

European Science Foundation  
Standing Committee for the Social Sciences (SCSS)

**ESF/SCSS EXPLORATORY WORKSHOP ON:**

**Voice Development, Assessment,  
Education and Care in Childhood  
and Adolescence**



**University of London, United Kingdom**

**1-2 May 2002**

**Convened by: Graham F. Welch**

*Institute of Education, University of London, United Kingdom*



## Executive Summary

### *Introduction*

Child and adolescent voice is a relatively neglected area of research. The ESF SCSS Exploratory Workshop was designed to build on an already established informal European network in order to identify and begin the process of mapping existing data sets, create a multi-disciplinary focus for future studies and build research capacity.

The intention of the workshop was to bring together a range of European experts from different disciplines concerned with child and adolescent voice development, education and care. Twenty specialists were invited from across Europe, but unfortunately five had to send belated apologies because of pressure of work. The fifteen that attended the 24-hour workshop (spread across two working days) were drawn from six different countries and represented three overarching areas of specialist expertise: medical, perceptual-acoustic and psychological-educational. These overarching groupings reflected particular emphases in their professional lives, such as work in clinical settings (for example, surgeons and clinical phoniatricians), scientific research into the psycho-acoustics aspects of voice (including electrical engineering, computer modelling and speech/voice science) or applied research in educational and therapeutic contexts.

The workshop was organised to allow each of these specialist groups to meet separately, interspersed with plenary sessions for reporting back and discussion. Both types of grouping permitted the participants to focus developmentally on consecutive age-phases, first childhood, then adolescence. Each session had several rapporteurs to ensure that key issues were noted for subsequent action.

### *Main outcomes*

The workshop reviewed the existing knowledge bases for child and adolescent voice and identified key issues for research. The mapping exercise revealed that:

- Although there was some overlap in expertise at the boundaries of the three overarching areas of expertise, the general categorisation was found to be useful in highlighting specific areas for development.
- Child and adolescent voice behaviour may be conceptualised as a 'continuum' in which classification ranges from abnormal to normal to supranormal. Within and between these categories, however, there is considerable variation in the robustness and extent of the existing data sets. For each grouping, the notion of 'normal' was problematic either because of perceived weaknesses in existing data or because data was absent.

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- In particular, the onset of puberty and the period of voice change ('mutation') for both males and females raises particular challenges for definitions of 'normal' and 'abnormal', function and dysfunction.
- Critically, the workshop rehearsed the necessity for (a) the creation of new assessment instruments and protocols for child and adolescent voice and (b) the generation of robust longitudinal data sets to inform theory, policy and practice.
- For the medical group, there was a recognition for research to focus on:
  - A comprehensive assessment battery. This could be in two forms (i) a 'minimum' range of elements and (ii) an 'optimum' set that would make full use of the wide range of technological support now available.
  - Several other areas that require investigation, including the possibility of a voice disability index, data sets of gender-related differences, and the influences of life style on voice development and the onset of mutation.
  - There is also a need for CD-Rom and web-based databases subsequently of 'normative' data.
- The perceptual-acoustic group suggested that they needed:
  - Standard Euro-wide systems and procedures for the gathering of data, such as in recording practices, and in subsequent analyses.
  - Key aspects of voice assessment to be improved, such as a better evaluation of loudness, a normalisation of long-term average spectra with loudness, recognition of regional and cultural voice differences, documentary evidence of voice use and vocal loading of children and adolescents in different situations and contexts. New data would lead to improved training devices.
  - More longitudinal studies and larger numbers of participants.
- For the psychological-educational group, two principle areas of research interest emerged:
  - Longitudinal data on vocal identity - the significance of voice to identity - and how this may change over time. Such data would include self-perception, self-esteem, personality, temperament, emotional factors and general voice use.
  - As part of a new comprehensive medical voice profile, there should be a recognised psychological element.

In addition to their distinctive disciplines, the participants also embraced different social and cultural assumptions on the nature and significance of voice within their home communities and cultures. This mixture permitted a highly positive exchange of views and laid a firm foundation for future Europe-wide cooperation that recognised a need for common frameworks, terminology and applications in order to appreciate better social and cultural diversity in child and adolescent voice.

