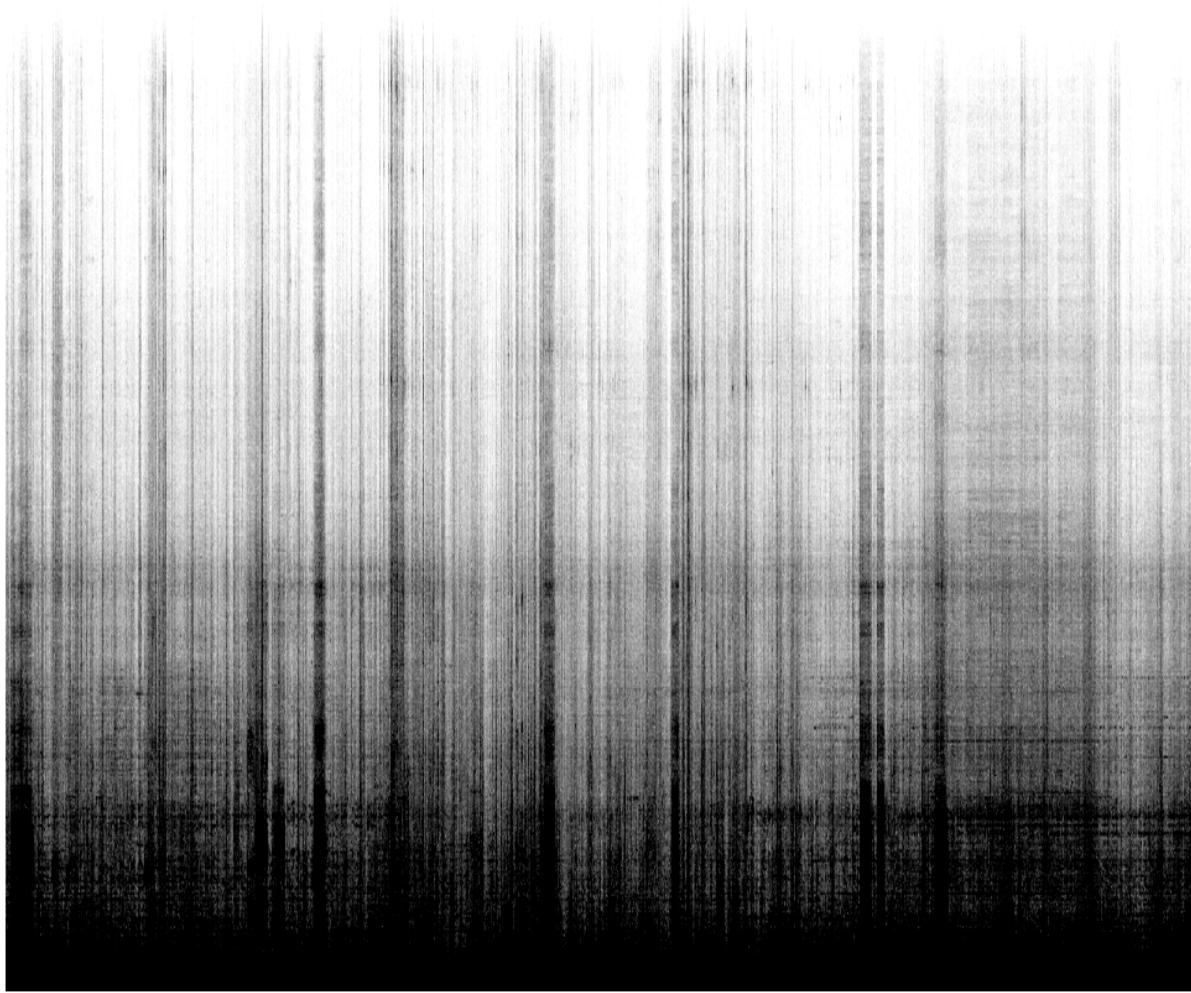


Cafe

The Spectrogram Handbook

Jimmy's Coffee Visualizations

01



01
Cafe.

AUDITORY DISTRACTION MEETS VISUAL COMMUNICATION

RYAN GERADA

GRPH4015-17
003

Preface.

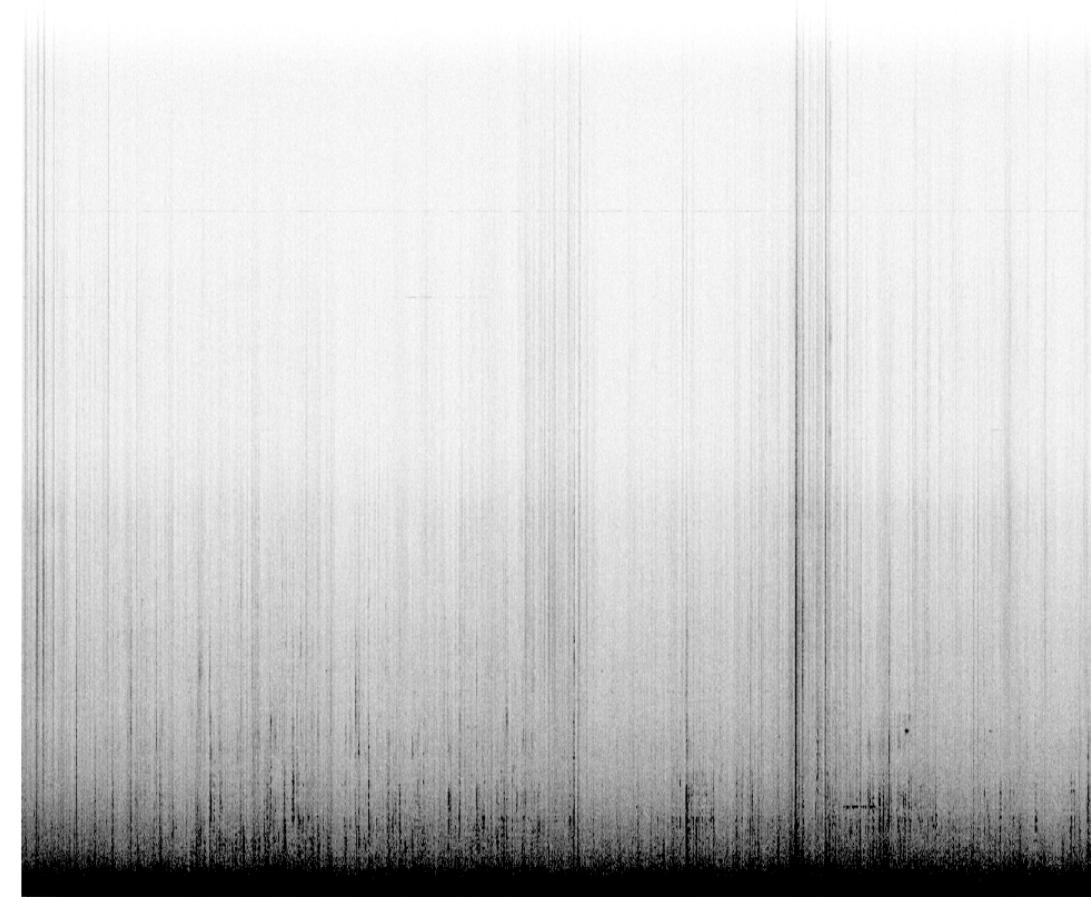
This thesis project was initiated with the intent of studying sound within spaces. It has quickly transformed into a broader study of acoustic ecology, inspired by the works of Walter Murch. I have set out to study the distracting sounds within three selected spaces, all three of these environments range in size and construction assemblies. The studies have been conducted using a portable condenser microphone, each of the selected sounds have been recorded five times. Additionally, this same methodology has been applied to three created sounds, dubbed *curated audio* for purposes of clarification. These recordings were played and recorded within each of the selected spaces, with the intention of establishing a better baseline comparison of the acoustic qualities of each individual environment. Lastly, five *longplay* recordings were conducted throughout each of the three environments. The 10 minute longplay recordings are an important part of the study, as it captures the atmosphere of each of the spaces.

