Three Personas of Potential High-Resolution Music Users

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Abstract

With advances in audio technology, high-resolution audio is becoming more affordable and gaining in popularity. This work qualitatively investigates on how people would experience high resolution music. We had a focus group discussion with music experts to identify six motivations for listening music and conducted an online survey with a hundred people who were asked several music behavioral questions for each motivation. We classified the participants into similar groups and finally selected 14 participants from the groups as diverse as possible, which include five high-resolution music users. From the diary studies and in-depth interviews with the selected participants, we constructed three personas of potential users of high-resolution music: 1) Leisurely listener who listens to hi-res music as a new hobby, 2) Music explorer who listens to hi-res music as a way of knowing the music, and 3) Artist maniac who listens to hi-res music when their favorite artist releases an hi-res version of the music. We also discuss design implications for high-resolution music download and streaming services.

Author Keywords

High-resolution audio; digital music; personas

ACM Classification Keywords

H.5.2 [Information interfaces and presentation (e.g., HCI)]: User-centered design

Six motivational dimensions for listening to music: The result of the focus group discussion with music experts regarding why people listen to music.

M1. To appreciate the work of an artist: e.g. listening to songs or consuming related contents of a particular artist.

M2. To seek emotional sympathy: e.g. understanding stories behind or finding empathic connections to lyrics of songs

M3. To enrich musical knowledge: e.g. studying histories behind music genres or exploring different types of music.

M4. To experience quality audio: e.g. seeking diverse sound experience by setting up an high-quality audio environment.

M5. To elevate mood: e.g. playing music in the background while doing something else.

M6. To follow a new music trend: e.g. listening to popular or new music regardless of music preferences.

Introduction

The way we experience music is strongly determined by available technologies. Portable audio devices, increased network bandwidth, and real-time audio streaming have transformed how we consume, store, and share music. While convenience has been a main focus in the recent advancements, the emphasis is now moving toward sound quality.

High-resolution (Hi-res) audio[1] has recently emerged as a solution to the sound quality problem. It usually refers to audio signals with higher sampling frequency and greater number of bits per sample, whose quality is generally better than that of a compact disc (CD). Its file format uses lossless compression, which means it is capable of reproducing the full range of sound from original recordings. Since the lossless format requires larger file sizes and expensive audio devices, it has previously stayed in an audiophile niche. It is only recently that hi-res audio resources are becoming more accessible to the masses.

This research addresses the question of identifying the characteristics of potential hi-res music users. Hi-res music services currently available differ from existing music download or streaming services in many ways. For instance, they are limited in the amount of music contents and tend to support only a few specific genres such as classical or jazz, due to the special audio encodings required. In addition, they provide different curation styles such as by record labels, producing studios, sound channels, and the levels of sound quality (e.g. sampling rate), compared to existing context-based playlists in streaming music services. However, there is no foundational understanding of people's needs and behaviors in relation to hi-res music.

Previous research investigated various aspects of people's music information needs and behaviors particularly in the music information retrieval literature. Lee et al [6] studied how the shift from physical to digital music format reshaped overall music experience including music seeking, listening and sharing by conducting a large scale online survey. Similarly, other researchers explored how the recent adoption of mobile technology changed the way people interact with digital music [9, 5]. More detailed behavioral aspects have been studied as well, including how people encounter new music [2, 7], how personality types relate to music preferences [4], how people manage music collections across multiple devices or using specific attributes such as color and mood [1, 10], and how people share music in households and workplaces [7, 8]. However, there is almost no user studies available concerning the emergent field of hi-res music. In order to design appropriate hi-res music services, we need to understand the affordances surrounding people's interactions with hi-res music.

This work presents three personas of potential hi-res music users and discusses design implications for hi-res music download and streaming services. We conducted diary studies and in-depth interviews with 14 participants in Japan, which include five current hi-res music users. The study participants were carefully selected to represent diverse types of users based on an online survey asking music behavioral questions that were designed on the basis of a focus group discussion with music experts. The three personas are 1) Leisurely listener who listens to hi-res music as a new hobby, 2) Music explorer who listens to hi-res music as a way of knowing the music, and 3) Artist maniac who listens to hi-res music when their favorite artist releases an hi-res version of the music.
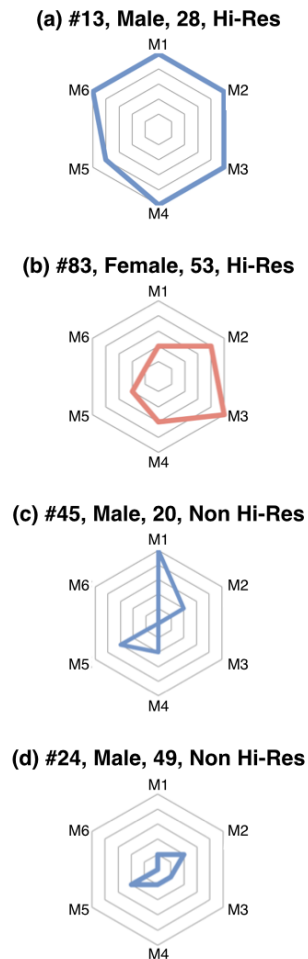
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[1]http://www.forbes.com/sites/billrosenblatt/2014/12/15/65/

