Hearing Aids for Music
Exploring the music listening behaviour of people with hearing impairments

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Exploring the music listening behaviour of people with hearing impairments

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Principal Investigator

Arts & Humanities Research Council | Sheffield Teaching Hospitals NHS Foundation Trust | UNIVERSITY OF LEEDS

Talk outline

- Aims
- Methods
- Challenges
- Strategies
- Project outputs

@musicndeafness
#hafm2017

AHRC funding application

Alinka Greasley (PI)
Associate Professor of Music Psychology

Music listening behaviour, functions of music listening, musical preferences

Harriet Crook (Co-I)
Lead Clinical Scientist for Complex Hearing Loss

Auditory processing in CI users, music listening with implants and hearing aids

Robert Fulford (PDRF)
Research Fellow in Music Psychology

Music and deafness, cross-modal sensory perception, interactive performance

Some observations…

- Music listening and performance is ubiquitous in society and fulfils various functions (Sloboda, Lamont & Greasley, 2009; Salimpoor et al., 2013)
- Musical engagement can have significant health and well-being benefits (MacDonald, Kreutz & Mitchell, 2012)
- More research on music perception with a CI than HA (Tozer & Crook, 2012)
- Hearing aids are designed for speech – acoustical properties of speech and music differ (Chasin & Russo, 2004)
- Deaf musicians report difficulties listening to and performing music with their HA technology (Fulford, 2013)

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Aims

- Explore how music listening experiences are affected by mild, moderate, severe and profound deafness and the use of HA technology
- Provide evidence of the issues currently affecting HA users with regard to music listening so that technical improvements can be targeted at particular difficulties and listening settings

HAFM team

Alinka Greasley (PI)
Associate Professor of Music Psychology

Harriet Crook (Co-I)
Lead Clinical Scientist for Complex Hearing Loss

Robert Fulford (PDRF)
Research Fellow in Music Psychology

Jackie Salter (PDRF)
Lecturer in Deaf Education

Amy Beeston (PDRF)
Research Fellow

Project team

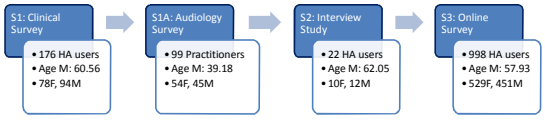
Core team

- **Alinka Greasley (PI):** Associate Professor of Music Psychology
- **Harriet Crook (Co-I):** Lead Clinical Scientist for Complex Hearing Loss
- **Robert Fulford (PDRF)**(2015-2016)**:** Music Psychology
- **Jackie Salter (PDRF)** (2016-2017)**:** Deaf Education
- **Amy Beeston (PDRF** (2017-2018)**:** Acoustics, Psychophysics, Computer Science

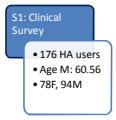
Advisory board

- **Lena Bartra** (Hearing therapist, freelance)
- **Guy Brown** (Professor, Computer Science, University of Sheffield)
- **Paul Checkley** (Clinical Director, Harley Street Hearing)
- **Brian Moore** (Emeritus Professor, Auditory Perception, University of Cambridge)
- **Ruth Swanwick** (Professor, Deaf Education, University of Leeds)
- **Rachel van Besouw** (Lecturer, Hearing Science, University of Southampton)
- **Paul Whittaker** OBE (Founder of Music and the Deaf, freelance)

HAFM study methodology



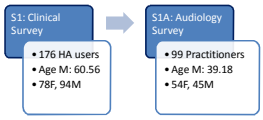
S1 Clinical Survey



S1: Clinical Survey

- NHS (Sheffield Teaching Hospitals) and private clinic (Harley Street Hearing)
  - STH (n=84) / HSH (n=89)
- Participants n=176 (age range 21 – 93)
  - Mean age = 60.35 (SD=18.07), STH=64.68, HSH=56.41
  - Gender overall: 56% male 44 % female, STH=45% male, HSH=65% male
- Method
  - Brief questionnaire completed at their appointment (or later using SAE)

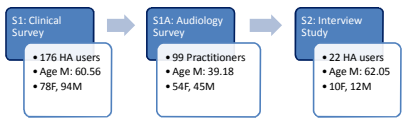
S1A Audiology Survey



S1A: Audiology Survey

- 99 practitioners
  - Public (62%), Private (23%), Public + private (10%), third sector (1%)
  - Age range 22-71, M=39.18 (SD=11.50)
  - Years practising >10 years (51%), 3-4 years (29%), 1-2years (9%), < 1 year (4%)
- Method
  - Online survey which explored training level and background, experiences discussing music listening issues, experiences optimising HAs for music listening