Further meetings are now planned in order to detail research priorities and funding opportunities, including bids to the European Commission through its various support programmes.

## Scientific content of the event

### *Workshop Process*

Prior to the discussions that generated the outcomes listed in the executive summary (see above), the workshop focused initially on reviewing existing knowledge in the field of child and adolescent voice, first by working as three breakaway groups and then through two, age-phased, plenary sessions.

The medical group reported that:

- A range of techniques are available for voice assessment, but these are not often combined into a comprehensive picture of the whole person.
- The medical world customarily focuses on individual cases within a clinical setting, often with one part of the voice system being the prime focus, such as the larynx. However, this may not reveal how the particular focus element functions within an integrated system (such as laryngeal behaviour that is allied to supraglottal vocal tract patterning and variable lung pressure).
- A focused research on mutational voice has enabled the generation of some predictors of voice change in adolescence, but (a) there are very few longitudinal data sets of healthy voice behaviours pre-mutation and (b) clinical mutational voice studies have been mainly conservatoire-based (the supranormal end of the ability continuum). A central challenge is to distinguish between healthy and pathological mutation in both trained and untrained voices, and also to investigate whether pre-mutational dysfunction persists into mutation.
- Our understanding of voice ‘dysfunction’ and pathology needs to be predicated on a better understanding of the parameters of ‘normal’ and healthy voicing. The reported differences between males and females in both function and dysfunction also require robust explanation.
- There is a need for a greater Europe-wide consensus concerning the design of an assessment battery to be used in the diagnosis of child and adolescent voice.

The perceptual-acoustic group reported that:

- Speech recognition systems do not work well with children, even when ‘trained’ with children’s speech. Speech recognition systems work best with adults speaking carefully. There are no speech recognition systems for adolescent voice.
- There is a need for speech data from child subjects to inform the algorithms underlying current recognition models.
- The subjective character of the perceptual databases create difficulties in agreeing the parameters of ‘normal’. The new technologies need to be applied to foster deeper understanding of ‘normal’ structure, function (how the voice works) and development in childhood through to adolescence.
- The data on articulation, perception and speech production needs to be integrated.
- Although there is general agreement about the completely healthy and the completely dysfunctional voicing, there is no clear picture of the group conceptualised as lying between these two extremes. Furthermore, the dynamic nature of the vocal system within its environment indicates that we need to understand ‘changes’ that are normative and those that are not.

- A clearer picture of developmental physiology is needed to act as a bridge between current theory on voice mechanics and anatomy.
- More standardised and calibrated recordings are needed.

The psychological-educational group reported:

- There are similar confusions concerning definitions of ‘normal’ and ‘optimum’.
- There is a need for greater multi-professional studies to link basic and applied research and in the design of longitudinal data sets for multiple users.
- More case study research is needed to critique ideas of normality and existing ‘normative’ models of a ‘typical’ child/adolescent voice.
- The symbiotic nature of voice and identity need to be understood more clearly. Voice behaviours and personality traits also require investigation.
- There is new evidence that social context (such as within the family setting) affects voice use and misuse.
- The nature of child and adolescent voice use and development in relation to contemporary cultures and lifestyle is absent in the research data.

As part of the discussions, the participants noted that:

- There are some significant data sets on child and adolescent voice with respect to (a) development, (b) assessment, (c) education and (d) care that already exist within the European Community. There is a need to make these accessible more generally.
- Gaps in our present knowledge need to be addressed systematically, with a certain prioritisation (see executive summary above for key issues).
- New technological advances need to go hand-in-hand with analyses of answers to significant questions, hence the need for multi-disciplinary approaches in all branches of voice science.
- Variables such as age, sex, gender, emotional state and social and cultural context are significant in vocal behaviour and vocal identities (whether social, personal, or interactional), but their significance and interaction have been unevenly researched and are not yet clearly understood.

Overall, the exploratory workshop was an excellent event. We were able to:

- explore key issues both within and between contributory disciplines;
- generate an initial literature survey from participants and
- initiate three linked working groups (see executive summary), each with a prioritised agenda for action.

We believe that we have made the first steps towards the establishment of a research network that can make a significant contribution to the field in future.



