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**CENTRE/GROUP/NETWORK
DIRECTOR'S ANNUAL
REPORT FORM
(Edition 10: November 2008)**

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CENTRE/GROUP/NETWORK DIRECTOR'S ANNUAL REPORT 2008/09

Reporting period : from 1 April 2008 to 31 March 2009

Name of Centre/Group/Network : DCAL: Deafness Cognition and Language Research Centre

Director's name : Professor Bencie Woll

Start and End Dates : January 2005 – December 2010

Year of Operation : 3

Total budget from ESRC :£3,652,277

The Director's Annual Report should be completed in accordance with the attached guidelines. It should be submitted to EST and a copy **emailed** to the relevant ESRC Case Officer by **31 March 2009**.

Introduction

DCAL - the Deafness Cognition and Language Research Centre - is based at University College London with linked work at City University London. DCAL brings together leading deaf and hearing researchers in the fields of sign linguistics, psychology, and neuroscience to explore language and thought using deaf people's communication as a model system, and drawing on theoretical work from linguistics, psychology and child development.

The main goals for the past year have been to continue to establish DCAL's themes within mainstream linguistics and psychology. We continue to produce a high number of research publications in top-rated journals. In RAE 2008, all the directors and Schembri were represented in their institutional returns: UCL UoA 12 – professions allied to medicine (Campbell, Woll, Schembri); UCL UoA 44 – psychology (Vigliocco); City University UoA 12 (Morgan). Within UCL UoA12, DCAL's work was highlighted as a Centre of special significance, and its research described fully in Section RA 5a of that return. UCL's UoA 12 profile was judged to be 60% at 3* and 4* levels (international significance); UoA 44 had 75% rated 3* or 4*.

Our work in collaborating with user groups has been maintained through our monthly research updates in the BDA magazine 'British Deaf News', the BATOD magazine for the UK teachers of the deaf and our involvement in the Department for Children, Schools and Families Sign Language initiative. Bencie Woll was invited to join the DCSF British Sign Language Steering Group, and Gary Morgan is a member of the Advisory Committee to the Sign Language Learning in Families programme for the National Deaf Children's Society. Bencie Woll also was commissioned to write the report on Deafness and Hearing Impairment for the Foresight Project on Mental Capital and Mental Wellbeing. We have also maintained our success in attracting additional research grants with 7 new funded projects, and with an increased number and variety of research collaborations

In the past year there were a number of changes in staffing. Our Deputy Director Ruth Campbell retired in October 2008 and Gary Morgan replaced her as Acting Deputy Director. We recruited a new Co-Director, Professor Daphne Bavelier (University of Rochester) who is expected to take up her position in autumn 2009. We also recruited several new post-graduate and post-doctoral Research Assistants

1. IMPACT AND HIGHLIGHTS

Research Progress

DCAL's research portfolio covers a broad range of topics related to our main themes. One highlight of our research this year is a study which uses data from British Sign Language to shed light on the possible evolution of human language. Although many researchers have theorised that early human communication was gestural, it has been difficult to identify a mechanism by which iconic gestures could transfer into arbitrary spoken words. 'Echo Phonology' is a phenomenon where for some signs, actions of the hands are obligatorily 'echoed' by actions of the mouth. For example, a abrupt contact between the edge of one hand and the palm of the other in a sign such as TRUE is accompanied by the production of the syllable 'ub'. These echoes have many of the properties of spoken language phonologies and as such suggest a way in

which spoken language could have derived from multi-modal communication (gestures with accompanying vocalisation).

DCAL also benefitted this year from a Strategic Research Infrastructure Grant of £90,000 which has enabled us to set up a Multi-Modal Communication Lab which provides facilities for simultaneous use of eye-tracking, motion-capture, and 360° video. This facility will enable us to further develop our methodologies for researching face-to-face communication in both spoken language and sign language.

Academic Impact

The work of the **Face-to-Face Communication** strand, **Atypical Sign Language** strand and our associated project “**Imaging the Deaf Brain**” have continued to produce major findings with important educational and clinical implications. Campbell was invited to run a special lecture series on speechreading for the Human Communication Science Summerfest in Australia in December 2008. Additional invited papers (including a review article: *The signing brain: the neurobiology of sign language* in *Trends in Cognitive Sciences*); and 7 refereed papers and book contributions described the brain bases for differences and similarities in processing seen speech and sign language.

In the **Language Processing** and **Language Development** strands DCAL presented a range of studies and position papers at major international conferences. DCAL’s presence at these top conferences indicates that work on sign languages is gaining recognition among cognitive scientists and psycholinguists working on both signed and spoken languages. DCAL multi-talk symposia were included at the Language Communication and Cognition Conference (University of Brighton 6th August 2008) and the Experimental Psychology Society (EPS) Meeting (UCL, 6th January 2009).

