Institution: University of Leeds

Unit of Assessment: 33A

Title of case study: Improving the Experience of Hearing Aid Use for Music

Period when the underpinning research was undertaken: 2013-present

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Dr Alinka Greasley	Associate Professor in Music Psychology	2009–present
Dr Robert Fulford	Postdoctoral Research Fellow (Music) Visiting Research Fellow (Music)	2015–16 2020–present
Dr Jackie Salter	Postdoctoral Research Fellow (Music) Lecturer in Deaf Education (Education)	2016–17 2017–present
Dr Amy Beeston	Postdoctoral Research Fellow (Music)	2017–2018

Period when the claimed impact occurred: 2016-present

Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact (indicative maximum 100 words)

Dr Alinka **Greasley**'s research impacts upon the lived experiences of those with hearing impairments who wear hearing aid (HA) technology. It gives HA users the knowledge and confidence to speak with audiologists about what they need to help them engage with music and participate in musical activities. It improves confidence and expertise amongst audiologists who fit HAs for music, leading to increased satisfaction amongst HA users. This enriches the cultural lives of those individuals and facilitates (re)engagement in social and societal activities: especially amongst older adults, participation in musical activities shows a direct correlation with improved health and wellbeing.

2. Underpinning research (indicative maximum 500 words)

Greasley was the Principal Investigator on the Arts and Humanities Research Council-funded (£197,836.17) *Hearing Aids for Music* (HAfM) project (February 2015–September 2018) **[R1]**, working with Co-Investigator, Harriet Crook (Lead Clinical Scientist for Complex Hearing Loss at Sheffield Teaching Hospitals NHS Trust) and Post-Doctoral Research Fellows, Amy **Beeston**, Robert **Fulford**, and Jackie **Salter**. **Fulford** provided skills in working with musicians with hearing impairments, **Salter** contributed expertise in working with deaf children and adults, whilst **Beeston** contributed multidisciplinary understandings (across music, acoustics, and computer science) of relevance for assessing HA technology benefit. HAfM investigated the current and potential effectiveness of HA technologies for engaging with music and musical activities for HA users (some 2 million individuals in the UK), through a formal collaboration between the University of Leeds (**Greasley**, with **Fulford**, **Salter** and **Beeston**) and Sheffield Teaching Hospitals NHS Foundation Trust (Harriet Crook). Its reach expanded to include working partnerships with a further 36 NHS Trusts across England.

Four studies collected data from more than 1,500 HA users and more than 100 audiologists, which revealed the benefits and challenges of listening to and performing music as an HA user **[1, 2]**. For some, HAs enable musical appreciation in an unambiguously positive manner.

For others—particularly those who self-identify as musicians—many difficulties arise: distortion, awareness of how different music can sound through hearing aids, problems identifying instruments, or with following lyrics **[1, 2]**. Commonly, HA users reduce or end entirely their engagement with music, whether privately or professionally: the psychosocial consequences of this are in some cases profound, but in all negative, leading to frustration, anxiety, and depression **[1, 2]**. Findings also showed, first, that audiologists are not routinely trained to account for music when fitting hearing aids **[1]** and, second, the significance of audiologist management of user expectations while acclimatising to hearing aids. Musicians in particular need (and have expectations of) fine-grained levels of auditory discrimination **[2].** As a result, professional musicians avoid hearing tests for fear of needing to use a hearing aid (in turn, suggesting a lack of knowledge *about* HA technology) **[3]**.

Greasley's research **[4, 5]** on the topic of music and everyday life gives a rich understanding of what listeners want and need from the music they listen to. This work was a baseline for the HAfM project's goal: to find ways to improve the musical experiences of HA users. The relationship between ability and musical practice is central to the burgeoning field of disability studies within musicology but, before this project, no large-scale systematic examination had been made of the musical experiences and behaviours of people with varying levels of hearing loss who make use of HA technology **[6]**, such that very little could be securely said about the lived experiences of music for a large segment of the population. It was this gap the project set out to fill, although it has ultimately proved more expansive, its findings suggesting ways of improving how HA technologies enable a rich engagement with music, from the perspectives of HA users, audiologists, and manufacturers.

Three guides were developed. One is for patients. It helps them better understand their hearing loss, HA technology, and outlines strategies to help improve their experiences with music, including the use of assistive listening devices (ALDs). Two are aimed at practitioners: a quick start guide on programming aids—to be used in clinic, enabling quick reference during appointments where time is often limited—and a longer leaflet on counselling and fitting hearing aids for music. These guides outline, for audiologists, strategies for counselling before and after HA fitting and HA settings—both more generally and musically—likely to have a positive impact on HA users' musical experiences. They explain, for HA users, what they can expect and what they cannot from their hearing aids, but also provide practical tips, from how better to arrange their own home environments, to the importance of persistence, and the benefits of beginning with music, counter-intuitively, at a quieter dynamic.

