Wessel. During her post-doctoral fellowship, Johanna will apply the tools she developed for studying Western art music to non-Western and popular music. She will also explore some of the perceptual questions related to the study of intonation, including issues around perceived pitch and the just-noticeable difference for tuning in different musical context.

An empirical study of intonation practices in solo singers and SATB ensembles

Intonation in singing is a complex phenomenon that has received only limited attention in the literature to date. Previous studies have observed that singers do not strictly conform to either equal temperament or any other fixed-intonation system, such as Just Intonation or Pythagorean tuning. There remains, however, a number of unanswered questions related to intonation, including what singers are doing rather than what they are not doing and whether the singers' actions change with training or experience. This study was made up of two experiments, one on solo singing and one on ensemble singing. The subjects in the first experiment consisted of two groups of singers (undergraduate soprano vocal majors and professionals) and the experimental material (Schubert's "Ave Maria") allowed for the examination of the role of musical context on melodic intonation. The second experiment used one semi-

professional and two professional SATB ensembles. The experimental material consisted of progressions that presented semitones and whole tones in different contexts, an exercise by Benedetti, and Praetorius' "Lo, how a rose e'er blooming," which allowed for both melodic and harmonic intonation to be studied. While the intonation data from the experimental recordings could be extracted manually, it is an extremely time consuming procedure that limits the number of recordings that can be evaluated. To facilitate this, a new algorithm for automatically estimating note onsets and offsets in monophonic recordings of the singing voice was developed. Overall, the experiments showed that the singers tended towards equal temperament; however, there was a wider range in interval size for both the melodic and vertical intervals than was anticipated at the start of the study. In the first experiment, there were significant differences between non-professional and professional groups of singers. These include a significant effect for accompaniment in the non-professional's semitones, which suggests that the singers become more consistent between *a cappella* and accompanied versions when they acquire more training/experience. Also, the non-professionals showed a significant effect for the difference between leading tones and non-leading tones, which suggests that either singers acquire greater stability in their production of leading tones with training or that the singers with less training tend to exaggerate them. One significant effect found for vertical intervals was that those in cadential contexts tended to be closer to Just Intonation than those in non-cadential contexts. The annotation tool developed for this research could be useful for some of the work being undertaken by researchers in the Development theme.

Theme 3. Singing and Well-being:
Promoting health through singing

About Me:

Sally Busch is a master's student in the psychology department at Carleton University (Ottawa, Canada), under the supervision of Dr. Mary Gick. After completing her first undergraduate degree in the combined honors Arts and Science program at McMaster University (Hamilton, Canada), Sally went on to obtain a Bachelor of Arts (Honours) in Psychology at Carleton University. Sally's interest in singing began at age 11 with voice lessons in her hometown (Vankleek Hill, Canada), which culminated in a Grade 8 Level Voice in the Royal Conservatory of Music, and led to the composition and production of a short opera for her undergraduate thesis at McMaster University. In 2010, she was awarded a Canadian Institutes of Health Research Master's Award. Sally looks forward to meeting fellow AIRS researchers in St. John's this summer.

Measuring the Effects of Singing on Well-Being

The concept of song as a contributor to well-being is intuitively powerful, but psychological research on the subject is sparse. Some limited research has suggested that singing has many potential benefits, both physiological and psychological, for a variety of populations. However, the study of these effects can be problematic as it is unclear what measures might

most successfully capture the effects of singing. To date, we have undertaken two studies to help address this issue in the research. The first was a pilot study of caregiver measures for group-singing related behavior change in a dementia population. Caregiver measures were deemed an important potential source for information in this population as individuals with dementia may not be able to reliably fill out standard self-report measures. For this study, caregivers at a long-term care facility for individuals with dementia were asked about their impressions of the effects of group-singing sessions on participating residents. Results suggest that caregiver measures are informative and that singing has a positive impact in this population, although this effect may be short-lived. The second study sought to examine the associations among singing and different measures of well-being in community choral singers. Choristers were asked to fill out a variety of well-being measures both before and after a rehearsal in order to determine whether any significant effects of singing on well-being could result from a single choir rehearsal and if so, which measures might capture this effect. Results from this study are forthcoming. This vein of research seeks to help build a foundation of knowledge from which to develop more complex studies of the relationship between singing and well-being.

About me:

Rita Bento is a PhD student in Psychology at the Sidney De Haan Research Centre for Arts and Health, Canterbury Christ Church University. Under the supervision of Prof. Stephen Clift, Dr. Paul Camic and Prof. Grenville Hancox, she is developing her doctoral research on the effects of choir singing on well-being. Rita's background is in psychology (mainly social psychology) and neurosciences and she is quite possibly one of the few (if not the only) PhD students in this field of research who does not have any kind of musical education. When choosing her research topic Rita did, however, want to work on some of her biggest research interests. Human musical behaviour was on the top of her list, in particular, music production for its probable contribution for well-being and health. Rita failed to see her lack of previous musical education and experience in music production as a limitation in her endeavors. Instead, this has afforded her somewhat of a baseline stage that she can now compare her choral singing experience to – Rita has been an active member of CCCU's Choral Society since October 2010. Coming to experience choral singing for the first time with a scientific awareness has allowed Rita an insight into the effects of singing - while performing or rehearsing - that could have escaped her otherwise. Furthermore, it allows her to explore effects of singing from the perspective of the non-musician, reflecting the experience of a wider group in our society. Rita hopes that this unique position will allow her to contribute further to existing research on singing.