Furthermore, DCAL has been recognised in these international arenas as the European centre for research on deafness and sign language. All directors gave invited key-note presentations at mainstream psychology, neuroscience and education conferences and in doing so advanced the agenda for including deaf people and signed languages in models of language, communication and cognition

Societal impact

Embedding good practice when working with deaf children

Using its standing as the leading academic research centre in the field DCAL brought together a wide range of organisations to develop good practice agreement for research with deaf children. Collaborators included universities, schools for deaf children and key organisations working with deaf children and their families. This approach meant that there was substantial buy-in from all stakeholders who then also helped with disseminating the guidelines to academic researchers and to people working with deaf children. The good practice agreement framework will consolidate knowledge transfer and enable resolution of issues revolving around recruitment of deaf children to research projects in the future. The GPA has also been adopted by the British Association for Teachers of the Deaf (BATOD)

(see <http://www.batod.org.uk/index.php?id=/articles/research/good-practice.htm>). The agreement has had a wide impact as it demonstrates clearly the care and attention that academics and other stakeholders take in managing their relationships for the benefit of all involved, especially children. DCAL have recently produced a briefing sheet about the agreement which has been sent to a large number of policy and decision

makers including senior civil servants, members of key all-party parliamentary groups and select committees, relevant think tanks and organisations representing children and young people.

The Deaf Brain

As the leading research centre into deafness, our research has the potential to have a profound effect on how deaf and hearing people are taught, diagnosed with medical conditions or supported in later life. DCAL therefore has a role in reaching out to the deaf community about some of the major issues that its research can influence. The BBC flagship program for Deaf people, “See Hear”, featured DCAL and its research on 14th January 2009. The feature explored how brains adapt to the absence of auditory input, and also tested whether deaf and hearing people show differences in vision, sensory perception and memory. DCAL Director, Bencie Woll, helped design the programme and was also interviewed, and Centre Secretary Martine Laverty was one of the test subjects.

The television piece had a significant impact on a large audience, raising awareness of the issues as well as awareness of DCAL. The programme stimulated discussion on BBC sites, and on social networking sites such as Facebook. Comments included: “OMG, I loved the deaf brain program! Best See Hear I’ve seen in ages!” and “That brain programme was brilliant. One of See Hear’s best programmes!” The producer of the programme is in discussion with Professor Woll about developing ideas for further, mainstream programming. On the back of the interest realised by See Hear, a briefing sheet about the research, its conclusions and implications was distributed to research, policy and political stakeholders.

3. PROGRESS AGAINST OBJECTIVES

DCAL strand	Targets for April 2008-March 2009	Achieved
General	<ul style="list-style-type: none"> • Maintain programme of workshops, seminars, training courses • Maintenance of web pages • Writing of grant proposals for associated research • Newly funded projects associated to the Centre • Dissemination at conferences (all groups) • Research publications for all strands • Knowledge Transfer • Annual Report 2008-9 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Cross-group	<ul style="list-style-type: none"> • Normative data • Publication of Normative Data (video) • Standardised assessment battery • Completion of testing and analysis of Grammatical Judgement Task within Assessment Battery • Design and piloting of morphology comprehension test • Design and piloting of phonological/lexical decision test 	<ul style="list-style-type: none"> ✓ continuing

Language Processing	<ul style="list-style-type: none"> • Interplay between language and imagery in BS (TMS) • Language Production and Comprehension: Completion of one main experiment to assess whether planning for producing signs with upward/downward movement affects low-level visual perception • Commencement of pilot work investigating similarities/differences in the perception of movement in signs and movement in real actions using point-light displays. • Two experiments using the ‘visual-world paradigm to investigate the time course of lexical activation in BSL, by tracking eye-movement of participants. The results will be compared with the processing of audio-visual English. 	<p>Commencing</p> <p style="text-align: center;">✓</p> <p style="text-align: center;">✓</p> <p style="text-align: center;">✓</p>
Face to face communication	<p>1 Developing a test of child speechreading Test normed for English speechreaders; training workshops undertaken, clinical use monitored, further funding sought for development of clinical applications</p> <p>2 Speechreading in adults Completed experiments exploring neural correlates of speechreading skill</p> <p>3. Localisation of facial actions in sign Completed lateralisation experiments, presentation to workshops</p> <p>4. Categoricity in sign and visible speech Complete one set of experiments, and write up – either speech or sign OR still images both speech and sign.</p>	<p style="text-align: center;">✓</p> <p style="text-align: center;">✓</p> <p style="text-align: center;">✓</p> <p>Study not undertaken because of Campbell’s early retirement; However, a linked study is planned in Dr Eleni Orfanidou’s fellowship application to the Royal Society</p>
Language Development	<ul style="list-style-type: none"> • Language experience and development <ul style="list-style-type: none"> ○ Publication of non-sign repetition study ○ Development and refinement of language development tools 	<p style="text-align: center;">✓</p> <p style="text-align: center;">✓</p> <p style="text-align: center;">✓</p>

