

# Advancing interdisciplinary research in singing: A performance perspective

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A major collaborative research initiative focusing on singing, entitled Advancing Interdisciplinary Research in Singing (AIRS, [www.airspace.ca](http://www.airspace.ca)), is engaging researchers worldwide in studies representing three research themes: how singing develops in every individual, how singing should be taught and used for teaching, and how singing impacts wellbeing. Over 20 studies are ongoing in nine sub-themes (i.e. three for each of the primary themes of development, education, and wellbeing). This article highlights performance aspects in the developmental theme by focusing on a test battery of singing skills that is being administered across ages and cultures by researchers in several parts of the world. The presentation also provides an overview of the performance aspects of the research enterprise as a whole, giving a context for the remaining presentations in this symposium by researchers engaged in or affiliated with the AIRS project. The project itself represents a research model applicable to studies of performance on any musical instrument. Such studies would be useful for determining unique aspects of singing performance versus unique aspects of performance on other musical instruments and for determining aspects common to performance of all musical instruments including the voice. Applications could also extend to other performance arts such as drama and dance.

*Keywords:* singing; interdisciplinary; development; education; wellbeing

Singing is an example of music performance that is accessible to almost all human beings. Singing requires no musical instrument other than the human voice. Basic skills of singing evolve naturally at the same time as the child learns the basic skills of speaking. What these singing skills are, how they can best be nurtured, and their benefits to wellbeing throughout the lifespan are topics in need of investigation both independently and in conjunction.

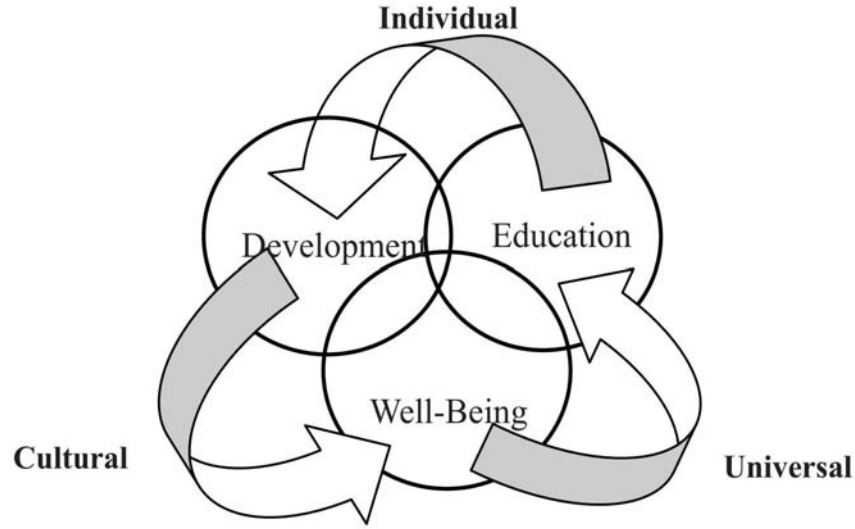


Figure 1. General framework of the AIRS program of research on singing, examining individual, cultural, and universal influences.

A major collaborative research initiative focusing on singing called AIRS (Advancing Interdisciplinary Research in Singing, [www.airspace.ca](http://www.airspace.ca)) is engaging researchers worldwide in studies of how singing develops in every individual, how singing should be taught and used for teaching, and how singing impacts on wellbeing. As depicted in Figure 1, these three interrelated research domains are being examined with respect to influences on singing that are unique to an individual, that are culturally determined, and that are universal. Research that seeks to advance our understanding of singing can draw on expertise from many disciplines: for example, music, psychology, education, folklore, acoustics, anthropology, etc. Given the context of the conference, the present article overviews the AIRS project with special focus on performance.

