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Unveiling the Female Ear

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ABSTRACT

This paper formalizes the praxis of the *Female Ear* in the research and teaching of the science and cultures of music production and audio engineering. After raising awareness of the hegemony of the *Male Ear* in audio and record-making conventions, alongside strong biases in psychoacoustic knowledge, we report on a preliminary study that was co-created with audio/music production students and music industry professionals, which explored alternative ways of hearing, listening, and negotiating sounds in the workplace.

1 Introduction

We define the *Female Ear*, echoing applications of the feminist theory the *Female Gaze*, which is used to study films through the lenses and desires of the female-identifying spectator, character, narrator, and director [1]. By drawing more attention to the auditory perception and “ear pleasures” [2] of the female-identifying listener, performer, composer, and sound recordist, the *Female Ear* aims to challenge the aesthetic canons and audio quality standards of sound engineering and music production that have been established in strongly male-dominated industries. For instance, only 3.2% of key technical credits in the 2022 Grammy’s production field categories were for women and non-binary people [3]. In addition, women only represent 1.9% of the authors of invited papers at 2012-2019 AES Conferences [4], and 21.6% of all artists, 12.6% of all songwriters, and 2.6% of all producers credited on the 900 popular songs of the 2012-2021 Billboard Hot 100 Year-End Charts [5]. Aiming to provide audio mentors and practitioners with heightened awareness of, and tools to overcome, the “normative listening orientations across a range of gendered and racial formations [6]”, we deconstruct the hegemony of the *Male Ear* and foster alternative critical listener positions.

To design a theoretical framework that diversifies and broadens analytical perspectives on the research and teaching of the cultures of sound and music production, we draw parallels between the range of filmmaking and audio innovations contributed by women working in patriarchal industries in which men establish and control the predominant conventions. We also make the intersectional ground [7] of the *Female Ear* explicit by explaining how the *Female Gaze*, as an initial alternative to the predominant *Male Gaze* based on scopophilia [8], has been radically expanded over the past 48 years by feminist and queer film theorists to include race, sexuality and class, while avoiding gender essentialism [9][10].

In the third section, we report on JB’s analysis of two published corpora of audio perception studies. Inspired by *Invisible Women* [11] that underlines the detrimental impact of gender data gaps on women’s life experience and health, this analysis denounces the demographic data gaps and other experimental flaws in audio perception studies that imply that much of the science of psychoacoustics that forms the basis of audio education programmes could be heavily biased, or potentially wrong. We thus advocate for the inclusion of the *Female Ear* in audio research and education to rectify audio knowledge errors and gaps;

to transform the toxic aspects of professions in the creative industries that involve audio and the use of music technology, and to empower women, non-binary people, and other representatives of social groups who have been “silenced by sound [12][13]”.

Finally, we report on a preliminary study that involved a group of four female-identifying Chinese students in the Master of Arts in Music Production at the University of York, and five female-identifying singer-songwriters, performers, composers, and producers from a range of genres who have participated in programme-related activities over the past few months. Guided by a co-prepared list of definitions of sound criteria and recordists’ attitudes that were introduced in AP’s lectures throughout the year and further elucidated with KA in supervisory meetings, these discussions extend the work of Cecilia Björk in *Popular Music Education* [14]. Both the methodology, which was chosen to avoid the researcher-participant power relationship induced by interviews, and the concepts and definitions to discuss, were designed to transcend gendered constructions in the ways that music and sound production approaches are predominantly perceived and evaluated.

2 Towards Theorizing the Female Ear

According to French film theorist Iris Brey, “The Female Gaze is a conscious gesture. It thus produces engaged and politicised pictures. The Female Gaze is no mere coincidence. It is a way of thinking”¹ [1].

Since the late 1800s, women directors have contributed to artistic and technical innovations in filmmaking. For example, in her most renowned film *Madame a ses envies* (1906), Alice Guy introduced the use of the close-up shot to enable the viewer’s understanding of the director’s subjectivity. Her experimentations in both France and US at the birth of the film industry “helped to form the basis of film grammar and structure [15]”². In the 1920s, the editing techniques that would become the hallmark of Hollywood’s visual style” were developed by women “cutters” [16], but in the transition to sound films, they lost the flexibility that they had editing silent films and “the new experts—the men in the studio’s effects department, from RCA, or from Western Electric—[...] interfered with the editing of early sound films”. Nevertheless, Dorothy Arzner who was

an outspoken feminist and lesbian, moved up from editing to directing. On the set of *The Wild Party* (1929), she placed a microphone on the end of a fishing rod to give her actors more room to move”, which became known as the “boom microphone”³ [15].

