

INVESTIGATIONS INTO MUSIC AND SOUND THROUGH RESTAURANT ATMOSPHERE AND
THE CROSS-MODAL FUNCTIONING OF THE SENSES

A thesis submitted in partial fulfillment of the requirements for the degree of Music as an
Interdisciplinary art

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September 2021
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This thesis is approved for recommendation by the Graduate Council

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CHAPTER 1 - INTRODUCTION

The growing realization that our understanding of the world is subject to multisensory perception has led cognitive neuroscientists to begin researching the ways in which the senses can be integrated more effectively into our everyday experiences (See Bruno & Pavani, 2018; Calvert et al., 2004; Stein, 2012). Multisensory perception has begun to be examined through new approaches to architecture, consumer shopping, and most relevant to this thesis, through restaurant design. Until recently however, most design and consumer experiences have been created to specifically influence and target visual human biases; preferences in visual aesthetics, perception, and audiovisual design, have demonstrated the influence of visuals on our creative and consumer experiences and thus, the lack of integration due the other senses. Architect Bruce Mau asserts this point in saying that, “We have allowed two of our sensory domains - sight and sound - to dominate our design imagination. In fact, when it comes to the culture of architecture and design, we create and produce almost exclusively for one sense - the visual” (Mau, 2018). Mau’s statement corroborates the current trend in visual biases of design and further highlights the necessity to integrate the other senses in the approach to design.

Attention to sensory integration is particularly important when it comes to restaurant design, due to the fact that much of the gastronomic experience is driven by anything but the food (See Spence, 2017). Many restaurants rely on their ability to create an *atmosphere* to attract customers and enable them to spend as much time and money as possible in their restaurant. Atmosphere however, cannot be defined alone through the visual design of a space; more intrinsically it relies on an inherent understanding of the “feel” of a space, which in other words,

defines the sensory experience, and perceptual integration, that Mau finds is lacking in the current design aesthetic.

Mau calls attention to sound - as well as vision - as having dominated the “design imagination.” When it comes to restaurant design, I hypothesize that it is foremost *through* sound, that the rest of the senses and the atmospheric experience are mediated. One of the key reasons that sound is such an influencing factor in restaurant atmosphere is due to the frequent use of music in restaurant spaces. Music has a very emotive force, that when used correctly can be powerful enough to set the mood of a restaurant and maintain a customer’s desire to stay in, and return to, the restaurant. In fact, the influence of music has been proven to be responsible for increasing the taste of beer and pleasure of customers in a bar, as well as the drive for consumer purchasing of certain products (See Carvalho et. al, 2016; see also Turley & Milliman, 2000).

Still, the music in a restaurant is reliant on a number of design features (i.e. architecture of the space, colors of the walls, decor choice, the room’s natural acoustics, and the acoustics of the materials comprising the space) that often do not coalesce into a cohesive sensory experience, or atmosphere. This disconnect reintroduces Mau’s dissension of visual dominance in design, as it is consistently through visual appeal that these design features are chosen and frequently inhibit the sensory, atmospheric, experience. In restaurant design, even sonorous elements, such as the materials of the space, may be chosen for their appearance, rather than incorporating sound absorption or reflection properties that would create a more complete atmosphere.

This research aims to demonstrate the paramount importance of music on a restaurant’s atmosphere. Research is conducted through testing the cross-modal interaction of the senses (i.e. multisensory interaction), the soundscape of a restaurant, and fieldwork investigating the

specifics of creating and executing restaurant atmosphere. This work shows that when the music correlates with the atmosphere, through careful attention to the aforementioned modes of investigation, that restaurants will be able to increase consumer retention and build brand equity, thus improving profitability. Additionally, this research will analyze how a restaurant's atmosphere is being affected by ongoing implications caused by covid-19 restrictions. Using covid-19 as a means to further analyze how music can continue to provide atmosphere in restaurants that have been stripped of many of their other atmospheric elements (i.e. changes in decoration and design to accommodate restrictions).

In Chapter 2 the connection between two senses, sound and smell, is examined through the creation of a wine and music pairing event, *Vinesthesia*. This event demonstrates the importance of the cross-modal relationship of the senses, through testing the individual connections between smell and taste profiles of four different wines, with music that emulates their flavor and smell. The importance of cross-modality is explored in Chapter 2 to emphasize, at a sensory level, the ways in which the senses will be shown to interact with each other on an atmospheric level during the dining experience, in Chapter 4. In Chapter 3 the soundscape of a restaurant (both ambient sound and music selection) is recorded at two separate dining experiences and then analyzed at the important sonic moments throughout the recordings. These recordings are used to explore the ways that sound operates in a restaurant, and to distinguish the extent to which sound can be controlled to mediate a cohesive atmosphere. Examining a restaurant's sonic environment serves both to advance the concept of cross-modality explored in Chapter 2, and as background to the sonic factors contributing to restaurant atmosphere in Chapter 4. In the final section, Chapter 4, a field investigation into restaurant atmosphere and the effects of covid-19 on restaurant atmosphere, is conducted through multiple case studies, and

extensive research, regarding the factors comprising atmosphere - and their alterations throughout the pandemic.

The present thesis presents new evidence that music, and its contributing factors, have the ability to greatly increase profitability of the restaurant through improving atmosphere. Through in-depth investigation into sensory functioning, sonic observation and analysis, and fieldwork observing restaurants throughout the world, this research calls to order a restructuring of the aesthetic visual bias surrounding restaurant design; greatly stressing the need for sensory integration and particular emphasis on music and sound, to target consumer satisfaction and retention. It is through this research that restaurants can build the future of a more integrative, profitable, sensory dining experience for consumers.

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CHAPTER 2 - SOUND AND SMELL: A CROSS-MODAL INVESTIGATION

1. INTRODUCTION

Vinesthesia is the name of a multisensory event I conducted in November of 2019. The name itself is derived from two words/concepts; first, “vin,” being the french word for wine, and second, “synesthesia,” to elucidate the way this event would explore the synesthetic (more specifically, cross-modal) connection between the senses of smell (through wine) and sound (through music). The extent of multisensory research has been limited by the fact that “Past studies have examined the effects of individual pleasant stimuli such as music, color or scent on consumer behavior, but have failed to examine how these stimuli might interact” (Mattila & Wirtz, 2001). It is due to this limitation that I sought to explore the connection between sound and smell, in an effort to “isolate” the conditions of multisensory functioning, and to look more closely at our perception of these senses. While the level at which cross-modal interactions occur in the brain is still uncertain, it has been shown through a significant number of studies that multisensory integration, among these individual pleasant stimuli, is likely to occur the closer that the stimuli in different modalities are presented in time (See Jones & Jarick, 2006; Shore, Barnes, & Spence, 2006; van Wassenhove, Grant, & Poeppel, 2007). Therefore, with Vinesthesia I deduced that, as music and the tasting and smelling of wine were going to be presented in close juncture, that it would be possible to analyze - to a degree - the multisensory integration of the two.

It should be noted here that while this chapter is examining sound and smell, that smell shares a close relationship with taste, due to orthonasal and retronasal processing (through inhaling and exhaling while tasting and smelling). During the tasting of wine this complicates the perception of flavor; the nose of the wine is processed through orthonasal smell, while the palate involves the combination of taste and retronasal smell. However, due to the consistent cross-modal associations found between auditory and both gustatory (See Crisinel & Spence, 2011) and olfactory stimuli (See Belkin et al., 1997), testing smell and sound through wine and music can still be shown as consistent with these experiments.

The reason I chose to focus on sound and smell is because of recent findings suggesting the cross-modal interplay of the two, which would substantiate an investigation into the two senses. In 2010 Wesson and Wilson found that the olfactory tubercle in mice would respond to auditory stimuli, in addition to having its activation modulated cross-modally when presented with *both* auditory and olfactory stimuli (Wesson & Wilson, 2010). This therefore demonstrates a close biological example of smell and sound's cross-modality. In *Neuroenology*, Gordon M. Shepherd explains how the brain maps odor images to create analogies between “nonspatial objects,” such as sounds, and that, in fact, the language the brain uses to represent smell, is “Analogous to the way sound frequencies are represented in spatial maps in the auditory system” (Shepherd, 2017). Additionally, in 2009 A. Crisinel and C. Spence conducted a study which showed that there is “An implicit association between basic tastes and pitch,” where sour flavors were associated with “higher pitched sounds,” and bitter flavors were associated with “low pitched sounds;” thus demonstrating the connections between the senses of smell and sound (Crisinel & Spence, 2009). Later, in 2011, Crisinel and Spence conducted another study which examined the relationship between food samples and musical notes. With this experiment they

found evidence that “When noise is added to an eating experience it can affect the levels of sweetness, bitterness, and sourness, people perceive from their food,” which shows how food, as a function of smell and taste, is connected to sound (Crisinel & Spence, 2011). The results of both of these experiments, and proof for these cross-modal connections, are supported by the work of psychologist María Teresa Orozco Alonso who says “Está comprobado que los sabores dulces y los ácidos se asocian a notas agudas, y que los salados y amargos se asocian generalmente a las tonalidades más bajas de la escala musical” (Alonso, 2014). Furthermore, Crisinel and Spence’s findings are supported by earlier experiments, such as that of K. Belkin and Martin R. Kemp who, in 1997, conducted an experiment which concluded that “Certain auditory pitches can be consistently associated with specific odors” (Belkin et. al., 1997).

The experiment “*A Fruity Note*,” also conducted in 2012 by Crisinel and Spence, became one of the most influential experiments in crafting *Vinesthesia*, due to its investigation into the relationship between odors in wine and music. With this experiment the pair demonstrated “That certain odor stimuli commonly found in wine can be matched with not only a pitch but also a specific type of musical instrument. For example, odors of fruits such as apple and lemon were consistently paired with high-pitched sounds, and pleasant odors were frequently matched with the tone of the piano instrument” (Crisinel & Spence, 2012). These flavor and sound associations guided the way that I crafted the music and wine pairings during the event, paying particular attention to the flavor profiles of the wines and the types of sounds in each song that would match Crisinel and Spence’s findings. Another influential experiment for this event was conducted in 2015 by Wang and Spence which examined how music and wine worked together during live classical music. The pair found that “The music chosen to be congruent with each wine was indeed rated as a better match than the other piece of music” (Wang & Spence, 2015).

With support from this finding, I felt encouraged to make my own assessment of congruence between music and wine through *Vinesthesia*. Additionally, “*The Taste of Music*” by Mesz et. al. tested the way that “Words elicited consistent musical representations by asking trained musicians to improvise on the basis of the four canonical taste words: sweet, sour, bitter, and salty” and yielded results that demonstrated that “Even in free improvisation, taste words elicited very reliable and consistent musical patterns: ‘bitter’ improvisations are low-pitched and legato (without interruption between notes), ‘salty’ improvisations are staccato (notes sharply detached from each other), ‘sour’ improvisations are high-pitched and dissonant, and ‘sweet’ improvisations are consonant, slow, and soft” (Mesz et. al., 2011). These results impacted the way that I chose songs with certain tempos for each wine. Especially since the four canonical taste words used in Mesz et. al.’s experiment are closely related to basic tastes found in wine, the types of musical patterns they found to hold true for each word were increasingly relevant to wine pairing.

I was further encouraged by the results of “*The Taste of Music*” since “Fifty-seven non-musical experts” were additionally tested on listening to the improvisations conducted by the musicians and “Found that listeners classified with high performance the taste word which had elicited the improvisation” (Mesz et. al., 2011). Through *Vinesthesia* I wanted to create an event that would show people how this research applies to their lives outside of the scientific world, and with these results I felt confident people would be able to make the multisensory associations I was testing with the event.

In today’s society we are extremely disconnected from the power and potential for relationships among our senses; we are inundated with the mass consumption of products - this includes music and wine - to the point that we simply consume without interacting with the

experience of drinking a glass of wine, or observing its effects when drunk in the presence of a suitable soundtrack. As Volker Kalisch notes in *Music from an Anthropological Perspective* the experience of music must be “Based on ‘body-related’ limitations” due to the fact that “We all share the same physiological conditions within a rather narrow framework of physiological limitations” (Kalisch, 2000). Kalisch emphasizes that “To experience music we depend on our body,” which explicates the importance of conducting research that investigates and explains the way our bodies (and thus our senses) work/interact, to enable us to experience the likes of music (Kalisch, 2000). Furthermore, music can evoke a strong psychological experience in the listener through a “Marked effect on pulse, respiration and external blood pressure,” which underscores the necessity to pay attention to the body’s and the mind’s experience of music when using it as a vehicle to sell or attract a customer (Mursell, 1937). In this experiment, research such as this will demonstrate that the experience of listening to music can affect the quality of the experience of smelling wine.

Considering that much of our validation of the world is based on the sense of vision and how we literally “see” the world, it is worth highlighting that smell is the first sense to have developed in the brain, and therefore is our most ancestral connection to perceiving the world. Its relationship to sound is therefore paramount in investigating unrecognized parts of ourselves. In *Music and Non-Human Agency*, Bernd Brabec de Mori addresses the inherent musicality of some animals’ ability to “Produce and perceive sonic patterns...[containing] meaning beyond obvious signal or pseudo-linguistic character” (Brabec de Mori, 2006). Which reminds us that, since we too are animals, we must contain an inherent musicality that informs our perception of the world.

For the event, wine was chosen to explore smell because of its uniquely complex aromatic structure. The fact that “between 80% and 90% of all sensations stimulating our

appetite come from fragrances [aromas]” makes the multitude of aromas present in a glass of wine an apt way to explore our sensitivity to smell (Chartier, 2012). To analyze the aromas in these wines’ relationship to music, I paired each wine with its own mini soundtrack that highlighted the types of pitches and instruments that the aromas of each wine evoked, through the guidance and interpretation of the aforementioned experiments.

2. METHODS/PROCEDURE

In this section I will start with a brief outline of the structure of the event, followed by several charts which detail and analyze the wines and soundtracks chosen for the pairings. It is important at this time to define a few wine terms that I will use in the first chart, so that the wines’ descriptions remain clear. I would also like to state that I hold a Level 3 certification from the WSET (Wine and Spirit Education Trust) which allows me to professionally assess and taste wine. For this reason I take the assessment of each wine’s characteristics seriously and base my opinions on trained professionalism when analyzing their profiles and creating their accompanying playlists.

The prevalent terms are taken from the WSET Level 3 book, *Understanding wines: Explaining style and quality* and are as follows:

- **Alcohol (ABV):** Alcohol contributes to the texture and body of a wine. Alcohol is more viscous than water, and higher levels make a wine seem heavier in the mouth. At low levels, the wine can seem a bit watery, at high levels alcohol triggers pain receptors, giving a hot, burning sensation, especially after spitting or swallowing.

- **Tannin:** Tannins bind to your saliva and cause your mouth to dry up and feel rough, they contribute to the textural richness of a wine. The drying sensation can be felt most clearly on the gums above your front teeth. Tannins can sometimes also have a bitter taste that is detected most clearly at the back of your mouth.
- **Acidity:** **High acidity** tends to be found in wines made from grapes ripened in cool conditions and can cause these wines to be especially mouth-watering. **Low acidity** describes wines that will feel broad, round and soft. For most people, acidity is detected most strongly at the sides of the tongue, where it causes a sharp, tingling sensation, and makes your mouth water as it tries to restore its natural acid balance.
- **Body:** Body, or mouthfeel, is the textural impression created by a wine. It is not a single component, but is an overall impression created by all the structural components working together. For certain wines, judging the body is relatively straightforward. A wine that is high in alcohol, with ripe tannins and intense flavors is very clearly full-bodied.
- **Nose:** Refers to the way that the wine smells, what aromas and structural elements do you perceive.
- **Palette:** Refers to the way that the wine tastes, what flavors and structural effects do you taste.

2.1 EXPLANATION OF THE STRUCTURE OF THE EVENT

Before I began the pairing of wine with music, I ran a test experiment on the participants with 88% dark chocolate and two control sounds, one high pitched and one low pitched beep. The high pitched beep was supposed to make the chocolate taste sweeter, while the low pitched beep was supposed to make the chocolate taste more bitter. The test experiment was based on a 2014 study conducted by Charles Spence that examined how noise can impact the perception of different flavors of food, and was used in the event for the purpose of demonstrating to the participants the potential effects that pairing music with wine could have on the gustatory

experience of the event (See Appendix A for further review). In essence, this test was used to cue participants in on the relationship between their sense of smell and hearing.

After the initial test, the framework of wine and music pairings were constructed as such:

- Four different wines were chosen; one red, one rosé, one white, and one cava.
 - The range in flavors between these wines allowed us to explore different aspects of the flavor and music pairings.
 - For example: Using cava added a carbonated fizz to the flavor of the wine, which amplified the brass-musical elements that paired perfectly with the flavor of the wine and its high acid content (See Crisnel & Spence, 2012).
- For each wine a soundtrack of three to four different musical tracks, which lasted between ten and fifteen minutes total, were chosen to highlight the flavor profile of each wine.
 - The soundtrack that I chose for the rosé was specifically made incorrectly, where the music did not pair with the flavor of the rosé. This was done on purpose, as a test for the participants, to see if they could discern which wine was incorrectly paired with its accompanying soundtrack. Mismatching a wine with its soundtrack helped to keep participants' attention as they drank the wines and listened to the music, and further validated the apparent relationship between the music chosen and the different wines.
- Before each wine and music pairing, a small introduction of the wine and its structure was given, followed by a few musical observations from the professional DJ Danica Vujosevic, who helped me with the event, of each soundtrack that would follow.
- The wine and music pairings lasted two hours. There was a thirty minute interlude for mingling in the beginning of the event, and a thirty minute conclusion and review at the end of the event. In total the event lasted a little over three hours.
 - The specific question answered by each participant was:
 - 1) Which soundtrack did not support the taste of the wine paired with it?
 - At the end of the event, during the thirty minute conclusion and review, I went around to each participant and asked the above question. The opinions of each

participant were expressed privately to me. After I spoke to each participant I summarized the opinions of the individuals to the group and we had a larger discussion together surrounding the success of the event.

2.2 BASIC STATISTICS OF THE EVENT

- There were 13 participants at the event, this included one of the wine-makers, Anna Geli of Mas Geli. There were 4 men and 9 women, ages ranging between 24 and 38 years of age. Participants were from a variety of nationalities: Spanish, English, American, French, Russian and Nigerian. This ensured that the experiment would test the effects of music and smell throughout multiple cultures to see whether the results would be pervasive, despite potentially varying conceptions of music and smell in each culture.
- I held the event at the Too Young Music Supervision Studio in Poblenou, Barcelona which is owned by my friend, Fred Schindler.
 - The studio is a large white room, which lends itself well to the acoustics for the music, accommodation for the participants, and space needed for set up (including tables, chairs, wine storage, and DJ booth).
 - A week before the event Danica and I visited the studio to conduct a sound test and map out the layout of the DJ booth, in order to maximize the quality of the music and its integration into the studio setting.

2.3 PRESENTATION OF THE FOLLOWING CHARTS

- The first chart names each wine and gives relevant structural information about the flavors and smells produced from the types of grapes in the wine.
 - In this chart I am very specific about flavors on the Nose/Palette and structural elements of the primary grapes in each wine. I describe these features in detail because they were the influencing factors in deciding how to pair music with the wine.
- The second set of charts addresses each soundtrack of each wine.

- Song analysis was conducted with TuneBat and Mixed In Key. They are two software applications that allow DJs to analyze various aspects of a song such as key and BPM and some of the other descriptive factors listed in the charts.