This publication is intended to act as an extension to the *Audio Graphic* posters on display. You may consider this publication a translator of sorts, its sole purpose is to lower the barrier to entry that has been established with these visualizations. The vernacular used within this manual is intended to educate, and extrapolate on the abstracted imagery you have already been presented with. Insights, comparisons and raw spectrographic visualizations are housed within this book. The content has been generated from Jimmy's Coffee.

Following this preface, the other two installations within this spectrogram handbook series will be showcased. Additionally, there will be a brief crash course on how to properly read and analyze spectrograms. Of course, you are encouraged to draw your own conclusions.

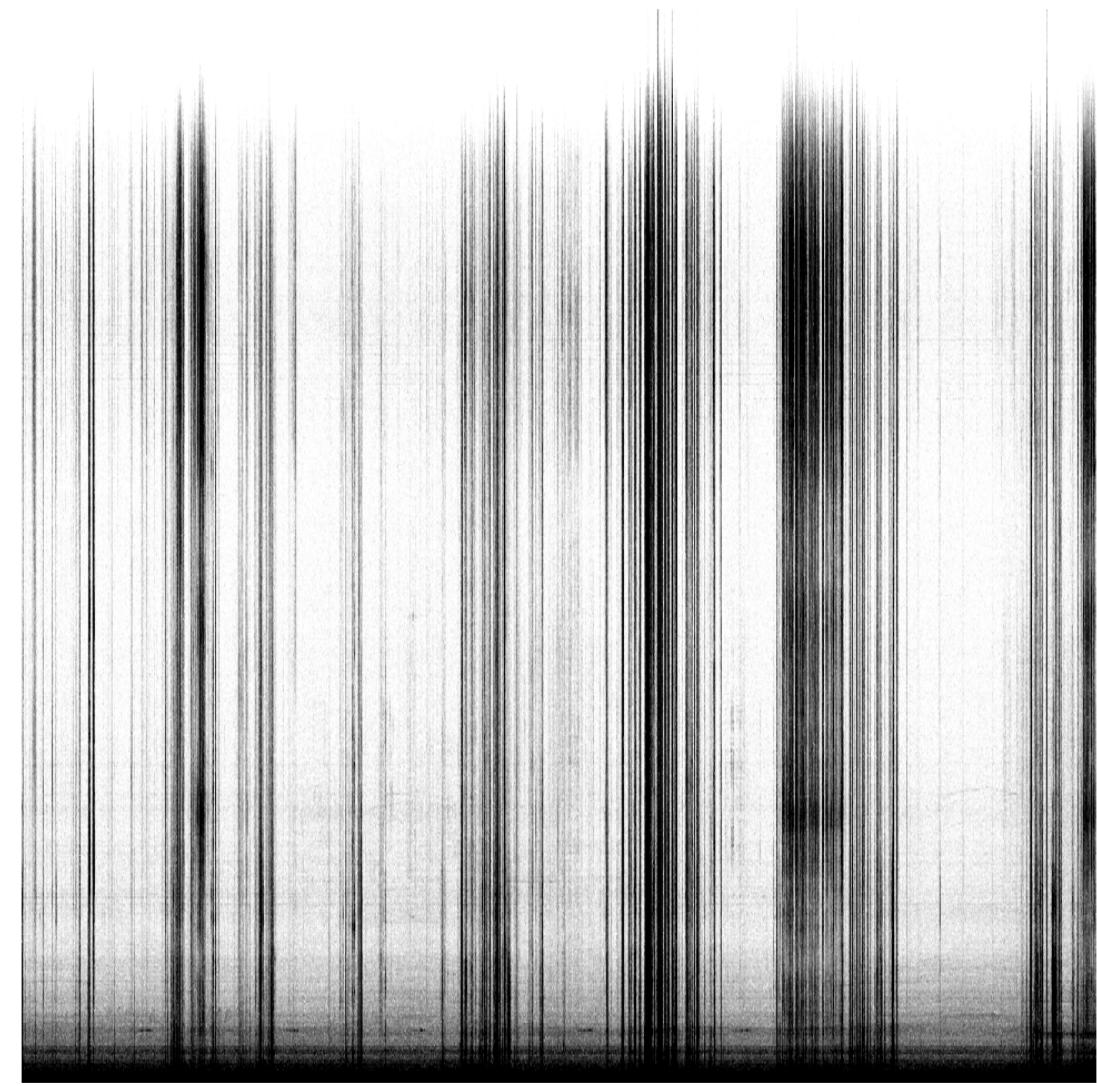
Library
The Spectrogram Handbook
Toronto Reference Library Visualizations

02



Studio
The Spectrogram Handbook
Personal Studio Visualizations

03



Contents.