In their forthcoming book [17], Eliot Bates and Samantha Bennett reveal the large extent to which women have historically contributed to the making of audio and music technologies. Leslie Gaston-Bird [18] has highlighted how important sound physics problems were solved by women artists and researchers, e.g. mathematician Marie Sophie-German who in 1821 published a system to analyze how metal plates would resonate at certain frequencies when a vibration was applied⁴. Her system was used to design plate reverberation devices in the analog era of recording. However, much more research needs to be undertaken into the contributions of women studio professionals in early musical recordings, as has been done quite recently for early films.

It is only in the 1970s that the first feminist film theorist Laura Mulvey “used a Lacanian interpretation of the visual objectification of women [9]” to raise awareness about how the “pleasure in looking has been split between active/male and passive/female [8]”. Towards the end of her foundational text, she stated, “Playing on the tension between film as controlling the dimension of time (editing, narrative) and film as controlling the dimension of space (changes in distance, editing), cinematic codes create a gaze, a world, and an object, thereby producing an illusion cut to the measure of desire.” Similarly, recording, editing, mixing, and mastering decisions produce a listener position within an auditory world that imposes a specific perspective on the music. For example, the film theory concept of *subject-position* was used to explore the tension between opera producer John Culshaw’s “radical approach to the listener and traditional approach to the authority of the score [19]”. The Female Ear proposes a toolkit for studio professionals to reflect upon the gender of the listener-position of their productions, and for female-identifying musicians to communicate their sound desires to studio professionals and avoid misunderstandings like the one that led PJ Harvey to release the 4-track demo version of *Rid of Me* (1993) to show to her fans how

¹ (p.20, our translation)

² (pp. 17—18)

³ (pp. 27—28)

⁴ (pp. 3—4)

Steve Albini had compromised her “visceral sense of immediacy” by overprocessing her vocals [20].

Over the years, Mulvey’s gender theory of the “three looks of gaze” in films, i.e., the narrator/director’s, the character’s, and the viewer’s, has been redefined to include sexuality, race/ethnicity, and class [9]. Meanwhile, queer film theorists have established the *Queer Gaze* that “offers us as viewers the opportunity to grasp at the possibility of queerness in film even where it is not explicitly shown, functioning as an alternative reading practice that queer audiences can employ beyond the medium of film and filmmakers can imbue into films themselves, allowing the film as object to trigger and sustain our desire [10]”. In summary, the filming gaze of a female character who is explicitly lesbian in the film narrative could be identified as either male or female, depending on whether the camera objectifies or subjectifies her and her potential partner(s); and the filming of a female character whose attraction for other women is suggested by the choice of shots and editing but not made explicit in the film narrative would be identified as Queer Gaze. While we do not pretend to define the praxis of the *Queer Ear* in this paper, we invite the readers to look into Prince’s cancelled album *Camille* (1987) engineered by Susan Rogers as it might be a good example of Queer Ear production [21].

The praxes of the Female/Queer Ears translate the shared principle of the Female/Queer Gazes that the techniques used to create “pleasure in looking” are biased by the social identities of the people involved in film-making, into the principle that the techniques used to create “pleasure in listening” are biased by the social identities of the people involved in music production. Therefore, it might not just be a question of idiosyncratic taste as is commonly believed in the field. With the need to moderate the impact of cultural reappropriation, those with “hungry” ears [6] could carry out “ethnographies of listening” to grasp others’ “sensory experience, affect, and emotion [2],” so to produce recordings that may fulfill the desires of a wider population of listeners. As a more ethical approach, the music industry could, also, welcome more musicians, sound-recordists, and producers, who would contribute alternative approaches to the engineering standards and aesthetic canons of the Male Ear if they were not prevented from doing so.

3 Data Gaps in Audio Perception & Music Production Research

For his “general listening test” comparing four different stereo loudspeaker systems, Gilbert Arthur Briggs assisted by Raymond E. Cooke [22] asked Messrs. A, B, C and D, “*Q.7. If you own a large speaker and your wife dislikes the idea of duplicating it, would you consider stereo worthwhile with a smaller, easily moved model to work with the big fellow?*”⁵. In his summary conclusion, he states, “*The kernel of the affair is that it is worthwhile to have the best speaker(s) in your stereo set-up if you can manage the ménage, the money and the missus.*”⁶.