1) Wines, flavors, vineyards

Wine Name/ Vineyard	Blanc 2017 Mas Geli	Red 2018 Mas Geli	Rosat 2019 Mas Molla	Cava 2019 Mas Molla
Vineyard	- Vineyard in Empordà - Close to the ocean with sandy and limestone terrain (impacts flavor, adding acid) - Vineyard is in the shadow of Begur and Montgrí Mountains (impacts flavor, cooling down the grapes, and adding structure)		- Vineyard in Girona (Empordà) - Vineyard in operation since 1338 - Makers of traditional wines, all aged in oak barrels over a century old	
Grapes in Wine	Garnatxa blanc, roja and subirat parent (Grenache white, red and an indigenous variety of malvasías grapes)	Garnatxa rojo, merlot (Grenache red, and merlot)	Carignan, garnatxa (Carignane, Grenache)	Xarel.lo, malvasía
Dominant Grape Profiles	Garnatxa Blanc (Grenache white) - Full bodied - High alcohol and intense	Garnatxa Rojo (Grenache red) - Medium/full bodied grape - High alcohol (15% ABV)	Carignan (Carignane) - Medium body - Medium/high alcohol - Medium tannin	Xarel.lo - Light body - Medium alcohol (11.5-13.5 % ABV)

	flavors - Dominant flavors: underripe plum, citrus zest, pear, honeysuckle, fenugreek, minerality, spice driven finish due to high alcohol content Subirat Parent - Indigenous grape to Empordà from the Malvasía family (grape shares many similar flavor characteristics to malvasía) - Dominant flavors: flowers, ripe grape, orange blossom, tropical fruit, apricot - Clean and pleasant, bitterness from tannins	- Medium tannins and acidity - Dominant flavors: stewed strawberry, grilled plum, leather, dried herbs, tobacco, cinnamon Merlot - “Deadpan” wine, named so due to its straightforward flavor - Medium/full body - High alcohol - Medium/high tannin - Medium acidity - Dominant flavors for Hot Climate Merlot (Emporda): more fruit forward and less tannin is prevalent, black cherry, raspberry, plum	- Medium/high acidity - Balanced flavors with bitter tannins - Dominant flavors: black fruit, menthol, spearmint, balsamic, slightly underripe fruit, high acidity Garnatxa (Grenache) - Full bodied - High alcohol - Soft tannin - Low acidity - Dominant flavors: raspberry, strawberry, subtle notes of white pepper and spices	- Light tannins - High acidity - Dominant flavors: lemon, peach, lime blossom, raw almond, ginger Malvasía - Medium body - Medium/high acidity - Dominant flavors: citrus fruit, some floral orange blossom characteristics
Nose/Palette	White flower, green apple, nectar, quince, lemon, lime, golden apple, pear, white melon, lychee, mineral notes, bright, clean, acidic elements	Strawberry jam, raspberry, thyme, rosemary, white pepper, menthol, black pepper, yellow bell pepper	Strawberry, dried strawberry, cherry, raspberry, simplest of the wine	Pear, apple skins, brioche, white pepper, toasty, caramel, toffee, gooseberry, bright and rich textured sweet notes with a clean beginning taste and a touch of honey during

				the end of the taste
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2) Wines and Music Pairings

Cava 2019, Mas Molla

Song	Analysis	What these songs have in common
Águas de Março - Elis Regina and Tom Jobim	- 144 BPM - Syncopated bossa nova rhythm. - Emphasized mid-high frequency with bright sounds. - Has prominent low frequency sounds but still sounds very bright. - Drums with many accentuations, Elis' voice is high-hat and dominant. - Piano: mid/high frequency range, playful and syncopated. Soft and sweet with mid/high range sounds. - More emphasized mid/high range sound, low frequencies are not so emphasized. - Elis Regina vocals are mid-high frequency. - Instruments: two pianos, double bass, drums, keys (potentially electric wurli or electric organ), definite presence of low brass.	- High BPM - Syncopated rhythm. - Mid/high range vocals (soft sounding). - Emphasized high frequency range: all the songs are "bright" sounding, like the bright elements in the wine. - Percussion/drums (hi-hats mostly) - dominant in high frequencies. - Two songs are in minor, and two are in major keys (Take Five has both major and minor).
Kore - Andrea Motis	- 150 BPM - Syncopated rhythm. - Andrea Motis vocals: sweet sounding, mid-high	

	frequency. - Whole orchestra: brass section and woodwinds (instruments include, clarinet, piccolo flute), the orchestra plays a lot of high frequencies, high spectrum sounds. - Bright and happy sounds. - Drums: emphasis on hi-hat sounds, cymbal use. - More complex arrangement than in previous song. - Highlight instruments: tenor sax, flabiol (Catalan wood instrument), fiscorn (brass instrument).	
Take Five - Dave Brubeck Quartet	- 150 BPM - Syncopated rhythm (smooth jazz/bossa nova style). - Overall sounds bright and warm (while still containing some mid, low-mid range sounds). Drums: Hi-hat and cymbal dominant (high frequency range). There are more toms than in the previous song and the kick is pitched higher. - Guitar playing syncopated rhythm, the sound is panned left. Mid frequencies and warm sound. - Alto Saxophone panned right (distinctly high pitched), plays mid-high frequencies and is responsible for playing the main melody.	
Spooky - Dusty Springfield	- 106 BPM - Rhythm is not syncopated. - Spectrally this song sounds similar to the previous song with emphasized mid-high frequencies (through the	

	tambourine and Dusty's voice). - Drums/percussion: tambourine dominant (high frequency), bongos, we hear snare more than in the previous song. - This is the first song from the playlist that has an electronic bass, not a double bass. - Guitar: mid/high frequency (same as previous song). - Dusty Springfield's vocals: high pitch and soft, similar to Aguas de Marco. - Brass section: high range frequency, the tenor sax solo has a similar range to Dusty's voice.	
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Blanc, 2017, Mas Geli

Song	Analysis	What these songs have in common
September Rose - Cailin Russo	- 89 BPM - Emphasized mid-low frequencies, sounds less bright than previous Cava pairings, darker sound but also warm. - Guitar sounds intentionally "muddy" (i.e. hard to discern), emphasized mid frequency sounds. - Minor keys give a mellow sound. - Cailin Russo's vocals have an alto to mid frequency arrangement. - The chorus and brass sections are played in mid frequencies, with the trumpet	- The songs have a "tight" sound, with compact instrumentation. - More mid/low frequency sounds. - Soul songs are prominently featured. - All the songs are in minor keys. - Brass section dominant.

	emphasized in a mid-high frequency. - Bass: low frequency is emphasized, which has a dominant role in the song. - Back vocals: airy and mellow, fitting with the minor key.	
Back Stabbers - The O'Jays	- 125 BPM - Rhythm dominant and tight. - Drums: bongas and toms are played on the rim (the border of the snare). - Dark sounding, partially due to the minor key. - Minor key, mellow notes. - Piano: starts with a minor chord and sets the mood for the song. - Electric guitar: plays in high range sounds. - String section: plays in high range sounds. - Brass section is emphasized. - Singer: high pitched, more "expressive" form of singing. - Musical arrangement is full, with lots of instruments, with a high energy theatrical sound.	
I Want You (Remix) - Erykah Badu	- 97 BPM - Minor key: sweet and mellow minor sounding sound. - Very tight sound, especially with the percussion at the beginning of the song. - Dark sounding with more low frequency sounds. - Percussion/drums: toms, snare, kick, we hear cymbals but they are more in the background. - Electric bass: plays in a	

	percussive way, with a staccato emphasis. - Piano keys sound like brass a little, they are played in a percussive instrument esq. the range of the piano keys will be mimicked by the brass section through trumpets. - Erykah Badu's voice is mid-high pitched. - Intense energy present like in the previous song.	
Malika - Hiatus Kaiyote	- 111 BPM - Happy mellow sound: playing between a mellow and a sweet sounding effect. - The song is in minor key, but it sounds more bright compared with the previous songs. - More instruments are playing at higher frequencies. - Very tight sounds. - More syncopated rhythms. - Rhythm section is tight (they are playing the rim of the snare). - This song could be featured on the Cava 2019, Mas Molla playlist. However, it has a mellow sound that makes it more suited for this wine.	

Rosat, 2019, Mas Molla

Songs	Analysis	What these songs have in common
Mona Ki Ngi Xica - Bonga	- 96 BPM - F# minor - Minor key with use of the	- Syncopated rhythm - Minor key - More traditional than

	minor chromatic scale. - Simple arrangement: two guitars (panned left and right) play a minor chromatic scale, percussion (african bongos, and double bass), bongos have a lot of reverb. - Guitar playing a percussive style with a staccato emphasis. - Vocals: very piercing voice, a sharp and bright element to the sound. - Overall mellow and dark sounding. - Besides the guitar, which is panned to the left and is playing the melody, the rest of what is played is in a mid/low range frequency.	modern sounds. - Very different arrangements: - Bonga - simple arrangement - Je t'aime - very complex arrangement - Maradona - in between these two for arrangement - Percussion plays an important role in all these songs. - The harmonic instrument in all the songs is the guitar.
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Je t'aime - Staff Benda Bilili	- 119 BPM - A# minor - Minor key (minor chromatic scale) - Sounds less dark than the previous song with more high frequency sounds. - Complex arrangement: interesting choice of instruments in a DIY style. The beginning of the arrangement starts with the double bass, the rest are as follows. - Guitar: sounds like a banjo, it is an acoustic guitar with metal strings. - Satonge (electric one string lute): high pitch and playing solos and melodies. - Percussion is DIY: the most prominent percussion is high pitched and has a "snappy"	
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	sound, there are some more identifiable standard percussion instruments such as shakers, cymbals and bongos. - Emphasis on the high frequencies of all these instruments.	
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Maradona - Niniola	- 118 BPM - Minor key - High frequency spectrum: the shakers, percussion and vocals (with effects) fill up this spectrum. - Combination of melodic percussion and non-melodic ones (marimba or vibraphone). - Mixture of acoustic instruments and electronic music production - more modern production here. - Niniola's Vocals: could be being filtered through a phone filter, due to the fact that high frequencies are nearly not present in her voice.	
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Red, 2018, Mas Geli

Songs	Analysis	What these songs have in common
Summer Wine - Nancy Sinatra, Lee Hazlewood	- 139 BPM - Dominant strings and brass as if the two have a dialogue in the "statement and response" format. - Full arrangement: bass,	- Full arrangement: most of the songs have a whole orchestra playing and this orchestration is what is complex and adds dynamic to the songs.

	acoustic guitar, strings, brass, drums, percussion, two vocals (female and male). - Vocals: sing very simple melody, in monotone and flat sound but accompanied by a complex arrangement of instruments. - Brass: begins around the last third of the song. - Instrumentation is constantly based in an add on to the dynamic of the song.	- Mid to high BPM (tempo). - Reverbs are frequent. - Use of voices with a monotone and even pitch: simple, repetitive melodies.
Perhaps, Perhaps, Perhaps- Doris Day	- 105 BPM - A Minor - Whole orchestration: Oboe, flute, vibraphone, guitar, pizzicato strings, double bass (plays the melody at the beginning). - Hi-Hat and cymbals played with brushes add a soft sandy sound. - Trumpet solo adds brightness to the sound of the song and gives a relief from the smoky vocals.	
Something Stupid - Nancy Sinatra, Frank Sinatra	- 104 BPM - E major - Full orchestration: highlights of acoustic guitar and strings. - Lots of reverb on this song. - Bright sounds playing above the more monotone vocals. - The complex orchestra arrangements add dynamic to the song and fill up the very simple vocal melodies.	
Fever - Peggy Lee	- 136 BPM - Simpler orchestration and arrangement. - Change of key in the song	

	which causes a modulation to add on to the dynamic. - Lee's voice is more dynamic and expressive than that of Day's in the previous song, but still maintains the monotone and even pitch throughout most of the song that many of the songs have in common in this playlist. - Key instruments: double bass, drums (toms), finger snaps.	
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2.4 RELATIONSHIP BETWEEN FLAVORS AND MUSICAL ELEMENTS

For each soundtrack I will now analyze one of the song pairings and its relationship to the wine's flavor, to give the reader an explicit understanding of the thinking behind the formulation of these pairings.

Cava, 2019, Mas Molla Pairing:

This cava was very clean at first taste with lots of bright acidity, due to the natural carbonation of cava (which prickles the tongue) and the lime, lemon, characteristic of the Xarel.lo grape. After some time the wine gained in richness, due to the use of oak and malolactic fermentation that added a brioche flavor to the taste. Additionally, as the wine opened up, the deeper notes of pear, honey and floral, became apparent. Because of these flavor characteristics the music chosen aimed to represent the balance between the richer flavored undertones (brioche, pear, honey, florality) and the brighter, acidic, fizz from carbonation and the lemon, lime characteristics.

In making this pairing between flavor and sound I focused on songs that had sweet and inviting elements, as well as sharper pitches and brass instruments, to infuse the sonic interpretation of flavor with a balance between these oppositional flavors. These pairings resulted from research stated in the introduction, particularly that of Crisinel and Spence in their finding that high-pitched notes and pleasant odors (those of the fruits above) were frequently paired with piano music, and that of Mesz et. al., in finding that sounds conjuring up the word ‘sweet’ were consistently matched with slow and soft sounds (See 2. Crisinel & Spence, 2012, and Mesz et. al., 2011). The use of “Águas de Março” by Elis Regina and Tom Jobim achieves much of this cross-modal combination between sound and smell from the research. The emphasis on mid-high frequency sounds imbues a sense of brightness in the song (matching with the acidity and lemon, lime flavors on the tip of the tongue). Additionally a high BPM (144 BPM) keeps the song moving at a constant pace, which reflects the activity of the bubbling sensation in the mouth from the carbonation of the cava. The vacillation of the syncopated, bossa nova style rhythm, emphasizes the constant flavor transition between these richer brioche and honey flavors and the lemon, lime acidity. The instrumentation (a mixture of piano, brass and drum) syncs perfectly with this pairing (See Mesz et. al. above); the piano plays a range of soft and sweet, mid to high range sounds - amplifying both flavor characteristics - and the use of the brass and drum instrumentation acutely strengthens the effect of tasting carbonation and lemon, lime within the initial sips.

Blanc, 2017, Mas Geli Pairing:

Similar to the cava, the first sip of this wine tasted of lemon, lime. Additionally it had notes of green apple and a clean minerality and bright acidity. As the wine opened up it

developed notes of white flower, quince, golden apple and pear. In describing the overall flavor of this wine I perceived it as a “tight” wine, by this I mean that its total flavor is more or less contained within each sip, it presents itself upfront on the palette and on the nose. To make a musical pairing for this type of taste I focused on sounds that could “cut through” the deeper flavors of golden apple and pear and equally manage the acidity of the lemon and lime flavors. Without the fizz from the carbonation in the cava, this wine did not require songs with such high BPMs, due to the lack of carbonated “movement” in the wine. Instead of mid-high range sounds, mid-low range sounds seemed more fitting - to imbue the acidity in the wine with more of the deeper flavor from both the stillness (lack of carbonation) and the golden apple and pear flavors. The sweeter taste and the slower tempo of the songs paired with this wine reflect the research of Mesz et. al. as mentioned in the Cava 2019, Mas Molla review (Mesz et. al., 2011). A brass dominant instrumentation to the song, to manage this acidity, was also an important layer to the musical structure of the flavor (See Crisinel & Spence, 2010).

“September Rose” by Cailin Russo exemplifies the change in these musical characteristics from the Cava to the Blanc. In this song the BPM is much slower (89 BPM) than in “Águas de Março,” which allows the song to dwell on more of the deeper flavors in the wine and its lack of carbonation. I described the guitar sound as “intentionally ‘muddy’” in the chart, which elucidates the “tight” structure of the wine, by presenting its sound as a composite whole. The mid-high frequency of the trumpet emphasizes some of the more acidic flavors in the wine (like the mid-high frequency brass section in “Águas de Março”), while the lower frequency of the bass stabilizes the deeper flavors of golden apple and pear beneath the “acidic” trumpet.

Acidity functions similarly to the ‘sour’ category in Crisinel and Spence’s research where, “Sour and sweet tastes, two qualities present in fruits, are associated with high pitch” and

demonstrates how higher pitches, found in these brass arrangements, can musically balance this flavor component of the wine's profile. Additionally, since there are many elements of sweet fruit tastes, such as that of the deeper flavors of golden apple and pear, Crisinel and Spence's findings demonstrate that these higher pitches will marry well with the sweeter flavors that also carry a high pitch association (Crisinel & Spence, 2010). This demonstrates how the complexity of the song - between the bass and brass elements - extrapolates the qualities of both 'sour' (acidic) and 'sweet' flavors, while allowing them to merge with each other structurally in the music. The song is made in a minor key and the backing vocals have an airy and mellow quality to them, which adds a light, richness to the wine, while simultaneously emphasizing the acidic and deep flavor notes.

Rosat, 2019, Mas Molla Pairing:

This was the wine whose musical profile did not match its flavor profile. As listed in the chart above, these songs were complex: they had very different arrangements to each other, while still sharing the use of minor key, syncopation, percussion, and the use of guitar as the harmonic instrument. The wine itself was simple; a blend of carignan and garnatxa that, being from 2019, had not developed much in bottle and mainly tasted of simple red fruit without much depth of flavor. When left open for a few hours the simplicity of flavor persisted. In the first chart I describe the Nose/Palette of this wine as "Strawberry, dried strawberry, cherry, and raspberry" which indicates no other flavors than ripe, red fruit. Structurally it had a medium body, tannin, and high alcohol. Thus, the use of complex musical elements does not marry well with this wine (See Crisinel & Spence, 2010 for a detailed review of the way sound, instrumentation, and flavor correspond). If I had paired this wine with a soundtrack I would have focused on songs with

slower BPM, to emphasize the lack of flavor progression in the wine (it tastes of mainly simple red fruit), some bass elements, to play with the heavy feeling of the high alcohol content, and piano based arrangements in a major key - to demonstrate a dense, simplistic sound, like the straightforward and simple fruit flavor present in the wine. The purpose of presenting a soundtrack that was musically complex, with a wine whose flavors were simplistic, was to directly contrast the sound structure with the smell/taste structure. Thus, this pairing demonstrated the significance of a correct pairing, through the use of an incorrect pairing.

Red, 2018, Mas Geli Pairing:

The main grapes in this blend were garnatxa and merlot. Merlot is described as a “deadpan” wine in the chart, mainly due to its high alcohol content making it feel heavy, and which is further supported by the weightiness of the medium to full body of the wine. Its fruit characteristics are mainly dark fruits - such as black cherry, plum, and raspberry, with occasional smoke and tobacco flavors. These elements lend themselves to the “deadpan” quality of merlot through their dark, heavier taste than lighter red fruits. The garnatxa in the wine is blended with the merlot to add some of these lighter red fruit notes, such as strawberry, while the natural high alcohol content of the garnatxa grape further encourages the heaviness and “deadpan” characteristics of the merlot.

When constructing a soundtrack for this wine the key phrase I kept in mind was “deadpan,” and for this reason many of the songs feature singing voices with very even, monotonous pitch to demonstrate this lack of character change in the wine. In Mesz et. al.’s experiment, ‘bitter’ improvisations were shown to be “low pitched and legato (without

interruption between notes),” and while the flavor of this wine had no ‘bitter’ taste, the quality of slow uninterrupted movement served the “deadpan” attitude of the singers voices well (Mesz et. al., 2011). Perhaps here, one could interpret ‘bitter’ semantically, as showing the “character” of the singer’s voice and therefore the similarity to the qualities of the ‘bitter’ improvisations in Mesz et. al.’s research (this would ultimately require deeper investigation into the nuances of cross-modal functioning). Additionally there are slower BPMs in these songs, again emphasizing the monotonous and “deadpan” quality to the wine, with beats that appear to drag on. Musically, the bright, acidic red fruit of garnatxa was balanced by some textural touches to the songs; such as bass and full orchestrations - with a focus on strings - to bring out some of the brighter, acidic, more lively flavors. Higher pitches in the string arrangements unite with the aforementioned findings from Crisinel and Spence’s research that higher pitches and ‘sour’ (here described as acidic) flavors harmonize with each other (Crisinel & Spence, 2010).

“Bang Bang (My Baby Shot Me Down)” by Nancy Sinatra demonstrates this wine’s flavors in several ways. Nancy Sinatra’s voice is a perfect, smokey and deadpan accompaniment to the quality of the merlot, emphasizing the smokey, tobacco characteristic of the grape itself. The guitar and bass use simple, lingering reverb, which equally reflects the deep cherry, plum notes in the wine, with those of the brighter, acidic, red fruit. The reverb also reinforces a further sense of smokeyness (like that of Sinatra’s voice) where the reverb of each note creates a sound that is not *completely* solid, and therefore slightly transparent like smoke.

3. RESULTS AND DISCUSSION

After the event, and during the thirty minute conclusion and review (where I went round to each participant individually and asked which soundtrack did not pair with the wine) 11 of the 13 participants reported that they realized that the mismatched wine and soundtrack pairing was the Rosat, 2019, from Mas Molla. Of the two participants who did not agree with this mismatch, one, a Spanish man, thought that Blanc, 2017, Mas Geli did not work with its soundtrack, and the other, an American woman, thought that the Cava, 2019, Mas Molla did not work with its soundtrack. For Blanc, 2017 the participant thought that the songs featured deeper, soulful voices than the flavor of the wine afforded. For Cava, 2019, the participant found some of the brass and hi-hat quality of the drums in the songs to imbue a sense of smokeyness to the wine (as in the Red, 2018, Mas Geli), rather than emphasize the acidity of the cava that this instrumentation was trying to achieve.

I found these results very interesting. I was impressed that several people who had no prior knowledge of the cross-modal relationship between sound and smell could intuit the relationship between these flavors and sounds. Also, I was very intrigued by the difference of opinions of the two participants who found discrepancies in some of the pairings. While these two participants may perceive the relationship between the sounds and smells used in a few of the pairings differently, these differences showed that each participant was actively participating in thinking through the sound and smell relationship. This demonstrates that it is possible for the individual to perceive the cross-modal relationship between sound and smell without any prior academic training or knowledge.