3. References to the research (indicative maximum of six references)

[1] Alinka **Greasley**, Harriet Crook and Robert **Fulford**, **'**Music Listening and Hearing Aids: Perspectives from Audiologists and their Patients', *International Journal of Audiology* [accepted April 2020 and available online 2 July 2020; REF2021 item produced within **[R1]** in peer-reviewed journal]

[2] Robert **Fulford**, Jane Ginsborg, and Alinka **Greasley**, 'Hearing Aids and Music: The Experiences of D/deaf Musicians', in Jane Ginsborg, Alexandra Lamont, Michelle Philips, and Stephanie Bramley (eds.), *Proceedings of the Ninth Triennial Conference of the European Society for the Cognitive Sciences of Music* (Manchester: Royal Northern College of Music, 17–22 August 2015), 372–80 (available online at: https://www.escom.org/proceedings/ESCOM9_Manchester_2015_Abstracts_Proceedings.pdf) [produced within **[R1]** in conference proceedings, peer reviewed as part of conference acceptance process]

[3] Alinka **Greasley**, Robert **Fulford**, Martin Pickard and Nigel Hamilton, 'Help Musicians UK Hearing Survey: Musicians' Hearing and Hearing Protection', *Psychology of Music* (2018) <https://journals.sagepub.com/doi/full/10.1177/0305735618812238> (doi/full/10.1177/0305735618812238) [REF2021 item produced within **[R1]** in peer-reviewed journal]

[4] Alinka **Greasley**, Alexandra Lamont, and John Sloboda, 'Exploring Musical Preferences: A Study of Adults' Liking for Music in their Personal Collections', *Qualitative Research in Psychology*, vol. 10, no. 4 (2013), 402–27 [REF2014 item in peer-reviewed journal]

[5] Alexandra Lamont, Alinka **Greasley**, and John Sloboda, 'Choosing to Hear Music: Motivation, Process, and Effect', in Susan Hallam, Ian Cross, and Michael Thaut (eds.), *The Oxford Handbook of Music Psychology* (Oxford: Oxford University Press, 2016), 711–24 [in peer-reviewed essay collection]

[6] Robert **Fulford**, Alinka **Greasley**, and Harriet Crook, 'Music Amplification using Hearing Aids', *Acoustics Bulletin*, vol. 41, no. 1 (2016), 49–51 [produced within **[R1]**]

[R1] *Hearing Aids for Music*, Arts and Humanities Research Council, £197,836.17, 2015–18

4. Details of the impact (indicative maximum 750 words)

In 2015, Action on Hearing Loss (formerly the Royal National Institute for Deaf People), the largest charity in the UK for people with hearing loss, estimated that currently some 11 million people in the UK experience some form of hearing loss, representing a sixth of the population, with that figure expected to rise to more than 15 million by 2035, which would, by then, represent a fifth of the population of the country. Even in the comparatively early stages of the research, there was broad interest in the HAfM project from outside the academy: a HA user whose regular column for *Action on Hearing Loss* promoted the project and summarised the key recommendations arising from the research in 2017, commented, "Alinka's research brought the issues out into the open and therefore publicly validated what individually so many of us have been struggling with for such a long time." **[D].** In November 2016, **Greasley** wrote about the project for *The Psychologist*, reaching *ca.* 50,000 professional psychologists and psychology students **[A]**, and for *Audacity*, the regular publication of the British Society of Audiology **[B]**, which has a circulation of *ca.* 1,200 professional healthcare practitioners, around a fifth of whom are trainee audiologists. Both pieces stressed findings of the first two studies: first, that almost half of HA users found that challenges with listening to music negatively affected their lives and, second, that a complex range of interacting factors—whether music is live or recorded, hearing loss across frequency ranges, the limitations of hearing aids which are primarily designed for speech— led to the first finding. These—and a further essay by **Greasley,** written at the invitation of one of the editors who had been present at the HAfM conference, in February 2017's *Action on Hearing Loss*, the charity's regular magazine with a readership of 20,000 HA users—were designed both to drive awareness of the project and to encourage participation in the later stages of the research **[C]**. "One of the key points that emerged from Alinka's research," the columnist added, "was the need for audiologists to better understand the demands of music listeners/musicians". Another HA user who also attended the conference and worked as a church organist before he became deaf, argued that, "thanks to HAFM, I now have the knowledge, understanding and confidence to discuss and explain my needs to my […] audiologist", stressing the importance of web and print publications alike, as well as the importance of the conference. He is now not only "playing for regular church services with enjoyment and satisfaction" but has also "returned to regular concert going." **[E]**

Greasley presented HAfM findings to the 2018 Association of Independent Hearing Healthcare Professionals Expo where she was one of five named speakers, and was one of the twelve speakers at the 2017 Congress of the British Society of Hearing Aid Audiologists, the largest trade meeting for the UK's retail hearing healthcare professions. Greasley has also given invited talks to the British Society of Audiology in 2016 for their 'lunch and learn' seminar series, and at the British Academy of Audiology's 2016 Annual Conference. More recently (24 November 2020), Greasley presented the HAfM resource pack within a talk at the British Academy of Audiology, and was asked to contribute details of project findings to their next e-newsletter. These talks ensured that the findings reached audiologists across the country who are in a position to make positive changes to their practice and to inform HA users of the research and

sources of support. With the research also gaining traction internationally, the Director of Auditory Research at the Musicians' Clinic of Canada, and a founding member of the Hearing Instrument Review Panel which recommends approval for all new hearing aids in Ontario, argued, in reference to his essay 'Musicians should not retire on my watch!', in *Hearing Health & Technology Matters* (May 2018), that **Greasley**'s work was "at the right time (with the right orientation) perhaps the proverbial straw that brought about change". **[F]**