ANATOMY OF THE SPECTROGRAM	XII
COMPOSITION BREAKDOWN	XIV
COMPARISONS	01
WELCOME TO JIMMY'S	11
CURATED SERIES	18
ENVIRONMENTAL INVESTIGATIONS	24

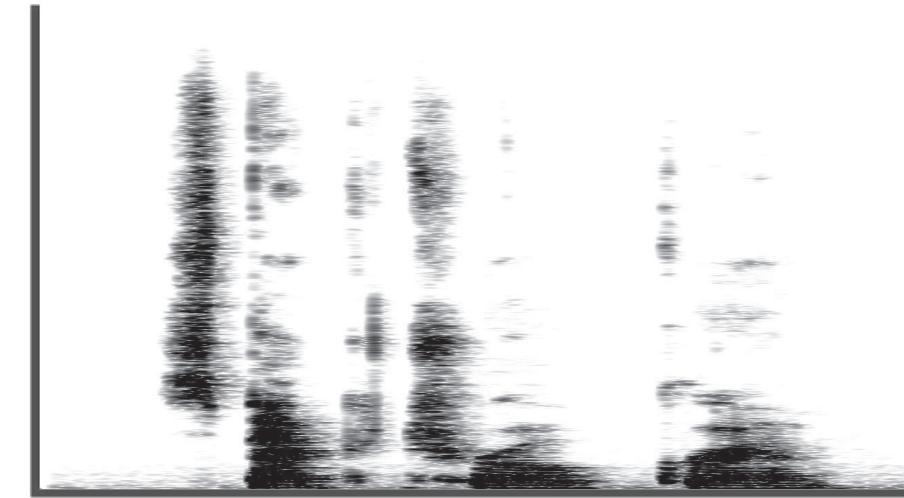
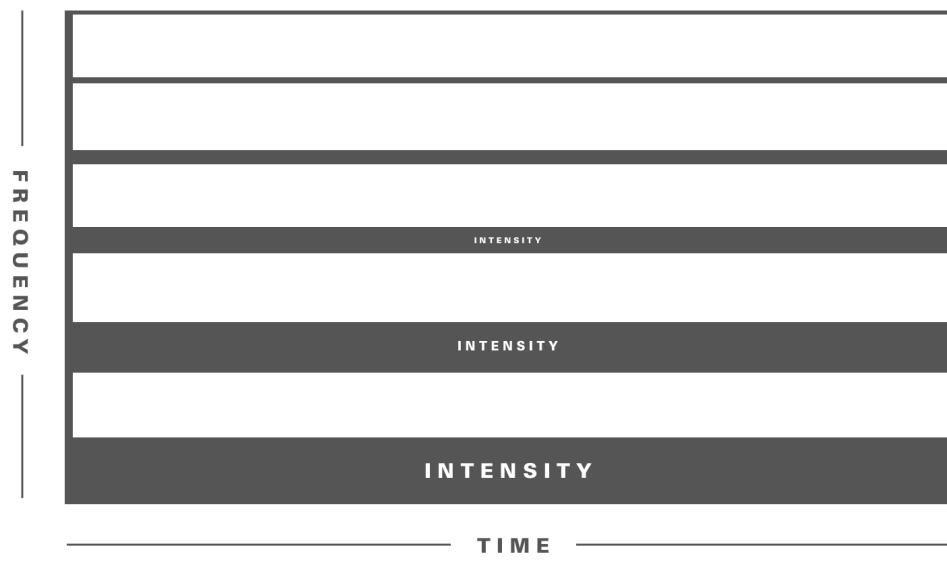
Anatomy of the Spectrogram.

A spectrogram is a picture of sound. A spectrogram shows the frequencies that make up the sound, from low to high, and how they change over time, from left to right. The intensity of the visualization demonstrates the dynamic range of volume, measured in decibels. To the right, you will see a spectrogram visualization of the recorded voice saying "spectrogram"

Frequency
Measured top to bottom.
[22k - 0k hertz]

Time
Measured left to right.
[represented in seconds or minutes]

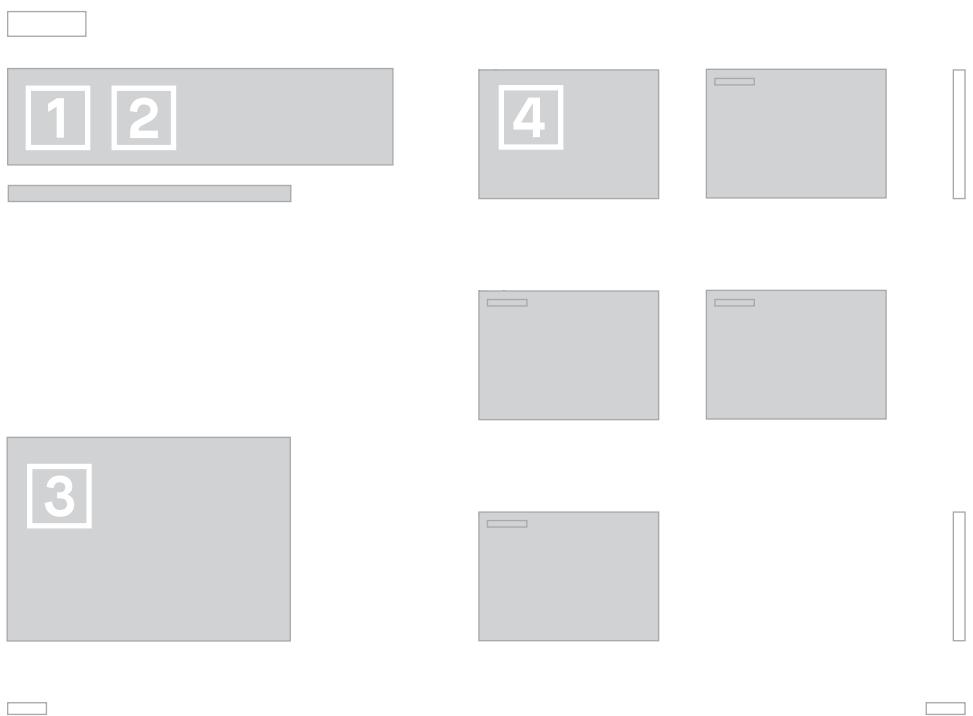
Intensity
Measured in decibels.
[represented by intensity of visual]



SPEC - TRO - GRAM

Composition Breakdown.

[1-5]



**[1]
AUDIO TITLE**

Title of the audio that is being analyzed.

**[2]
(LUFS) READING**

Loudness units relative to full scale. The LUFS reading provides a quick look at the measured loudness of the five audio files.

**[3]
BODY COPY**

The body copy includes a short description as to what exactly is going on with the sound, and how it pertains to this study.

**[4]
SPECTROGRAMS**

Five recordings were conducted for each sound. These recordings were cropped into ten second soundbytes, and visualized as spectrograms. These visualizations are intended to be compared.