As this event only tested the opinions of 13 individuals, it is impossible to draw scientific data with these results. However they do demonstrate a positive trend in identifying cross-modal congruency within a group. Additionally, since wine is a complex flavor stimulus, it becomes

difficult to isolate the variables which may have influenced the opinions of the participants (See Smith, 2010). Crisinel and Spence note that wine has the potential to test smell as a “More complex and naturalistic stimuli” that we encounter commonly in everyday life, but that “The differences between the stimuli would be smaller, and might only be easily detected by wine specialists,” which reiterates some of the limitations to this experiment (Crisinel & Spence, 2011). Furthermore, since what we hear has the ability to influence the hedonic rating of what we taste, it is difficult to discern if the flavor and sound pairings actually correspond, or if they are subject to the *influence* of each on the other. As an example, in 2012 North tested the effect of background music on the taste of wine and found that “Hearing music that was ‘powerful and heavy’ also increased the ‘powerful and heavy’ rating of the wine that the participants happened to be tasting at the time” (North, 2012). North’s findings demonstrate a limitation to both the participants ratings of the event, as well as to my ability to create an objective soundtrack for each wine. Moreover, I recognize that since my analysis of the wine and music pairings was based upon my own knowledge of wine through WSET training, that this is somewhat of a deficiency in lieu of concrete scientific and empirical evidence.

Vinesthesia was constructed in a broader investigative sense as a way to primarily demonstrate to people that the influence of cross-modal functioning *is* present in our daily experience. That it is something which we can consciously observe for ourselves and test amongst each other through - as in wine and music - tastings such as this, based on guidelines such as those found in the WSET. Vinesthesia serves as a more nuanced and everyday application of cross-modal functioning, that is founded on the deeper empirical research cited throughout this chapter.

The results of the pre-test with the 88% dark chocolate had a slightly different outcome than those expected (where the high pitch beep should elicit a sweet taste and the low pitch beep should elicit a bitter taste). Of the participants, nine experienced the correct pitch and flavor correlation, while four had different experiences. One of the participants, a French man, said that, with the high pitched noise, he found the chocolate to taste no different than with the low pitched beep, while another participant, a British man, found the low pitched beep to evoke more syrupy and rich chocolate flavors. The other two, a French woman and Spanish woman, found the opposite pairing to be true, where high pitch equaled bitter and low pitch equaled sweeter. The greater incongruence of the results of the pitch test, than that of the music and wine pairing, may demonstrate that people are actually better suited to perceive the relationship between smell and sound by being subjected to an experience - one that allows them to interact with the dialogue and story told through song and flavor - instead of an individual sound and flavor pairing.

The results of these experiments also tell us that our relationship to sound, as a function of music, may be more deeply ingrained in our culture than our relationship to sound, as a function of distinct, individual sounds. Donald Ferguson said that “Melodies, which are mere sounds, resemble dispositions,” which illustrates how humans take sound and transform it into melody, to give the sound an emotional substance (Ferguson, 1960). This may account for the greater discrepancy in pitch and flavor pairing, than in the music and wine pairing; where the added emotional layer of hearing songs paired with the wines, allowed the participant to make greater mental connections to the pairings, than simply trying to recognize a one-to-one correspondence of sound to flavor.

To question how we arrive at an emotional understanding of music, Tia DeNora explains that musical meaning is informed by cultural cues, “So that the listener listens ‘in good faith’ and

thus cooperates in fleshing out the sketchiness of the music so that it appears to mean something” (DeNora, 1986). This relates to how the music and wine pairings proved more effective than the pitch and flavor pairing; because the participants - informed by a cultural musical meaning - were able to taste the flavor of the wine and connect it to the different emotional, musical states that the playlists conjured. With the pitch and flavor pairing, there were no cultural cues for the participants to use to connect the meaning of the sound, to the meaning of the flavor; and therefore perhaps more frequently perceived the pairing to be incorrect. It is also interesting to note that participants came from different cultural, though westernized, backgrounds but still, overall, perceived the musical pairings to be correct.

This may allude to a universality of musical meaning, where even when speaking different languages, the quality of sound can carry the same emotional relevance across culture. While nearly all of the participants in this experiment were Westernized - which serves as a limitation to the concept of universal music processing - Samuel Mehr, a fellow of the Harvard Data Science Initiative, and his associates have recently published “The most comprehensive scientific study to date on music as a cultural product, which...examines what features of song tend to be shared across societies” (Gottlieb, 2019). The on going project in which they are examining this is called the Natural History of Sound and has shown research which

Provides evidence for the existence of recurrent, perceptible features of three domains of vocal music across 86 human societies for the striking consistency of form-function percepts across listeners from around the globe - listeners who presumably know little or nothing about the music of indigenous peoples (Mehr et. al., 2018).

Then, in 2019, Mehr et. al. published a new study which stated that “Music is in fact universal: It exists in every society (both with and without words), varies more within than

between societies, regularly supports certain types of behavior, and has acoustic features that are systematically related to the goals and responses of singers and listeners” (Mehr et. al., 2019). While these publications have been met with controversy in the scientific community, Patrick Savage, an ethnomusicologist at Keio University in Japan has noted that “No one has done [this research] in a rigorous scientific way until now,” which emphasizes the efforts of the Natural History of Sound to find a way to categorize universalities in music processing (Woo, 2019). Research such as this opens the discussion on what elements of song could at least be considered a part of a universal musical meaning and serves as important information regarding the way our brain’s process music.

Delving further into the emotional understanding of music, we see musical genres taking on their own subsets of musical meaning where, “Specific genres come to have particular associations at given times or places: some with overtones of nostalgia and loss; others excitement, dance, or rowdy laughter; others again gaiety, solemnity, exuberance, reverence, humor, trance” (Finnegan, 2003). Here, Finnegan’s observations may account for the discrepancy between the two participants’ perception of the playlists; perhaps the two participants that deviated in opinion about the pairings were perceiving different emotional undertones from the genre category that each playlist had. For the discrepancy in the Blanc, 2017 pairing, the strong presence of a soul-singer genre may have evoked a different set of emotional undertones for the participant, than they did for me when I made the playlist, which then influenced their perception of the pairing. This emphasizes both North’s findings and those of Crisinel and Spence, in terms of the influence of music on the individual’s taste perception and the different perceptions of flavor (and sound) based on knowledge of wine (North, 2012; Crisinel & Spence, 2012).

4. CONCLUSION

The experience of creating and hosting *Vinesthesia* was an indelible way to test various anthropological, cultural and psychological aspects of our understanding of music. As B. Piekut said, “Whatever music might be, it clearly relies on many things that are not music, and therefore we should conceive of it as a set of relations among distinct materials and events that have been translated to work together” (Piekut, 2014). As such, the cross-modal relationship between our senses is just one of the ways that we can begin to expand our understanding of the ways that music interacts with our minds, and our surroundings.

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CHAPTER 3 - SOUNDSCAPE OF A RESTAURANT

1. INTRODUCTION

Soundscapes greatly inform the way that we perceive an environment, in essence they are the sonic roadmap to understanding our whereabouts. Specifically, a soundscape is defined as “An environment of sound with an emphasis on the way it is perceived or understood by individuals or society” (Truax, 1999). This definition highlights the interactive nature of sound; sound, in essence, is what cues us in to the experience of our environment and allows us to respond to it. Without sound, we lack the acoustic element of tactile, visual and gustatory experiences and we become disconnected in an indelible way from our perception of the environment surrounding us.

Why then, has the importance of the acoustical structure of the environments we inhabit been such a secondary thought when designing spaces, both public and private? To put this question more bluntly, Michael Frank Southworth said nearly fifty-three years ago in his field report on The Sonic Environment of Cities that, “Design has been visually prejudiced, and the non-visual aspects of the physical environment are among the least considered characteristics” (Southworth, 1969). Further, Southworth goes on to acknowledge that “What people hear is a factor of many other environmental and psychological factors” and that since the “Senses do not operate independently, sound cannot be analyzed as an isolate” (Southworth, 1969). Including these psychological and environmental effects, this relays the strong interdependence that each sense has to one another (See Chapter 2) where, if sound itself cannot be viewed in isolation,

why then, through design, would we view the other senses (such as vision) in isolation from sound?

One of the most important design spaces that we can see sound's relationship to the other senses in, is through the "Dynamic acoustic environment of a restaurant" – where each sense must interact with the other senses to produce an environment that maximizes the comfort and satisfaction of the customer (Frid, 2013). The sensory perception of a restaurant is influenced by many factors, all of which have a relationship to the sounds they produce: is there an open kitchen (which will produce more noise than a closed kitchen), what materials are the walls made of (are they sound absorbing or sound reflective), how bright are the lights (bright lights will make a person talk louder than dim lights), what material are the chairs made of (will they make noise when the customer stands up), what kind of decorations fill the restaurant space (do they produce sound) and what kind of, and how loud is, the music being played. All of these are pertinent questions one should ask when designing a restaurant but instead, visual appeal is usually the primary focus in restaurant design - with only a secondary or tertiary nod to the acoustics. But, how can this be if, as Emma Frid reports in Restaurant soundscapes in Stockholm, that "Taste perception [is influenced] by auditory cues, such as loudness and background music properties," therefore showing how influential the soundscape of a restaurant can be upon the customer's gustatory experience (Frid, 2013). Relating to this, Charles Spence states in his book Gastrophysics that "Restaurants are becoming stages," and since one of the principal design aesthetics of a stage is the mastering of its acoustics, it is fair to say that this should be a principle design focus of the restaurant as well (Spence, 2017).

Because the soundscape of a restaurant usually has music amid the environment's sounds, it is important to analyze the effect of musical sounds on the overall perception of the

soundscape. When I began to study soundscapes as a function of the restaurant, I was inspired by hearing John Cage's recording of "*27 sounds manufactured in a kitchen*," due to its emphasis on the inherent musicality of the preparation of food. Sounds of chopping, whisking and frying had their own sense of musical structure - with tempos and rhythms - that lasted the duration of the task. The natural musicality of the cooking experience intrigued me to investigate its relationship to a restaurant, where such cooking sounds would be amplified depending on if the restaurant's kitchen was open or not. Additionally, there is a natural rhythm of sound in a restaurant: as a lunch or dinner shift proceeds, and the restaurant becomes more occupied, there are more tasks to accomplish by the staff and an increase in customers, which add layers of complexity to the soundscape. Each set of sounds and the music played on top of the sonic environment, formulate a network of sounds that is no longer random, but inextricably dependent on each and every sound. This is exhibited by the sounds produced by the fluctuating occupancy of the restaurant - as occupancy increases, food orders drive an increase in kitchen activity and dually increase noise of production. Occupancy also affects the volume of customer voices - as more enter the restaurant the level of talking increases. An increase in voices additionally affects an increase in the volume of music to compensate and overcome the increase in surrounding noises.

The interaction of sounds that are programmed (musical) and those that are natural to the environment of a soundscape (i.e. those produced by a fluctuating restaurant capacity), is something that John Cage studied throughout his life. Like Igor Stravinski, who found that "Algunos sonidos de la naturaleza, como el murmullo de la brisa entre los árboles, el borboteo de un arroyo o el canto de un pájaro, no evocan la música, sino que son música en sí" (Stravinski, 1947). Cage believed that it was wrong to separate natural and environmental sounds from music by deeming them simply "sounds," but not a part of music. Cage felt that, "Si trabajando en una

composición descubrimos que no se adapta a nuestra vida cotidiana, creo que hay algo que no va bien en nuestra forma de componer. Al contrario, si nuestro modo de componer puede aplicarse a nuestra vida cotidiana, entonces pienso que hay algo útil en el modo en que componemos la música,” which essentially reformulates music to include the daily or ordinary sounds as a part of musical structure (Doná, 2006).

On a neurological basis, Daniel J. Levitin has argued that the brain itself is continually transforming sounds into musical structures: “El compás lo crea el cerebro extrayendo información de las claves de ritmo y volumen, y es el modo en que se agrupan los tonos entre sí a lo largo del tiempo,” thus showing that it would be naive to ignore any sound as separate from their potential musicality (Levitin, 2008). In the soundscape of a restaurant the “daily” sounds that would be seen to lack musicality are those of chopping, whisking, frying but, because of their inherent rhythm (an element of musicality), this is not the case. As Levitin said, “La diferencia entre ‘música’ y una serie de sonidos al azar o desordenada está relacionada con el modo que tienen de combinarse estos atributos fundamentales y las relaciones que establecen entre sí,” which therefore firmly establishes the grounds for articulating the relationship between the environmental and musical sounds of a restaurant; as a function of the restaurant’s own particular musicality (Levitin, 2008).

In addition to accounting for the musicality of programmed and natural sounds, it is important to examine the role of the architecture of a space in the creation of these sounds. As described above, many elements in a restaurant contribute to the type of sounds produced, one of the most important being the materials comprising design features and their potential for sound absorption or reflection of atmospheric sounds. Filipe Lopes conceptualizes the importance of space and musical integration in saying that “Ignoring the sonic expressive elements of a space is

to ignore aspects that are able to bond and combine a space with a musical composition” (Lopes, 2020). Lopes identifies the sonic role of a space through “sonic expressiveness,” which is meant to further the “Necessity to spend time in a space so that you can understand the role of the space in the type of music played” (Lopes, 2020). The role of a space to the type of music being played is an indelible element of restaurant design that is often neglected. Customers’ experience of a restaurant space is directly related to the satisfaction provided by the integration of these elements: the fact that customers spend so much time within a restaurant space while dining demonstrates how it is *particularly* important to acknowledge this relationship in their design. A space’s role in “sonic expressiveness” is further highlighted by what Christine Anderson calls a “sound mark,” which she uses to define the acoustics of the individual room where, “More varied room resonances in principle should yield more varied sound results. In a space with walls and other surfaces made of several materials (wood, glass, concrete, textile materials, etc.), it is relatively easier to exploit a variety of sonic reflections (Anderson, 2005).” In relation to a restaurant, many of these materials are at play to yield extremely varied sound results (as mentioned above). With the addition of the inherent musicality of the cooking experience, as demonstrated by Cage, and the music selection played in a restaurant, one begins to see how incredibly varied the sonic environment in a restaurant is.

Anderson synthesizes the randomness of sound in space by saying that “Noise reflects a tendency not to abstract from reality, and instead to witness it in a more direct way” where, if sound “includes a room’s resonances, then it becomes room-specific, or room dependent signal processing” (Anderson, 2005). Room-specific signal processing demonstrates the incredible opportunity that a careful curation of sound and space can offer a restaurant; where honing in the sounds produced by the design of a space, in addition to the selection of music, will offer a

customer a more intelligible experience of a restaurant. The idea of room-specific signal processing is elaborated through Lopes's definition of "conscious processing," which is defined as "The psychological act of understanding and comprehension driven by the motivation to derive meaning from the sounds we hear," and emphasizes our strong psychological inclination to work to incorporate our environment in an intelligible way (Lopes, 2020).

In essence, both concepts (conscious processing and room-specific signal processing) theorize the potential, and necessity, for the restaurant to harmonize their environmental sounds with those of the music they are playing. As Frid astutely observed, "If management can be understood to use the restaurant environment properly the environment has the potential to become an effective marketing tool" (Frid, 2013). For this reason, with this research I have attempted to conduct my own assessment of the soundscape of a restaurant. With this field work I will observe the relationship between the natural environmental sounds of a restaurant (those produced from the activity of the restaurant and the material and decorative construction of the restaurant) and their correlation to the music chosen. This will investigate the interaction of a sonic environment, through the connection between its inherent musicality, and the music played in the restaurant.

2. DETAILS OF RESTAURANT

The restaurant I conducted my field investigation in was Berbena on Carrer de Minerva, 6, 08006 Barcelona. I chose this restaurant for several acoustical reasons:

Restaurant size:

Berbena is a very small, rectangular restaurant. A rough estimate of the dimensions of its dining room (including open kitchen) is length 15' 2" (4.6 meters) and width 16' 7" (4.9 meters). Because of its size all seven tables in the dining space are very close together with only about 2' (0.60 meters) between each table. The open kitchen stands just a few feet back of where the dining tables are, with a small bar (that you can eat at during the lunch shift) partially dividing the space in two. The small size of the restaurant was important because it would compact the sounds created in the space during the service. The proximity of the tables to each other meant that conversations were very close to each other, which allowed each table to hear what other parties were ordering and to see and hear what was being placed at the table next to you. The density of the restaurant optimized the acoustical experience felt, both as a patron living the experience of dining at Berbena and from an analytical perspective (where the richness and variety of sounds in a closed environment were very useful for field work).

Open Kitchen:

The open kitchen was an important acoustic feature for conducting this research because of the layer of cooking sounds that it would add to the already small dining space. I was not able to explore the kitchen space personally, but what I observed from my dining spot was that in the center of the kitchen was a large stainless steel stove top, the back wall and right side wall also looked to be made of stainless steel, that then transitioned into smooth concrete at the top border leading up to the ceiling. I was unable to discern what material the cutting stations were made of. Additionally, many of the materials used for cooking were metallic and therefore conducted a lot of sound when used. Among others these included steel mixing bowls and whisks, steel forks,

metal chopping knives, metal frying pans. The high volume of sound reflective material coming from an open kitchen would be responsible for amplifying the sonic effect of many of the environmental sounds that were previously defined as having an inherent musicality (chopping, whisking, frying, etc.).

Materials of Restaurant:

Berbena is constructed of several different materials, all of which will have different sound absorption rates which add complexity to the acoustic environment. Sound absorption is guided by a materials' sound absorption coefficient rating. This is represented on a scale of 0 to 1. Soundproof Living provides a concise description of the way that the absorption coefficient works amongst many of the materials I will discuss below. For reference they describe how "A coefficient of 0.70 would mean that a material can absorb 70% of frequencies and reflect the remaining 30%" (Soundproof Living, 2021).

The entrance, and right wall of Berbena are made of several pieces of thick glass held in place with wrought iron framework. As described in Soundproof Living, glass generally has a sound absorption coefficient of 0.03 but this will vary depending on the thickness of the glass: where a "4mm glass can absorb up to 30% of low-frequency sound waves and 2% of high frequency ones" while "Thicker glass reflects between 90 and 98% of frequencies" (Soundproof Living, 2021). The thickness of the glass walls at Berbena proved to be effective at blocking outdoor sound (except for particularly high pitched noises like that of an ambulance siren) and therefore helped to isolate, and contain, the sounds in the restaurant space.

The left wall of the restaurant is made of unpainted brick which is mainly sound reflective, with an estimated absorption between 3 and 5% of all frequencies (Soundproof

Living, 2021). This adds a reverberational element to the acoustic environment of the restaurant. Close to the left wall are several shelves and cabinets which are made of wood, which is not noted as being particularly sound absorbing or reflective but has been shown to be slightly better at reflecting (Soundproof Living, 2021). Wood's ability to absorb and reflect depends upon its thickness (like glass) and the type of wood. Wood is frequently used in music studio construction because of its reflective properties to provide better acoustics for recordings. In Berbena's construction the effect of the wood cabinets adjacent to the brick wall will provide a large amount of sound reflection in the sonic environment.

The floor is made of polished concrete which is also sound reflective, capable of reflecting even more depending on if a "Layer of paint or glaze" has been added to the concrete, which was the case at Berbena (Soundproof Living, 2021). However, because of the small interior of the restaurant, the floor does not appear to cause as much acoustic reverberation as polished concrete is known to. In fact, throughout the two recordings I took of Berbena's soundscape there is an evident muffling of sound during the dinner shift. This is an interesting feature of the sound quality of the recording considering how many of the materials are sound reflective rather than absorbent. Perhaps the small size of the restaurant accounts for this, where the reflective materials muffle, or "cancel" each other out slightly, to produce a softer overall sound.

The ceiling is made of slatted wood and iron, which are both sound reflective. The small bar which divides the kitchen space from the dining space is made of marble which is "Among the most reflective materials because of its density and strength" (Soundproof Living, 2021).

Plates/Silverware/Glasses:

The plates are made of either porcelain, wood, or pottery. Wood has been identified as sound reflective, clay is sound reflective, and porcelain is also sound reflective. The silverware was made of a heavy stainless steel and the knives were made with wooden handles, both with varying degrees of sound reflection. The glasses were made of glass and therefore sound absorbent and reflective, due to their minimal thickness, though they probably reflected sound more than they absorbed it. The sound reflective nature of all of the dining ware definitely stood out in the recordings when people were finishing with a plate and scraping the last bit of food off of it, it created a very sharp acoustical spike in the soundscape.

Lighting:

The lighting in Berbena is relatively dim and warm with brighter lighting in the back than in the dining area. The lighting is important for the acoustic environment because it causes people to talk in lower, hushed tones in dim lighting and louder tones when in bright lighting (Spence, 2017).

Music Selection:

Having eaten at Berbena several times over the past year, I had a relative understanding of the type of music I could expect to hear there. The staff frequently chooses to play songs from the 1950s-1970s, featuring a variety of genres from soul, jazz, funk, rock, country, folk, and salsa. They hardly ever play anything modern and never anything that is too intrusive on the dining environment. The speakers are set to a low volume that is audible just above the voices of

the customers, and are located in the right corner of the restaurant, behind the small bar, just before the kitchen. The less intrusive elements of both the type of music played and the volume that the speakers are set at, is an interesting choice for a restaurant that is so small and contains so many different types of sonically reflective materials. One of the interesting aspects to the volume of the music itself, is that, like the lighting, the volume appears to moderate the volume of the customers' voices in the recordings. In the dB analysis section of the paper I will discuss further the effects that the music choice and volume level had on the restaurant soundscape.