(a) #13, Male, 28, Hi-Res

(b) #83, Female, 53, Hi-Res

(c) #45, Male, 20, Non Hi-Res

(d) #24, Male, 49, Non Hi-Res

Figure 1: Example participants. (a): enjoys music in many different ways (b), (c): have particular interests (d): has little interest in music.

Methodology

Participants

Considering individuals have different music listening tastes and habits, we tried to recruit diverse people for our study. First, we had a focus group discussion with music experts who are also stakeholders of a hi-res music download service[2]. From the discussion, we collected various keywords in relation to motivations for listening music. We then organized the keywords using affinity diagram and extracted six motivational dimensions (See the sidebar on page 2).

We then ran an online survey with a hundred people in Japan which has a leading market for hi-res audio [3]. In order to recruit active music users, we asked screening questions beforehand whether how frequently they listen to music, what products they own (e.g. portable players, home audio systems), or how much they spend on purchasing hi-res audios. This resulted in around 50 participants. Among them, hi-res music user participants had spent at least more than ¥2,000($17) for purchasing hi-res music for the past year, and one-third of general music user participants had spent more than ¥10,000($85) on music products. Each participant was then asked to answer five yes-no behavioral questions for each motivational dimension, resulting in total 30 questions; a music user can have more than a single motivation for listening music. For example, for the dimension M5, we had questions asking such as "I listen to music while doing other activities (e.g. commute or work)" or "I listen to music based on mood in random order".

Based on the survey results, we represented each participant using a radial graph in which each axis represents a

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[2]http://www.groovers.kr/
[3]http://www.rappler.com/technology/features/71094-japan-sony-high-res-audio

single motivational dimension with a score ranging from 0 to 5 (i.e. number of questions answered 'yes'). We grouped similar participants into clusters in which we finally selected 14 participants (2 female, 12 male, age mean=37.36, std=12.58, min=20, max=53) among which five participants were hi-res users. Example participants are depicted in Fig. 1. We excluded participants whose general interests in music are too low (Fig. 1 d).

Procedure

We conducted diary studies and in-depth interviews with the 14 participants. In the diary studies, the participants were asked to log their music listening experience, including when, where, and how they listen to what music for the past seven days before the interviews. They were also encouraged to take photographs of music listening environments. The follow-up interview took around 90 minutes with a 5 minute break and involved a transcriber, moderator, and interviewee. The purpose of the interview was to understand underlying motivations and attitudes for the actions logged in the diaries. For hi-res music users, we asked additional questions including the rationale behind purchasing or repurchasing hi-res music as well as pain points for hi-res music services or products. For general music users, we examined different factors such as needs for and entry barriers to hi-res music audios.

Personas

We open-coded the transcribed responses from raw interview data and identified eight behavioral and attitudinal characteristics of 14 participants on the sidebar on page 4. We then projected participants back to the these characteristics based the extent of how much they show each characteristic. We adopted the persona approach [3] to qualitatively create final user representations by clustering the participants into groups who share common character-

Music behavioral and attitudinal characteristics
: The result of open coding of the interview data regarding participants' music experience.

C1. Possessive of physical music resources in addition to sound sources.

C2. Active in exploring and listening to new music, albeit taking time and cost.

C3. Enthusiastic about learning additional knowledge related to music.

C4. Sensitive on sound quality, often having a minimum quality standard.

C5. Receptive to new music technologies changing audio environments.

C6. Versatile in the ways of listening to music, setting up various listening environments.

C7. Flexible on changing or diversifying music preferences such as genres.

C8. Particular over purchasing new music considering the gains and the losses.

istics. Three distinctive personas of potential hi-res music users were constructed: leisurely listener, music explorer, and artist maniac. Each persona is designed to describe a different character, attitude, and context; it is also intended to cover a broad range of potential users instead of representing a minority of audiophiles. The most discriminative characteristics that were used to differentiate the personas are depicted in Fig. 2.