Comparisons & Insights.

The comparison's and insights section will provide a valuable deep dive into the visual implications of these standardized audio recordings. The curated audio was designed to be diverse in its playback through all three instalments. Additionally, the recording conditions were encouraged to accurately represent the environment. The acoustic ecology of spaces was a major study within this body of work, it is within these comparisons that the research comes to life.

Moving forward, the curated audio samples will act as a means of comparison. Firstly, five particular recordings were conducted, using each of the three unique curated audio samples. The curated pad sample was played and recorded for 20 seconds, while both the curated synth and voice were played and recorded for 10 seconds. These five individual recordings have been amalgamated, resulting in a visually dense spectrogram. This has been done for each of the curated audio samples, within each of the individually studied spaces.

This publication will first highlight the combined visualizations with the intent of providing a visual overview of the spaces. Next, each of the curated audio samples, unique to Jimmy's Coffee will be visualized in the standard format.

It is encouraged to draw your own conclusions on the implications that these spectrograms might have.

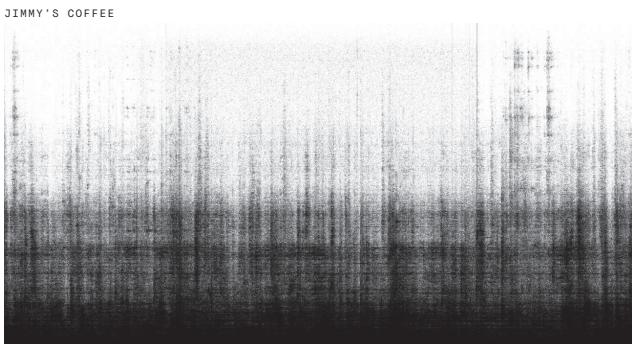
Curated Pad (combined)

The curated pad spans for 20 seconds within each of the recordings. The audio was created to intentionally swell in two places during playback, while maintaining a discrete audio signature. Distinguishing the curated pad audio sample within the top two visualizations, Jimmy's and the Reference library, becomes quite difficult in comparison to the studio recordings. Extrapolating from these general observations, it is clear that the ambiances of the top two spaces have contributed to a large amount of distortion within the visualizations.

Focusing on Jimmy's visualization, there is a lot of congestion in the low to mid ranges, resulting in the intense blacks that litter the lower half of the spectrogram. Naturally, the bustle of a coffee shop would contribute to a great deal of noise, drowning out the unpronounced audio clip.

The Reference library finds itself somewhere comfortably in the middle of the other two spaces. It can be concluded by the heavily washed grey background that there was in fact quite a bit of background ambiance within the space, although it has been set into the background of the space for the most part. The peaks of the curated pad reveal themselves in the later portion of the spectrogram, around the 7 second mark. However, without the studio as a point of reference, it would be difficult to distinguish the similarities between the top two spaces.

Finally, the personal studio space reveals hints of the pad sound, however subtle it is, the lack of background noise allowed for a clean recording, later resulting in a clean visualization. The pad can be seen swelling at two points most prominently, with a bit of a low frequency hum plaguing the lower portion of the spectrogram.



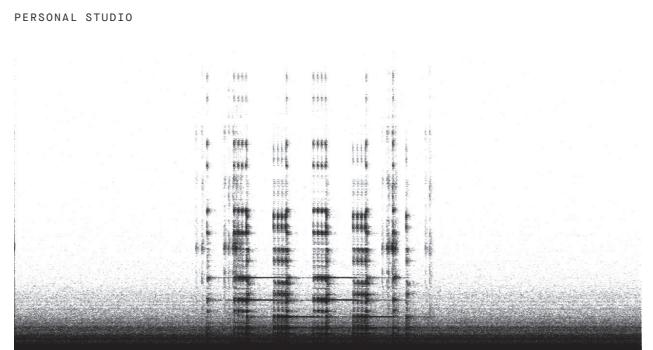
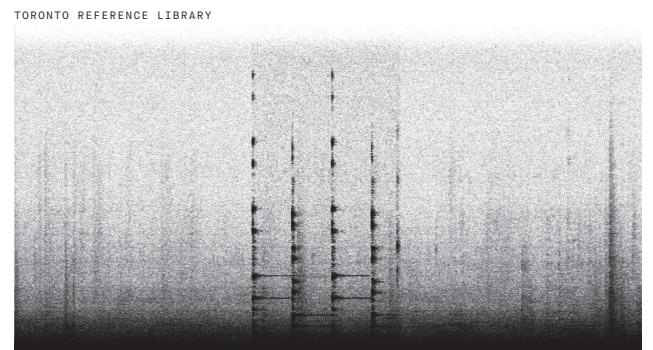
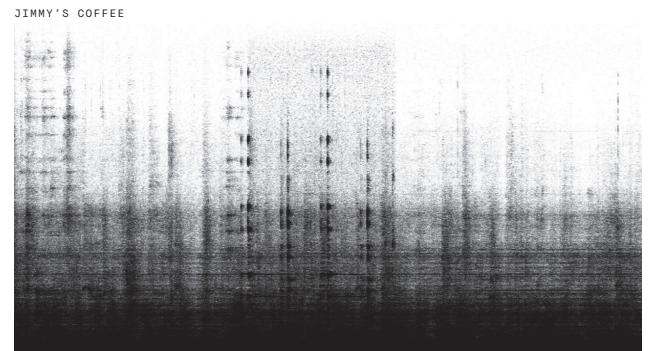
Curated Synth (combined)

The curated synth spans for 10 seconds within each of the recordings. The audio was created to peak sharply, in rapid succession. This arpeggio of sorts was designed to be easily distinguishable, even in crowded, noisy environments. Using the personal studio visualization as a point of reference, the audio leaves a unique signature that punches through the ambiances of all three spaces. This visual can be identified clearly in all three of the visualizations.

Jimmy's visualization falls victim to the crowded acoustics of the space. However, the curated synth audio manages to pierce some of the lower frequencies, resulting in the upper half of the spectrogram revealing the synth. The ambiances of the coffeeshop have dominated the lower portion of the visualization, although the curated synth still peaks through down there because of its varied intensity.

The Reference library hosted the audio quite well. Although the space has been washed in grey, the punctuation of the curated synth audio stands strong within the visualization.

As for the studio space, it provides a strong canvas for the visualization to stand up against. The intricacies of the sound can be clearly seen here as the white background showcases the line work through nearly the entire spectrum of frequencies.