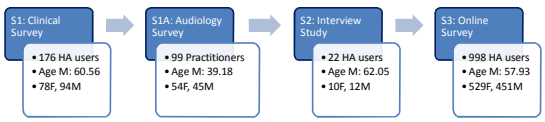
S2 Interview Study



S2: Interview Study

- N=22
  - 13 NHS, 9 private
- Categorisation
  - 10 mild, 10 moderate, 2 severe (BSA 5 frequency av.)
  - 9 musicians, 13 non-musicians
- Method
  - Interview covering history of hearing loss, past and current music listening practices, How HL has influenced listening over time, and experiences of HA fitting
  - Collection of audiometric data

S3 Online survey



S3: Online Survey

- N=998 (snapshot)
- Participants n=998 (age range 21 – 93)
  - Mean age = 57.93, 54% female
- Method
  - Questions on music listening habits, hearing level and use of HA technology, experiences of music in live and recorded settings, discussions with audiologists
  - BSL videos for accessibility (7%, n=57)
  - Requested for latest audiogram (10%, n=83)

HAs enable music appreciation

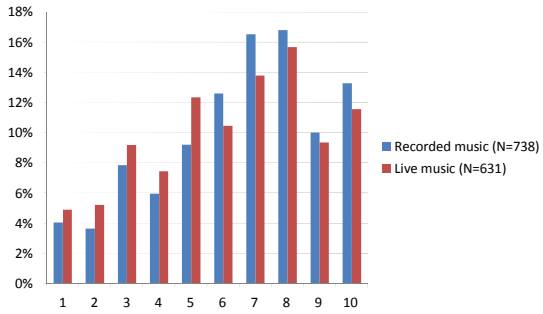
- Many HA users did not report problems with music listening
  - Mild hearing loss levels
  - Non-musicians

"I would probably give them [HAs] a 9 out of 10, I used to struggle with lyrics but I can hear the words clearer."

"Without my hearing aids, there's nothing there except the thump, thump, thud bits of a track. They do improve it vastly."

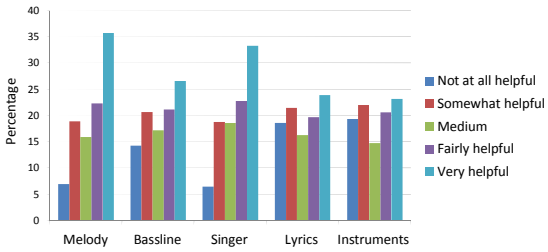
Overall rating for HAs

(1 'Not at all helpful' to 10 'Extremely helpful')

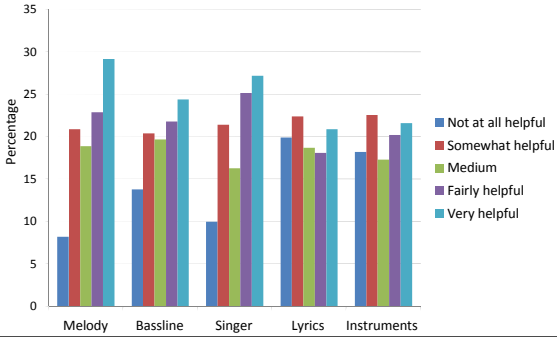


HAs rated as helpful for…

- HAs mostly rated as 'fairly' or 'very' helpful for aspects of music appreciation when listening to **RECORDED music** (N=738)



- HAs rated as 'somewhat useful' for 'Hearing and Understanding Lyrics' and 'Picking out instruments' in LIVE music contexts (N=631)



Live contexts more problematic

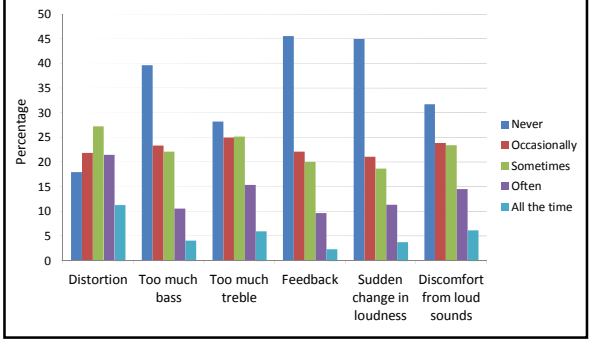
Recorded music

- Listener able to control auditory input
  - Volume adjustments
  - Mode of delivery
- Properties of the music
  - Compression
  - Level of complexity
  - Limited dynamic range
- Familiarity with music
  - Artist, musical features, lyrics