3. METHODS

To conduct the field investigation of Berbena's soundscape I visited the restaurant for one dinner shift (January 21, 2020) and one lunch shift (January 24, 2020). The purpose of visiting two different service shifts was to observe the changes between the sounds made in the restaurant during the daytime versus nighttime. I recorded each visit for the length of time that I was eating at the restaurant (audio files are attached separately and labeled by date of recording in Appendix B). The dinner shift was recorded at a little under an hour (57.02 minutes total). The recording for the dinner shift was accidentally broken into two separate recordings due to a lapse in my phone's recording system. Only a few seconds were lost of the recording as I saw the lapse in the recording very close to when it happened. For the lunch shift I got one complete recording (1h 0min 18s) from the time that I ordered, to the time that I finished eating.

The types of sounds that I was interested in observing were based on the Swedish Soundscape Quality Protocol, where Axelsson et al. 2010 investigated soundscapes on the standard of "Sounds categorized as 'human,' 'natural,' and 'technological,'" (Axelsson, 2010). I

will break down in each recording analysis (below in the dB analysis section) how the sounds heard in the restaurant fit into each of the three categories listed. The evaluation of the dB analysis of the acoustics of the restaurant was based on the work of Novak et al. 2010, who observed that “Music plus ambient noise in a range of 62-67 db increased the dining pleasure and the overall consumer satisfaction” of customers (Novak et al. 2010). Additionally, results are based on the work of Rohrmann who found, “Customers accepted rather loud sound levels in the restaurants (equivalent loudness levels up to 85 dB and peaks above 100 dB where, despite the loudness, such landscapes were found to be liked or at least tolerated by the restaurant visitors” (Rohrmann, 2003). In my dB analysis I use these parameters to observe the dB reading of the restaurant at key moments in the service when the acoustics significantly fluctuated. I recorded each dB analysis with the app Decibel X: dB Noise Meter, SLM, which processed the averages, exact dB reading at time of analysis, and maximum of each peak sonic moment. Each restaurant shift was recorded on iPhone X using the voice notes which uses Advanced Audio Coding (AAC) codec to record and compress files. I begin each dB reading with a 2 minute averaging of the beginning of the service from when I sat down, and then take three other readings from the peak moments in each service.

Weather conditions of the days recorded:

The weather conditions of a soundscape analysis are very important for a restaurant where, depending on the weather, the amount of people, and the types of noises overheard, may change significantly.

For the dinner shift on January 21, the weather had been very rainy: in the middle of the shift it began to pour outside, but because of the glass front wall, the rain was not heard from

inside the restaurant. Perhaps presumptuous, but I believe that the density of sound inside the restaurant that night was in part due to the fact that it had been raining so heavily. Rain, which naturally draws people to shelter, may have a psychological effect on the customer to make them huddle together at their table and speak more ardently. Additionally, from an atmospheric perspective, the humidity added to the air from the rain makes sound travel faster (sound passes through hot air faster than it passes through cold air), which may play a part in the increased acoustics of the restaurant that night (See Hamer, 2019).

For the lunch shift on January 24, the weather was sunny and clear out. Just as warm, humid air may have had an effect on the muffled “density” of the acoustics on January 21, the cool, dry air of the lunch shift may have played a part in allowing certain sounds to stick out more than others. Since sound “Moves faster in warm air than colder air, the [sound] wave bends away from the warm air and back toward the ground,” which, “Is why sound is able to travel farther in chilly weather” (Hamer, 2019). This could account for certain sounds sticking out much more acutely in the lunch shift than in the dinner shift recording.

Weather conditions can also influence the capacity of the restaurant. If the weather is bad, people may choose to cancel a reservation and stay at home, and when the weather is good, people may feel that they would rather be outside than in a restaurant, or they may take pleasure in enjoying a nice meal in celebration of the good weather. However, both shifts that I went to at Berbena were at full capacity by the time I was finishing my meal, which means that, in lieu of good or bad weather, the acoustics were not going to be influenced by a lack of customers.

4. dB ANALYSIS

Dinner Shift: 2 Recordings (46.40 minutes + 10.22 minutes = 57.02 minutes total)

dB STATS (Across) Observed Times (Down)	Average	At the mark	Max
2:00	77.6	76.8	91.0
23:00	83.1	81.0	95.0
38:00	82.4	76.7	89.1
50:00	74.4	75.6	92.3

The maximum of each reading is very high, even higher than Rohrmann predicted would be a sonically accommodating atmosphere for the clientele. Interestingly, during the service, though the overall volume of the restaurant was high, it did not inhibit the dining experience to the degree that a dB reading in the mid 90s could be perceived as doing. The average of dB analysis was highest at 23:00 and 38:00, these times were specifically chosen because they were peak times for the service, when volume of sound shifted and increased. Influencing factors contributing to the shift in sound included an increase in customers which generated an increase in many sounds: water pouring, chairs shifting, voices of people greeting each other, orders being taken, plates being set down, are just a few of the many sounds that occurred during these moments in the service.

The muffled effect of the acoustic environment during this service may contribute to the dB maximum's not being perceived as quite so loud as the readings may suggest. This muffling, potentially caused by the humidity in the air and general compactness of the restaurant (sound reflective and absorbent materials taken into consideration), may have deflected the perception

of the high volume of individual sounds by synthesizing all the sounds together, and dampening the perception of high dB.

Sounds Observed at Dinner Shift:

Human	Natural	Technological
Voices in conversation, coughing, laughing, musical vocals (transported through technological sound - speaker), water sipping	Silverware being picked up, bread being cut, glasses hitting wood, water being poured, chink of plates, fabric shifting, cabinet opening, cabinet being hit by knee (natural and human contact), sweeping of bread crumbs, chopping of food items in kitchen, knife scraping against wood block, utensils scraping food from plate, chair legs sliding, wine being poured in glass, wine bottle being opened, instrumentals of music (jazz and soul), plates being collected and put on table, plates being taken from table, silverware shifting in containers, boxes being set down on ground	Iphone ringing, beeper (timer in kitchen), the music coming through the ipad speaker system

Music Observed:

Range of music was played and not all was easily identifiable. The two albums I heard songs played from throughout the hour I was recording (20.30 - 21.30h) were:

- *Silk & Soul* by Nina Simone
- *Chet Baker Sings* by Chet Baker

Aesthetically speaking, the use of jazz/soul and jazz/vocal songs was a nice accompaniment to the rain outside that night. As mentioned before, the volume of music in the restaurant is kept low, which allows the music to mingle with the other atmospheric sounds. Even as the restaurant capacity and atmospheric sounds increased throughout the shift, subtle notes of piano, trumpet, or soft, melodic vocals would stand out in the midsts of the soundscape. The sonic highlight of musical sounds within the soundscape is accounted for by Southworth, who wrote that “It is expected that people will attend more carefully to novel sounds than to those which are redundant” (Southworth, 1969). This makes the musical selection in a restaurant even more important, if the redundant sounds become those of the dining experience, and where the novel ones are primarily moderated by the perception of musical notes within the soundscape.

Lunch Shift: 1 Recording (1h 0m 18s)

dB STATS (Across) Observed Times (Down)	Average	At the mark	Max
2:00	76.2	66.1	88.1
12:00	78.2	74.9	89.7
30:00	71.3	74.8	83.3
50:28	72.3	73.3	81.0
51:14	78.9	87.4	90.3

The maximum of each dB reading falls between 81.0 - 90.3 dB, which is a significant range for an hour’s worth of recording. Interestingly, the analysis shows that the environment was the loudest toward the beginning of the hour (12:00) and at the end of the hour (51:14), even

though the capacity of the restaurant increased between these two times (most notably at 30:00, as listed in the chart above). I chose to take a dB reading of 12:00 because, though there were not many people in the restaurant at the time, there was a significant increase in volume, which was important to note though it increased the observed times by 1 in comparison to that of the dinner shift. Unlike during the dinner shift, at 12:00 in the lunch shift recording, many types of sounds stuck out from the acoustic environment. These included a range of atmospheric sounds, such as distinct kitchen sounds (particularly the water from the faucet running and the sound of liquids being whisked), conversations from people in the restaurant, and the soundtrack that was playing at the time (*At Folsom Prison* by Johnny Cash).

While the overall dB levels of the lunch shift were lower than that of the dinner shift, I would argue that it was in fact, most notably, the change in weather that contributed to the change in sound. Being a cool, dry, day, sound traveled through air slower than through the humid air of the dinner shift on January 21. This allowed for certain sounds, such as the ones listed above, to become more prominent, rather than muffled, as in the dinner shift.

At 51:14 the dB reading was the highest. In addition to the sonic-atmospheric relationship mentioned above, this peak in dB was significant because it was at this point in the service that the soundtrack changed from the live recording of *At Folsom Prison* by Johnny Cash to the studio recording of *Superfly (O.S.T.)* by Curtis Mayfield. Unlike the dinner shift, where a range of music was played, during the time that I was at Berbena for the lunch shift only these two albums played in their entirety. I speculate that at the point when the music stopped and changed (51:14) that this had a psychological effect on the volume of voices in the restaurant rising. This is validated by what is known as the Lombard effect, which is an involuntary rise in vocal effort as an attempt to compensate for background music volume (or, in this case, the momentary

absence of background music volume). Due to the sudden lack of music, before the new album was put on, the drop in background sound caused the customers to raise their voices in order to maintain the dB level from before the music stopped. As a result, the customers overcompensated for the change in volume without music and raised their voices even higher than before the music had stopped.

Sounds Observed at Lunch Shift:

Human	Natural	Technological
Voices in conversation, bread crunching in teeth, coughs, laughter, clapping, melodic vocals of album, shifting sound of people sitting down at table and moving in their chairs, people's feet walking up and down the stairs	Oil sizzling, water steaming, food in pan, silverware hitting plates/scraping against plates, front door slamming, bread being sliced, water being poured in glasses, instrumentals of music (rock and roll), plates put on table, knife cutting food, spoon hitting side of bowl to whisk, cabinets opening and shutting, wine bottles sliding off of shelves, chairs scraping floor, water pouring from the faucet, water bottle being opened, water bottle being set on the table, shifting of fabric, porcelain plates rattling, boxes shifting, napkins crinkling, bread crumbs being swept off table	Meat slicer, beeper (timer in kitchen), speakers projecting music from ipad

Music Observed:

Only two albums were played during the time I recorded the lunch shift (14h-15h).

- *At Folsom Prison (Live)* by Johnny Cash
- *Superfly (O.S.T.)* by Curtis Mayfield

The use of only two albums created a consistency - same voice, same genre and accompanying instruments - in the musical portion of the soundscape. Additionally, the transition between a live album and a studio album added another layer to the soundscape. On the live recording of *At Folsom Prison* you can hear many background sounds: cheers from the audience, small introductory speeches, and transitions between songs (setting up instruments, closing remarks) that you do not hear on a studio album. There is a certain sort of “opacity” to playing a live album versus playing a studio album in a restaurant. The layering of the live, environmental sounds (those of the restaurant), with those of the recorded environmental sounds - in addition to the music played on the album - creates a doubling of the environmental soundscape; where two versions of environment (recorded and live) overlap while the music plays. This makes the experience of hearing an album in a restaurant less intrusive, as it incorporates itself into the environment at large. For this reason I find the increase in the dB reading at 51:14 to be not just a function of transition between albums, but a transition between live and studio albums. Here, the less intrusive live album transitions into the more intrusive studio album (where atmospheric sounds are lacking), which could potentially account for the additional increase in volume of voices in the restaurant at this time.

5. RESULTS AND CONCLUSION

When analyzing the soundscape of a restaurant, it is important to remember that the soundscape exists “In a particular social and physical (emotional) context,” which places the

customer in a close relationship with their sonic environment, through how it affects them (Frid, 2013). Man's natural born musicality (see Levitin, 2008) combined with the music played in a restaurant, creates a soundscape that doubles as a space for social and physical (emotional) interpretation. In *Música y la mente* Anthony Storr states that music encourages an emotional response from the individual, and then connects this to the natural world of sound by saying:

El consenso es generalizado al afirmar que está relacionada solo de forma remota con los sonidos y los ritmos del mundo de la naturaleza. La ausencia de la relación con el exterior convierte a la música en algo único entre las artes. Sin embargo, ya que la música tiene una estrecha relación con los sentimientos, no puede considerarse como un simple sistema incorpóreo de relaciones entre sonidos (Storr, 2007).

Storr therefore acknowledges that sound, like music, must elicit an emotional response to it. It is for this reason that I argue, if there is a clear link between music, sound, and our mind's emotional response to them, then it would stand to reason that there would be a wholly similar relationship between them in a restaurant setting.

The psychological effect that music has on the individual, where “Parece indiscutible es la existencia de una relación más estrecha entre la escucha y el estímulo emocional que la existente entre la percepción y ese mismo estímulo,” has already been used by the film industry to evoke the desired emotional response to a scene (Storr, 2007). An example of this is when you are watching a scary movie and the scary music played triggers the emotional response of the viewer to the scene - a scene which, without the suspense created by the music, would not be as terrifying. This, and the aforementioned concept that restaurants are becoming like stages, proves that it would behoove the restaurant industry to pay attention to their music selection, as the film industry has, as well as the acoustic structure of their restaurant. Putting this into film terms, the

acoustic environment of a restaurant would become like the “soundtrack” to the dining experience.

Incorporating sound into man’s emotional response to music, Cage said that the point of natural sounds, in relation to music, is that we “Capturar y controlar estos sonidos, y usarlos no como efectos sonoros sino como instrumentos musicales” (Cage, 1999). In terms of how this applies to the soundscape of a restaurant, Cage is saying that sound itself is like a musical instrument - which furthers the notion that there could be a conceived of orchestration to the sounds of a restaurant or rather, a “control,” through careful curation of design, placed on the sonic environment. Thus, with this orchestration, sound becomes a function of music, and therefore may be perceived as having a close connection to the emotional response of the individual.

Cage’s idea of orchestrating sounds became popular during the come-up of DJ culture. Paul D. Miller has said that the DJ creates “Una estructura analógica de sonidos basando en el collage” and that “El arte de pinchar reside en algún punto intermedio entre esos polos del azar,” which demonstrates how the DJ harmonizes the randomness of natural, environmental sounds - as Cage intended - within a structure of musical beats (Miller, 2007). This is significant because, if there is a genre of music which can layer natural sounds with musical sounds, then why couldn’t a restaurant do the same?

In 1990 Michael Chion said that there is “A new sound reality” which has brought with it a new “Standard form of listening...that is no longer perceived as a reproduction...but as a more direct and immediate contact with the event” (Chion, 1990). There is no greater representation of this than in the restaurant setting where recorded sounds and music are heard together. In relation to recordings, Damon Krukowski has said that, “Grabar es una forma de exterioridad, no es que

preserve un acontecimiento sonoro preexistente, sino que lo crea y lo ordena para que exista la posibilidad de su preservación,” which shows how music played in a restaurant does not preserve what was recorded on an album, as much as it takes on a new musical form, by contributing to the overall “live” soundscape of the restaurant (Krukowski, 2017). This was earlier exemplified through the transition between the albums *At Folsom Prison* by Johnny Cash and *Superfly (O.S.T.)* by Curtis Mayfield, where both albums were actively incorporated into the soundscape of the restaurant, and who’s transitions were partially responsible for changing the volume of the restaurant’s soundscape overall. Therefore, through continuing research such as this, and making aware more restaurants of the effect that the acoustic environment has on the satisfaction of their customers, there will hopefully be an occurrence of not just a new “standard form of listening,” but a new standard form of restaurant.

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CHAPTER 4 - RESTAURANT ATMOSPHERE AND EFFECTS OF COVID-19 ON ATMOSPHERE

1. INTRODUCTION

Today, the gastronomic innovation in restaurants such as Celler de Can Roca and Vespertine in LA is challenging the conventions of culinary art, the highest expressions of which rely upon collaboration between a multitude of artistic and scientific fields. During the seventeenth century the expression “culinary art” was first used to describe “Creation forms that still depended on the classical artistic categories;” for the purposes of this research, most significantly, these include theater and music as categories which expound upon food’s ability to convey an artistic message (Hartung, 2002). Theater and music are highlighted as artistic, culinary collaborators for their success at creating the atmosphere of a dining experience; where the thoughtful curation of atmospheric elements such as “Brightness, size, shape, volume, pitch, scent, freshness, softness, smoothness, and temperature” can elevate a meal to an expression of cinema (Milliman, 1986). Recalling from Chapter 3 that the restaurant is becoming more and more like a stage (See Spence, 2017) and that the music played in a restaurant has the potential to become like the restaurant’s “soundtrack,” a discussion of a restaurant’s atmosphere would not be complete without examining its connection to a cinematic experience.

2. A DISCUSSION OF HOW A RESTAURANT DESIGNS ATMOSPHERE

Originally, the intent of this research was to simply explicate the cinematic quality of the restaurant atmosphere, where elements such as music, lighting, decor and the number of patrons create a live, cinematic dining experience. Now, in the wake of covid-19, where the very elements that establish a restaurant's atmosphere (its unique "cinema") have been removed - and replaced, again and again - from the restaurant, the discussion of atmosphere shifts to occupy two realms: that which creates atmosphere, and in what way a restaurant's atmosphere can be preserved, or reimagined, under the regulations set for restaurants by covid-19.

To understand the atmosphere of a restaurant it must first be questioned why people go out to eat in the first place: is it for consumption, or is it for the *experience* of dining, and by proxy, the atmosphere? If it is the former, then eating out would have nothing to do with the company at your table, the music played within, or the mood that is set by lighting and decor; it would simply be a justification for consuming better cooking than you yourself could make. However, as far back as the 1910's there has been an argument for including atmosphere as a part of an improved quality of the dining experience. In 1910 the dining experience was described as being "A hurried, unappetizing and generally unpleasant experience," so much so, that the National Restaurant Association made it their personal mission to imbue restaurants with a sense of home-like intimacy and comfort (Barbas, 2002). Then, in 2015, the National Restaurant Association published even more eye-opening statistics about the effect that music has on the restaurant experience; be it a restaurant "Seeking to increase table turnover, retain patrons by fostering a soothing ambiance or liven a festive gathering, music plays a crucial role" (National Restaurant Association, 2015). This signifies that, regardless of if the restaurant aims to create an

atmospheric experience, the interplay between whatever atmosphere the restaurant space exudes, and the way that we respond to it, will always be at play.

The National Restaurant Association cites several studies on the way that music specifically works in a restaurant space. They quote an article published by CNN that showed that “People chewed food nearly a third faster when listening to high-volume, fast-tempo music, potentially increasing table turnover,” and a Scottish study published in the Association for Consumer Research that states that “Diners increased their expenditures by 23 percent when slow-tempo music was played” and that “Most of the additional spending went toward the drink bill, which grew 51 percent” (National Restaurant Association, 2015). Further, a study published in the Journal of the Academy of Marketing Science states that “Loud music drives customers to choose unhealthy options like burgers and fries because the volume raises heartbeat and stimulation” (Vandette, 2018). These results constitute proof that music (as a function of atmosphere) can have a significant impact on *any* restaurant experience. Even if it is fast food, which in a more practical sense serves to simply feed a person before they return to work, the music that plays in the restaurant space has the power to influence how quickly a person eats, what kind of food they eat, and their likelihood to spend more time and money in a space. Despite that not all restaurant experiences are created with atmosphere in mind, the fact that restaurants are inherently consumer driven - to remain financially viable - means that it would behoove them to pay attention to studies such as the ones cited here by the National Restaurant Association.

Some fast food restaurants, which we do not typically regard as atmosphere driven, have already responded to this research. One example is Chipotle who hired Christopher Golub to program “The songs for all of Chipotle’s more than 1,400 restaurants” (Utterback, 2013). Golub

is deeply engaged with what he calls the “texture of sound,” where he says that when you go into a restaurant, “You’ve got concrete floors, a lot of windows, hard walls and a lot of cooking gear and tile. So that doesn’t work with certain songs” (Utterback, 2013). As an example, Golub states that “The high, tenuous yowl of Radiohead frontman Thom Yorke wreaks havoc with the steel and concrete of a Chipotle buildout” - a line of thought which exemplifies much of the discussion in Chapter 3, about the way that the construction of a restaurant space works with the music. A restaurant such as Chipotle’s attention to the subtle nuance of the “texture of sound” substantiates the real influence that atmosphere (shown here through music) can have on the dining experience, regardless of the degree to which the experience is *meant* to be atmospheric (i.e. the quick consumption of food is not, at the forefront, about the atmosphere of experience, but has been shown through the aforementioned studies to be influenced and financially driven by such).

Attesting to the nuance surrounding the discussion of atmosphere, A. Mehrabian asserts that “People respond with different sets of emotions to different environments, and that these, in turn, prompt them to approach or avoid the environment,” thus signifying that from an emotional and psychological standpoint the atmosphere of a restaurant environment can be extremely influential on the perception of the dining experience (Mehrabian, 1976). Adding to this, Ronald E. Milliman highlights the quality of atmosphere alone as “An all-encompassing term used to describe the experience ‘felt’ but not always seen,” which begs the question, what is it, exactly, that shapes atmosphere and manifests the quality of feeling what is not seen (Milliman, 1986)?