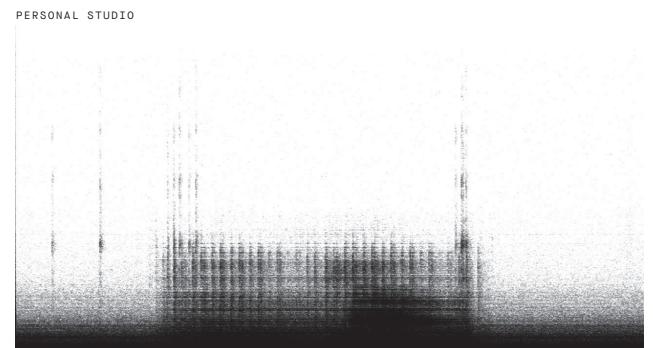
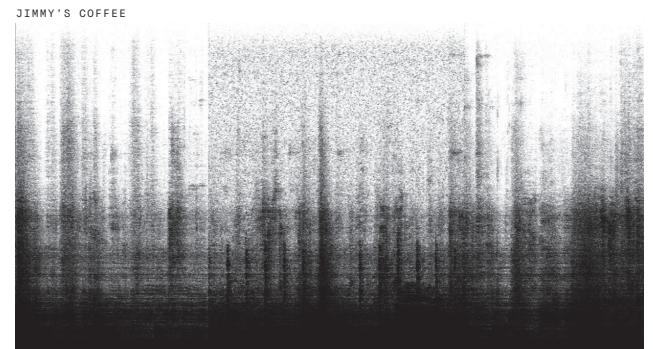
Curated Voice (combined)

The curated voice spans for 10 seconds within each of the recordings. The audio was created to test the dynamics of the human voice when played back within each of the spaces. The intent with each of these curated sounds was to bring a unique auditory signature to the forefront, the human voice was the last logical fit in the trio. The studio recordings reveal a strong presence in the low to mid range frequencies,

The unique qualities of the curated voice audio are almost completely lost in the ambiances of Jimmy's, it is difficult to visually distinguish the particular peaks or valleys created by the presence of the voice within the space. The intense blacks flood the bottom of the spectrogram, washing away any unique attributes that the voice may have brought to the space.

The Reference library provides a strong grey washed background for the voice to sit upon. The ambiances of the library are constant, but not intense enough to destroy the visual properties of the voice.

The personal studio recording dances across the bottom third of the spectrogram, the curated voice is heavily comprised of low to mid range frequencies. The striations within the visualization show a staggering of the voice playback, as if the speaker is not confident in what he is saying.



Conclusion.

It is clear that there is a wide variance between the visual noise that is depicted within each of the spaces. Jimmy's coffee inherits much of the ambiance that constantly swirls around the coffee shop. The Toronto Reference Library falls somewhere in the middle - it hosts the curated audio quite well, as there is little distortion of the visualization. However, the intricacies within each of the audio samples are sometimes drowned out in the visualization. As for the studio recordings, the lack of ambient noise has provided a strong platform for the audio to sit upon, this comes out clearly within the visualizations.

Ultimately, I am happy with the results of this comparative experiment. I believe the selection of the curated audio works well in its diversity, each of the sounds are unique in their structure, frequency range and theme. The visualizations themselves act as a strong metaphor for each of the spaces, visually, you are able to quickly digest the happenings of the space. The acoustic ecology of each of these environments has been clearly displayed through this series of visualizations.

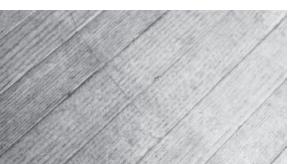
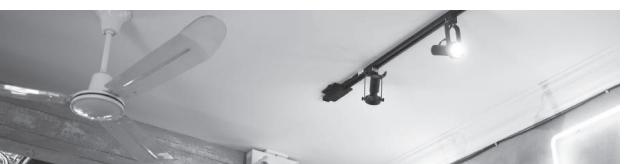
Combining the 5 recordings have worked well in amplifying the visual intensity of these spectrograms. Although accuracy has been sacrificed in the process, the next pages will display the separated visualizations of each of the recordings taken in Jimmy's Coffee.

Welcome to Jimmy's.

Jimmy's Coffee is housed within an old victorian home, north of Dundas on McCaul street. The coffee shop opens its doors at 7am, and is open for 12 hours from then on. During my investigation of the space, I had planned to study the interactions of the employee's, the guests, and how the space was utilized. Since it is obvious that the dynamics of the coffee shop change throughout the day, I paid close attention to when I was visiting, and noted any unique interactions or events that stood out. As I observed, it was apparent that Jimmy's is home to a wide array of guests. You get an interesting combination of locals from around the area, either starting or finishing their workday. Hospital employees that work just down the street from the coffee shop, or some young professionals that are on their way to work up the street. Jimmy's also plays hosts to a wide range of students, from both OCAD and U of T. This diverse range of cliental make the space dynamic, exciting, and distracting.

The space is divided up equally between the front of house, and a public workspace towards the back. Immediately after entering the coffee shop, you're greeted by the baristas behind the counter to your right. There are a few chairs that host window seating at the front as well as a few bench tables across from the barista's countertop. As you move to the back, you enter the main workspace, where a large communal table is shared with a few others, some more bench seating, and a couple single tables a bit further back. For the purposes of the recordings, it was my intention to cover every nuance of the space. Setting up my microphone in each corner of the shop to capture my longplays. The sound-bytes and curated sounds were more difficult to capture, as the space is constantly flooded with new guests. It was critical that the microphone was setup in a working space while recording all of the sounds. The recordings brought with them a more atmospheric and noisy background, although I wouldn't consider this a failure - they are simply a product of their surroundings.

The space, although sometimes over capacity, feels robust and welcoming. The ceilings stand a generous 12 feet, and appear to be constructed out of a hardwood. Similar to the ceilings, the floors toward the back working space are constructed out of a dilapidated hardwood that has been warped over the years. As guests or employees step, it gives way with a loud creak.





14



WELCOME TO JIMMY'S COFFEE

ENVIRONMENTAL ANALYSIS

15



16



WELCOME TO JIMMY'S COFFEE

ENVIRONMENTAL ANALYSIS

17

Curated Pad

MOM (MAX): -13.33 (LUFS) at 00:00:12.632
SHORT (MAX): -16.54 (LUFS) at 00:00:14.304

This curated audio clip is 20 seconds.

A long, droning pad gathers momentum as the sound begins to swell as it almost simultaneously fades away.

Recording of the curated audio clips was conducted within the space, using a medium sized speaker to boom the pre-rendered audio into the coffee shop.