Leisurely Listeners usually listen to music in the background while doing something else. They thus prefer to have a convenient environment for listening to music at any time and from anywhere. Although they do not have a keen interest in high-fidelity sound, if financially affordable, they are willing to pay money for improved sound quality often in the form of self-rewarding —P6 (Male, 50, Hi-Res): "Listening to music has become my favorite hobby ever since I have time and money. Actually, I do not exactly know the differences between hi-res and ordinary audios, but I want to enjoy music in the best way possible as I can afford it now". When it comes to hi-res music, they become more open to unfamiliar music but have a difficulty in finding new music—P13 (Male, 46, Hi-Res): "I would like to try listening to classics if I have a chance to listen to hi-res music", —P6 (Male, 50, Hi-Res): "I would like to broaden a spectrum of hi-res music that I listen to, but I do not know what music is good and why it is". They rather serendipitously encounter new music such as through music charts, radios, or recommendations.

Music Explorers enjoy learning musical knowledge about music that they listen to. They feel pleasure in exploring the pedigrees of specific genres, stories behind music, or histories of the music artists. For that reason, they do not really care the audio quality of music unless necessary —P3 (Male, 53, Non Hi-Res): "hi-res audio would be of course

better than regular audio, but I think that other things are more important to me than having high-quality sound.". They are willing to purchase additional music resources (e.g. CD/LP) that they believe valuable; they often manage music separately for listening and collecting. They actively look for new music that can expand their musical landscape and have various channels for the purpose —P1 (Male, 45, Non Hi-Res): "In case of classical music, it is fun to explore new music through conductors and affiliated orchestras that have different styles and histories.". They express curiosity about hi-res music, but are not satisfied with available contents—P4 (Male, 32, Non Hi-Res): "I am interested in hi-res audio as I heard it has better quality sound than CD. But, I think there is not enough content, especially genres I like."

Artist Maniacs listen to music in order to better understand the artists that they like. They value not just music but anything related to the artists including album jackets and lyric books; that is, they also have a strong need for having physical music resources. In this respect, they do not have any interest in hi-res music unless there exist hi-res versions of the artists' music —P10(Male, 52, Hi-Res): "I bought a hi-res music album only because Led Zeppelin had released the album. I would have never known about hi-res music if he did not release the album". Similarly, they want to know any news, which includes new music (e.g. songs recommended by or made through collaborations with the artists), related to the artists as soon as possible through multiple channels such social media, artist websites, and fan communities—P7 (Male, 22, Non Hi-Res): "I listen to all of my favorite artist's songs and find any background information in order to better understand his music. I would even like to listen to songs from other artists who get along with the artist".
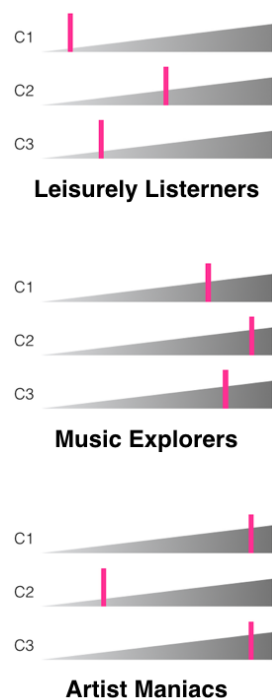
Leisurely Listerners

Music Explorers

Artist Maniacs

Figure 2: Comparison of the most discriminative characteristics of the three personas.

Discussion

Lowering Barriers to Hi-Res Music
Each persona has different motivations for entering to use hi-res music services. For leisurely listeners who would like to experience hi-res music but have a difficulty in learning it on their own, easy accessibility is important. An instructional guide on how to enjoy hi-res music would be useful for them (e.g. setting up audio environments and players). Music explorers and artists maniacs, on the other hand, have their own unique ways to enjoy music, which is not necessarily related to sound quality. The lack of musical contents in current hi-res music services might be a significant barrier for them. It is important to provide unique experiences that hi-res music can bring to them in addition to mere sound quality; for instance, music explorers would become interested in learning detailed acoustic characteristics of hi-res audio.

Easy Accessibility to New Genres
Most participants tend not to adhere to their prefered genres when it comes to hi-res music; we intentionally did not include this in music explorers and artist maniacs as they had other stronger characteristics. They become more open to new genres and even try to learn the genres that they used to avoid, such as classical or jazz music. It may be due to the lack of available hi-res music contents or emerged expectation of experiencing quality sound. Hi-res music services currently do not provide appropriate interfaces to learn new genres. Particularly for leisurely listeners who are not equipped with a strong need and enough knowledge for searching and learning, it would be necessary to help them discover new genres in more accessible ways instead of just merely providing rankings and recommendations.