	<ul style="list-style-type: none"> ○ Start of data collection for longitudinal study ● Developmental Impairments in the acquisition of sign language <ul style="list-style-type: none"> ○ Completion of development of diagnostic batteries ○ Testing of typically and atypically developing children 	<p>✓</p> <p>✓</p>
Atypical BSL	<ul style="list-style-type: none"> ● Usher Syndrome Completion of collection and analysis of data on comprehension and production of spatialised grammatical relations in visually and proprioceptively transmitted BSL Completion of collection and analysis of facial expression in visually and proprioceptively transmitted BSL Analysis of fMRI experiment exploring tactile and visual perception of fingerspelling ● Autism Piloting of experimental tools Collection and analysis of naturalistic and experimental data on production and comprehension of face and mouth actions, use of eye gaze ● Signers with stroke Completion of analysis of production of BSL ● Other atypical signing A grant application has been submitted with University of Manchester and RAD for a project on dementia in signers. If funded, this work will commence in late 2008. 	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
The individual and the community	<ul style="list-style-type: none"> ● Cross-modal bilingualism <ul style="list-style-type: none"> ○ Collection and coding of data on mouthing in hearing and deaf signers ○ Collection of data for study of aptitude for learning BSL ○ Collection and analysis of data for “Ghost-writers” study of deaf translators and interpreters ● Processes of Change in BSL (research on this topic will now link with the BSL Corpus Project) <ul style="list-style-type: none"> ○ design of questionnaire and stimulus materials, and recruitment of participants ● Unimodal bilingualism <ul style="list-style-type: none"> ○ Study of individuals bilingual in 2 sign languages: collection and analysis of data from BSL/Irish SL bilinguals 	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>Pilot data collected and analysed</p>

Cross-group strand

This theme concentrates on collecting normative data and developing assessment tools for BSL. Results of the DCAL norming study (norms for age of acquisition, familiarity and iconicity of BSL signs) were published in 2008 in the journal *Behavior Research Methods*. The video clips of the stimulus items and collected norms have all been made publicly available as part of the Psychonomic Society Online Archive (Vinson, Cormier, Denmark, Schembri & Vigliocco, 2008). The study provides invaluable data for those researching with BSL and also provides crucial information about methodology for those who work with other signed languages. These BSL norms and stimuli have been used for developing further stimuli and tasks by various DCAL strands and associated projects including the Language Processing strand, the Atypical Signing strand, the DCAL-associated project developing a BSL vocabulary test for deaf children, and the DCAL-associated project on deafness and the neurobiological basis of language (led by DCAL Associate Mairead MacSweeney).

Also in 2008 we developed the BSL Grammaticality Judgement Task, adapted from a similar instrument designed for American Sign Language (Boudreault & Mayberry, 2006). In this task, participants view 120 BSL sentences and are asked to judge whether each is grammatical or ungrammatical. Accuracy and response times are both measured. Following methods used by Boudreault & Mayberry for ASL, data are being collected from native signers, early childhood learners and late childhood learners of BSL. Data collection from native signers was completed in August 2008. Once analysis is completed, the task will be adapted for broader use in assessing sign language grammatical skills.

Language processing

We have completed, or are in the process of completing, all the work planned for the year. The most important features of the work we have carried out so far are:

1. We have provided decisive evidence that language is not encapsulated from cognition by showing that iconicity (i.e., whether a lexical sign evokes properties of the referent) of sign form does affect language processing.
2. We have begun to investigate the interplay (coordination) of the different articulators used in sign language during language production, suggesting a large degree of independence
3. We have validated the use of a new methodology for the study of sign language (the visual world paradigm). This has now allowed us to address a large number of questions concerning on-line sign processing.

The work so far has focused on providing evidence that iconicity affects the automatic processing of signs. These results indicate that iconic links between meaning and form provide a processing advantage for signers. Two grant applications have been submitted. The first (to the US NIH) in collaboration with Prof Karen Emmorey of San Diego State University concerns studies using TMS over parietal areas to more clearly understand the neural substrates that underlie iconicity and, more generally, the interactions between linguistic and perceptual representations. The grant has received a favourable review and Dr Emmorey has been invited to resubmit. As part of the resubmission proposal, we have already obtained some pilot data that indicate that such a study with TMS is feasible and can provide informative results. The second application (Vigliocco, PI) to the ESRC concerns studies in spoken and signed

languages of the relationship between language, perception and emotion. If successful, both projects will start in 2009 and will provide an important complement to the work carried out within the DCAL grant.

Language development

In the past year, the non-sign repetition study has been completed and a standardised test developed and disseminated for use in schools and by speech and language therapists. We have been approached by two other research groups (in Holland and the USA) who wish to develop a similar test. Dr Wolfgang Mann received a two-year post-doctoral fellowship from City University with Morgan for Mann to develop the first test of school-aged deaf children's sign vocabulary.

In October 2008 we began the Families with Deaf Children project, which is looking at the early development of communicative competence and interaction skills between deaf and hearing parents and their deaf children. The work is being done in collaboration with partners from Italy and Sweden. The aim is to trace children's later development of Theory of Mind abilities back to the early stages of interaction. So far 10 families have been recruited to the study, and we have been collecting samples of sign language development from the children.