Live music

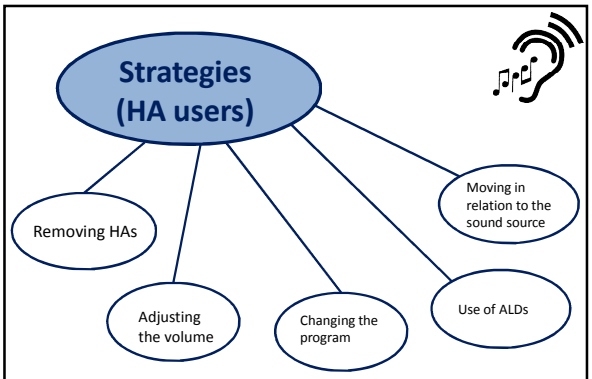
- High pitches distorting
  - Large gain at top end
- Feedback
  - Those with greater HL
- Sound levels controlled by others
  - E.g. sound engineer
- Music and speech
  - Artist talks between songs

When listening to RECORDED music, how often do you experience the following difficulties? (N=738)

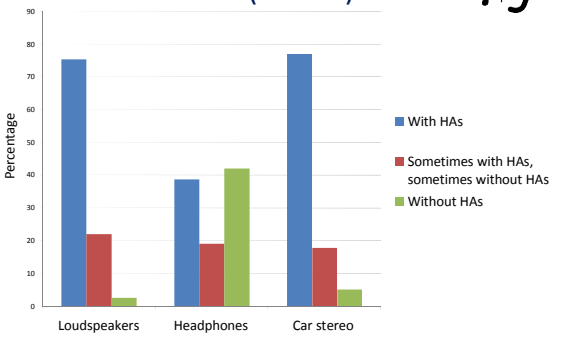


Challenges

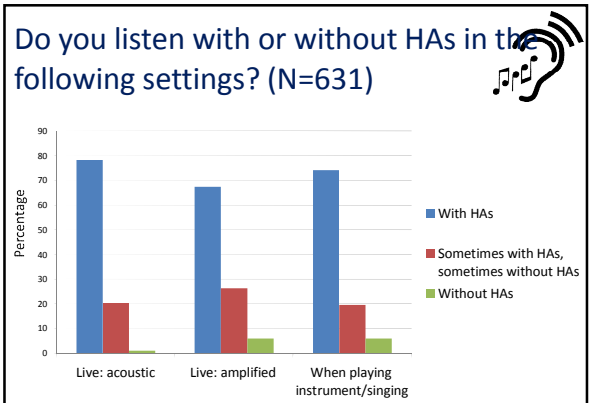
Strategies (HA users)



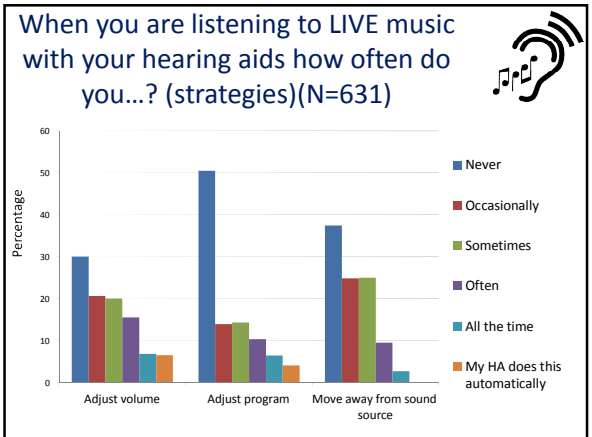
Do you listen in these ways with or without HAs? (N=738)