### MAIN CONTRIBUTION

AIRS uses a wide variety of quantitative and qualitative methods to acquire data. In the development theme, a new AIRS test battery for acquiring data on singing has been created (Cohen *et al.* 2009). The test includes two language components (a phoneme pronunciation task and a verbal fluency and story generation task) which serve as book ends for nine singing tasks. These include singing the so-called universal minor-third melody, singing a favorite song, singing up to the highest note possible and down to the lowest note possible (vocal range), singing short musical elements such as *doh re mi re*

*doh* and a major triad, *doh mi sol*, singing the familiar *Brother John* song (*Frère Jacques*), singing an unfamiliar song, making up the ending of a song, and composing a song prompted by one of four pictures. The data are recorded using an audio-video camcorder. The rich data become even more valuable when contrasted with data derived from successive test sessions (i.e. longitudinal studies) or from other cultures or ages (i.e. cross-sectional studies). Current work is being conducted in two sites in Canada, in England, and in Estonia and Iceland and will soon begin in several other countries including the USA and Brazil, with China and Kenya to follow. Benefits of music training have already been shown, even when that training is not specifically on singing. One study in PEI has compared native Chinese and native English speaking university students revealing the disadvantage to learning to sing the contour of a melody when lyrics are in a foreign language. The detriment occurs even when the singers produce the syllable *la* and not the lyrics. (Stevenson *et al.* 2011). The challenge created by foreign- as opposed to native-language lyrics in learning to sing a melodic contour implies that learning a melodic contour takes processing capacity that is shared by phonemic encoding. Intercorrelations among multiple measures from each of the performance tests help to reveal the underlying mechanisms affecting performance. For example, Bing-Yi Pan at UPEI has discovered a relation between the ability to sing the ending of a short unfamiliar melody and accurately singing a major triad and a descending major scale.

The test battery represents only one research arm of AIRS. To date, over 20 other studies are ongoing in 9 different sub-themes (three for each of development, education, and wellbeing). Electromyographic technology is being harnessed to study facial motion in singing (Russo *et al.* in press) and body movement during singing is being monitored through motion tracking. Acoustical data of singing is being analyzed using artificial intelligence techniques (Devaney *et al.* in press). At the same time researchers are administering questionnaires, making audio-visual recordings and interviewing singers in many contexts.

Groups working within the same discipline may not necessarily agree on the best approaches or questions to address. The history of musical acoustics reminds us of the controversies surrounding the correct tuning of fixed pitch instruments. The same issues can arise in measuring vocal performance, where the voice is a performance instrument of continuous pitch often in the context of equal-temperament. Within vocal pedagogy, various practitioners and researchers may be passionately attached to different approaches. Potential controversies are the bread and butter of research that often leads to productive critical experiments or demonstrations. The real problem arises in

interdisciplinary discourse. A trick here is to find common ground between two domains that will enable persons of different disciplines to see how the same material can play a role in an entirely different context. So for example, a finding from the AIRS test battery which reveals a disadvantage in learning the melody of a song when foreign language lyrics accompany the melody, may have implications for formal vocal training in the school setting, a part of the education theme. It could also have an impact on the method of teaching songs of a foreign culture to children in a study of learning non-native songs as a means of improving attitudes to persons from a different nationality. The latter is a project in the singing and wellbeing theme led by Lily Chen-Hafteck teaching children in Canada, Brazil, China, and Kenya. If further we find that elderly persons similarly are unable to learn a melody when the words are presented in a foreign language, this would impact the study in the wellbeing theme that focuses on the role of singing in intergenerational understanding (Heydon in press).

At the same time, from the education theme, analysis of songs in the natural repertoire of children of certain ages (cf. Campbell 2010) should confirm the findings from the test battery about what intervals or short melodic patterns the children are able to produce at that age, and conversely, capacities demonstrated in the test battery could predict what elements might appear in the songs of children of these ages.

It is one thing to see the potential relation between the findings in two different disciplines and another to establish the interdisciplinary dialogue. For example, developmental psychologists collect data and analyze it statistically. Educators or ethnomusicologists, however, may provide descriptive evidence that is less likely to be submitted to statistical tests. Both groups may provide notation of songs with different considerations regarding tuning. While the developmental psychologist may fail to consider some of the musical aspects of singing (e.g. focus instead on the communicative dimensions of facial expression, the suppression of body motion in accordance with certain stylistic conventions), the educator may not see the value of videotaping examples of pedagogy in the studio or choir context and may feel that this could hardly be enough of a contribution to a project. Naturally, researchers in one area may find it challenging to fully understand the work of researchers in another area. It is challenging enough to keep up with and appreciate the work of peers in one's own research area.