We may find these quotes amusing, but nearly 70 years after the publication in 1958 of the 2nd edition of Brigg’s book on loudspeakers, gender bias in audio/music production is still prevalent, and the fact remains that much of the research into aural perception, on which educators and researchers rely, hides a very real gender data gap. The scale of the potential problem is illustrated by an initial analysis of two corpora of audio perception studies which revealed this gender data gap, and therefore questions the accuracy of the ‘known’ science of psychoacoustics. Also, given the reliance on research traditionally carried out in department of physic and engineering predominantly based in the UK, USA and Europe, with test participants mostly drawn from staff and students in these institutions, it can be assumed that audio perception research also exhibits a racial, cultural and socio-economic data gap.

Corpus A comprised all papers cited by [23] which included reports of experimental, perceptual testing. From the 150 papers cited in [23] 33 included the results of perceptual testing: in nearly half of these (48%) the gender of listening test participants is not stated. Seven papers (21%) noted all male participants (in contrast no papers included only female participants) and 10 papers (30%) described a mixed gender participant group. The total number of participants included in tests reported by these papers was just under 500; out of these only 48 (9.7%) are known to be female. None of the papers in Corpus A report on the effect of gender on the results of the listening test, so it is not known whether any gender differences might exist.

Corpus B is a smaller corpus of nine works cited in [24], specifically in the section on gender, age and hearing loss. Six of these works report differences between female and male perception of sound, in

⁵ (p. 287)

⁶ (p. 289)

relation to localisation cues, suggesting that there is indeed a data gap in aural perception which needs urgently to be filled.

The gender data gap firmly embedded in our underlying scientific understanding of sound also permeates research into recording studio working practices, and the culture of audio and music production in general. For example, a study that revealed the high level of emotional labour that music producers and sound engineers must perform in the recording studio was based on semi-directed interviews with 19 male studio professionals from London [25]. Similarly, the large gender data gap pervades studies collecting data which is subsequently used to feed machine learning algorithms and inform computer-assisted tasks. For example, Pedro Duarte Leal Gomes Pestana [26] created an 88-assumption database to capture and model expert mixers' craft knowledge on studio mixing of music. Of the 57 participants who contributed their knowledge, only two (3.5%) are known to be female. Such blatant omissions continue to contribute to the documented detrimental impact of the gender data gap on women's life experience, work, leisure and health [11]; we need to do better.

4 Exploration of Analytic Directions

4.1 Study collaborators and preparation

Three discussions were conducted in total for this exploratory study as part of the 'Engaging with research' module of the Master of Arts (MA) in Music Production at the University of York. On May 26th, 2023, four female-identifying Chinese MA students, namely Zhao aka Max Deng, Shuli aka Shuri Mo, Linyuan aka Amy Wang, and Ning aka Winni Wang, exchanged with Eva Blanche (EB), a French-American pop singer-songwriter, who is based in Paris and London and who has four years of experience, and Marjolaine Charbin (MC), a French London-based performer (piano, objects, voice) of experimental/improvised music who has about 20 years of experience. On June 1st, KA, who completed the MA in 2014, had a conversation with Italian London-based classical music producer Isabella de Sabata (IdS) who has near to 40 years of experience, and experimental voice and opera artist Loré Lixenberg (LL). Finally, AP, who has led the MA for two years, talked on June 5th to York-based DIY punk bassist Jo Dale (JD) who has 15 years of experience. Therefore, each discussion included at least one person who could draw on their expertise as a sound-

recording, and at least one person who could draw on their expertise as a performer. The three discussions were then transcribed and coded deductively by KA based on the pre-determined list of sound criteria and recordists' attitudes.

The study methods were co-designed by the four MA students, KA, and AP in a meeting on April 28th, based on academic papers on the Female/Queer Gazes [8][9][10], a review of essential movies made by women [15], and Björk's paper on Gender in Popular Music Education [14]. The same team met again on May 15th to co-create the list of sound criteria and recordists' attitudes that would be used in discussions with female-identifying musicians who have been involved in MA activities during the school year. All criteria and attitudes were given their own definition to ensure that, in the absence of questions, everyone in the research team had the same understanding of each concept, and that there was a clear and easy way to initially present each topic of conversation. Out of the seven musicians who were approached, five could find the time to take part in a discussion within our short timeframe. MA student, Winni, and KA presented the preliminary outcomes of this exploratory study at the joint Student Symposium on June 7th.