As part of the DCAL-associated Positive Support project, we have developed a standardised checklist (Communicative Development Inventory) for measuring early BSL development (8 – 36 months). This will be published in 2009. We are currently analysing early BSL and English language data from over 80 deaf children in this study.

Face-to-face communication

The timing of work in this strand was planned with a view to Ruth Campbell's retirement in October 2008, and to support further career development for researchers Fiona Kyle and Cheryl Capek. Consolidation of complete and near-complete work was therefore the main consideration and, to this end, the categoricity experiments were not undertaken, although some aspects of them are being explored by Kearsy Cormier and colleagues. The planned lateralisation studies were taken over by the Atypical BSL strand and the associated brain imaging studies. Kyle's new post at Cambridge University has allowed her to continue work on the Test of Child Speechreading, which is being prepared for publication. Capek and colleagues completed several papers for publication during her time at a neighbouring laboratory (J. Devlin, UCL Psychology), and more will be developed when she takes up her faculty post at the University of Manchester (February 2009).

The collaboration with Swedish partners on behavioural and cortical bases for cross-language processing is underway. The research has been funded by the Bank of Sweden Tercentenary Foundation and the project leader is Mary Rudner (University of Linköping). DCAL collaborators are Woll, Capek and MacSweeney. This work will compare familiar and unfamiliar sign languages in terms of their behavioural and cortical bases.

Atypical Sign Language

In the area of acquired atypical sign language, the research on signers with Usher syndrome (deaf-blind signers) has continued to be a major area of activity. The studies completed in 2008 are being written up, and two studies: perception and

production of spatialised grammatical relations in blind, partially sighted and normally sighted signers, and perception and production of facial affective and linguistic expressions in blind and normally sighted signers have also been completed. The work on deaf-blind signers has led to a successful application to the European Science Foundation for an International Exploratory Workshop, which will take place in November 2009.

Although our initial application for funding for a project on dementia was not successful, we have continued pilot research with this group and have made a second application which has received favourable feedback at the initial stage.

The *Deaf Children with SLI* project had outstanding success in recruitment, receiving over 60 referrals from schools. We have tested 25 children on language and cognitive measures. The preliminary results suggest that characteristic SLI profiles can be found in deaf children who use BSL as a first language. The results were presented at several international conferences and we have organised a symposium which will take place at the Society for Research in Child Development in April 09. We are writing up the first set of studies for this project for a special issue of the British Journal of Developmental Psychology. Work in the same strand was awarded a Leverhulme 3 year post-doctoral fellowship for Dr Chloe Marshall (based at City University with Morgan).

Our other studies of atypical signing currently being undertaken by research students include: sign language in individuals with autistic spectrum disorder, and the relative contribution of motoric and linguistic factors to handedness in signers with stroke compared to unimpaired signers.

The Deaf individual and the Community

The cross-modal bilingualism study (PhD student Donna Lewin) is investigating the relationship between the use of mouthing in BSL and its interaction with social (e.g., hearing status, BSL as a first language) and situational (e.g., narrative vs. interview) factors in deaf signers and hearing sign language interpreters, controlling for participants' age and region of origin. Data collection from hearing and deaf native and non-native signers is complete. A related study investigating mouth gestures in BSL is currently being written up.

At present there is no way of assessing the aptitude of potential learners of BSL, including those who wish to train as interpreters. This means that efficient selection of trainees is not possible. The DIATC strand is therefore developing a sign language interpreter aptitude test, which includes a battery of tasks: English reading, the Modern Languages Aptitude Task, the BSL Grammaticality Judgement Task, and the Non-Sign Repetition Task. Data have been collected from three groups: experienced sign language interpreters, undergraduate Deaf Studies students, and trainee interpreters. Research with this last group has involved collaboration with the RNID in Wales as part of the Welsh Assembly-funded BSL Futures project, which aimed to address the shortage of sign language interpreters in Wales. Data collection has been completed for the 'ghost-writers' study of deaf translators and interpreters working informally within the Deaf community, with interviews conducted in both the UK and Australia. We have just begun our studies of unimodal bilingualism (people who use two sign languages); this is the first-ever British-based study in this field.

INVESTMENT-SPECIFIC INDICATORS

In our third year we have met our milestones on all six strands of DCAL's research programmes, continued progress towards our long-term objectives, created new collaborations, and obtained associated research project and seminar funding. Crucial to our successes to date are our outstanding international team of deaf and hearing researchers.

We have maintained an active programme of engagement with the Deaf community, policy makers and academics (Morgan met with Brian Lamb at the RNID to discuss the follow up to the Bercow report on children with Special Educational Needs), participation in international conferences, and short and extended visits by researchers from other countries, including senior sabbatical attachments.

There has been a continuing high demand from students from UCL and other institutions and organisations within the UK and abroad for unpaid internships. In the past year we have had 5 interns on placements ranging from 2 weeks to 9 months. We have maintained capacity building with studentships from ESRC, AHRC, Deafness Research UK, City University, UCL/ORS and the Mexican government. DCAL obtained a grant from ESF for an international workshop on deaf blind communication (Woll) which will take place in November 2009, and from ESRC Social Science Week funding for an event on social cognition (Morgan).

