BIOGRAPHICAL SKETCH

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NAME: Dye, Matthew

eRA COMMONS USER NAME (credential, e.g., agency login): mwgdye

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Manchester Polytechnic, Manchester	BSc (Hons)	05/1992	Psychology
Stirling University, Stirling	MSc	08/1993	Neural Computation
Southampton University, Southampton	PhD	11/2001	Psychology
University of Rochester, Rochester, NY	Postdoctoral Fellow	08/2005	Brain & Cognitive Sciences

A. Personal Statement

My fascination with deafness and sign languages began after taking a British Sign Language class as an undergraduate, and deciding to complete my undergraduate thesis on visual memory in deaf adults. For over 20 years I have continued my passion to uncover the psychological and linguistic impact of deafness. After completing my doctoral dissertation at the University of Southampton on the psycholinguistics of sign languages, I started my first faculty position teaching deaf students at the University of Bristol. There I became interested in visual learning, after noticing the ways in which deaf students had to actively manage their visual attention in the classroom. This led to a postdoctoral research fellowship at the University of Rochester, where I spent seven years learning American Sign Language and developing a new line of research in vision science. My postdoctoral research examined the development of visual functions in deaf children who used ASL as a primary language, as well as adult studies that examined the specificity of visual function changes resulting from deafness. Spending a lot of time in schools for the deaf gave me greater insight into the nature of attentional difficulties - in addition to the enhancements - experienced by deaf children. Subsequently, as a faculty member at the University of Illinois, my researched focused on temporal aspects of visual attention in the deaf. During that time, I also developed collaborations that allowed me to use event-related optical signals to examine cross-modal plasticity in deaf adults, and I also attended the ERP Bootcamp at US Davis as I worked to build EEG/ERP methodologies into my research program. Since 2015 I have been on the faculty at RIT/NTID, where I have access to a large population of deaf adults both on campus and in the local Rochester NY community. This extensive experience in working with deaf children and adults, allied to cross-disciplinary training in psychology, cognitive neuroscience and the speech and hearing sciences, makes me well prepared to lead this study that will reveal the ways in which cochlear implantation and sign language acquisition influence cognitive and neural functions in young deaf college students and how that in turn predicts spoken language abilities.

1. Seymour JL, Low KA, Maclin EL, Chiarelli AM, Mathewson KE, Fabiani M, Gratton G, Dye MW. Reorganization of neural systems mediating peripheral visual selective attention in the deaf: An optical imaging study. Hear Res. 2016 Sep 23;PubMed PMID: 27668836.
2. Dye M. Temporal entrainment of visual attention in children: Effects of age and deafness. Vision Research. 2014 December; 105:29-36.
3. Dye M, Hauser P. Sustained attention, selective attention and cognitive control in deaf and hearing children. Hearing Research. 2014 March; 309:94-102.
4. Dye M, Bavelier D. Differential development of visual attention skills in school-age children. Vision Research. 2010 February; 50(4):452-459.

B. Positions and Honors

1999 - 2002	Lecturer, University of Bristol, Bristol
2005 - 2008	Research Associate, University of Rochester, Rochester, NY
2008 - 2009	Senior Lecturer, University of Rochester, Rochester, NY
2009 - 2015	Assistant Professor, University of Illinois at Urbana-Champaign, Champaign, IL
2015 -	Assistant Professor, Rochester Institute of Technology, Rochester, NY

Membership of Learned Societies

2010 -	Member, Sign Language Linguistics Society
2012 -	Member, Association for Psychological Science
2015 -	Fellow, Psychonomic Society
2015 -	Member, Vision Sciences Society

NSF Federal Grant Review Panels
2009-2010, 2012, 2014 (twice)

Editorial Responsibilities
Frontiers in Psychology/Cognitive Science (Guest Associate Editor, 2016); Journal of Deaf Studies and Deaf Education (Guest Associate Editor, 2016-2017)

Reviewing (since 2010)
Brain and Cognition; Child Development; Cognition; Developmental Psychology; Experimental Brain Research; Frontiers in Human Neuroscience; Hearing Research; International Journal of Bilingualism; Journal of Cognitive Neuroscience; Journal of Experimental Child Psychology; Journal of Memory and Language; JAMA; Journal of Deaf Studies and Deaf Education; JEP: Human Perception and Performance; Language and Cognitive Processes; Memory and Cognition; Motivation and Emotion; Nature Neuroscience; Neural Plasticity; Neuropsychologia; Perceptual and Motor Skills; PLOS ONE; Psychological Science; Restorative Neurology and Neuroscience; Second Language Research; Trends in Neurosciences.