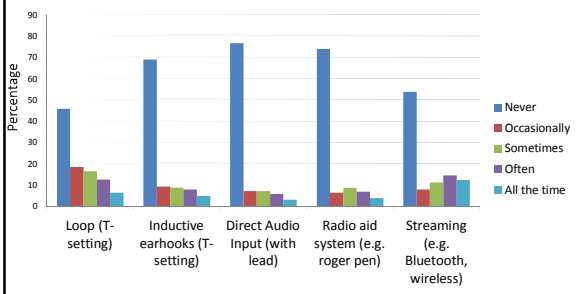
Do you listen with or without HAs in the following settings? (N=631)

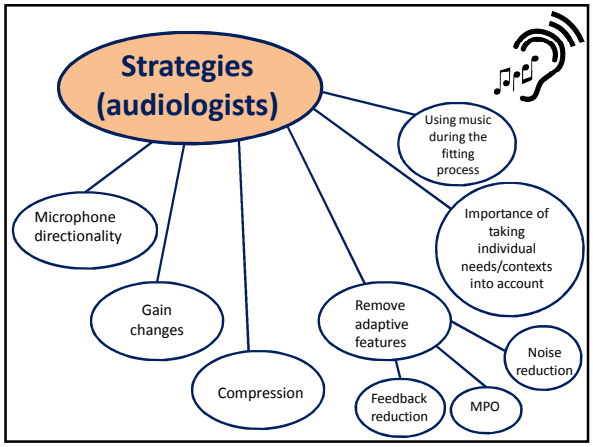


When you are listening to LIVE music with your hearing aids how often do you…? (strategies)(N=631)



Use of Assistive Listening Devices with HAs for recorded music (N=238)





Understanding of HL and HA technology and acclimatisation

- Individual differences in level of understanding of HL and HA technology
  - Unrealistic expectations
  - Confusion over channels/programs
  - Make/model/type of aid/type of fitting
- Individual differences in mindset
  - Resilience, willingness to try/experiment
- Limited agreement about HL level
  - Descriptors, audiologist description, PTA data (n=83)
  - < 50% agreement with PTA (BSA 5 Av.)

Discussions with audiologist

- Very few discussions taking place, limited positive outcomes
  - No sig. diffs between public and private
- 85% of practitioners in S1A report asking patients about music
- 61% HA users (n=518) in S3 report having discussed music
- Increased experimentation and tailoring more effective

"Due to him taking time and experimenting, the margin between having a successful music listening hearing aid setting and having undesirable oscillation in the form of a constant whistle is quite fine".

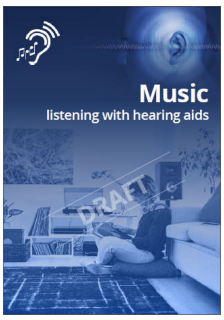
Musicians and HAs

- Musicians highly experienced listeners
  - Adjustment to HL and HAs takes more time
- Process of acclimatisation is key
  - Need to learn to listen again – timescale?
- Strategies incl.
  - Managing expectations
  - Adjustment and experimentation
  - Use of resources in clinic
  - Encourage use of ALDs
    - E.g. roger pen to hear conductor

"it was two years before it was a pleasure to put them in rather than a pleasure to take them out"

Patient leaflet

- Understanding your HL
- Why is music challenging?
- How can my HAs help me?
- What other Assistive Listening Devices might help?
- How can I make the best out of listening situations?
- Top tips for music listening
- Persistence pays off!
- Making the most of your audiologist
- Existing resources

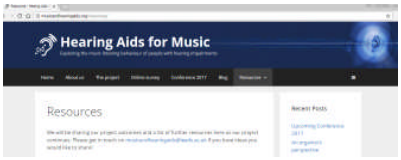


S4: Evaluation study

S5: Resource evaluation study

- NHS and private clinics
- Evaluate leaflet
- Rate usefulness
- Map behavioural change

Project outputs



BSHAA

BAA BRITISH ACADEMY OF AUDIOLOGY

ACTION ON HEARING LOSS

The British Psychological Society

British Society of Audiology
KNOWLEDGE | LEARNING | PRACTICE | IMPACT

ICMPC14

Be Curious FESTIVAL 2016

Conference aims

To bring together hearing aid users, researchers, audiologists and manufacturers to examine current issues and potential solutions in the perception of music through hearing aids

- Learn from each other!
- Plenary session dedicated to:
  - Summarising current issues
  - Exploring solutions
  - Future research directions
  - Potential collaborations

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- Thank you for listening!

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Requests:

- Leaflet evaluation form
- Plenary session contribution
- Conference evaluation form

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