International Collaborations

We have established new international collaborations including: Cross-language processing with Mary Rudner, University of Linköping (Sweden) (Woll, Capek and MacSweeney); and the Families with Deaf Children project, part of an international network, including Michael Siegal (Sheffield), Luca Surian (Italy), Erland Hjelmquist and Marek Meristo (Sweden) and Morgan at DCAL. Vigliocco and Karen Emmorey (San Diego State University) continue to work on psycholinguistic studies. Woll and Schembri are collaborating with the Max Planck Institute Nijmegen and San Diego State University on a study of the language of perception. The Deaf Ghost Writing project involves collaboration with Dr Breda Carty at the University of Newcastle, Australia, and we have been active in establishing the BilingQuality International Networking group, collaborating on research related to bilingual deaf education and Bilingualism in deaf language learners.

ESRC GENERAL INDICATORS FOR REPORTING TO GOVERNMENT

<i>Name of investment: DCAL - Deafness Cognition and Language Research Centre</i>	
<i>Indicator</i>	<i>Number</i>
Indicator A: Number of activities and events involving the general public	3 created by DCAL 1 broadcast programme with DCAL input 5 events for parents of deaf children (participation with a DCAL information stall at over 20 other Deaf community events)
Indicator B: Number of projects attracting co-funding	6
Indicator C: Number of public policy/business orientated seminars and workshops	3 Seminars and workshops for organisations in Education and the Voluntary Sector
Indicator D: <i>(i) How many non-academic users have worked within the investment on a formal basis to complete a specific programme of work?</i> <i>(ii) How many researchers have the investment placed in user organisations on a formal basis to complete a specific programme of work?</i> <i>NB – placements funded through ESRC placement schemes should not be included.</i>	(i) Number of non-academic users hosted: 1 (ii) Number of researchers placed in user organisations: 0
Indicator E: Number of non-academic users on the investment's Advisory Committee	(i) Total number of Advisory Committee members: 19 (of whom 5 are deaf) (ii) Total number of non-academic user members: <i>Including:</i> Number of private sector members: 0 Number of public sector members: 3 Number of third sector members: 3

Indicator A: Activities and events involving the general public

For each activity/event please complete the table below:

Title:	Date:	Format: [<i>type of event (e.g. lecture/broadcast ...)</i>]	Number of participants:
Learn to Sign Day	6/10/08	Display stand about DCAL research, short courses on Deaf Awareness and BSL	> 200

Social & Emotional Learning: How we learn to mind-read	9/3/09	Lectures and Discussion panel as part of Social Science Week	100
One World Week	2/2/09	Display stand about DCAL research	250
BBC See Hear	14/1/09	TV Programme on Researching the Deaf Brain	Estimated viewing figures available from BBC

Indicator B: Number of projects attracting co-funding

For each project please complete the table below:

Name of project:	Amount of external funding:	Name of co-funding body/bodies:
Developing a web-based British Sign Language vocabulary test	£75,000	City University Research Fellowship
Research Network on Bilingualism and the Brain	£25,195	AHRC (with University of Bangor)
Trait Emotional Intelligence Questionnaire- British Sign Language version: A pilot project (with University of Manchester)	£12,000	Nuffield Foundation (with University of Manchester)
Multi-Modal Communication Laboratory.	£90,000	Strategic Research Infrastructure Fund
Familiar and unfamiliar sign languages: their behavioural and cortical bases – a cross sign-language comparison study	£184,000 (SK 2,167,800)	The Bank of Sweden Tercentenary Foundation (with Linkoping University)
Sign language and working memory in deaf children.	£310,000	Leverhulme Early Career Fellowship

Indicator C: Public policy/business orientated seminars and workshops

Title:	Date:	Target audience: [private sector/public sector/ practitioners/ third sector]	Number of participants:
Equal Access to Mental Health Services for Deaf People	13/3/09	Practitioners	12
Sign Language Acquisition and Assessment for professionals working with deaf pupils	August 08	Practitioners	40
BSL as a modern foreign language	9/1/09	Practitioners	25

Indicator D: Number of (i) non-academic users hosted and (ii) number of researchers placed in user organisations *NB – Placements funded through ESRC placement schemes should not be included.*

For each placement please complete the table below:

Name:	Hosted:	Placed:	Dates/duration:	Purpose:
Sarah Reed	SENSE:	DCAL	Weekly on a continuing basis	To provide research expertise and support in relation to deaf-blind signers

KEY PERFORMANCE INDICATORS

PERFORMANCE MEASURE	2006	2007/8	TARGET FOR 2008/9	ACHIEVED 2008/9	TARGETS FOR 2009/10
1. Scientific outputs – publications					
Refereed journal articles	15	49	55	29 (+ 19 forthcoming)	35
Authored and edited books		2	2	4	2
Book chapters & conference proceedings	3	21	25	17	20
Other (book reviews, non-refereed articles)	4	14	15	8	8
2. Scientific outputs – other research contributions					
Keynote and invited presentations at conferences/major seminars	22	33	35	33	30

Forward Plan

Long term aims and key goals – strategic and research objectives

DCAL's objectives are to impact both on the broad scientific study of language, cognition, brain and development and on deaf people's lives. DCAL research explores the following areas: the deaf person's experience as an individual and as a member of a linguistic community, communication, the processing of language and thought, the role of identity, the interface between spoken, written and sign language, the development of sign language in young children and how sign language is affected in disorders of language and cognition.