## FINAL PROGRAMME

### Workshop Convenor:

**Professor Graham F. WELCH**

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### **Overview:**

The workshop brought together a range of experts from different disciplines concerned with child and adolescent voice development, education and care. In addition to their distinctive disciplines, the group also embraces different social and cultural assumptions on the nature and significance of voice within their home community. Child and adolescent voice is a relatively neglected area of research and the workshop will build on an already established informal European network in order to map existing data sets, create a multi-disciplinary focus for future studies and build research capacity. In particular, it is essential to create new assessment instruments and to generate robust longitudinal data sets to inform theory, policy and practice.

### **Intended Outcome:**

The intentions of the workshop (and subsequent collaborative networking) were to:

1. identify significant data sets on child and adolescent voice with respect to (a) development, (b) assessment, (c) education and (d) care that already exist within the European Community and the disciplines and contexts within which the data were gathered;
2. identify any significant gaps in our existing knowledge;
3. clarify the customary research paradigms (ontological, epistemological and methodological) that give rise to existing data sets in order to promote (a) greater cross-disciplinary understanding and (b) opportunities for increased interdisciplinary approaches across geographical boundaries;
4. critically review existing assessment tools (hardware, software, protocols) in the light of increased interdisciplinary understanding;
5. understand more clearly how such variables as age, sex, gender, emotional state and social and cultural context (cf Lindesmith et al, 1999; Hargreaves & North, 1997) are significant in vocal behaviour and vocal identities (whether social, personal, or interactional);

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(continued)

6. review our conceptualisations of normality, abnormality and supranormality;
7. map out a framework for the building of longitudinal data bases that have multi-potential uses for the voice science, education and care communities;
8. initiate a first examination of any current policies (e.g. local, professional, regional, governmental) on the promotion of healthy child and adolescent voice behaviour, education and care in the light of the existing and subsequent data sets;
9. build strong Europe-wide research capacity across this relatively neglected area that draws on individual pockets of existing expertise.

Although it is recognised that this list of intended outcomes is far-reaching and likely to be beyond the scope of a 24-hour workshop, each of these outcomes will be touched on in some form during the workshop and some items, such as 1-4, will be covered in more depth.

### **Prior to the Meeting:**

Before the meeting begins, each participant will have completed a **specially designed questionnaire** (*Annex A*) that provides background information on their particular research and disciplinary expertise:

1. self-identification of membership of one of three possible groupings according to the bias in the participant's expertise, i.e. selecting from (i) medical, (ii) perceptual-acoustic, (iii) psychological-educational;
2. an overview of the data sets pertaining to child and adolescent voice (whether development, education or care) that they have already collected and/or have access to; these would be grouped according to the grid in *Annex B* (see below).
3. titles of selected key publications that report their research;
4. the identification of any key issues that should be researched by a European network that arise from within their discipline;
5. a photograph as a *gif* image that can be emailed to facilitate identification and a sense of group membership.

The content of these questionnaires will be collated for dissemination *before* the meeting in order to ensure that the workshop begins with participants being informed of the wide range of expertise and perspectives represented across the group.

Throughout the workshop, the group will be serviced by an academic secretary in order to ensure that we have a formal record of discussions.

*G. F. Welch*



## PROGRAMME

### Wednesday 1 May 2002

#### Introduction and initial reviews

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16.00-16.30:

#### Plenary Session

##### Welcome

*Director of International Development,  
University of London Institute of Education*

##### Overview of meeting format and intended outcomes

*Graham Welch, Convenor*

16.30-18.00:

#### Parallel Groups, each with *Chair and Rapporteur*

1. Medical
2. Perceptual-Acoustic
3. Psychological-Educational

Focus is to:

- (a) generate an overview of the existing knowledge base for each area; and
- (b) clarify key issues for research, drawing on questionnaire responses (*Annex A*) and discussion.

18.00-19.00:

#### Plenary Session

##### Discussion and Working group reports

(15 minute presentations from each *rapporteur*)

19.00-19.30:

*Return to hotel in preparation for evening meal*

19.40-21.40:

*Evening meal at Poon's Chinese Restaurant.  
Continuation of informal discussions and network building*

### Thursday 2 May 2002

#### Conceptualisations of normality - what does our specialist knowledge lead us to expect?

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09.00-09.20:

#### Plenary Session

##### Brief review of discussions

informed by a written *aide-mémoire* from the workshop's academic secretary summarising **key points**.