C. Contribution to Science

1. Deafness reorganizes the visual system of children with hearing loss. Previous research on visual functions in deaf individuals had focused on spatial components of attention in deaf adults, and temporal components in children. My research has demonstrated that (a) compensatory spatial enhancements in vision extend to deaf children as young as 10 years of age, and (b) there is a dissociation between widespread spatial changes observed as a result of deafness, and specific enhancements in the inferior visual field attributable to extended use of a visual language such as ASL. In addition, we have shown that temporal processing deficits in deaf children may not be generalizable to all deaf children, and that early exposure to a natural language such as ASL may inoculate deaf children. Ongoing funded research is developing this line of inquiry.

    a. Seymour JL, Low KA, Maclin EL, Chiarelli AM, Mathewson KE, Fabiani M, Gratton G, Dye MW. Reorganization of neural systems mediating peripheral visual selective attention in the deaf: An optical imaging study. Hear Res. 2016 Sep 23;PubMed PMID: 27668836.

    b. Dye MW. Foveal Processing Under Concurrent Peripheral Load in Profoundly Deaf Adults. J Deaf Stud Deaf Educ. 2016 Apr;21(2):122-8. PubMed PMID: 26657078; PubMed Central PMCID: PMC4886313.

    c. Dye M. Temporal entrainment of visual attention in children: Effects of age and deafness. Vision Research. 2014 December; 105:29-36.

    d. Dye M, Hauser P. Sustained attention, selective attention and cognitive control in deaf and hearing children. Hearing Research. 2014 March; 309:94-102.

2. Children who play action video games are on different developmental trajectories to those who do not. Although there is ongoing debate about causality and how to interpret the results of training studies, research has shown that playing fast-paced, first person perspective video games has the potential to bring about changes in the processing of visual information. My past work demonstrated that, in the visual domain, the processing and attentional skills of children who play these games might also be affected. Alongside quasi-experimental studies of enhanced visual attention skills in

children who play these games, we also performed a meta-analysis that revealed faster processing of visual information across a wide range of experimental paradigms, with no apparent cost in terms of accuracy.

a. Bavelier D, Green CS, Dye MW. Children, wired: for better and for worse. Neuron. 2010 Sep 9;67(5):692-701. PubMed PMID: 20826302; PubMed Central PMCID: PMC3170902.

b. Dye MW, Bavelier D. Differential development of visual attention skills in school-age children. Vision Res. 2010 Feb 22;50(4):452-9. PubMed PMID: 19836409; PubMed Central PMCID: PMC2824025.

c. Dye MW, Green CS, Bavelier D. The development of attention skills in action video game players. Neuropsychologia. 2009 Jul;47(8-9):1780-9. PubMed PMID: 19428410; PubMed Central PMCID: PMC2680769.

d. Dye MW, Green CS, Bavelier D. Increasing Speed of Processing With Action Video Games. Curr Dir Psychol Sci. 2009;18(6):321-326. PubMed PMID: 20485453; PubMed Central PMCID: PMC2871325.

3. The effect of deafness on visual functions demonstrates specificity. It is widely acknowledged that one effect of deafness is to bring about a wider distribution of attentional resources in the visual periphery. In a series of studies, we showed that the effects of deafness on other aspects of visual attention were more elusive. Specifically, we reported effects sizes for visual orienting, multiple object racking, enumeration and attentional alerting that were indistinguishable from zero. We also reported a lack of deaf-hearing differences on clinical measures of visual processing such as the Rey-Osterrieth Complex Figures Test.

a. Hauser PC, Dye MW, Boutla M, Green CS, Bavelier D. Deafness and visual enumeration: not all aspects of attention are modified by deafness. Brain Res. 2007 Jun 11;1153:178-87. PubMed PMID: 17467671; PubMed Central PMCID: PMC1934506.

b. Dye MW, Baril DE, Bavelier D. Which aspects of visual attention are changed by deafness? The case of the Attentional Network Test. Neuropsychologia. 2007 Apr 9;45(8):1801-11. PubMed PMID: 17291549; PubMed Central PMCID: PMC2885017.

c. Hauser PC, Cohen J, Dye MW, Bavelier D. Visual constructive and visual-motor skills in deaf native signers. J Deaf Stud Deaf Educ. 2007 Spring;12(2):148-57. PubMed PMID: 17194846.

d. Bavelier D, Dye MW, Hauser PC. Do deaf individuals see better?. Trends Cogn Sci. 2006 Nov;10(11):512-8. PubMed PMID: 17015029; PubMed Central PMCID: PMC2885708.