Our long term aim is to inform and extend mainstream psychological, neuroscience and linguistic theories by studying this unique community. At the same time DCAL is committed to improving the quality of life of deaf individuals in our society by influencing policy makers through our research findings. We are working with many user groups to close the gap in education, employment, and health between deaf people throughout the life span, and their hearing peers.

An important challenge is to reconcile our academic research priorities with those in the 3rd sector. As well as ensuring strong 3rd sector representation on our Advisory Committee, we have regular meetings with organisations in this sector to align priorities and develop collaborative partnerships.

Workpackages and targets for 2009-10
<p>General activities</p> <ul style="list-style-type: none"> • Maintain programme of workshops, seminars, training courses • Maintenance of web pages • Writing of grant proposals for associated research • Newly funded projects associated to the Centre • Dissemination at conferences (all groups) • Research publications for all strands • Knowledge Transfer • Annual Report 2009-10 • DCAL Mid-Term Report and Renewal Application
<p>Cross-group strand</p> <ul style="list-style-type: none"> • Completion of data collection, analysis, and publication of BSL Grammaticality Judgement Task within Assessment Battery • Analysis of lexical frequency data from the DCAL-associated BSL Corpus Project, in preparation for second phase of normative data collection

Language Processing

- Write-up and submission of the work completed thus far
- Submission of our work to international conferences
- Conduct two new experiments employing the visual world paradigm assessing differences/similarities in processing between sign and spoken language
 - one study will assess the role of lexical variables that affect spoken language (such as lexical frequency and neighbourhood) in sign lexical retrieval.
 - Another line of studies will address similarities and differences in eye-gaze patterns for deaf and hearing signers.

Face-to-Face Communication

- Activities in this strand are now completed, with the retirement of Prof. Campbell

Language Development

- Submission of two journal articles on the SLI project
- Completion of testing on 20 families in the Theory of Mind Study
- Presentation of ToM study results at the EPS conference

Atypical Sign Language

- **Usher Syndrome**
 - Collection and analysis of data on narratives produced by Usher signers
 - ESF Exploratory Workshop to initiate collaborative research proposal
- **Schizophrenic Signers**
 - Inner Signing Experiments to be piloted and run on signers without impairments
- **Dementia**
 - If independent funding application is successful, research will commence on healthy aging subjects to obtain norms for cognition and language
- **Autism**
 - Completion of studies of autistic spectrum and typically developing children
- **Signers with stroke**
 - Collection and analysis of motor impairments affecting hand dominance in right- and left-hemisphere patients; comparisons with a corpus-based study of handedness in healthy signers; collection of experimental data on hand dominance when hand and arm movement are impeded

The Deaf Individual and the Community

- Cross-modal bilingualism: Completion of data collection, coding and analysis
- Sign language interpreter aptitude task: Completion of data collection, coding and analysis.
- Ghost-writers study: Completion of data collection, coding, analysis and writing up
- Unimodal study: Completion of data collection with coding and analysis in progress

Programme of research - Emerging areas of interest

New and emerging areas of research which we plan to develop further over the next 12 months include expansion of our atypical strand to include neuropsychiatry (dementia and schizophrenia) as well as neurological and sensory impairments; the designing of studies of sign language in children before and after cochlear implantation; and making use of the resources now provided by the BSL Corpus Project database across several DCAL strands: including obtaining frequency data, and exploring regional and age variation. Work on new areas will be integrated into our mid-term review and renewal application.

Associated activities

- **Additional funding.** In the coming 12 months we will continue to seek research funding from national and international agencies in order to support our core ESRC projects. Two focus areas we have identified through consultation with our Scientific and User group advisory boards are Education and Neuroscience. We plan to write research proposals in these areas to complement our research centre renewal proposal.
- **Mid-term review.** An important activity for the next 12 months will be the construction and refinement of our mid-term review. This proposal will form the next set of funded projects associated to the Centre. We are consulting with our deaf and hearing researchers and user groups in collecting research questions for this next stage of work. One area of interest is a follow-up to the 1979 Conrad study of reading levels in deaf school leavers. We will also build on our Deaf Brain work by continuing to explore the effects of late language acquisition on language and cognitive processing.

Research objectives

An important activity for the next 12 months will be the design and submission of our mid-term review. We are consulting with current members of the DCAL team, and members of our Advisory Committee (from the Academic and other sectors) in prioritising research questions for this next stage of work.