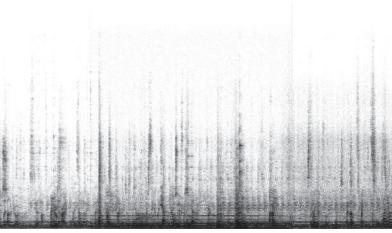
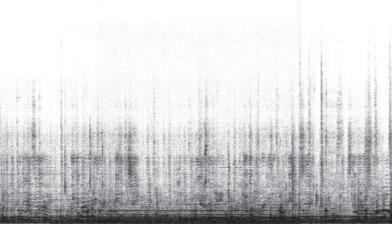
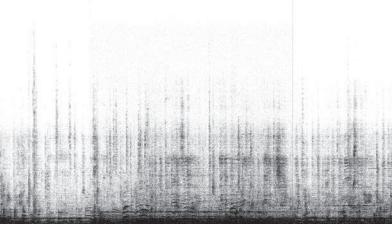
[one]

[three]

[five]

[two]

[four]



Curated Synth

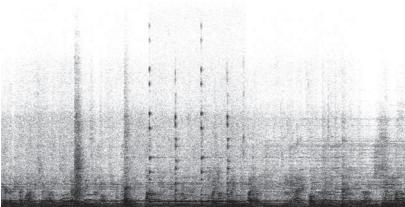
MOM (MAX): -13.97 (LUFS) at 00:00:04.087
SHORT (MAX): -17.70 (LUFS) at 00:00:06.131

This curated audio clip is 10 seconds.

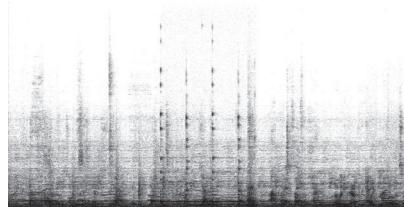
An arpeggio loops for a few seconds, then, it suddenly ends.

Recording of the curated audio clips was conducted within the space, using a medium sized speaker to boom the pre-rendered audio into the coffee shop.

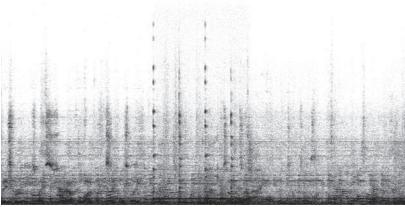
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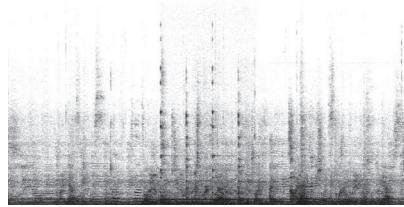
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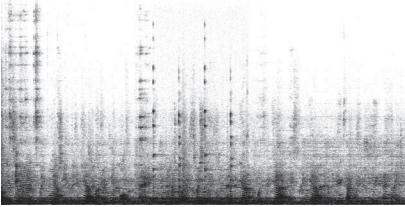
[three]



[four]



[five]



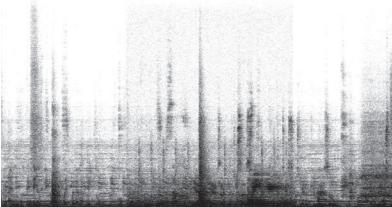
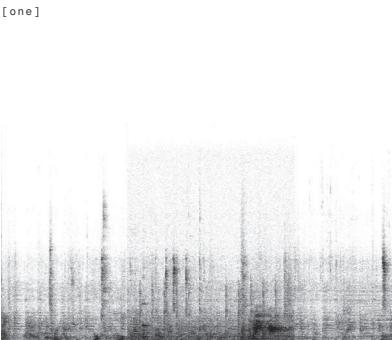
Curated Voice

MOM (MAX): -4.51 (LUFS) at 00:00:06.502
SHORT (MAX): -11.63 (LUFS) at 00:00:06.874

This curated audio clip is 10 seconds.

An amalgamation of sampled audio of voices were combined from all three spaces, these voices were anonymous.

Recording of the curated audio clips was conducted within the space, using a medium sized speaker to boom the pre-rendered audio into the coffee shop.



Miscellaneous Banging

MOM (MAX): -15.72 (LUFS) at 00:00:05.016
SHORT (MAX): -22.94 (LUFS) at 00:00:06.502

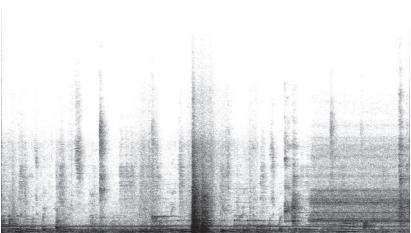
Traveling through the workspace.

As guests come and go through the libraries's workspace, the muted shuffling of their footsteps on the carpeted floors alerts you of their presence.

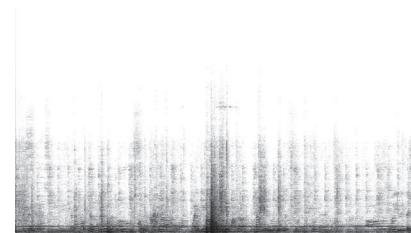
Depending on how active the workspace was, you would generally tune into the hushed whispers of a guest's footsteps sneaking across the floor. The closer these footsteps were to your immediate location, the more distracting they became. The increased volume of the step paired with the curiosity of their exact location provided a strong distraction.

This audio was recorded at a distance, within the communal workspace of the library.

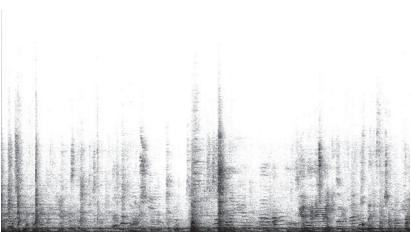
[one]



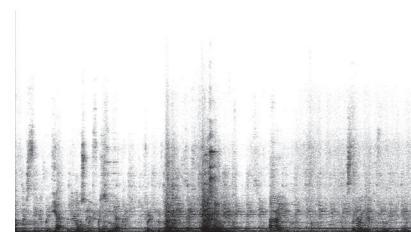
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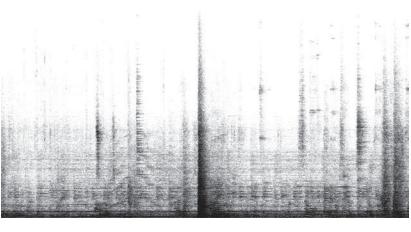
[three]