Music Curation and Recommendation Based on Auditory Experience
A lesson we learned from the interviews was that hi-res music users are not necessarily more sensitive or appreciative of sound quality. While there has been a debate whether human can perceive the difference between a hi-res audio and CD, in our study, participants did not dwell on whether they can appreciate the difference in the sound quality. They rather put more emphasis on different auditory experience that hi-res audio can provide, which includes not only clear vocals, but also delicate instrument and environment sounds. Instead of simply providing specs about audio quality such as sampling rates or sound channels (e.g. stereo and surround) like most hi-res music services, more qualitative ways to experience hi-res music would be beneficial. These include music curation by not just popularity or genres, but also production studios[4], recording environments, or other acoustic characteristics (e.g. what sound to focus on which parts of an audio[5]). Similar to mood- or context-based playlists in current streaming music services, further research is necessary to explore ways to curate and listen to hi-res music.

Improving Digital Experience of Hi-Res Music
Although the personas provide insights on potentially useful features of hi-res music services, benefits for hi-res music may not be fully realized until many more people are using the services. The perceived value of hi-res audio is still low. It takes longer to download because of the larger file size, which also results in a management problem in limited storage space. In addition, high pricing, low quantity of number of available music, and special players required all contribute to inconvenience in accessing hi-res music. While traditional sound records such as CD and LP have

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[4]www.ponomusic.com
[5]hd-music.info/html.cgi/help_03.html

similar issues, people often value them as physical music resources (e.g. collection). While people have to pay more money and time for hi-res music, experiential rewards are relatively small except sound quality. Further investigations remain about improving the overall experience of downloading, managing, and listening to hi-res music; for instance, showing tips for enjoying music being downloaded to make up for lost time in long-downloading or providing further incentives for purchasing hi-res audios through gamification.

Limitation
In this study, we hoped to understand potential hi-res music users not hi-res music audiophiles, resulting in the mixed set of participants. The study was conducted in Japan and thus the results might not generalize to other countries; music downloads and physical CDs are still popular while streaming services are not widely used yet in Japan. In addition, most of participants were male users who happened to pass our rigorous recruiting process. The study results thus may not represent female users.

Conclusion
This paper presented preliminary insights on potential hi-res music users in light of the recent shift of attention from convenience to sound quality. An important message to take away from this study is that hi-res audio has opened new ways to experience music based on delicate acoustic characteristics such as recording methods or particular sounds beats, rather than existing popular categories including moods and genres.

Acknowledgements

References
[1] Justin Brinegar and Robert Capra. Managing music across multiple devices and computers. In *Proc. iConference'11*. ACM. DOI:http://dx.doi.org/10.1145/1940761.1940828

[2] Sally Jo Cunningham, David Bainbridge, and Dana McKay. 2007. Finding new music: a diary study of everyday encounter with novel songs. (2007).

[3] Anke Dittmar and Maximilian Hensch. Two-Level Personas for Nested Design Spaces. In *Proc. CHI'15*. ACM. DOI:http://dx.doi.org/10.1145/2702123.2702168

[4] Bruce Ferwerda, Emily Yang, Markus Schedl, and Marko Tkalcic. Personality traits predict music taxonomy preferences. In *Proc. CHI'15*. ACM. DOI:http://dx.doi.org/10.1145/2702613.2732754

[5] Neha Kumar and Tapan S Parikh. Mobiles, music, and materiality. In *Proc. CHI'13*. ACM. DOI:http://dx.doi.org/10.1145/2470654.2481396

[6] Jin Ha Lee, Hyerim Cho, and Yea-Seul Kim. 2015. Users' music information needs and behaviors: Design implications for music information retrieval systems. *JASIST* (2015).

[7] Tuck Leong, Steve Howard, and Frank Vetere. Choice: abidcating or exercising?. In *Proc. CHI'08*. ACM. DOI:http://dx.doi.org/10.1145/1357054.1357168

[8] Tuck W Leong and Peter C Wright. Revisiting social practices surrounding music. In *Proc. CHI'13*. ACM. DOI:http://dx.doi.org/10.1145/2470654.2466122

[9] Lassi A Liikkanen and Pirkka Åman. 2015. Shuffling Services: Current Trends in Interacting with Digital Music. *Interacting with Computers* (2015).

[10] Michael Voong and Russell Beale. Music organisation using colour synaesthesia. In *Proc. CHI'07 EA*. ACM. DOI:http://dx.doi.org/10.1145/1240866.1240913