HA users, deaf musicians, audiologists, industry researchers, educationalists from HA providers, and representatives from hearing impaired support communities attended the project's conference in 2017, alongside hearing and music therapists and d/Deaf music teachers and performers. The international conference was, from the ground up, driven by research but designed to have an audience beyond the academy. In a four-month follow-up survey of 120 conference attendees, of *ca.* 50 respondents, 62% of audiologists, 58% of those working in manufacturing/research, and 50% of HA users agreed they took action and/or changed their behaviour as a direct result of the work they encountered **[G]**. One composer attended "as someone who had lost much of my hearing, as well as acquiring tinnitus and diplacusis" and though he "had kept my hearing loss secret since it first was diagnosed in 2009" now had "the confidence to openly admit my problems for the first time." The event, he later argued, "showed very clearly that there should be no obstacle to my talking freely about my own condition and that, furthermore, there were positive benefits in so doing" and led directly to his own essay, 'Ménière's and me' **[H]**. Following his 'coming out' regarding his deafness to the musical world, he developed, under the 'Aural Diversity' banner, in collaboration with HA manufacturer GN Resound, a series of concerts (in Bath and in Leicester in 2019, with a further event in London planned for 2020 and currently postponed), funded by Arts Council England, which recognise and engage with many different ways and modes of listening, including HA use, cochlear implants, or bone conduction.

As discussed in **§2**, findings have been used to develop a set of resources for audiologists and hearing aid users which are freely available on the HAfM website (https://musicandhearingaids.org/) for patients and practitioners: a leaflet for HA users offering guidance on music listening (directly addressing common problems identified by study participants), a leaflet for audiologists to aid in discussions in clinic, and a quick-start guide for audiologists to use when fitting hearing aids. Feedback from participants and conference delegates to determine the likely uptake of these leaflets found that 71% of hearing aid users and 100% of audiologists would recommend these resources to others **[G]**. A pilot survey of 20 audiologists, working in the NHS and in private practice, found that 90% agreed that they had a better understanding of the capabilities and limitations of HA technology for music and the 95% felt more confident in programming an HA for music listening as a result of the practitioner leaflet (the beginning of the Covid-19 pandemic curtailed further work with NHS audiologists). The impact was particularly strong among audiologists who had not received any prior training on the subject of music, who reported improved confidence in providing advice about music listening, and who had increased their discussions of music with patients. In follow-up interviews, one audiologist working in a private clinic noted that the leaflet had "already changed how I operate". A Deputy Head of Audiology working within the NHS said that the project had both meant that "some instincts" had been "validated" and that it "gave even more confidence of what I would say to people when they were still trying their best to enjoy music rather than giving up on it completely", while another NHS audiologist commented that it was "long overdue" and that "it's been really, really useful. And I know that it's going to change a lot of perspectives" **[I]**. In October 2020, the National Institute for Health Research (NIHR) promoted the project as one of its own case studies on the impact of academic research on healthcare practice. The NIHR highlighted the HAfM resource pack as being of particular value to the NHS, "empower[ing] audiologists to consider their patients' musical needs with them—something which was not previously standard practice." **[J]**

The project is the first of its kind in the field of music psychology to be fully accessible to those with severe/profound deafness whose first language is British Sign Language (BSL). The

project's national survey includes BSL translations of all questions and the ability to respond in BSL, and around 7% of the >1,500 HA users used the BSL translations.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[A] Alinka **Greasley**, 'Music to Our Ears', *The Psychologist* (Vol. 29, November 2016) and archived webpage confirming readership [pdf]
[B] Alinka **Greasley**, 'Considering Music in Routine Fittings', *Audacity* (pp. 32–33, November 2016) and archived webpage confirming readership.
[C] Alinka **Greasley**, 'Soundtrack to Our Lives, *Action on Hearing Loss* (February 2017) and email from its Editor confirming readership.
[D] Email and review from *Action on Hearing Loss* columnist and HA user (31 July 2019).
[E] Email and commentary from church organist and HA user (30 July 2019).
[F] Email and article from the Director of Auditory Research, Musicians' Clinic of Canada (11 July 2019).
[G] Survey questions and responses from 46 conference attendees (February 2018)
[H] Email (19 July 2019) and blog entry (29 November 2019) from composer and HA user.
[I] Summary of pilot survey and follow-up interviews with NHS audiologists (January–April 2020)
[J] 'Hearing Aids for Music', NIHR impact case study (https://www.nihr.ac.uk/documents/case-studies/hearing-aids-for-music-impact-case-study/25873)