[four]



[five]



Chair Moving

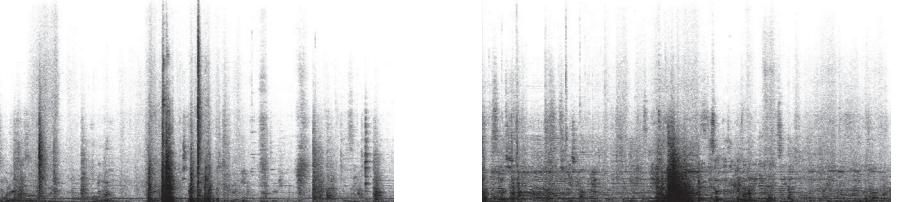
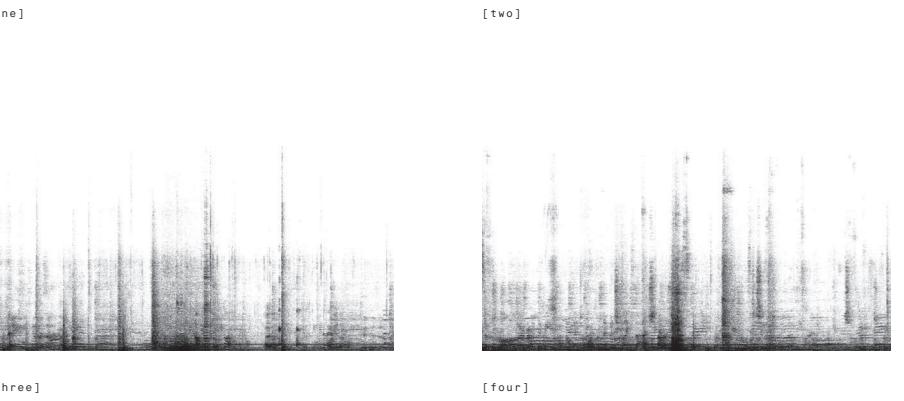
MOM (MAX): -13.88 (LUFS) at 00:00:04.830
SHORT (MAX): -19.55 (LUFS) at 00:00:05.945

The scrubbing of a chair against the wooden floor.

The chaotic coffee shop brings with it a generous amount of movement.

During peak hours, chairs shuffled around the coffee shop frequently. With guests moving around within the workspace, the dragging and shuffling of chairs is imminent. The crowd and population of the space influenced the amount of chair drag.

This audio has been captured within a close proximity to the coffee shop's communal working space.



Anonymous Chatter

MOM (MAX): -19.57 (LUFS) at 00:00:01.672
SHORT (MAX): -23.20 (LUFS) at 00:00:06.874

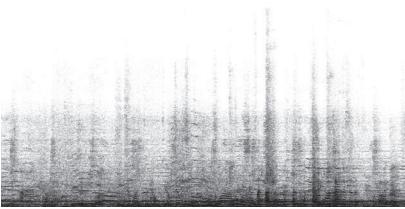
Guests conversing.

The bustling coffee shop invites all types of leisure, or productivity.

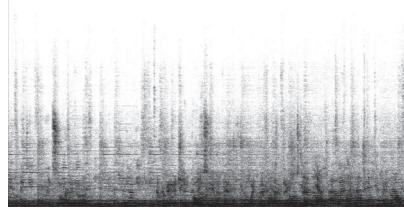
Peak hours invited generous amounts of conversation, the more populated, the higher chance of a conversation being sparked up between guests. The conversations can pull you away from your concentrated state, as you can't resist tuning in.

These conversations were captured within a close proximity to the coffee shop's communal working space.

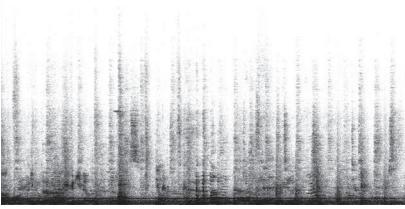
[one]



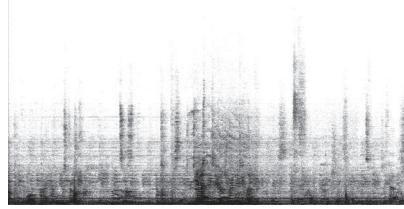
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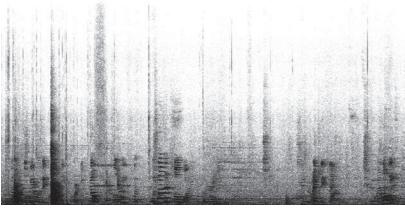
[three]



[four]



[five]



Coffee Grinding

MOM (MAX): -17.12 (LUFS) at 00:00:07.245
SHORT (MAX): -19.00 (LUFS) at 00:00:07.431

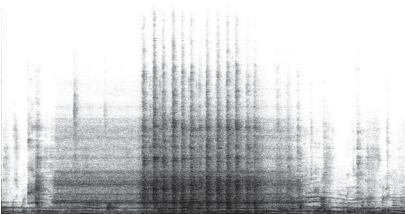
The barista's were hard at work.

The natural workflow of the coffee shop tasks the coffee grinder with producing generous amounts of coffee.

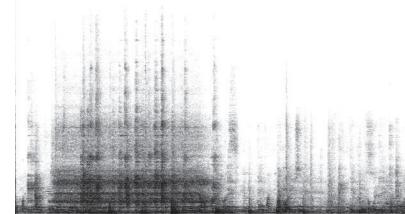
Grinding coffee plays an integral role in shaping the acoustic ecology of the coffee shop. The sound can be heard anywhere within the shop, and at almost anytime. The grinding of coffee can sometimes be soothing, although more often than not, it invites you to tune in - taking you out of your work.

This audio was recorded at a distance, while sitting in the coffee shop's communal working space.