The quality of this atmosphere depends on the type of restaurant; high end, experiential restaurants, versus smaller, intimate restaurants, both of which have their own sense of atmosphere. High end restaurants tend towards a multisensory gastronomic experience, where

the senses are at the forefront of the atmosphere and the cinema of the dining experience created (such as Vespertine and Celler de Can Roca). Smaller, intimate restaurants rely on the multisensory elements of the dining experience as background influences. Smaller restaurants are even more dependent on the discrete experience that is not always seen (i.e. atmosphere), because the pleasure of the dining experience is created through the energy of the restaurant itself and the people occupying it. High end restaurants, with more financial means, can further control certain atmospheric features - making their presence more palpably felt than smaller, intimate restaurants have the means to do.

Moving into the specifics of atmospheric factors, music has been found to significantly influence the atmosphere of a restaurant. However, very little research has been conducted to specifically target how a restaurant can utilize music to accordingly influence the atmosphere of their restaurant. As such, several examples of careful music curation in restaurants around the world will demonstrate that this is in fact fundamental in establishing the atmosphere, and cinema of a restaurant.

In terms of cinema, we can think of music as the soundtrack to the restaurant, where the theme and mood set by lighting and decor are carried out by the music that is played. The necessity of these atmospheric elements to coordinate in a restaurant is attested to by Blesser and Salter who state that

Although we expect the visual and aural experience of a space to be mutually supportive, this is not always the case. Consider dining at an expensive restaurant whose decorations evoke a sense of relaxed and pampered elegance, but whose reverberating clatter produces stress, anxiety, isolation, and psychological tension, undermining the possibility of easy social exchange. The visual and aural attributes produce a conflicting response (Blesser & Salter, 2007).

This demonstrates how, when these elements of visual and aural design do not coalesce, that the mind and body can, at times, physically reject the atmospheric experience. In turn, this expresses how crucial it is for a restaurant to create an environment that is equally as visually appealing as it is sonically.

Further, Gerardo Gonzalez of Lalito in New York City “Contends that music is the first and strongest sensory indicator of what a restaurant is about” (Ratliff, 2018). This statement is perhaps best represented by Ryuichi Sakamoto’s musical curation of Kajitsu in New York City. Sakamoto’s renowned career as a musician and composer provided a wealth of musical knowledge when curating the music played in Kajitsu. As Ben Ratliff notes in his article on the subject, Sakamoto’s music “Represented a devoted customer’s deep knowledge, sensitivity and idiosyncrasies” where he is described as “Exemplary perhaps not only for his music but also for his listening, and his understanding of how music can be used and shared” (Ratliff, 2018).

Listening is a significantly highlighted point, as it qualifies the choice of music played in a restaurant as interactive with the atmosphere. This, then, highlights that the choice of music played cannot simply be chosen based purely upon musical preferences, but instead, must be selected from an integrative standpoint; where atmosphere, as a function of a restaurant’s “feel,” is the driving force of the selection. Previously, in Chapter 3, listening was explained through the concepts of “empathy” and “conscious listening,” which both emphasize environments that attend to the listener in a way that engages them in the sonic experience. In relation to the above, and the importance of a restaurant’s “feel” as it relates to music selection, Leonard B. Meyer describes in *Emotions and Meaning in Music* that

Until recently, one role of music has been to fill existing spaces, designed or otherwise, both to inspire and in the case of ‘music as environment’ (what used to be called ‘background music’) to

manipulate those not listening to it. I have suggested here that soundscape composition, as both a musical and communicational form treating ‘environment as music,’ can use sound to create acoustic spaces and thus draw attention to our ongoing relationships to the everyday world (Meyer, 1956).

Which shows that a continual and thoughtful fixation on music can actually shape the environment, and thus create an atmosphere unique to a space.

George H. Mead brings up an interesting point in terms of listening, through what he calls “Taking the attitude of the other” (Mead, 1934). Here, Mead refers to the way that a composer attends to his audience; in a restaurant this could be used in reference to the customer’s experience - similar to taking a reading of the restaurant’s atmosphere or “feel.” With this concept, Mead explains that the composer is capable of communicating better with the audience because they themselves are a listener that “Is able to control [their] inspiration with reference to the listener. For instance, the composer knows how the listener will respond to a deceptive cadence and controls the later stages of the composition with reference to that supposed response” (Mead, 1934). The relationship of the composer to the audience is, in fact, demonstrated through Sakamoto’s playlists for Kajitsu: Sakamoto, coming from a compositional background, is highly attuned to this “attitude of the other,” here demonstrated by the atmosphere that the restaurant exudes, and is therefore able to successfully create a playlist that emulated the feeling of Kajitsu best.

Returning to the concept of the music being a selective soundtrack for a restaurant, the case for atmosphere as a function of such becomes clearer; as an orientation towards what the restaurant wants a person to feel, to experience, from entering their space. Sakamoto’s wife, Norika Sora, elucidates the significance of music’s interaction with an overarching atmosphere, in saying that at Kajitsu, “The color of the wall, the texture of the furniture, the setting of the

room, wasn't good for enjoying music with darker tones, to end your night... it depends not just on the food or the hour of the day, but the atmosphere, the color, the decoration" (Ratliff, 2018).

As far back as the beginning of the 1900s, during the Marrinetismo movement, music's influence on the dining experience was described as such

La música es creadora de una atmósfera. En las comidas futuristas se hacía uso de ella en los intervalos entre plato y plato, como se señala en el manifiesto y, entre estos intervalos, la música propicia esa atmósfera en la cual el oído interioriza el sonido de forma singular y, una vez terminado el intervalo, el siguiente platillo es degustado de manera renovada o virginal (Diez, 2013).

Most importantly, this identifies music among the atmospheric influences on the dining experience as the primary creator of atmosphere. Following this line of thought, atmosphere becomes a function of music: music itself becomes the 'feel' previously established as the main quality of atmosphere. Continuing in this vein, atmospheric features such as decor, lighting, even the patrons, will then become a function of the way that they contribute to the music. Further, this will make listening an even more significant feature of atmosphere, for both establishing and participating in a restaurant's atmosphere. Listening, now works in a reciprocal way: the choice in music must be done by a careful attention to how these aforementioned atmospheric elements interplay with the songs chosen, at the same time that listening becomes an engagement of the patrons themselves to incorporate their experience of the restaurant *with* the music. Thus, listening acts as the glue which binds musical choice with the atmosphere - that is both established, through musical choice, and engaged with, through listening.

Jordan Kahn's description of his restaurant Vespertine in LA, elevates the concept of music as the atmospheric creator in saying that "The music might be the most important part of the whole experience...The sound and the space [are] the transportive mechanism" (Bull, 2017).

Identifying sound and space as a function of music further highlights the importance of listening. As music chosen will interact with ambient, environmental sounds created from the restaurant itself, listening is shown, again, to be driving musical selection to both suit and influence the atmosphere of the restaurant.

The purpose of Vespertine is to create a restaurant that puts the diner in an experience that is unlike any they have had before. The food is supposed to have no reference points to convention and the building itself is unconventional in its architecture, where there are no traditional walls supporting the building itself. Their website describes a dinner at Vespertine as an “Experience in four acts,” thus uniting the importance of music with the idea of a play, or film. Furthering this concept, the dinner itself is set to an original “score” that was created by the band This Will Destroy You.

When a guest enters the restaurant, they will first hear a composition that is supposed to support the visual experience of seeing a 26-foot-long “Hanging art piece ominously named ‘The Table’ across from the entrance to an elevator that has only one button to push;” this musical piece acts as the introduction, or something similar to the opening credits of a movie (Bull, 2017). Once they have left the elevator they will hear another track and be greeted by Kahn himself. Here the music is acting as the first scene, the guest has been introduced to the star of the “film,” the chef and owner of the restaurant. Then, they will hear another track from the roof, taking in the skyline view and taking their first bite of some snacks. This composition acts as the third act, the drama has been set by the second song and the introduction to Kahn, but has yet to be resolved in the fourth act. Finally, the guest will be taken to the dining room where they will eat their meal and hear the last track, the fourth act of the dining experience and ultimate discovery and resolution about the experience. The score establishes the atmosphere through

music that “Has a euphoric, synthed anticipation to it, the sort of thing you might hear during the part of a sci-fi movie where a ragtag group of explorers opens up the hatch of their spaceship and looks out upon undiscovered land” (Bull, 2017).

Vespertine is an example of a high end restaurant operating their dining experience on a multisensory expression of live cinema. Kahn, however, is not the first chef to make a case for the restaurant as an entertainment model; Massimo Bottura, the world famous chef of Osteria Francescana, believes that a meal should flow like an opera - further connecting the concepts of cinema and music together with the dining experience. Additionally, in an even simpler, direct sense, Jon Nodler, chef and co-owner of Cadence in Philadelphia, believes that “Eating at a restaurant *is* your entertainment” for the night (Stephens, 2020).

Nodler’s notion of the restaurant as entertainment questions whether it is the restaurant’s job to provide entertainment in an active sense, as is the case with Vespertine, where atmosphere is choreographed like a theatrical production or, if it is the restaurant’s job to simply provide entertainment as a byproduct of careful attention to the creation of atmosphere - where atmosphere is presently felt but not choreographed. Assuming the first stance, investigating the role of active entertainment, this theatrical dining, and what defines theatricality, becomes necessary to examine. Aside from the example of Vespertine, which takes to heart the idea of restaurant cinema, many high end restaurants use nostalgia, or the triggering of memory, as the theatrical feature in their meal. One of the best examples of this can be found at The Fat Duck in London. Here, sound is used to elicit memory and unite the sensory experience in one of their most famous dishes *The Sound of The Sea*; described as “A sculptural plate of seafood, seaweed and panko “sand” that comes with an iPod tucked into a conch shell” (Johanson, 2015). The experience of being at sea is triggered by the music played in the shell, to unite all sensory

elements: taste is harmonized with sound and sight, to fully encompass the feeling of the sea. The theatrical nature of the meal comes from the moment of consumption, when all senses, through memory, harmonize.

One of Blumenthal's more recent meals is most notable for its introduction of "A single narrative thread that binds the entire meal," where the narration, which is based upon a fairy-tale holiday, is "Designed to trigger nostalgia" (Lutrario, 2017). The introduction of a collective nostalgia to the meal's message, where each guest will find relevance in the narrative told, questions whether nostalgia can be a narrative force - can our shared memories be a form of theater? If we assume that memory is the purpose of the dining event, then the dinner becomes a way to recall our past memories, at the same time that it must create the memory of the dining experience itself, for the guest. Adding to this, Charles Spence, who runs the crossmodal research lab at Oxford University and was Heston Blumenthal's collaborator on *The Sound of The Sea*, says in his TEDx Talk on The Perfect Meal, that much of what we remember of a meal is, in fact, "Based on surrounding factors, the moment, and the nostalgia of the experience" (Spence, 2015, TEDx Talks). He uses the example of drinking a lovely wine at a vineyard that you then buy a bottle of to have back home, but when you open it, it does not taste the same. The reason being that "It's the illusion about flavor, the fact that we think we're tasting the wine in the glass but our brain cares about the 'everything else.' The sound of the seagulls, the smell of the salty sea air, the warmth of the sun on our backs, all of that plays a part into the experience" (Spence, 2015, TEDx Talks). If this is the case, then the atmosphere's second biggest component is how it generates memory, and the nostalgia of that memory. Keeping in mind the influence of music on atmosphere, assessing the effectiveness of the connection between memory and music becomes paramount.

The bounds of theatricality, music and memory are pushed even further with the example of Celler de Can Roca's *El Somni* ("The Dream" in English). Described as "An experiment, a dialogue between gastronomy and opera... [where] the objective is to bring twelve diners to the climax of emotions, surprise and also fear, using diverse and complementary media," with *El Somni*, the Roca brothers attempt to expose the atmospheric elements of theatricality, music and memory for what they have never been before seen as (Yemsi-Pasillisse et. al., 2018; See trailer and images in Appendix C and D). Like Blumenthal's meal based upon a fairy-tale holiday, *El Somni* sets its meal to a narrative - twelve small dishes to twelve acts (the same number of acts in an opera). This story is different from the linear story approach of Blumenthal: the Roca brothers use media, video art, philharmonic music and singing, culinary arts (design, sommeliers, cuisine) to converge on "An initial or expository moment" where the main character, Astrid, first falls to sleep and then the plot unfolds through several adventures and obstacles (Yemsi-Pasillisse et. al., 2018).

In regards to memory, what is significant about *El Somni* is the non referential nature of the experience it creates. Unlike Blumenthal's meal, *El Somni* does not attempt to align its guests with a shared nostalgic memory, but instead, attempts to generate a completely *new* memory for its twelve diners to share in. This expands the quality of memory that can be experienced by the meal: collective memory, recalled to unite with a new meal experience, as with Blumenthal, or memory made, and therefore, contained within the meal itself, as with *El Somni*. Thus, when the diners recall attending *El Somni* later, the experience of the meal becomes its only reference point. As Joan Roca said himself, the idea of *El Somni* was to decontextualize, so as to "Experience cuisine beyond the restaurant," signifying that *El Somni* is both a unique dining experience as much as it is a unique experience in and of itself (Yemsi-Pasillisse et. al., 2018). In

relation to music, the use of philharmonic music and singing seals the memory of the event within the unique music played. Similar to when you hear a favorite song and it can take you back to any multitude of special memories created while it was being played, the unique music created for this dinner, will now only be able to evoke the memory of the dinner when heard. In relation to atmosphere, the connection between memory and music demonstrates that a restaurant's music choice has the potential to create a memory for the guest that, upon hearing the song outside of the restaurant, will take them back to the memory of that night and the atmosphere created.

Another interesting part of *El Somni* is the treatment of social interaction with the guests. With the excess of sensory stimulation, particularly the use of screens to tell the visual story of Astrid, "El Somni is not a normal meal, it is a meal where verbal interactions among guests are not welcomed" (Yemsi-Pasillisse et. al., 2018). Further, connecting to the cinematic nature of a meal, the need for silence to experience the event is "Exactly what happens when we attend the conventional theater or cinema" (Yemsi-Pasillisse et. al., 2018). Silence drastically alters, and even reinterprets, the meaning of dining in company. The experience of a meal under normal circumstances where, "The mere act of sharing a meal around a table already represents a social performance, where every guest is interpreting a part of the composition," demonstrates the inherently performative nature of dining (Yemsi-Pasillisse et. al., 2018). Then, the fact that *El Somni* is filmed creates a dual performing dimension: exacerbating the inherently performative nature of dining, with a recording, thus signifying a genuine performance.

Highlighting the fact that eating out is a socially performative experience, such that each table can lend itself as a "stage," set to a mini performance amongst guests, demonstrates how a restaurant can serve as a stage in a multitude of ways. Not only can the restaurant create cinema

from the atmosphere that it sets, but in a social sense, a performance is equally executed amongst each individual table. Cinema, in fact, as Raymundo Mier Garza states

No es la simple yuxtaposición de una densa historia del mirar y una inquietante historia de los instrumentos, de las tecnologías y de la fuerza de su utilización. Es la historia de la congregación de las miradas en el espacio público y de la escenificación colectiva (Mier Garza, 2012).

Which indicates that the very nature of cinema can present itself in more ways than just an on screen experience can provide, and that perhaps, the true nature of cinema is executed through the live experience of all of these mediums.

So far I have been exploring the way that restaurant atmosphere can be shaped through dinner theater-esq production, now I will explain the second stance, that shapes atmosphere through careful attention to detail (lighting, music, decor, etc). The restaurants that rely on this kind of atmosphere are those that are small and intimate, that do not emphasize a “show” as the dining experience, but rather, let the environment speak for itself, generating their atmosphere from its very curation. Aside from the atmospheric details mentioned, one of the most important elements of atmosphere in a small, intimate restaurant is the guests themselves. These types of restaurants greatly rely on the energy of the people that fill up the place: where a bustling and busy restaurant finds much of the joy in the experience of the atmosphere stimulated from the vitality of the people and their happiness. Remembering that the dinner table invites a natural social performance, guests in a small, intimate restaurant become like extras in the nightly “film” that is being created from the atmosphere; guests take in the energy inherent in the restaurant and release it back into the environment, suffusing the atmosphere with a full integration of “stage” and “cast.”

Taking into consideration a few examples of the way that this type of atmosphere and restaurant cinema can be created, let us begin with Hart's in New York City (See appendix E for image). Hart's occupies a very small 30 seat dining space, shaped like a scalene triangle. Because of this, it is almost impossible to not be in the midst of your neighbor's meal as much as your own. The proximity of seating is not at all detrimental to the experience of eating at Hart's, in fact it is part of what makes the meal. When you dine there one of the reasons you find yourself immersed in the dining experience is because of how closely integrated the seating is. One of the other features is the very dim lighting in the place, which is done by a few overhead lights and many tiny tea candles scattered across the tables. The flicker of the candles adds a dimension to the lighting that creates a very active, integrative experience: the flames respond to the movement of plates being placed upon the table, or the breath of people laughing and talking across the table. The lack of lighting also emphasizes the music and voices in the restaurant, adding a layer of enveloping intimacy to the structural intimacy of the place itself. The music is always played one album at a time with high volume from a turntable in one of the back corners of the triangular space which projects the music well throughout the whole of the restaurant. Because they are playing from a turntable, the quality of sound will be different from digitized mp3 files, which have a sharper, compressed sound to them. The softness to the sound created from the turntable integrates well with the sound of the voices, as well as with the warmth and intimacy of the restaurant. Decor in Hart's is also very simple, emphasizing the importance of the lighting and music even further, such that, aside from the influence of the customers, the atmosphere at Hart's could be said to almost solely be controlled by the use of these two elements. In regards to the cinema that has previously been emphasized more literally through the theatrical productions created by restaurants such as Vespertine and Celler de Can Roca's *El*

Somni, restaurants such as Hart's create their cinema primarily through control of these atmospheric elements.

Another example is Berbena in Barcelona, which was the focus of the soundscape investigation in Chapter 3. Berbena is a very small restaurant: with about 23 seats, including seating at the bar (which faces the open kitchen) and by the front glass wall, where bar seating runs along both sides of the entrance. Like Hart's, this makes the dining experience at Berbena very intimate, tables are so close together that the meal you are having almost becomes a part of the meal at the table next to you, and the owner, Carlos, emphasizes the tone of intimacy by coming to your table and leaning down next to you to take your order. Additionally, the use of an open kitchen merges the energy of cooking with that of the dining experience, and fully integrates the anticipation of the meal being made with the social excitement of their guests.

At Berbena the lighting is brighter than at Hart's, with strong kitchen lighting behind the bar and soft golden lighting in the dining area. When thinking about a stage, and the performative nature that this kind of restaurant lends the dining experience, the strong kitchen lighting makes the kitchen appear like the main stage, where guests are clustered at their tables in front of this stage. This creates an interesting duality of performance in Berbena; you have the performance executed by the cooking, layered with the social performance created across every table. The soft, golden lighting of the dining area and the design of the restaurant coalesce with each other: pale wood, white marble, and sparse accents of flowers add softness to the design, and a black wrought iron framework grounds the design with the dimmer accents in the lighting.

Due to the open kitchen and small size of the restaurant, there is a lot of environmental noise that fluctuates throughout (as was explored in detail in Chapter 3). When music is played the environmental noises become almost a part of the song; this is because of the careful

attention the restaurant has taken to the level of volume (low enough to not overcome the environmental noise), source of music (a single ipad speaker played from the back right corner of the bar bordering the kitchen), and type of music (usually rock, jazz and bossa nova from the 50's - 70's), all which impact the atmosphere of the restaurant without becoming overbearing. Allowing the environmental noises to integrate with the music played allows the restaurant to establish its atmosphere, through song choice, as much as it allows that atmosphere to be redistributed into the environment, allowing the sound of guests talking to become a part of the atmosphere's experience.

Berbena is a uniquely successful example of a restaurant that manages to unite the restaurant's atmosphere with music from just one source (an ipad). One example of a restaurant that does not successfully control their atmosphere through limited sound sources is Birdie's in Austin, Texas (See appendix F for image). Like Berbena, Birdie's is a very small restaurant. Birdie's is shaped like a rectangle: when you enter the restaurant, to your right is a single wall with four tables, and in front of you is an open kitchen divided from the main dining space by a long marble bar. While Berbena embraces the limited size of their restaurant, with soft lighting and decorative features that both invite and relax the guest to the intimacy of the dining experience, the intimate size of Birdie's restaurant works in opposition to its atmosphere: bright lighting, stark white walls, little to no decoration (just one photograph of a beach scene in Europe hangs on the back right wall), chairs and tables that appear cramped together rather than intimately imbibed in the dining experience of a neighbor's meal (as at Berbena), and a counter style ordering system instead of ordering from your table (again, as at Berbena), create friction in the dining experience. This friction divides the atmosphere through a perfunctory notion of

ordering and eating;, that simultaneously, and ironically, due to the limitation of the restaurant's size, desperately seeks an intimate experience.