Effects of choral singing on well-being and its psychoendocrine correlates

Singing has been said to promote well-being. Many who take part in regular and organized singing, particularly with others (such as choral singing), attest to this effect. However, there is little scientific evidence to support the extensive anecdotal evidence on this issue. In fact, little is known about the relationship between singing and well-being in general and choral singing and

well-being in particular. Due to the relative infancy of this field of research, understanding on what the beneficial and positive effects of choral singing are and how they interact is still limited. Well-being is a multidimensional concept and an array of activities have the potential to promote it. Understandably, singing activities that target more dimensions of well-being should result in a more enjoyable experience with higher potential to benefit well-being in the short and long term. I propose that choral singing is a complex activity with several psychological, bodily, and social components that can interact and contribute to feelings of well-being. Choral singing creates a context and requires the individual to perform a series of actions that force the mind and body to engage physically, socially and psychologically with the task at hands in a way that tackles the main hedonic, eudaimonic and social dimensions of well-being. To advance understanding on such multifaceted concepts and activities, integrated perspectives should be more successful. For this reason, the empirical work associated with this project is being carried out from a psychoendocrine point of view. The first empirical step has been to create a questionnaire instrument in order to better understanding the effects of choral singing. Based on previous work by Clift & Hancox (2001) and Bailey & Davidson (2005), items were created to address the main domains that are thought to be influenced by the experience of choral singing - psychological (emotional and cognitive), bodily (physiological and physical), and social (bonding and cooperation). After a pilot study where 67 choral singers (45 females) were asked to rate their agreement with the different items, an improved version of the Choral Singing Experience Questionnaire is now being further tested and will be used to assist in gathering psychological data in subsequent studies. To complement this, I am also in the process of collecting endocrine data. Previous research has looked at effects of choral singing on cortisol, a hormone related to stress and anxiety, in order to investigate how choral singing may benefit our well-being and health. The evidence indicates that choral singing promotes positive psychological states that help cope with stress and anxiety (Beck et al., 2000). Members of CCCU's Cantata Choir conducted by Prof. Grenville Hancox, will take part in a study where psychoendocrine data will be gathered before and after a rehearsal, performance or passive control condition. We believe this is an important step forward in clarifying the relationship between choral singing and well-being. I look forward to sharing the results of this study with the AIRS community.

About Me

Dawn Merrett is an MPsych (Clinical Neuropsychology) /PhD candidate from The University of Melbourne and the Florey Neuroscience Institutes. She works out of the Music Neuroscience Laboratory at Melbourne Uni and the new Melbourne Brain Centre under the supervision of A/Prof Sarah Wilson, Prof Isabelle Peretz (Université de Montréal), and Prof Graeme Jackson. She spent much of last year in Montreal on study leave at BRAMS, the International Laboratory for Brain, Music, and Sound Research, and she enjoyed the opportunity that provided to attend the AIRS annual meeting in Seattle. Dawn is an Associate of the Royal Conservatory of Music and previously maintained a private teaching studio for 10 years. She has been heavily involved in music education and in the promotion of music and the arts in the community, particularly with community choirs, festivals, and music programs in assisted living facilities. Dawn is now exploring her interest in music neuroscience and the influence of active music making, especially

singing, on brain and behaviour.

Using singing to speak after stroke

Previous research has shown that singing training has a significant influence on the brain and behaviour in both healthy individuals and those with neurological disorders. In particular, singing has been used in rehabilitation programs for those with language impairments after stroke. Despite some evidence for the efficacy of singing, the mechanisms by which it might interact with the language system and thereby promote language recovery are still uncertain. To probe these issues, we are investigating the influence of singing training on brain organisation and music and language outcomes in neurologically-healthy individuals and those with non-fluent aphasia after stroke. Before and after standardised singing training, participants undergo structural and functional neuroimaging and a behavioural assessment battery. The assessment battery includes measures of processing speed, memory, attention, mood, musical abilities, and speech and language. Data collection is ongoing, and preliminary behavioural results suggest that singing training in individuals with aphasia leads to improvements in singing and language, with increased pitch accuracy, phrase repetition ability, and generation of trained phrases in response to questions. This research will provide insight into the interaction of music and language in the brain and the mechanisms of singing-induced language recovery after brain injury.

About Me:

Jean Emmerson is a PhD candidate at the University of Saskatchewan, Department of Educational Psychology and Special Education. Her supervisor is Dr. Jennifer Nicol, AIRS Research Team Leader, Singing and Health. She has taught elementary, secondary, college and university students in Toronto, Vancouver, and Saskatoon over the past 20 years. She has also sung in choirs, performed in musicals, and played in a variety of bands. She has degrees in Music (BFA, York University), Education (BEd, University of Toronto), and Counselling Psychology (MA, Adler School of Professional Psychology, Chicago).

Mama Music: Promoting health and harmony in the lives of adolescent mothers and their infants with singing

I am working on this project as part of my dissertation. I plan to use qualitative arts-based and educational action research in this semester-long study of a singing program for young mothers and their infants. I am interested in the adolescents' experiences with singing as well as the interactive singing with their infants and their infants' responses to singing. A participatory model will be used to engage the youth and ensure the research represents their interests and motivations. With consent, video recording/photography/ audio recording will be used in data collection and ideally be provided to the participants at the end of the singing program. The visual media will also serve as a knowledge translation strategy for presentations at professional and public forums. Expected scholarly outcomes include a dissertation as well as accompanying conference presentations and peer-reviewed publications. I am planning to begin this research in the fall of 2011.

AIRS: A Major Collaborative Research Initiative of the Social Sciences and Humanities Research Council of Canada.

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