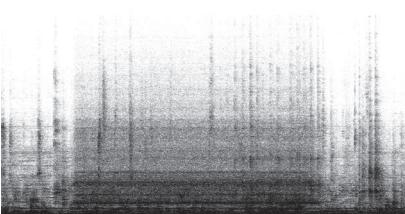
[one]



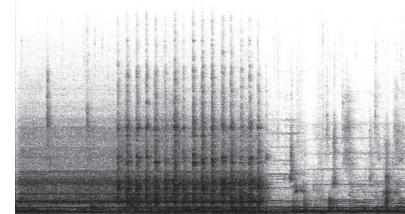
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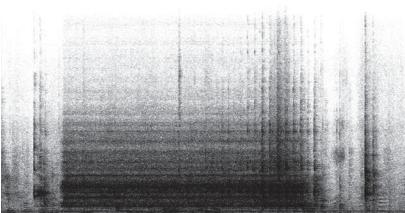
[three]



[four]



[five]



Dish

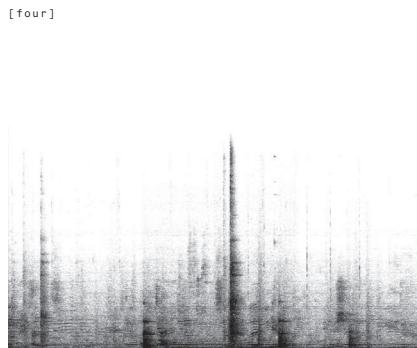
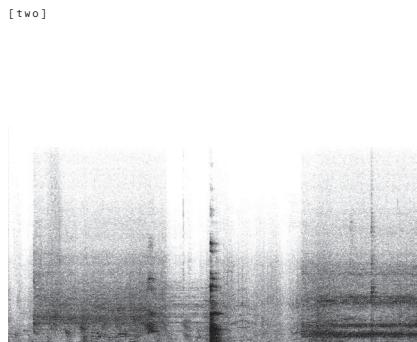
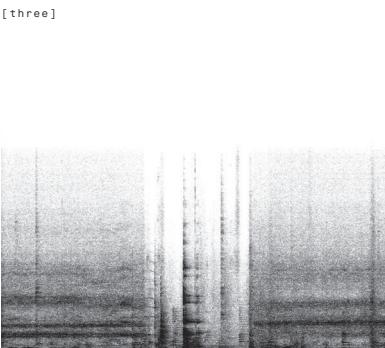
MOM (MAX): -18.59 (LUFS) at 00:00:04.830
SHORT (MAX): -23.15 (LUFS) at 00:00:05.759

Baked goods, small bites, or coffee dishes.

Jimmy's coffee offers a wide array of baked goods. This audio ranged from the baristas plating a purchased good to the clatter of a plate dropping on the communal working table.

The clattering of the dishes can be heard frequently while working within the coffee shop. Whether guests are bringing plates of food to the communal table, or the baristas are preparing something behind the counter, the sound can pierce the acoustics of the space, providing a distraction.

This audio was recorded at a distance, while sitting in the coffee shop's communal working space.



ENVIRONMENTALLY SPECIFIC AUDIO

SPECTROGRAM VISUALIZATIONS

Anonymous Laughter

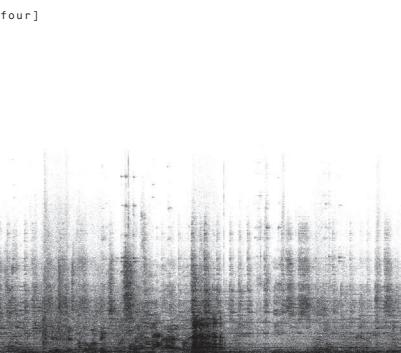
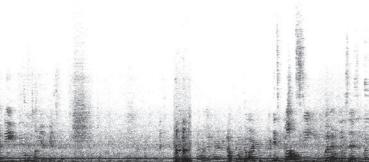
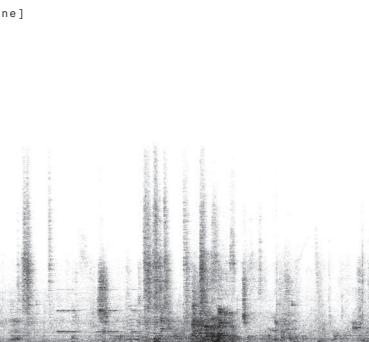
MOM (MAX): -19.34 (LUFS) at 00:00:05.388
SHORT (MAX): -23.50 (LUFS) at 00:00:06.131

Guests conversing.

The bustling coffee shop invites all types of leisure.

Peak hours invited generous amounts of laughter, the more populated, the higher chance of a conversation being sparked up between guests. The laughter can pull you away from your concentrated state, as you can't resist tuning in.

This laughter was captured within a close proximity to the coffee shop's communal working space.



ENVIRONMENTALLY SPECIFIC AUDIO

SPECTROGRAM VISUALIZATIONS

Steaming Milk

MOM (MAX): -17.72 (LUFS) at 00:00:05.945
SHORT (MAX): -19.66 (LUFS) at 00:00:07.059

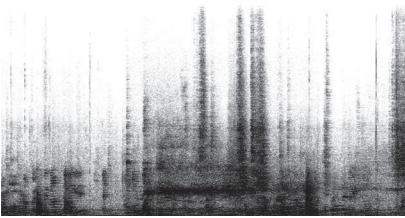
The prevailing sound of any coffee shop.

As the baristas rush to fulfill their queue of orders, the steaming of milk steadily pierces the ambience of the space.

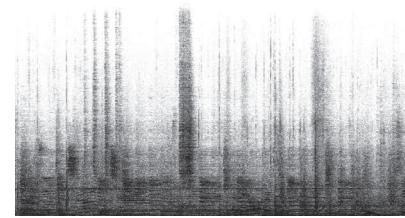
Steaming milk creates a soft hiss that covers the coffee shop in a quiet, but noticeable fizz. Similar to grinding coffee, the sound of the steaming milk comes with the territory, although the sound is jarring enough to pull you out of your concentration.

This audio was recorded at a distance, while sitting in the coffee shop's communal working space.

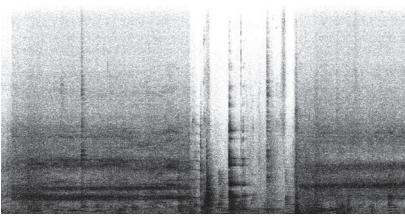
[one]



[two]



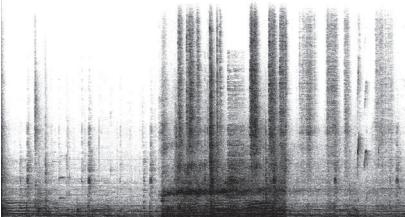
[three]



[four]



[five]



Longplay

MOM (MAX): -9.83 (LUFS) at 00:04:23.965
SHORT (MAX): -15.54 (LUFS) at 00:00:07.988

The longplay recording is 10 minutes.

The longplays curiously capture the ambiance of the environments.

All 5 recordings take place in different locations from around the coffee shop.

[one]

[two]

[three]

[four]

[five]

ENVIRONMENTALLY SPECIFIC AUDIO

SPECTROGRAM VISUALIZATIONS