We will also continue our extensive capacity building activities by offering specific training, workshops and seminars in our main strand areas. These activities are aimed at furthering expertise and networking opportunities for specialists in this area, as well as opening up the field for scientists from other disciplines allied to those of DCAL who may wish to collaborate with us.

Research Environment

The unique research environment provided by DCAL has been recognised through senior academic affiliations and honours. In the past year, these have included the award of Honorary Fellow of UCL to Professor Virginia Volterra of the CNR, Italy, in recognition of her work as a member of the DCAL Advisory Committee; the award of an Honorary Professorship at the University of East Anglia to Bencie Woll, and the affiliation of Professors Li Wei, Birkbeck College, and Professor John Glauert, University of East Anglia, as Honorary Senior Research Associates.

Gary Morgan, Acting Deputy Director of DCAL, was promoted to Professor at City University; Dr Joanna Atkinson, DCAL post-doc researcher, obtained the Post-Doctoral Diploma in Applied Clinical Neuropsychology from Kings College, and two members of DCAL, Helen Earis and David Vinson, obtained their PhDs.

DCAL also hosted a large number of academic visitors and research students for stays of between 2 days and 6 months, including Dr Pasquale Rinaldi, CNR, Rome, Italy (July – August 2008), Dr Gaurav Mathur (ESRC-SSRC fellowship - July 2008), Professor John Glauert, School of Computing Sciences, University of East Anglia (January – June 2009), Professor Arnfinn Murovik Vonen, School of Education, University of Oslo (November 2009), Dr Mantrimas Danielis, Vilnius University, Lithuania (March 2009), Mathilde Varin (University of Grenoble, France), Saul Villameriel, (University of Valladolid, Spain).

DCAL has strong links with the ESRC Centre for Research on Bilingualism in Theory and Practice at the University of Bangor with an AHRC network grant. It is expected that this will stimulate collaborative research into behavioural and neurological studies of deaf bilinguals (both within sign languages and across signed and spoken/written languages). Bencie Woll continues to act as Scientific advisor to the NSF-funded Science of Learning Programme “VL2”, at Gallaudet University. Gary Morgan continues to collaborate with colleagues working on language processing at the Max Planck Institute in Nijmegen; Gabriella Vigliocco and Karen Emmorey (San Diego State University) are jointly submitting a proposal to NIH.

Research priorities and goals

In the next 12 months DCAL will continue to act as a conduit nationally and internationally for the presentation of new research results into deafness, language and cognition, collaborate on appropriate associated projects with relevant teams nationally and internationally, disseminate our cutting-edge research in academic journal papers, conference presentations and talks to user groups, create new research methods and interfaces with mainstream linguistics and psychology and continue to provide the wider sign language research community with assessment tests and sign language corpus materials.

Planned capacity building activities

Our research seminar series provides fortnightly talks from experts nationally and internationally on deafness language and cognition. We will be offering continuing training in sign language and gesture data analysis using the ELAN tools. In the past these sessions have included UCL PhD students from other departments as well as DCAL researchers. We will be running several training sessions for researchers who wish to use the Multi-Modal Communication Laboratory. DCAL researchers contribute to the very successful sign linguistics module within the Linguistics department in UCL, and are currently developing a second module as a preliminary to creating a new MSc in Sign Linguistics. DCAL staff also offer a module on Language, Cognition and Deafness as part of the MSc in Neuroscience, Language and Communication. Our PhD students receive training from the associated MRes and PhD programmes offered by the Centre for Human Communication. We are planning to run a second Sign Language Studies summer school following the oversubscribed first event in 2008. All our research staff are required to reach fluency in BSL and we provide teaching to achieve this objective.

Proposals for bringing in co-funding.

Woll and colleagues in Manchester (Professors Alys Young and John Bamford) are planning a follow up project to the National Lottery funded Positive Support study to explore the language learning environments of young deaf children in various environments (both signing and oral). Woll, together with Prof. Alys Young, University of Manchester, has submitted an application to the Alzheimers Society for a study which will explore clinical and social obstacles to the early identification of dementia in the Deaf community. Morgan and Woll have collaborated on an application to the NHS funding scheme: Closing the Gap through Clinical Communities, together with Dr Barry Wright, Clinical Lead National Deaf Child and Adolescent Mental Health Service to deliver best practice for assessment and diagnosis of autism spectrum conditions in deaf children throughout England. Morgan is planning collaborative work with colleagues in Plymouth (Dr Allegra Cattani) and Essex (Professor John Clibbens) on hemispheric specialisation in deaf children and adults. This work is expected to feed into new DCAL research into deaf children's learning. Vigliocco and Woll in collaboration with Professor Karen Emmorey (San Diego State University) are collaborating on two proposals, the first to carry out studies using TMS to more clearly understand the neural substrates that underlie iconicity in sign language users. The second proposal will be submitted to the NIH (USA) to explore the interactions between linguistic and perceptual representation. Vigliocco has an application pending with ESRC to study the relationship between language, perception and emotion in signed and spoken languages.

Proposed academic outputs.