4.2 Sound criteria and recordists' attitudes

The discussion guide opens with the sound criteria of Loudness and Spectrum, illustrated by the aesthetic values of colours and noises in the reproduction of the human voice. Loudness implies 'loud', and therefore influences the level of intensity or desired median volume applied to a mix or master. Spectrum contains the frequencies that the voice and other sound sources occupy, and their perceived colours and affordances. Drawing upon previous research, we highlight in the next paragraph how the predominant standards and expectations for these two major sound criteria do not take race, culture, or ethnicity into account, and generate a dilemma for women.

African-American live engineer-scholar Whitney Slaten [27] denounces the "ideological and technical preference for sonic intelligibility and transparency" that leads sound engineers to eliminate "uneven resonances or 'colorations' in all phenomenal sounds, acoustic environments, and hearing capabilities, as well as the culturally constructed expectations for listening to these sounds in live or recorded popular music." This suggests that sound engineers make decisions according to their (straight white male) ear as the universally accepted reference in the field.

Moreover, Björk [14] explains that “women need to be louder and sharper (more aggressive) in timbre than normative femininity permits in order to be heard in popular music”. However, this can be challenging for those who experience the “feminine-fear-of-loudness [that] can be regarded as a fear of disrupting the dominant gendered socio-acoustic order in Western society in general and in popular music soundscapes in particular”. This also carries the risk “to invoke ‘shrill and strident fishwife’ stereotype [28]”⁷. “Women, on the other hand, use the lower end of their pitch range to be assertive”⁸, which reduces the threat of being silenced but prevents them from cutting through the mix or the conversation in a noisy workplace, e.g., a rehearsal space, stage, or recording studio.

The next two sound criteria in the discussion guide bring value to Depth as the created 3-D virtual space within the sound image, and to the Complexity of the Musical Discourse that is based on how differently we appreciate the layers and colours of a track each time we listen to it. These criteria mirror some of the Female Gaze movies’ specificities. For instance, through “subjectifying” multiple characters who represent a range of social identities, directors complexify the film narrative that can be understood in different ways, according to the viewers’ identification with some of the characters more than others, and this can change over time. A careful use of space is thus required for the different layers of narrative understanding to take place simultaneously. Moreover, the criteria of Depth and Complexity of the Musical Discourse moderate the hegemonies of Loudness and Spectrum, and have therefore the potential to rebalance priorities when manipulating sounds in the recording studio. Indeed, paying attention to Depth requires “claiming space” [14] for the non-predominant sources and lines to be heard, and so countering what obstructs flow and subtleties [29]. These criteria have their importance at every stage of the production, though play a major role at the editing and mixing stages.

Finally, we propose to discuss typical recordists’ attitudes that are perpetuated in audio programmes, namely imposing a Sound Signature, and embracing either a traditionalist or a “technophilic” Sound Mind as elucidated by Bennett [30]. We define the Sound Signature of a producer/engineer, label or recording culture as the sonic specificities that delimit a sound territory, which may be imposed on music performances mediated by technology, consciously

or unconsciously. For instance, Slaten stated, “there’s a dominant ideology, where the technique of engineering rock shows is placed on everything. I see it as imperialism” [31]. Interestingly, this attitude contradicts the music mediation ideal of technology being transparent in the artistic product and goes hand in hand with the audio engineers’ necessity to define themselves by the type of technology that they fetishize. Based on AP’s observations as a practitioner and teacher, not fetishizing or pretending to fetishize technologies leads audio engineers to be excluded from the field because they do not comply with their profession’s definition.

4.3 Initial observations from the discussions

In every discussion, one or more participants observed that the term Loudness is misleading, as the term itself assumes high volume whereas the defined criterion refers to relative levels within a mix. As IdS remarked, “*Expressively, I think volume is a function of what comes before and after, not the decibel levels*”. There were multiple references to how compression is often applied in post-production, but that the use of compression can directly oppose this expressive function of the created volume or the level within a space. It was acknowledged that this applied compression also risks losing the colours and frequencies found in the sound that the musicians take their time to cultivate. JD talked in detail about searching for the right rich sound in an instrument, which was seemingly constrained for years by a constructed belief that this was a sound color palette that only solid wood basses could create. This belief limits who can create this specific sound, as due to her body structure and height, JD struggles to play a bass that is both full size and solid wood. It is only recently that she found out that she could perform with a ¾-size electric bass that has a shorter neck and scale length with less weight than a full size, without compromising her desired sound.