The problem is further exacerbated with researchers from different cultures, even those working within the same field. Standards of excellence may vary across cultures. What is regarded as essential knowledge or protocol by scholars in one culture (e.g. a background in basic epistemological philoso-

phy; the canon for the specialty; journals of significance; use of standard bibliographic referencing) may be unappreciated or regarded as unnecessary by scholars of another culture. The problem is further augmented by language. That is, even if there were complete agreement on standards of excellence and how one goes about research, communication among scholars is challenged by virtue of language differences.

Whereas a large multidimensional set of studies operating simultaneously is no guarantee of added value, a project on singing however has several advantages in this regard. Researchers of singing are often singers and musicians or persons who appreciate music. AIRS collaborators understand that they are members of a choir. Metaphorically speaking, the members sing different parts in harmony; with sufficient practice, they will perform at a high level suitable for the world audience. The AIRS annual meeting is an academic symposium in which, from time to time, everyone sings together literally and metaphorically. It is a matter for empirical research whether singing at a meeting helps to facilitate subsequent dialogue in the short and long term.

Just as fulfilling relationships between individuals may require effort, similarly, relationships across or even within disciplines require nurturing. AIRS works at this by teleconferences established to focus on synergies, by student funding applications that require reference to the impact of the proposed work on more than one theme or sub-theme, by the establishment of a global committee to address how best to take advantage of opportunities afforded by the multinational research team and how to address problems that might arise from multiculturalism and the development of a student network with representation from all research themes of the project. Finally, the common currency of the AIRS Digital Library, still in development, will enable AIRS researchers to meet across disciplines while working on the same materials from different perspectives, and potentially different locales.

## **IMPLICATIONS**

Questions of development, education, and wellbeing are questions that could be addressed to some extent about performance on any musical instrument. In parallel with the AIRS tripartite research theme approach, it would be possible to have a musical-instrument version of the test battery, study what goes on in the band, orchestra, or teaching studio; study the value of learning repertoire from other countries along with the cultures of those countries; explore the development of an intergenerational musical instrument curriculum, and study the health benefits of playing particular instruments.

Such studies may help to determine the unique benefits of singing versus the benefits of playing a particular instrument, as well as what is the common benefit of singing and playing an instrument. Such a mammoth study is a natural follow-up of the AIRS project because it is important to define the boundaries of the benefits of singing. For example, whereas singing allows engagement in music without the purchase of an expensive instrument, there may be some benefits of playing an instrument that cannot be matched by singing. It is necessary to begin that investigation to find out. The design of the AIRS project with its focus on development, education, and wellbeing could also be transposed to other artistic domains such as drama and dance.

### **Acknowledgments**

The support of the Social Sciences and Humanities Research Council of Canada (SSHRC) Major Collaborative Research Initiative (MCRI) program and the University of Prince Edward Island are gratefully appreciated.

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### **References**

- Campbell P. S. (2010). *Songs in Their Heads* (2<sup>nd</sup> ed.). Oxford: Oxford University Press.
- Cohen A., Armstrong V. L., Lannan M., and Coady J. (2009). A protocol for cross-cultural research on the acquisition of singing. *The Neurosciences and Music III: Annals of the New York Academy of Science*, 1169, pp. 112-115.
- Devaney J., Mandel M. I., Ellis D. P. W., and Fujinaga, I. (in press). Automatically extracting performance data from recordings of trained singers. *Psychomusicology: Music, Mind and Brain*, 21.
- Heydon R. (in press). Intergenerational learning from a curriculum studies perspective. In N. Howe and L. Prochner (eds.), *New Directions in Early Childhood Education and Care in Canada*. Toronto: University of Toronto Press.
- Russo F. A., Sandstrom G. M., and Maksimowski M. (in press). Mouth versus eyes: Gaze fixation during perception of sung interval size. *Psychomusicology: Music, Mind and Brain*, 21.
- Stevenson L., Pan B.-Y., Lane J., and Cohen A. J. (2011). Singing a new song: Effects of Chinese vs. English native language on learning an unfamiliar tonal melody with Chinese vs. English lyrics. Presented at the *Annual Meeting of the Society for Music Perception and Cognition*, Eastman School of Music, Rochester, New York, USA.