In addition to the tension created through the size of Birdie's, the open kitchen provides a surplus of background noise that antagonizes the potential success of the music selection. This is because the music selection at Birdie's alternates between a wide range of genres (grunge, hip-hop, 70's pop, shoe-gaze from the 2000's, rock, etc.) from song to song, whose transitions alone are abrupt, and in conjunction with the aggression of the background noise coming from the kitchen, become discombobulated and agitated in their resistance to settling into any conceived of atmosphere that the restaurant hoped to achieve. The sound source of the music is also jarring; a single speaker leans against the back of the bar (right next to a chair where a guest might sit) and very loudly plays this eclectic mix of songs that infrequently, if at all, allow guests to relax in the dining experience (especially the guest that might sit next to the speaker), due to the loudness of both the volume of the speaker and the general loudness of songs from these genres.

Another example of a restaurant that does not utilize its music sound sources, or selection of songs effectively, is Anvil in Houston, Texas. While larger than Berbena and Birdie's, Anvil is still shaped like a rectangle, with tables wrapping around the outer right and back walls and a long bar fixed with seats that wraps around the left wall when entering the restaurant. Because of its rectangular shape and use of dim lighting, despite an increase in size from the other two restaurants mentioned, Anvil still manages a moderately intimate atmosphere. Similar to its name, the decorations in Anvil are harsh and stark: the walls are made of rough brick, the bar is painted black and made of a thick steel, floors are made of polished concrete, black painted iron scaffolding remains exposed on the ceiling, and decorations are sparse (a large antique roulette

wheel is mounted to the top of the wall and a large neon liquor sign hangs by the front entrance). Anvil specializes in cocktails, so much of the environmental sounds are also metallic in nature, due to the metal shakers and stirrers used to make the drinks.

Unlike Berbena and Birdie's, Anvil has multiple large speakers that are attached to the ceiling of the restaurant. Despite generally assumed benefits to a strong speaker system in a restaurant space (where being able to project and control volume accurately, could be viewed as an excellent mediator of atmosphere), because Anvil is composed of so many metallic, and therefore extremely sound reflective, materials (See Chapter 3; Utterback, 2013), the sound of music coming from the speakers instead serves to amplify the cacophony of the environmental sounds. Aiding the cacophonous nature of the space, is the disjointed and nearly unintelligible transitions between songs: 50's rock and roll transitions into rap, which turns to metal, rave music from the early 2000's, early 2000's rock, gentler 70's rock ballads, 70's funk, mid 2000's soft-rock, etc.

One of the biggest reasons that these transitions do not work together is due to the changes in recording technology throughout these eras where the music of the 50's and 70's used analog recordings, which sound spacious and less compressed than the modern technology that is used to record music from the 2000's. The difference in recording technology is highlighted by the excess of reverberation and environmental (making cocktails, people talking, etc.) sounds that already occupy the restaurant space. As a result, playing "polished" and compressed songs, like those of the rap and rock genres from the 2000s, sound stark in a space that is full of so much ambient noise. While, ironically, "fuzzier" recordings, like those of the 50s and 70s harmonize with the environment. This makes the transitions between these genres more jarring even than in Birdie's, due to the sensitivity of the space to the effects of sound.

Recalling the differences in sound as demonstrated through the transition between the live album *At Folsom Prison* by Johnny Cash and the studio album *Superfly (O.S.T.)* by Curtis Mayfield in Chapter 3, one could liken these differences to those witnessed by the transitions between music of the 2000s and music from the 50s and 70s in Anvil. Here, the additional atmospheric elements caught on the live recording of *At Folsom Prison* integrated with the atmosphere in Berbena, similar to the way that the analog recordings of the 50's and 70's integrate more cohesively with the atmosphere in Anvil.

The success of Berbena and the failure of Anvil and Birdie's sonic qualities, all highlight the importance of blending the individual space's environmental noise with music, to create a holistic ambiance. As J. Pallasmaa has said, "Every building or space has its characteristic sound of intimacy or monumentality, rejection or invitation, hospitality or hostility," whose individuality must be navigated in order to create pleasing and intelligible environments for the diner (Pallasmaa, 1994). Further, Spence has emphasized that "More often than not, discussion around sound and architectural design tends to revolve around how best to avoid, or minimize, unwanted noise" (Spence, 2020). However, as was the case with Berbena, where the "unwanted" environmental noise of the kitchen and the dining environment actually served as a positive addition to the music played, I would argue that is not the *elimination* of "unwanted noise" but rather, the thoughtful integration of such, with music - through understanding the individuality of a space - that creates the best atmosphere possible.

In another review, Spence states that "Year-on-year, noise continues to be one of the top complaints from restaurant patrons," which he suggests elucidates the lack of success that architects and designers have had in designing spaces to minimize noise (Spence, 2014). That being said, I would suggest that these complaints are more significantly generated by the former

acknowledgement of the lack of sonic integration in restaurant spaces. If Anvil managed to integrate the excess of environmental sounds in their space with their selection of music, I would venture that, like with Berbena, the environmental sounds would be additive to the overall atmosphere of the restaurant. This is exhibited on occasion when a song from the 50's or 70's comes on the speaker and suddenly the environment sounds more pleasing than it did a minute ago. This demonstrates how truly psychological and nuanced the nature and success of restaurant atmosphere is, and that it is up to the restaurant to recognize the type of space they have, and how best to utilize it to create an atmosphere that people will respond to.

While Anvil served as a negative example of a large and very sonic space that only moderately mediated the intimacy of its atmosphere, other, larger restaurants, can be just as successful at creating the type of intimacy and atmosphere that Hart's and Berbena succeeded at. Further, with the example of Hart's and Berbena, one of the key features of the atmosphere *is* the intimacy that is created, where the cinema of the dining experience is emphasized by the way that the intimacy of the atmosphere seals its guests within the experience of the place itself. This intimacy can be reflected in larger restaurants through a sort of "public privacy," where eating still feels private, and intimate, while in an environment that is large, and therefore by definition is not intimate.

One restaurant that successfully achieves this effect is Balthazar in New York City. Balthazar's atmosphere is a take on the classic small, French brasserie but at New York scale; where the size is large and moving many people in and out of the restaurant is a priority. While this is their model, Balthazar's decor is warm and comforting (soft golden lighting, gold varnished ceilings, large, spacious red leather couches, lantern like lamps, and pale tile), that it projects a voluminous, yet intimate, atmosphere, that doesn't escape the experience of dining

there. Another interesting atmospheric choice that has a significant effect on the experience is the absence of music; this is typical of a classic French brasserie but unusual for a popular and very busy restaurant in New York, which makes it unique that it works so effectively. The absence of music, and the spaciousness of the restaurant create a swathe of environmental sounds whose effect adds an unusually sleepy element (perhaps because they are overwhelming in their multitude, and blur together) to the hustle and bustle of the dining atmosphere. The juxtaposition between the sleepiness generated by the environmental sounds and the high energy and occupancy of the restaurant, creates a tension that locks the guest into the experience of dining and the atmosphere of the experience as a whole.

Where cinema is concerned, it is the type of atmosphere created by these smaller, or larger, intimate restaurants, that are capable of producing the best kinds of restaurant “movie magic.” Their attention to atmosphere creation, through careful selection of the music, decor and lighting are capable of creating an atmosphere that feels like an escape from daily reality for a second. Through the atmosphere, the restaurant is shown to be not just a place for eating, but a place for feeling and memory making. In the latter half of this research, the effects of covid-19 on restaurant atmosphere will primarily concern the argument of how the atmosphere has been changed, and how it can be reimagined by music.

3. A DISCUSSION OF CHANGING RESTAURANT ATMOSPHERE IN THE WAKE OF COVID-19

Throughout the past year and a half, the idea of a restaurant’s atmosphere, predicated on socializing, intimacy of space, high occupancy of guests, even being able to be *in* the restaurant -

to feel its atmosphere - were nearly nonexistent. Many restaurant owners felt like Mourad Lahlou (owner of Aziza in San Francisco) did, in saying that, “We provide the exact thing we are told not to do anymore - which is socializing” (Finney, Yip 2020). The very idea of atmosphere was essentially removed from the restaurant format and now, as many restaurants around the world have been allowed to reopen under new health and safety regulations, it must be questioned whether the same atmosphere and cinema can be created moving forward. The latter half of this research will therefore examine the ways that covid-19 has reshaped the dining experience over the past year and a half and how the pandemic continues to pose potentially permanent changes to restaurants in the future.

Pre-Vaccination March 2020 - March 2021

Beginning in 2020, I will examine some of the projected ideas about the effect covid-19 would have on restaurants. In April of 2020 Vaughn Tan wrote an article in Eater London that outlines many of the predictions that held true throughout the pandemic. For the purposes of this research, some of the most important points are written below

When restaurants reopen, by force or by choice they will be operating in a different world than before the lock downs began. There will be temperature checks for staff and much less tolerance for working while sick. Kitchen and dining areas will have to be redesigned to accommodate staff and customer physical distancing. There will simply be no way to fit in as many guests as before. And customers may not return in the numbers they used to be.

Even with these profound changes to business as usual, the number of infections will begin to rise again as soon as the economy reopens. Slowly first, then more quickly. Countermeasures will then have to be put in place to slow the virus’s spread. If it nonetheless spreads too fast, another intense lockdown will be necessary, followed by another reopening.

This is the reality: Corona time is the cycle that has only just begun. It will probably

alternate between intense lockdowns to prevent infection rates spinning out of control and less-intense lockdowns during which the economy partially reopens. This cycle will have to continue until there is a vaccine - which could be up to two years away. Any existing restaurant business model is incompatible with this new social and economic reality (Tan, 2020).

From Tan's predictions, changes to restaurant atmosphere in 2020 can be analyzed from two different standpoints: current changes that fall in line with regulations and restrictions, and projections for future atmospheric innovations if these regulations continue to set restaurant standards. Beginning with the first standpoint, let us take a look at some of the regulations in the Black Sheep Restaurants SOP: Covid-19 Playbook; this playbook was continually updated throughout 2020 and served as a guide book for restaurants around the world - since the restaurant group comes from Hong Kong, a city at the forefront of handling the response to covid-19. I will list the most significant of these changes below:

- Physical distancing: The playbook states for the inside of a restaurant, "We are looking into installing semi-permanent partition screens between tables which may mean guests can be seated closer than six feet to their nearest neighbour" until then, occupancy at every other table is protocol. For the outside of the restaurant they state, "We consider the area outside of our restaurants our responsibility so we are looking at adding stickers to the ground six feet apart for guests queuing or waiting for pick up." For group gatherings at any table, they state that "The maximum group gathering size in the city is eight."
- Health Declaration Form: Every guest must fill out a form that provides their name, phone number, email address, and signature, in case they cause the spread of the coronavirus. Once guests have completed the form "The next step is temperature checks [where] anyone with a temperature of 37.5 degrees celsius or above cannot be accommodated and should consider seeking medical advice."
- Scheduled Sanitization: all shared surfaces in the restaurants must be cleaned every 30 minutes.
- Ban physical contact: No handshakes, high fives, fist bumps, are allowed.
- Masks: Must be worn by all staff members and "Masks for guests entering the restaurants are now mandatory" (as of April 28th of 2020).
- Gloves: Must be worn by all staff members.

- Hand sanitizer: guests must sanitize their hands before proceeding to eating.

In addition to these regulations set in Hong Kong, others which affect the atmosphere of a restaurant include “Time limits for eating, [and] pared-down menus” (McLaughlin, Serhan, 2020). When interviewed by Timothy McLaughlin for *The Atlantic*, Syed Asim Hussain, the co-founder of Black Sheep Restaurants, is quoted in saying that the change “Kills the ambience of the restaurant” and further, when commenting on the clear dividers separating tables and bar seats at his izakaya-style outlet, that it “Looks incredibly ugly, but we have no choice” (McLaughlin, Serhan, 2020). Hussain’s frustration with the stifling atmospheric changes was ubiquitous in the restaurant community throughout 2020, and in some part remains today - as news of variants rising has caused some states in the USA and some countries throughout the world to reinstate mask mandates and other safety precautionary measures.

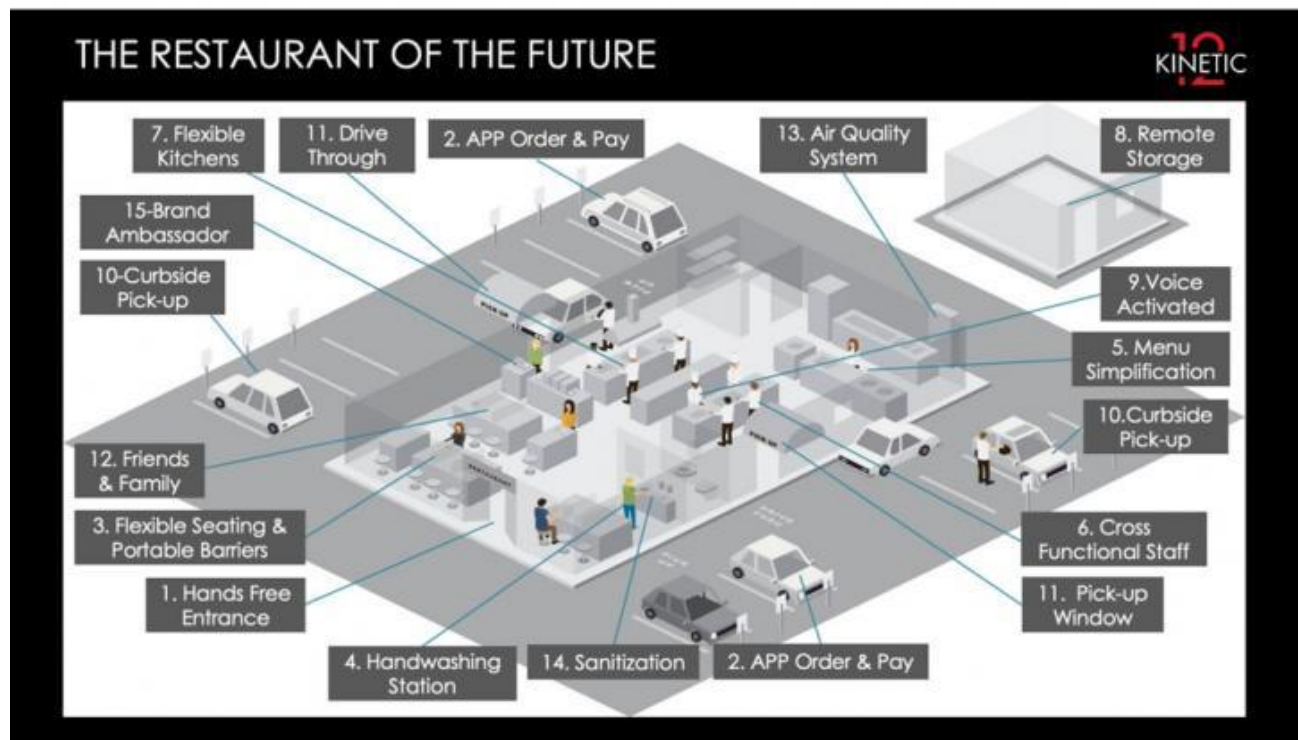
In 2020 with the sudden necessity for health and safety regulations, many restaurants struggled to find ways to make these changes less oppressive on the restaurant atmosphere while abating their guests’ fears about dining out in a pandemic. Because of this, the success of these changes in part depends on the type of restaurant. Restaurants such as Celler de Can Roca might be able to evade such a drastic alteration to their restaurant atmosphere, as these restaurants are spacious, with plenty of room between tables, and an emphasis on private, individual table “show-like” dinner experiences. Further, interpersonal service (which is altered by the mask blocking the guest’s view of the server’s face) is not as important - as service is designed around the experience of the “show” itself, and not necessarily the service. With some of the more extreme examples of restaurants, such as Vespertine, the emphasis on creating an alternate reality for the dining experience may even benefit by the use of masks to create this alternate experience. In the case of restaurants such as Berbena and Hart’s, where the atmosphere is

inextricably linked to the intimacy created by tables being close together and servers being a part of the experience, the use of masks adds an impersonal barrier to the dining experience.

Distancing requirements at these restaurants limit the capacity of the restaurant, and thus the intimacy of small dining quarters. Joan Roca of Celler de Can Roca has even said that he “Thinks the hardest hit [restaurants] will be the small locals where tables are traditionally very close together” (Baeza, 2020). When thinking about a dining culture such as that in Barcelona, which thrives on bars that are built into small, old spaces, it becomes particularly difficult to imagine how these places can maintain their atmosphere, suddenly having to shirk the comfort of traditional spacing for a format that does not cohere with their model.

Moving into a discussion of how a few restaurants reshaped themselves through the regulations set in 2020, it is important to recognize that what was understood at the time to build a successful model was innovation, and the acknowledgment that the old model did not exist anymore, and would not exist for the near future. Stephen Kaplan, co-owner of Rumi’s Kitchen in Atlanta, stated that “The covid-19 pandemic [gave] an eerie glimpse into how agile most restaurants aren’t [and that] likely the industry [would] see growth of concepts that are agile, meaning they can serve guests in a multi-faceted fashion such as dine in, to-go and/or delivery, and retail,” signaling for an expansion of the types of atmospheres that could be created and controlled by the multi-functional model of restaurant service (Stephens, 2020).

Below, FSR Magazine created an illustration of what this type of restaurant might look like:



This illustration demonstrates an ideal restaurant in 2020 that would have space enough to perform all of these multi-function adaptations to service. Adjustments to each restaurant would vary slightly from the illustration based upon the space they had (Hand, Reinstein, 2020).

Two examples of multi-functioning restaurants last year were Misi and Hearth in New York City. Both of these restaurants encouraged customers to purchase prepackaged foods from their restaurant and offered to-go options from their menus. In June of 2020, Misi opened for regular service, following health and safety regulations. While Hearth did not open up for normal restaurant service at that time. Before the coronavirus hit New York City both of these restaurants were notable for their convivial atmospheres and warm lighting, which encouraged an enjoyable meal. As restaurants had to find new ways to generate revenue with the restrictions and regulations, much of what once represented the atmosphere of a restaurant was extrapolated in the form of take-away foods and goods. These served as “tokens” of the memory of the

restaurant and the feel of the lost atmosphere. Of course, take-away food also encouraged the memory of good flavor but, as eating the food in the absence of the restaurant itself was currently the only option for customers, their ordering of the food must also be seen as a function of their memory of the restaurant - similar to Charles Spence's example of the bottle of wine, which represented the flavor of wine as much as nostalgia for the memory of the experience of the place it came from.

In 2020 one of the new purposes of the restaurant was the inverted need to express their atmosphere through the very *absence* of their restaurant. The thoughtful, and imaginative nature of these restaurants' attempts to recreate the memory of themselves away from the restaurant is, in fact, a natural connection: as scientist Alvery Gilbert states, "Imagination is inextricably tied with memory, the ability to conjure past experiences and, at the same time, trigger associations that transport the diner to uncharted sensory experiences" (Gilbert, 2008). Gilbert's assurance of the connection between memory and imagination was reassuring during the state of extreme uncertainty that covid-19 brought to the restaurant industry; where restaurants worked hard to unite the two - using imagination and creativity to reunite the customer with the memory of their restaurant. This connection between memory and imagination has been heavily drawn upon by Celler de Can Roca, where their meals aim to bring together "Emotions that are tied to experiences that, while personal, are fed by a communal sensibility and the memories of those who create the dishes," which further emphasizes the natural connection between the two (Ulloa, 2017). Imagination in 2020 took a central role in the creation of a restaurant's atmosphere, where much of the creation of such relied upon generating a strong communal memory of the restaurant, while having the dining experience remain fractured from its community.

Another way that restaurants attempted to recreate their atmosphere was through increased outdoor seating. Before covid-19, outdoor seating was already common practice in cities across Europe, such as Barcelona and Copenhagen, where many streets can afford to close without inhibiting transportation. In the United States, taking up street space for seating is relatively underutilized (as this would inhibit car traffic flow) however, in the wake of covid-19, many cities across the United States, such as New York City, Los Angeles, Houston, and Atlanta turned to outdoor seating to accommodate the new regulations and restrictions. Outdoor seating is an interesting experiment for restaurants that were initially driven to serve people from their interior; questioning whether the same atmosphere can be generated in a makeshift outdoor environment, or even improved with the addition of fresh air. Outdoor dining serves as a continual example of how covid-19 is altering the experience of dining and will be explored further, later in this research.

One particularly unique example of outdoor dining in 2020 was Astoria's Bel Aire Diner in Queens, New York, where the owners turned their parking lot into a drive-in movie theater, screening classics such as "*Pulp Fiction*," while serving up classic diner snacks at customer's car windows. The idea came from the owner's oldest son who posed the question "How can we bring people in [the restaurant] without actually bringing people in?" essentially attempting to answer the question all restaurants were currently trying to (Goldfield, 2020). With the space their parking lot affords them, Astoria's literally created the experience of "restaurant cinema" that has been previously shown through curation of restaurant atmosphere in smaller places, and as dinner-theater-esq experiences amongst high end restaurants. With a drive-in, Astoria's regenerated the community and atmosphere its restaurant once provided, while being outside of the restaurant itself.