The quality of our research and the interest of a wide academic readership is reflected in the large number of high impact journal papers we have produced, despite our specialised area in psychological and linguistic studies. Our approach to academic outputs – the embedding of our research in the academic mainstream, as well as position papers in the specialist deaf and sign language research community has been maintained. . Our targets for the next 12 months by strand are found on pages 16-17 of this report.

Principal aims of the Communications/Impact Strategy

The principle aim of the communications strategy is to ensure DCAL's research is effectively promoted to those non-academic audiences who have an interest in our research, who would benefit from a greater understanding of the research or its applications, or who have a role in implementing policies relating to our target research group.

Key interrelated sector audiences include organisations or individuals with a professional role in

- Deafness or deaf people
- Language and language acquisition
- Education, especially those connected with the education of deaf children or special education needs.
- Health care, especially those with an interest in deaf people
- Higher education research
- Access issues for deaf people in relation to interpreting and other support provision

Over the coming year our focus will be on maintaining and expanding our high-level relationships with influential people within public policy, media and the third sector as well as developing a greater understanding of DCAL's work amongst politicians.

Activities that will be undertaken over the next twelve months and their likely impacts

Overview

- Continue targeted relationship building with influential people and organisations through a structured external affairs programme. This will include producing press releases, briefing sheets (on individual areas of research) and a general newsletter. The impact of this sign posting activity is that a range of organisations become aware of DCAL research, and act upon it when appropriate.
- Continue to build relationships with the Department for Children, Families and Schools (DCFS), Office of Disability Issues (ODI) Department of Health (DoH) and other government departments through active participation in consultation, evaluation and assessment processes so that government takes due account of DCAL research in the development of public policy.
- Active engagement with All Party Parliamentary groups including the All Party Parliamentary Group on Deafness. The impact of this is that key politicians with an interest in deafness become advocates for DCAL research.
- Ensuring that the work of the Corpus project and the BSL assessment battery is disseminated throughout the deaf community and other people with an interest in BSL. This impact of this is that non academic audiences, including the deaf

community, will become supportive or aware of, and where appropriate utilize the battery.

Core Communication Activities for all non academic groups

- Produce DCAL newsletters in April and October 2009. The newsletter goes to a large database of individuals and institutions that may have an interest in DCAL research, successes and events. The audience is primarily non-academic and includes targeted politicians, policy makers, think tanks and organisations of deaf people.
- Produce at least two briefing sheets to explain specific pieces of DCAL research work to a non-academic audience including the media. These are likely to include the development of the first BSL assessment battery, and the initial results from the Corpus project.
- Produce a health briefing sheet about any DCAL research that may have an impact on health service development and thinking. This will be sent to a targeted audience of those with influence in health think tanks, watchdogs, statutory and voluntary organizations.

Specific activities

- **It's my Future.** DCAL are partnering Deaf Research UK in running the It's My Future Competition 2009 for deaf young people, looking at what they would like to see research into deafness focus on. There will be an awards ceremony at The Houses of Parliament during Deaf Awareness Week, hosted by The All Party Parliamentary Group on Deafness Chairman, Malcolm Bruce MP. This will enable DCAL to maintain the good personal relationship we have with Malcolm Bruce MP as well as other politicians and policy makers with an interest in deafness. It also promotes DCAL as an organisation that listens to and involves the sign community in its work.
- Produce information and prepare a specific communications plan around the proposed DCAL 2010 summer school *Signed and Spoken Languages: A comparative perspective*. This will be disseminated to a broad research and academic community, including think tanks and policy groups who are likely to be interested in the initiative. It provides an opportunity to highlight the good practice that DCAL hope to develop in this area that has a relevance to a wide audience.

Communication and engagement with policy makers and practitioners

DCAL already has good contact with DCFS and organisations that work closely with them, such as the Special Educational Needs consortium and key players in the Bercow and Lamb Reviews. The initial findings from the BSL assessment battery research will be distributed to senior civil servants and key influencers where it is highly likely to be of great interest and to have maximum impact on education policy development. The DCAL-coordinated *Deaf Research and Children: A model of good practice and participation* will also be used to raise awareness and interest in the work of DCAL through more generalist education policy key players.

We will build on our contacts within Department of Health, NHS and third sector health organisations and distribute a targeted briefing sheet about those areas of DCAL's research that have implications for health service development and thinking.

Communication with third sector organisations working with the Deaf community.

DCAL already have strong relationships with many organisations of deaf people and their membership. During 2009/10 we will strengthen these by ensuring that regular information is received by an increased number of representative organisations working on Deaf culture, rights and health, and reach out to organisations working at a national and regional level. We will work with these organisations to ensure that information about DCAL is cascaded through relevant networks by providing information in suitable formats for websites and newsletters.

We are also planning a major dissemination event to the Deaf community with all participants who have taken part in our research projects invited to see what the findings were. This event will be led by two Deaf researchers (Dr Joanne Atkinson and PhD student Robert Adam) who have already secured funding of £1500 from the UCL Beacon fund for Public Awareness of Science