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**Thursday 2 May** *(continued)*

09.20-10.45:

**Plenary Session**

**Age phase discussion on child voice**

drawing on data collated from participants' questionnaires *Annexes A and B*. What is "normal" from each group's perspective? What is "abnormal" and "supranormal"?

10.45-11.00:

*Coffee break*

11.00-12.45:

**Plenary Session**

**Age phase discussion on adolescent mutational voice and post-mutational voice**

drawing on data collated from participants' questionnaires *Annexes A and B*. What is "normal" from each group's perspective? What is "abnormal" and "supranormal"?

12.45-13.30:

*Lunch*

**Creating an action agenda for a European Network**

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13.30-14.30:

**ACTION (1):**

**Parallel Working Groups, each with *Chair* and *Rapporteur***

- 1. Medical**
- 2. Perceptual-Acoustic**
- 3. Psychological-Educational**

Foci:

- (a) identifying topics for new research projects; and
- (b) building longitudinal data sets.

14.30-14.45:

*Tea break*

14.45-15.15:

**ACTION (1):**

**Plenary Session**

**Report back on suggestions for action**

(10 minutes per group)

15.15-16.00:

**ACTION (2):**

**Plenary Session**

**Building Research Capacity - taking forward a European Network on Child and Adolescent Voice - mapping future action.**

16.00

*Meeting closes*



## Final List of Participants

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*continued overleaf*



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### **Statistical information on Participants**

Age structure:

Age decade	30+	40+	50+	60+
Participant number	4	5	5	1

Country of origin:

UK	Croatia	Germany	Sweden	Denmark	Finland
5	1	3	4	1	1

With apologies from: Italy (1), Belgium (2), Denmark (1), Czech Republic (1)

Principle professional background:

Medical	Perceptual-acoustic	Psychological-educational
4	6	5

Some participants had expertise in more than one principle area



## References

### *Indicative Child Voice Publications*

#### SECTION 1 MEDICAL

#### **Dr. Michael Fuchs**

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- Fuchs, M., Behrendt, W. & Täschner, R. (nd). Significance of speech training in students of singing. In: Pahn, J. et al. (Hrsg.): Sprache und Musik, Zeitschrift für Dialektologie und Linguistik – Beiheft 107, S. 78-83, ISBN: 3-515-07544-5

Fuchs, M. & Plinkert P.K. (2001). Telemedicine in Phoniatics and Pedaudiology – potentialities and bounds. In: Kruse E (Hrsg.) Aktuelle phoniatisch-pädaudiologische Aspekte 2000/2001. (pp. 303-313). Band 8, Heidelberg: Median.

Fuchs, M., Fröhlich, M., Knauff, D., Hentschel, B., Behrendt, W. & Kruse, E. (in press). Acoustic voice analysis by means of the hoarseness diagram as diagnostic instrument for phoniatic care of the professional singing voice of children during mutation. In: Kruse E (Hrsg.) Aktuelle phoniatisch-pädaudiologische Aspekte 2001/2002. Band 9, Heidelberg: Median.

### **Dr Mette F. Pedersen**

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*Cochrane review: Surgical versus non-surgical interventions for vocal cord nodules (with co-author 2001).*

### **Dr Friedemann Pabst**

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## **SECTION 2 PERCEPTUAL -ACOUSTIC**

### **Prof David Howard**

Howard, D.M., Barlow, C. & Welch, G.F. (2000). Vocal production and listener perception of trained girls and boys in the English cathedral choir, Proceedings of 18<sup>th</sup> International Research Seminar of the Research Commission of the International Society for Music Education, University of UTAH, 169-176.

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Howard, D.M. & Angus, J.A.S. (1998). A comparison between singing pitching strategies of 8 to 11 year olds and trained adult singers. Logopedics Phoniatics Vocology, 22, (4), 169-176.

### **Dr Elisabeth (Sederholm) Lindström**

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- Sederholm, E. & McAllister, A. (2000). Group therapy for dysphonic children. In P.J. White. (ed). Child Voice (pp. 143-147). Stockholm: KTH Voice Research Centre.

### **Dr Peta Sjölander**

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