Bars across the world serve as another interesting example of managing the atmosphere under regulations and restrictions. Bars, perhaps, are one of the best examples of spaces that establish atmosphere, as the drinks are generally the same no matter where you are, but the bar becomes popular based on the feel of it and the energy it invites each night. In 2020 bars in New York City were not permitted to serve alcohol inside their premises, but were allowed to serve drinks to go, and were lenient about allowing customers to gather outside of their bar - spilling into street space once occupied by cars. Factory 380 in New York City is one example of such. In an article published in the New York Times last summer, a patron of the bar, Tony Auliano, “Would rather have been inside the bar...but [was] happy for any social interaction he could get,” stating that, ultimately, “This is a good thing. An opportunity to communicate, come out, have a drink” (Simonson, 2020). Mr. Auliano’s comments demonstrate that, even if the atmosphere cannot be what it was before coronavirus, the desire to socialize and gather with others outweighed the negative effects on the atmosphere of the bar at the time - that, for many, it is enough to gather outside of a place you loved to go to, creating new experiences while remembering the bar for what it once was.

Another example is Bar Salvatge (“Wild Bar” in English) in Barcelona. Before the coronavirus hit Barcelona, Bar Salvatge thrived on the atmosphere it created from a busy, loud, and energetic night: loud garage music and orange overhead lighting created a unique atmosphere to walk into and enjoy any night of the week. Last summer, Bar Salvatge reopened through reservation only with limited outdoor and indoor seating. As we move into the discussion of what the future of restaurants and bars will look like (post vaccination, but in the midst of rising variants) we have to question if places that sustained their energy so indelibly from the restaurant itself will be able to create this energy and atmosphere in the future, if

lockdowns occur again. With the use of reservation only, Salvatge loses the casual excitement of becoming a part of the night at their bar, leaving little room for the spontaneity they so expertly curated pre-covid. Additionally, as with many others, limiting the seating capacity in a place like this deflates the excitement of being in the space when it is crowded. Perhaps a casual drink can be enjoyed, but to experience the high octane energy Salvatge can suddenly create from a busy night will be impossible to replicate under these regulations.

Moving into a few examples I can personally attest to from last year, I will describe two of the dining experiences I had in Houston, Texas once the city moved into the government's phase-2 of reopening restaurants. The first dining experience was at the restaurant Cuchara in late May of 2020, during the beginning of the reopenings. Cuchara is a mexican restaurant with a large amount of outdoor seating available and a very lively atmosphere pre-covid. Upon reaching the restaurant, before entering the outdoor seating space, you are met by a makeshift station and a hostess in a mask. You are asked to sanitize your hands and wait a few minutes as they let people in one at a time. Once you are in the outdoor seating area, you are greeted by a waiter in a mask and gloves who allows you to choose to eat indoors or outdoors. I chose to eat outdoors and was seated close to the makeshift entrance that I walked through. To access the menu you are told that you must go to their website on your phone, as they are not distributing physical menus to limit any germ exposure. Eating itself was a relatively normal experience and the restaurant was quite busy, with energy that seemed to express gratitude to be eating out, despite the circumstances. The stiff interaction with the make-shift entrance, the inability to see the waiter's face, and lack of a menu, definitely altered the atmosphere of the dining experience. It was possible to divert focus from some of these adjustments and have a normal dining experience when you were focusing on the company at your table and the food you were eating however, the

palpability of the different tone that was being set, as a result of the health and safety measures, remained distracting throughout the meal. Interestingly, the use of live music became the salve that abated the strangeness of the atmosphere as a mariachi band walked outside, singing songs at each table. The interactive nature of a live band singing to each table fostered a community among the diners outside, despite the discomfort created by health and safety measures. I was personally moved to see music so vividly become the force that elevated the dining experience past the present strangeness of covid-19. The use of the band questions whether the reimagining of atmospheric elements would be capable of filling the gap between the quality of the old dining experience and new one in the wake of covid-19.

The second dining experience I had in Houston was indoors at the restaurant Poscol in June of 2020. Poscol is a nuvo italian restaurant that, before the coronavirus, with very dim lighting and candles on each table, had the cozy atmosphere that fostered long dinners and date nights. By June, details about increased infection rates after the reintroduction of phase-2 reopenings in Houston had just come out, and many restaurants were beginning to close again. With this in mind, the atmosphere at Poscol that night still encouraged the pre-covid atmosphere, but with several adjustments made for health and safety measures. Like Cuchara, all servers wore masks and gloves, but there was no pre-entrance station to sanitize your hands and await entrance. The lack of a pre-entrance made the introduction to the dining experience slightly more comfortable and familial, despite the discomfort of seeing masks and gloves on the servers greeting you. The main bar area, which is very visible from the entrance, had been blocked off by a large table. The emptiness of the barricaded bar area was eerie to see and not conducive to the intimacy of the old environment. From the entrance you are led to an area with reduced seating but with occupancy at each table available. The fact that from the dining space available

each table was occupied helped to make the guest feel that they were part of a communal, normal experience despite the new regulations. When you are seated at your table you are given an actual menu, which also eases the tension of the new regulations, but when bread is brought to your table it is pre-wrapped in a sanitary bag and plates and silverware are constantly changed between courses. While precautions like this are in place to assure safety and ease guests' concerns about dining in the pandemic, I find that the unnatural nature of these measures was jarring to the comfort and intimacy the restaurant aims to provide through its dim lighting and soft music. Dining inside the restaurant versus outside, as with Cuchara, made the presence of the health and safety measures more oppressive on the atmosphere. The atmosphere at a restaurant such as this is best generated from the intimacy fostered inside, perhaps making the presence of the regulations even more palpably felt inside Poscol than outside at Cuchara.

As restaurants adjusted to the health and safety measures last year, it was increasingly apparent that there was a need to find ways to create an atmosphere that still felt natural to the dining experience. The ability to do so varied from restaurant to restaurant and relied on an intuitive finessing of atmospheric elements to coincide with health and safety regulations, instead of standing in contrast to these regulations. The success of this depended on either recreating the atmosphere of the old restaurant in line with the regulations, or on completely reimagining the atmosphere of the restaurant and transforming it into a new atmospheric concept, to accommodate regulations.

One restaurant ahead of its time on the concept of sanitized and clinical dining environments was Pharmacy (See Appendix I for image), the restaurant/bar created by artist Damien Hirst (open from 1998 to 2003 in London, England). Pharmacy was designed like an old school pharmacy with “Estanterías y vitrinas en las que se exhiben frascos de jarabe para la tos y

casa de píldoras, para ofrecer un menú europeo, que era servido por meseros cuyos trajes fueron diseñados por Prada” (Díez, 2013). In the current dining climate, where every restaurant’s atmosphere has been altered by the introduction of heightened sanitary measures, it is interesting to see an artist create a restaurant that was popular for the exploitation of the very measures inhibiting atmosphere today. At Pharmacy, if servers were to wear masks it would not seem out of the ordinary at all, it may even have been encouraged as an *added* atmospheric effect. The restaurant was in fact designed as

Provocadora al alterar el sentido usual, tanto de lo que es un restaurante como una farmacia. Confunde: gente en busca de un medicamento es atraído - por los códigos farmacéuticos empleados - a un espacio que es en realidad un restaurant-bar, mientras que los comensales departen en un espacio aséptico (Díez, 2013).

The irony of using a clinical, pharmaceutical environment as a novel restaurant concept in the midst of the coronavirus climate may be too realistic to work as an alternate dining experience. However, it stands to serve as an example of taking the elements of “un espacio aséptico” and promoting them as an atmosphere that a guest would want to dine in. Returning to the power of cinema in the restaurant environment, when guests visited Pharmacy it must have seemed incredibly theatrical to dine in this imagined space of an old pharmacy, even if servers were wearing masks. This, then, raises the question whether it is seeing masks that is disturbing the atmosphere of the restaurants during covid-19, or is it the knowledge of what they represent in today’s climate?

Last year it became paramount to find dining concepts that could adapt to the fluctuating changes that would, and still occur from periods of lockdowns and potential alterations to the health and safety regulations as covid-19 and its variants are managed globally. The old model

must change and how we change it will depend on how we can reshape what we understand a restaurant and its atmosphere to be. In an excerpt from a podcast interview with Ben Leventhal, the CEO of Resy, on The Dave Chang Show, Leventhal contends the current need for change in the restaurant model, saying that now is the time for owners of restaurants to

Take a swing, nobody is going to knock you for taking a swing right now, there are people and restaurateurs who are putting mannequins in seats right now to try to figure out social distancing in a social restaurant context to try to figure out how you set ambiance. Are mannequins the right answer? F***k no! But he's taking a swing and it's going to get us to a solution (Chang and Ying, May 18, 2020, Too Small to Fail, Vol. 8: Ben Leventhal).

The restaurant that used mannequins that Leventhal mentions was The Little Inn in Washington, Virginia. The use of mannequins demonstrates that, while this might not be the solution to spacing and making guests feel welcome in the environment, part of the effort to arrive at what *is* the solution to a changed atmosphere during covid-19 required (and in many ways still does) solutions that have not even been conceived of yet, that are unprecedented to the very times that they represent. Then, it is the attempt to make something happen, to use resources that engage in thinking outside of the box to find the solution to these atmospheric problems. Leventhal's commentary brings to mind restaurants and bars that, pre-covid, operated on ideas of constant change and evolution. One example of such is Trick Dog in San Francisco, which changes the decor of their restaurant and the full menu every month. With the radical change that covid-19 brought to so many restaurant concepts, Trick Dog demonstrates the type of constant flexibility and imagination that could continue to make people feel welcome in their restaurant-bar. Other examples, such as the idea of non-referential dining that Vespertine adheres to, could survive the current climate because of its lack of connection to anything outside itself. Both of these

examples are the kind of innovative mindset that restaurants will have to adapt to to create atmospheres that survive the regulations put in place by health and safety measures.

Last summer, to gain clarity on how one restaurant-bar was thinking of adjusting their space to health and safety measures, I interviewed the owner of Light Years in Houston, Texas, Steve Buechner. The interview went as follows:

CA: How important has the atmosphere to a restaurant during covid-19 become?

SB: Very important. I predict that atmosphere, or the lack thereof, will play a far greater role in restaurants' survival than is currently being discussed. The pivot to restaurant take-out and pre-packaged foods, while understandable, reflects a fundamental misunderstanding of how customers value a restaurant's offerings.

CA: How can we improve the atmosphere of a restaurant during covid-19?

SB: Given the tendency of masks to drain all sense of conviviality out of a dining room, restaurants will need to use countering forces such as music and lighting in an amplified way to distract away from what is otherwise provided for by the human experience. The more that a restaurant's appeal depends on the conviviality of the place, the atmosphere, the more that masks are going to present a challenge. For prophylactic measures, such as masks, to work without meaningfully impacting the ambiance, they will need to be perceived as close to invisible as possible. Dropping lighting as low as possible and turning the music up as loud as possible in an attempt to immerse guests in the experience of the place, and not in the interaction with the server - which is unfortunate, but not fatal - and also trying to express joy and communicate via non facial means, while wearing a mask, will be integral to our process of reopening.

CA: You're a restaurant that has the ability to maximize outdoor seating, how do you intend to utilize this space and maintain the atmosphere that is generally created inside of your restaurant, outside of it?

SB: I think that very few establishments create a meaningfully cohesive indoor/outdoor experience, or an outdoor experience that reflects their aesthetic. For us it is exciting because we've always wanted to try to create an outdoor party experience that reflects the same feeling of walking into the bar on a Friday night. Since we are in Houston, where the weather is warm almost year round, we are able to do this, whereas some cities may struggle to make this option viable.

CA: What is the atmosphere that you are hoping to create outdoors?

SB: To try to make people feel comfortable and invigorated by the experience. For me, our brand equity, meaning how people view everything we do, is my priority to maintain. Since we operate as a retail and distribution of wine as well, we are more flexible than most restaurants who are strapped for cash. Because of this, I am not as concerned with reinventing the atmosphere of Light Years, as much as I am with preserving what we stand for. (Buechner, 2020)

Buechner's comments elucidate the extreme importance of maintaining atmosphere as the restaurant world wrestled with the notion of how to adjust their restaurant models through covid-19. Similar to the success of the mariachi band at Cuchara's ability to foster atmosphere, Buechner highlights the importance of music volume, to distract from health and safety measures, and redirect focus on the positive energy that the underlying atmosphere can create. Perhaps then, moving forward, the solutions to maintaining atmosphere, despite regulations, will ultimately rely upon the careful curation and understanding of music in its environment, as Ryuichi Sakamoto and his wife attested to.

Post-Vaccination March 2021- Present

Since vaccinations have begun to be distributed globally, restaurants around the world have been able to reinstate many of their former dining conditions with less severe restrictions (sometimes none at all, depending on country or state in the U.S.), which have allowed them to

return to a “normal” atmosphere, similar to that of the pre-pandemic dining culture. However, certain customs/precautions have remained: many places have continued to use makeshift outdoor dining structures and masks among wait staff have remained a custom in many places (especially as variant cases have risen, many restaurants have chosen to return to the use of masks amongst their staff). In the latter half of this discussion, the effect that the continuation of these customs/precautions will have on the restaurant atmosphere will be the primary focus.

Frances Anderton has said that “We appreciate a place not just by its impact on our visual cortex but by the way in which it sounds, it feels and smells,” when considering these two customs, Anderton’s statement becomes particularly significant due to the extreme influence that masks and outdoor dining structures can have on the ability to engage with the atmosphere (Anderton, 1991). Masks have been demonstrated throughout this research to be preventative in providing many of the socializing and convivial aspects of dining out which, in turn, block a guest’s ability to engage with the “feel and smell” of the restaurant, in addition to blocking one of the key aspects of restaurant service - the server’s facial expressions. Outdoor structures, through their complete extrapolation of a space, to a new, outdoor, setting, quite literally prohibit engagement with the inside atmosphere of a restaurant and, in many cases, have yet to show that they can adequately mimic a restaurant’s inherent environment from the outside. Since many of these outdoor structures have been makeshift, they do not have the ability to block sound the way that the inside of a restaurant could, and therefore introduce a whole new set of atmospherics - those of outdoor noises - to the dining experience. As Buechner noted, maintaining atmosphere in the midst of unsavory health and safety protocol, such as mask wearing, would rely heavily on atmospherics - particularly lighting and music - to distract away from the loss of some of the human interaction in dining. If outdoor dining structures become permanent fixtures in many

cities, and if mask wearing remains, it will be even *more* important for a restaurant to figure out how to engage the diner from the outside. This means that a restaurant must understand the outdoor acoustics of their space (are they on a busy street, what kind of traffic goes by), how to utilize natural lighting (instead of dimmer, ambient lighting) and decor, to create a dining experience equally representative of the interior of their restaurant.

To elucidate the ways in which restaurants are attempting to create an atmosphere from the outside of their space, I will use a few examples of outdoor dining experiences I can attest to in the past year. While a few examples are from before vaccination was possible (during the fall and winter of 2020), these examples will serve as projected conditions for outdoor dining this coming fall and winter.

Beginning with Leo in New York City, I dined here in the fall of 2020 (See Appendix G for images). From the inside, Leo is a spacious yet intimate restaurant, with light wood floors, marble table tops, black wood chairs, soft orange booths and a warmly lit bar (through candle light and gentle overhead lighting). Leo's atmosphere provides a lively and personal dining experience that is additionally aided by a music selection usually composed of 70's rock, funk and soul. Intriguingly, their atmosphere is well replicated outside despite having few atmospheric elements: a plain wooden box houses a few long tables next to the street, and an additional five tables run along the outside wall of the restaurant. At night individual tea candles are lit on each table, and soft music comes from speakers attached to the outside overhead of the roof of the restaurant. One of the reasons I believe the simplicity of Leo's outdoor dining set up to be successful is because of the minimal traffic noise that gets filtered through the quiet side street that the restaurant is located on. This allows guests to feel more comfortable, even when heavy foot traffic passes through the street between the wooden box and the tables that line the outside

of the restaurant. Additionally, similar to the way that music and environmental noise integrated well inside of Berbena, the less abrasive outdoor noise (a rarity on any street in New York City) and the soft overhead music were able to mingle nicely with each other - providing some semblance of an atmosphere, that without these acoustics, would simply comprise of tables on a street corner. Leo is an interesting example of a low budget outdoor dining set up that, through acoustics alone, allows the diner to feel engaged with their dining experience, and to linger at a meal that on a hurried street corner in the city, would have been much shorter lived.

A more elaborate example of a rather successful outdoor dining set up is Cotogna in San Francisco, California (See Appendix G for images). From the inside, Cotogna is not very atmospheric: modern decorations bordering on the style of an airport lounge and an ambient trance-like music selection are discordant with the highly technical, yet rustic cuisine. Outdoors, Cotogna emulates a very different atmosphere. Just as with Leo, Cotogna is positioned on a very quiet street. This street was actually made quieter from covid-19 due to the fact that, in the financial district where it is located, no workers (as of June 2021) had returned to their offices. The basics of their set up were similar as well: a wooden, boxed in, street side, dining set up and several tables lining the outside wall of the restaurant. However, Cotogna placed much more emphasis upon the decoration of their outdoor set up; a tuscan country theme set the tone, with olive trees interspersed between tables, fine attention to chairs and table type, and a slated semi exposed roof on the wooden structure allowed the outdoors to mingle with the composed dining setting. Similar to Balthazar, no music was played, which emphasized the confidence Cotogna had in its atmosphere, provided by the privacy of the quiet street's acoustics and the attention paid to decoration. Reading the reviews of Cotogna on Google, one can see just how successful this set up is, as many five star reviews attest to it. One customer writes in saying that Cotogna

was the “Only time it felt like we weren’t dining in a busy side street” and that it was “Perhaps the best outdoor dining set up in San Francisco.” This review demonstrates that the success of an outdoor dining set up relies, in many ways, on the same atmospheric controls that have been proven effective for indoor dining spaces throughout this research. Interestingly, Cotogna succeeds in their outdoor environment while faltering in their indoor environment.

While music is not at the forefront of the atmosphere at Cotogna, the results of Chapter 3 and the fact that “What is considered ‘music’ depends on our own capacity for perception” where, “By switching on our aptitude for musical listening, we can find musical excerpts in just about everything, including our cities,” show that the success of dining outdoors will be largely mediated by the balance between controlled acoustics (music choice and volume and noise blocking structures), and the environmental acoustics of each unique street. Ways of controlling outdoor acoustics have been studied by some urban architects as far back as the 1960’s. One example is the construction of Paley Park in New York by Zion and Breen, who used a waterfall to effectively mask city noise as well as “Greenery growing thickly along the side walls [which] likely help absorb the noise of the city” (Spence, 2020). At Cotogna, the multitude of olive trees lining the outdoor dining space may partially contribute to the quiet of the street corner. Additionally, with both Leo and Cotogna, the wooden boxes may contribute to blocking some of the street side traffic for all the diners.

Another example of outdoor dining is Ernesto’s in New York City. This is a high end Basque restaurant that has a sleek interior, with modern paintings, gold lighting fixtures, marble tables and a deep blue, grey bar with gold brass details. The atmosphere is bustling and loud, music ranged across many genres and featured many modern rock and pop artists. Dining outside of Ernesto’s in the winter of 2020 was a completely different experience however. Five black

outdoor picnic tables were set up along the outside wall of the restaurant and the street side. Ernesto's did not make use of a wooden structure, like with the examples of Leo and Cotogna, and no table lighting was provided, instead bright overhead street lights were all that were used. There was no music being played outside and despite the fact that the street corner was very quiet, dining outside at Ernesto's felt very desolate and uninviting. This dinner happened to be on a very cold and windy night which would have made dining outside difficult under even inviting circumstances, but the complete lack of attention to even a few table lights or music made the experience almost unbearable. Unlike with Cotogna, the quiet of the street did not aid the restaurant's outdoor atmosphere in their choice to not use music; instead the silence was eerie and unwelcoming. The failure of Ernesto's sparse atmosphere, in contrast with the success of Leo's sparse, but inviting, atmosphere probes at the ultimately subtle nature of successfully creating atmosphere - if under similar circumstances one restaurant can succeed and the other cannot. With Leo and Ernesto's, the fact that one restaurant played music while the other did not may contribute to the failure of Ernesto's atmosphere. As Lori Hon, the founder of Gray V (a sound and music consultation company in New York City) has said, "Music is the easiest one, of all the design elements, to actually change and it's the one that's most alive in the room. The music really sets the tone" (Day, 2018). Hon's comments may demonstrate how under limited decorative conditions, that the atmosphere of restaurants like Ernesto's and Leo could succeed based on their ability to generate atmosphere from music alone - provided that outdoor acoustics are minimal.

Relating to this, another outdoor dining experience with a sparse set up is NIU Kitchen in Miami, Florida. The inside of NIU is very atmospheric: dark red walls, very dim lighting with many candles, excellent loud and boisterous music. The outside of the restaurant has four black

picnic tables lined along the wall outside of the restaurant with overhead speakers that are kept loud to help maintain some of the energy inside of the restaurant. There are no lights on the tables relying, like Ernesto's, on the natural lighting of the street corners. At NIU the street lighting was slightly more atmospheric than at Ernesto's, due to the architecture of the design district where the restaurant was located: many art deco buildings across the street had interesting neon lights, which made the street scene more engaging than at Ernesto's. However, despite the loud music, the fact that NIU was located right next to a bus stop (which caused a lot of noise) and that the street was not very wide (which made foot traffic frequently interfere with the dining experience) made it difficult to establish atmosphere with just the use of loud, boisterous music.