4. Deaf individuals fixate the face when perceiving a sign language. Anecdotal evidence and self-report measures supported the idea that fluent signers fixate the face of a communicative partner during sign language interactions. In collaboration with engineering colleagues, we provided the first empirical evidence to support this conjecture. Eye tracking approaches revealed that signers of British Sign Language fixated the nose/mouth region of their communicative partner, with few-to-no saccades to the moving arms and body. Ongoing behavioral work suggests that this fixation pattern may drive enhanced attentional allocation to the inferior visual field.

a. Dye MW, Seymour JL, Hauser PC. Response bias reveals enhanced attention to inferior visual field in signers of American Sign Language. Exp Brain Res. 2016 Apr;234(4):1067-76. PubMed PMID: 26708522.

b. Agrafiotis D, Canagarajah N, Bull D, Kyle J, Seers H, Dye M. A perceptually optimised video coding system for sign language communication at low bit rates. Signal Processing: Image Communication. 2006; 21(7):531-549.

c. Agrafiotis D, Canagarajah N, Bull DR, Dye MW. Perceptually optimised sign language video coding based on eye tracking analysis. Electronics Letters. 2003; 39(24):1703-1705.

Complete List of Published Work in My Bibliography:
http://bit.ly/2dbzZyu

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

R01DC016346-01, National Institutes for Health – NIDCD

Dye and Sharma (PI)

07/01/17-06/30/18

Neurocognitive Plasticity in Young Deaf Adults: Effects of Cochlear Implantation and Sign Language Exposure

Evaluate how the timing of cochlear implantation and sign language exposure influence the maturation of auditory cortex and the emergence of crossmodal recruitment of superior temporal areas.
Role: PI

R01DC005407-11, National Institutes for Health – NIDCD
Senghas (PI)
04/06/17-03/31/18
The Creation and Enhancement of Language
Discover the abilities all humans apply to acquire and use language, by capturing how those abilities create and shape language over generations, particularly when language exposure is initially incomplete.
Role: Consultant

1550988, National Science Foundation - Directorate for Social, Behavioral & Economic Sciences
Dye (PI)
09/01/16-08/31/19
Development of Temporal Visual Selective Attention in Deaf Children
Determine the relative contributions of hearing loss and language deprivation to the development of temporal visual selective attention skills in deaf children.
Role: PI

Completed Research Support

1565990, National Science Foundation - Office of the Director
Dye (PI)
09/01/15-03/31/17
CNIC: U.S.-Swedish Workshop on Assessment of Multimodal-Multilingual Development in Deaf and Hard-of-Hearing Children
Host an international conference to discuss synergistic research collaborations between cochlear implant and sign language researchers.
Role: PI

NSF SBE 1041725, National Science Foundation/Gallaudet University
Petitto and Allen (PI)
10/01/11-09/30/15
Collaborative Research: Science of Learning Center: Visual Language and Visual Learning (VL2)
PI on subcontract that used the event-related optical signal (EROS) to study cross-modal plasticity in adult deaf signers of ASL.
Role: Co-Investigator

NSF SBE 0541953, National Science Foundation/Gallaudet University
Allen (PI)
09/15/06-09/30/11
Collaborative Research: Science of Learning Center: Visual Language and Visual Learning (VL2)
PI on subcontract that examined the development of visual temporal selective attention in deaf and normal-hearing children.
Role: Co-Investigator

NIH R01 DC004418, NIH/University of Rochester
Bavelier (PI)
09/01/09-09/30/11

Reorganization of Visual Functions After Early Deafness
PI on subaward that compared the spatial distribution of visual selective attention in deaf and normal-hearing children,
Role: Co-Investigator

The Dana Foundation
Bavelier (PI)
09/01/04-08/31/07
Reading in the Deaf: Neuroanatomical Underpinnings of Fluent Reading
Sought to determine differences in neural recruitment during written sentence comprehension in skilled and less skilled deaf readers.
Role: Co-PI