The gendering of instruments is even more prominent when relating to the human voice, as the instrument is entwined within the body of the practitioner. EB talked about her experiences working as a professional singer, where colleagues were encouraging her to “*stay on that [...] soprano thing*” even though as an artist she wants to explore all the frequencies and colors that her voice has to offer. The concept of different voice types and identities putting constraints on the creativity of the practitioner embodying the voice was also explored in the

⁷ (p. 134)

⁸ (*ibid.*)

discussion between IdS, LL, and KA, all of whom have professional experience as singers.

The preconceived constructions mentioned above permeate through the way in which sound-recordists and music producers have formed taught methods for mixing. AP recounted that she was told at school “*that you put the bass in the middle, [and] don’t question it*”. If one chooses to push against these expectations, it is possible that a mix can be perceived differently by different people, or perhaps even differently by the same person on another occasion. As LL noted, “*in a way that’s the beauty of it because it’s so abstracted that actually nobody can tell you how to listen. They can try, even you can try, but you will listen to what you’re listening to and that’s it. [...] but then also one can only speak for oneself, I suppose, because we don’t know what it’s like to be in someone else’s ear*”. Several participants in the discussions spoke about the need for everyone in the recording session to be involved in the process of defining the sound for the project, and that this process of allowing multiple voices to shape this sound should naturally lead to a complex mix with several layers of understanding, simply because it mitigates one person’s opinion and taste dictating the entire sound.

By delimiting the sound territory, it can no longer be owned by just one person. There was discussion about how the concept of a sound signature is taught as part of a sound-recordist or producer’s education, and that without this, a prospective practitioner will not be able to ‘make a name’ for themselves in the field. By considering the voices of all involved in a project, this sound signature could be seen to apply specifically to a project, not even to a particular set of musicians, sound-recordist, or producer. This attitude towards sound creation also mitigates against any form of othering in the co-creation of recorded music. The fetishization of technical gear, alongside a tendency to use jargon, can be exclusionary when speaking to those who have not had access to the specific knowledge required. As JD stated, “*It is almost like medical terminology isn’t it [...], it’s a different language, a very technical language, that people outside of that don’t understand*”. Use of technical language in this way can give the user a status of power, as it allows them to hold knowledge over this ‘elusive’ gear and only sharing this language with other people who are in the know.

Several participants spoke about situations where they have felt that it has been assumed that they cannot have this technical knowledge, based purely on the gender that they present, and that they have had

to prove their knowledge in a way that their male counterparts have not. MC recalled her experiences studying to be a sound-recordist, saying that she was “*pushed out of the profession [...] because it was so sexist. It was, it was horrendous*”. She went on to say that she could feel that “*there was just no room for me. I would walk in [to] a studio, and I could hear sexist comments almost the minute I walk[ed] in*”. Working towards diffusing these stereotypes and prejudice about knowledge that practitioners hold or do not hold should facilitate all listeners, performers, composers, and sound recordists to work freely and creatively without restriction imposed by presented gender.

5 Future Directions

Going forward, we plan on both illustrating and further defining the Female Ear as a praxis for the research and teaching of the science and cultures of music production and audio engineering. In KA’s continued work towards her doctoral thesis, she intends to explore how the Female Gaze and Ear influence and inform the intersection between technology and gender in choral performance spaces, by investigating the representation of men, women, and non-binary people in visual and audio recordings using an ethnographic approach. The four MA students who took part in the exploratory study are applying the Female Ear to their final research project, inspired by the hopes that this praxis could catalyze new approaches to make music, to think outside of the box, to fight stereotypes, and to promote equitable treatments for everyone in the creative industries that involve audio and music technologies.

JB aims to pursue her critical review of gender and other social data gaps in psychoacoustic studies, and to initiate a rectification of knowledge errors in audio perception by conducting more ethical and inclusive studies. AP will continue to incorporate sociological and anthropological theoretical frameworks and methodologies into the research and teaching of audio and music production cultures to transform the toxic aspects of our fields, and to enhance access to professional training for self-taught producers who represent marginalized social groups in audio globally. Also, if she gets allocated enough time to focus on writing, she would like to publish a monograph that will establish the basis of music production grammar and structure, and refine the praxis of the Female Ear for the next generations of audio/music production educators and students.

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