The contrast of the experience at NIU with that of Leo - where sparse dining set ups and music both succeeded in the case of Leo and failed in the case of NIU to establish an inviting atmosphere - further demonstrate the significance of understanding the nuances of atmosphere for each individual restaurant space. With NIU, despite having a good outdoor music set up, being next to a bus stop and heavy foot traffic inhibited the atmosphere greatly. Perhaps then NIU would have benefited from creating a wooden structure, like at Cotogna, to mitigate the flow of foot traffic and provide a visual and structural separation to the street's acoustics. However, while wooden box structures have been a preferred choice of many restaurants in New York City and around the world as restaurants have attempted to navigate covid-19, these do not necessarily have to be the preferred system in the future. As demonstrated by Paley Park, things such as water and greenery are effective sound blockers and could prove more integral to permanent outdoor dining set ups in the future, provided that the space would have the capacity to integrate these features.

6. CONCLUSION

Should outdoor dining set ups remain, examining the successes in outdoor atmosphere and eliminating the individual causes of atmospheric failure among each restaurant will be valuable in the coming years. As has been shown by these examples, the atmosphere is anything but straightforward, relying heavily on intuition about what succeeds for each individual restaurant. Through examples like Anvil and Birdie's, a restaurant cannot succeed in simply playing music, but will need to understand how to *utilize* music within their space. Further, as Hon's comments elucidate, the potency of music allows it to control atmosphere in many instances. Music will therefore be extremely significant for both the indoors and outdoors of the restaurant, as the restaurant community continues to witness changes throughout the pandemic.

Little research has yet been conducted about the underlying conditions that warrant a successful use of music in a restaurant's space. Therefore, I include a brief conversation which I moderated at Light Years in Houston, Texas, between customer (Arturo) and owner (Steve Buechner), to demonstrate the nuances of music selection and the integral part they play in a real restaurant's atmosphere.

Conversation at Light Years 7/11/21

Arturo: When you are not here there is something different, we find we are not having quite as much fun as we usually do, the ambiance is different, it is strange because the other people that work here are great, the wine is great, the space is great, so what is so different? And I realized it is the music, when you are not here the music changes. Because you read the room, you play music, turning it up and turning it down so slightly, and at the right time to keep the people happy and the crowd feeling good. That is what changes when you are not here.

Steve Buechner: Yes, I know, that is what I struggle with when I am not here, I know that that changes because it is much more difficult to just put a playlist on and have the music work out for the day. It doesn't work like that here, it is a very live experience [playing music] and any given Monday can be different from all the others. You need to be able to play music in the moment, and this is what I struggle with to figure out; how can you play the right music and keep the ambiance of the place alive when you are not there. How can you choose music that can “read a room” ? (Buechner & García Lopez, 2021).

Choosing music that “reads a room” is what the musical selection should guarantee in a restaurant space. While Hon emphasizes the importance of music to “set the tone” of the restaurant, Buechner’s comments emphasize the importance of the music to work *with* the room and the ambiance of the individual day (See Sakamoto’s comments earlier in this chapter). Ultimately, a total reading of the atmosphere depends on both things. It is symbiotic in nature; where an inherent and shifting, environmental atmosphere, responds to and is modulated, at the forefront by music, and in addition, the aforementioned atmospheric factors.

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CHAPTER 5 - GENERAL CONCLUSION AND FUTURE DIRECTIONS

The impact of music and sound have been shown throughout this thesis to be highly significant in a number of ways. At the core of their influence is the relationship they have to our sensory perception of the world and how we derive satisfaction and pleasure from experience. A compatibility between sound and smell were shown in Chapter 2 to improve the experience of drinking wine while listening to a corresponding soundtrack. The combination of environmental and musical sound in a restaurant was shown, in Chapter 3, to be all the more impactful when a study of their nuanced integration guides the design and musical selection of the space. In Chapter 4 the subtleties of atmosphere were exposed for their great dependence on music and sound. Which, without attention to our cross-modal sensory perception, and comprehension of interior space and sound/music, would not be nearly as successful.

As the conversation at Light Years revealed, the factors contributing to a successful selection of music for a restaurant space are anything but straightforward. Relying instead upon the ineffable ability to “read a room,” which is grounded in inherent feeling more than it is a matter of an equation for atmosphere. Therefore, it is only through meticulous attention to the interrelated functioning of our senses, and a sensitivity of design - to the way that space influences sound - that one can hope to achieve a restaurant atmosphere that both satisfies the customer and increases the equity and profitability of the restaurant.

In an attempt to finesse the talent for uniting the atmosphere with music, many restaurants have turned to apps that claim to know how to do this through algorithms. These

algorithms will either generate music based on key mood words (i.e. happy or sad) or, suggest music based on what you have listened to. One of the most famous of these apps is Spotify, which is widely used by the restaurant community throughout the world. Ironically, most of the time, algorithmic music selections do not, in fact, produce a more pleasing musical environment and instead have contributed largely to a sameness among restaurant spaces that are anything but reflective of their unique elements. As Michael Hann notes, “Spotify actually makes people into more conservative listeners, a process aided by its algorithms, which steer you towards music similar to your most frequent listening”(Hann, 2019). This in turn shows that algorithms prohibit restaurants from generating music that accompanies the individuality of their restaurant space. Relying instead upon a pastiche of musical selection, that never deviates or integrates itself, but simply caters to the tone set by the first song on the playlist. Further, Hann remarks that “Streaming has stripped music of context, pared it back to being just about the song and the moment,” when it is, in fact, the attention *to* context that has been shown throughout this thesis to be so integral to a restaurant’s atmosphere and profitability (Hann, 2019). Emphasizing this point, Alec DeRuggiero (music supervisor for Gray V in New York City) says that the most significant musical element that influences a diner’s experience is “That fine line of creating a playlist for people that has enough discovery in it but then you’re still hearing something that’s familiar. It’s finding that balance of not being too cool or esoteric and also not sounding like a Top 40 radio station” (Day, 2018). Here, the fine line of creating the playlist is likened to the ability to “read the room,” and to then play music that caters to human perception.

As we move further into a technology based lifestyle, where in dining alone, things such as contactless pay (which removes human interaction from the dining experience) and algorithmic music are already dominating the experience, we must further seek the creation of

human atmosphere and question the extent to which it can be programmed by algorithm alone. During the pandemic, some restaurants began using DoorDash to allow customers to download backgrounds and playlists to use in group chats while they dined separately from each other; which problematizes further the degree to which atmosphere is contingent on the human experience. As Leslie Wu states, what DoorDash did may work for big chain restaurants, “Where familiarity and homogeneity are key to pumping out franchisees year after year, perhaps this environment can be replicated at home with a Zoom background and a corporate approved playlist in the background” (Wu, 2020). For smaller restaurants though, Wu believes it is a different matter, since, “Neighborhood bonhomie is a signature part of the aesthetic and not easily replicated in a digital world, these methods ring hollow” (Wu, 2020). Wu’s comments emphasize a divide that we may begin to see more of in the restaurant industry in the coming years. Larger restaurants will rely upon an established and branded atmosphere to attract customers while adhering to technological advances, while smaller restaurants will either additionally embrace these changes at the cost of their “bonhomie” atmosphere, or find ways to incorporate them without hindering the delicacy of their unique atmosphere. Some, too, may simply reject technological advancements, and rely upon an individual’s ability to “read a room,” attend to atmosphere, and create an ineffable experience.

As we move forward into the fall of 2021, these observations and the continuing ways that covid-19 and its variants continue to impact and shape the dining experience - through technological advancements and health restrictions - will be integral to understanding how to maintain human connection in the dining atmosphere at large. It has been proven through this thesis that the attention to the human sensory experience is decisive in creating an atmosphere which will increase restaurant profitability and brand equity. The future of this research will rely

upon an understanding of how technology will both inhibit and improve the human sensory experience - can we refine algorithms to work better with the human senses, can the atmosphere survive without human interaction (such as is beginning to be introduced through contactless pay)? These are the questions which advance atmospheric creation, and will thus define the restaurant industry's success in monetizing the sensory atmospheric experience.

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Wu, Leslie. "Setting the Scene: How the Restaurant Environment is Changing During the Covid-19 Pandemic." *Forbes*. April 27, 2020.
<https://www.forbes.com/sites/lesliewu/2020/04/27/setting-the-scene-how-the-restaurant-environment-is-changing-during-the-covid-19-pandemic/?sh=7a67a912e880>.

APPENDICES

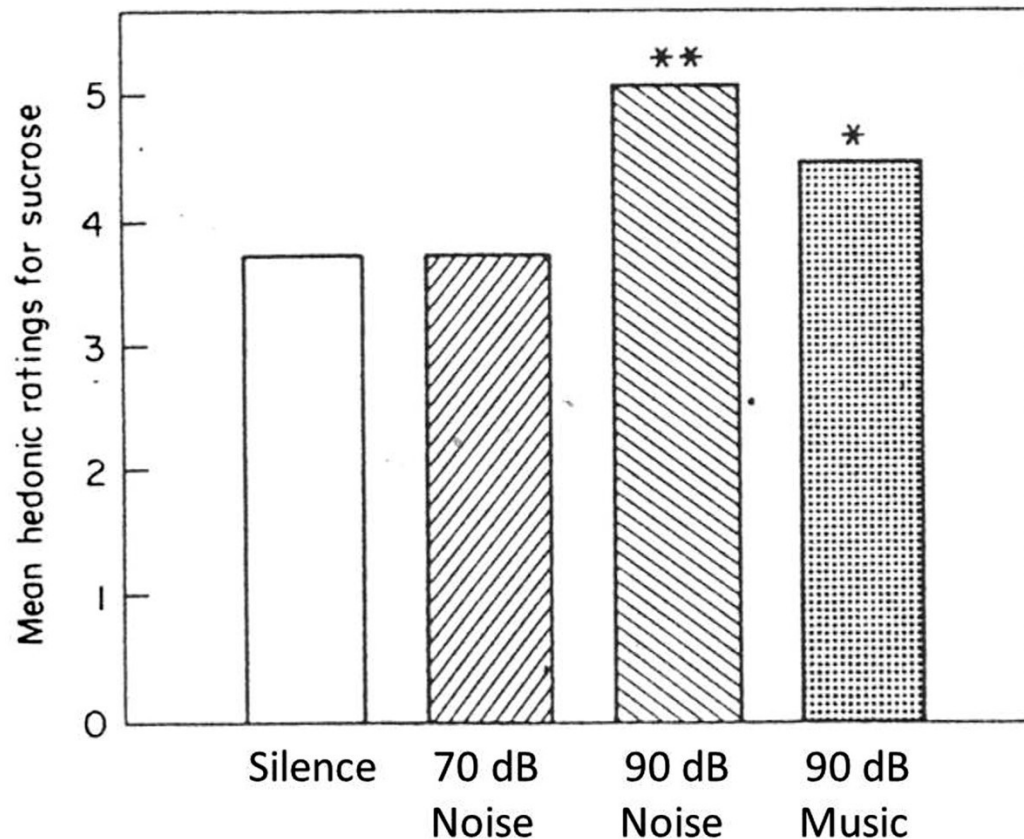
APPENDIX A

Spence, C. (2014). Noise and its impact on the perception of food and drink. *Flavour* 3:9. doi: 10.1186/2044-7248-3-9.

In this study Spence reviews the ways that noise can impact sweetness in food. Below is an excerpt from one of the sections of this review that my test of the two pitches determining sweetness and bitterness in chocolate was based on.

A few years later, however, Ferber and Cabanac conducted a study in which the hedonic valence of sucrose (but not of sodium chloride) solutions were elevated (meaning that people reported liking the solutions more) when listening to either loud noise or music (Ferber & Cabanac, 1987). The ten male participants who agreed to take part in this experiment had to start listening to the auditory stimuli 20 min prior to tasting to, in some sense, match the conditions that one might expect to find in a restaurant or cafeteria when dining. The sweet solutions were rated as significantly more pleasant when the participants were in the presence of the loud background noise or music (both presented at 90 dB over headphones) than when tasting in silence or while listening to quiet music (70 dB) instead (see Figure 2). Interestingly, despite the fact that each person was allowed to listen to the music that they liked (that is, they were encouraged to bring their own preferred music into the study), it was the presumably unpleasant white noise that actually gave rise to the largest sweetness enhancement effects. Ferber and Cabanac suggested that this particular cross-modal effect may have been mediated indirectly via the modulatory influence of noise on participants' arousal/stress levels which, in turn, may have affected their taste perception (Ferber & Cabanac, 1987).

Figure 2



Cited:

Ferber C, Cabanac M: Influence of noise on gustatory affective ratings and preference for sweet or salt. *Appetite*. 1987, 8: 229-235. 10.1016/0195-6663(87)90022-5.

Additionally, Spence conducted a study called “*A Bittersweet Symphony*” which was also foundational to the pre-test of determining sweet and bitter tastes. The following is stated in their abstract:

We report an experiment designed to investigate the consequences of manipulating the pitch of the background auditory stimulation on the taste of food. The participants in the present study evaluated four pieces of cinder toffee while listening to two auditory soundtracks, presented in a random order. One soundtrack was designed to be more crossmodally (or “synaesthetically”) congruent with a bitter-tasting food whereas the other soundtrack was designed to be more congruent with a sweet-tasting food instead. The participants rated each sample using three computer based line scales: One scale was anchored with the words bitter and sweet. The second scale required participants to localize the taste/flavour percept elicited by the food (at the front

vs. back of their mouth). The third scale involved participants giving a hedonic evaluation of the foodstuff. As expected, the cinder toffee samples tasted while listening to the presumptively 'bitter' soundtrack were rated as tasting significantly more bitter than when exactly the same foodstuff was evaluated while listening to the 'sweet' soundtrack instead. These results provide the first convincing empirical demonstration that the crossmodal congruency of a background soundtrack can be used to modify the taste (and presumably also flavour) of a foodstuff.

Cited:

Crisinel, A., Spence, C., Cosser, S., King, S., Jones, R., Petrie, J., (2012). "A bittersweet symphony: Systematically modulating the taste of food by changing the sonic properties of the soundtrack playing in the background." *Food Quality and Preference*, vol. 24, Issue 1. (pgs. 201-204). <https://doi.org/10.1016/j.foodqual.2011.08.009>.

APPENDIX B

Recordings Filenames:

"Berbena Jan 21 Dinner 20.30" Duration 46:40

"Berbena Jan 21 Dinner 20.30" Duration 10:22

"Berbena Jan 24 Lunch 14h" Duration 1:00:18

APPENDIX C



Fig. 1. Reprinted from Eat Drink Films

<https://eatdrinkfilms.com/2015/10/23/critics-corner-el-somni-the-dream/>



Fig.2. Reprinted from Eat Drink Films

<https://eatdrinkfilms.com/2015/10/23/critics-corner-el-somni-the-dream/>

Figures 1 and 2 demonstrate media elements at play during the courses of the El Somni dinner.

APPENDIX D

El Somni. Youtube. April 30, 2014. *El Somni (The Dream - El Cellar de Can Roca) - Official Trailer*. YouTube. <https://www.youtube.com/watch?v=0fZ5ZtyA8yI&t=1s>.

APPENDIX E



Fig. 3. Hilton, W. "Restaurant View." November 5, 2016. *Yelp*.
https://www.yelp.com/biz_photos/harts-restaurant-brooklyn-2?select=rSoimpCRIAFLvr614gTAw.

Figure 3 demonstrates the dim lighting and candles used in Hart's, as well as the closeness of each table to each other.

APPENDIX F



Fig. 4. Williams, Matthew. Birdie's. August, 2021. *Google*.

<https://www.google.com/maps/uv?pb=!1s0x8644b5080783e9b7%3A0x3966bdc4f4a3a61a!3m1!7e115!4shttps%3A%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipNUcBOoJVacS3UXvB95oBxfBtJxxpBQncthechi%3Dw172-h174-n-k-no!5sbirdies%20austin%20tx%20google%20photos%20-%20Google%20Search!15sCgIgAQ&imagekey=!1e10!2sAF1QipPNFNlt4fS7d430YhWHyuNzEJcEzhSbgTp5zgIG&hl=en>.

Figure 4 shows the starkness of the decor at Birdie's. Against the small white wall in the right of the image is where the speaker is. If a customer is sitting there on a night like the one in the image, it will be very loud and discordant to the dining experience by having the speaker so close to them (and the open kitchen).

APPENDIX G



Fig. 5. Ganter, Brigitte. Cotogna Outdoor Set-Up. August, 2021. *Google*.

https://www.google.com/maps/uv?pb=!1s0x808580f5182f4603%3A0x355bdd340d9a7979!3m1!7e115!4shttps%3A%2F%2Fih5.googleusercontent.com%2Fp%2FAF1QipMWLkgCXUuPDDEUGbQb_gpnCegf45hZuMLbG0n9%3Dw320-h320-k-no!5scotogna%20san%20francisco%20-%20Google%20Search!15sCgIgAQ&imagekey=!1e10!2sAF1QipM5pmaBVizwQDLQ1tlafN3fuY

[ljWW7TjuBX9Ntm&hl=en&sa=X&ved=2ahUKEwjrsae03_ryAhUiTjABHYQQAoIQoip6BAhqEAM](https://www.google.com/maps/uv?pb=!1s0x808580f5182f4603%3A0x355bdd340d9a7979!3m1!7e115!4shttps%3A%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipMWLkgCXUuPDDEUGbQb_gpnCegf45hZuMLbG0n9%3Dw320-h320-k-no!5scotogna%20san%20francisco%20-%20Google%20Search!15sCgIgAQ&imagekey=!1e10!2sAF1QipM5pmaBVizwODLQ1tlafN3fuYljWW7TjuBX9Ntm&hl=en&sa=X&ved=2ahUKEwjrsae03_ryAhUiTjABHYQQAoIQoip6BAhqEAM).



Fig. 6. Chan, John. Cotogna Outdoor Set-Up. August, 2021. *Google*.

https://www.google.com/maps/uv?pb=!1s0x808580f5182f4603%3A0x355bdd340d9a7979!3m1!7e115!4shttps%3A%2F%2Flh5.googleusercontent.com%2Fp%2FAF1QipMWLkgCXUuPDDEUGbQb_gpnCegf45hZuMLbG0n9%3Dw320-h320-k-no!5scotogna%20san%20francisco%20-%20Google%20Search!15sCgIgAQ&imagekey=!1e10!2sAF1QipM5pmaBVizwODLQ1tlafN3fuYljWW7TjuBX9Ntm&hl=en&sa=X&ved=2ahUKEwjrsae03_ryAhUiTjABHYQQAoIQoip6BAhqEAM.

Figures 5 and 6 demonstrate the care that Cotogna put into their outdoor dining set-up. Even on the street, the addition of trees and small plants greatly enhance the outdoor atmosphere.

APPENDIX H



Fig. 7. C., Lisa. Leo Outdoor Dining Set-Up. July, 2021. *Google*.

https://www.google.com/maps/uv?pb=!1s0x89c259f246a16dc1%3A0xffeef33565822d9!3m1!7e115!4shttps%3A%2F%2F5.googleusercontent.com%2Fp%2FAF1QipPz78QsgLXP1Ucipu05tSmhrPN6kitFXe_POFi5%3Dw492-h320-k-no!5sleo%20williamsburg%20-%20Google%20Search!15sCgIgAQ&imagekey=!1e10!2sAF1QipNmcyNYdBqym3tT43XZJkuFHVXrAOxn2vbraDKD&hl=en&sa=X&ved=2ahUKEwiQ3bbz4PryAhUoVTABHTR1DacQoip6BAhIEAM



Fig. 8. C., Lisa. Leo Outdoor Set-Up from Across the Street. July, 2021. *Google*.

https://www.google.com/maps/uv?pb=!1s0x89c259f246a16dc1%3A0xffeefd33565822d9!3m1!7e115!4shhttps%3A%2F%2Fh5.googleusercontent.com%2Fp%2FAF1QipPz78QsgLXP1Ucipu05tSmhrPN6kitFXe_POFi5%3Dw492-h320-k-no!5sleo%20williamsburg%20-%20Google%20Search!15sCgIgAQ&imagekey=!1e10!2sAF1QipNmcyNYdBqym3tT43XZJkuFHVXrAOxn2vbraDKD&hl=en&sa=X&ved=2ahUKEwiQ3bbz4PryAhUoVTABHTR1DacQoip6BAhIEAM

Figures 7 and 8 show two views of Leo's outdoor dining set-up to demonstrate the greater simplicity of their set-up in comparison to Cotogna.

APPENDIX I



Fig. 9. Prudence Cuming Associates. Inside Damien Hirst's Restaurant Pharmacy. February 24, 2016. *Business Insider*.

<https://www.businessinsider.com/damien-hirsts-pharmacy-2-restaurant-in-london-photos-2016-2>.

Figure 9 shows Hirst's pharmaceutical restaurant concept which was ahead of its time in terms of steril, health and safety driven dining experiences.

