never left: Re-Sanctifying and Reappropriating Technologically-Mediated Acts of Self-Disclosure in Virtual Reality

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Arts

in Music

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Abstract

Over the past couple of decades, the advertisement industry's rampant monetization of personal information and coercive methods of data collection for the sake of profit have become a dangerous norm (Crain, 2021; Moon 2000). These dangers are further exacerbated when Virtual Reality is involved, thanks to the sheer number of sensors made increasingly necessary by the demands of the technology (Maloney et al. 2020) and the market control which Meta – one of the worst culprits of surveillance advertising (Crain, 2021) – holds over the medium. Yet the importance of safe and comfortable self-disclosure remains a fundamental human need: forming not only the basis of our interpersonal relationships, self-disclosure is essential to developing our own understanding of self (Derlaga & Berg, 1987; Stokes, 1987). As a digital humanist, game designer, and composer interested in the artistic expressions afforded by VR and self-disclosure alike, how can I safely explore self-disclosure in VR? In other words; how can we respectfully and artistically reappropriate the act of technologically-mediated self-disclosure? Created in response to these questions, *never left* is work of research-creation comprising of an audio-first (Çamcı & Hamilton, 2020) 10-15 minute VR experience, aiming to re-sanctify technologically-mediated acts of self-disclosure via mutual reciprocity, consensual design, and navigable music (Berkowitz, 2016). This thesis document serves as the work's artist statement and details my motivations, inspirations, and processes for creating *never left*.

Acknowledgments

I would like to thank my family, for supporting me through not one, but two Fine Arts-related graduate degrees. If you guys weren't so cool, I'd probably be doing something like Engineering right now. Whether that's a good thing or a bad thing, well... I'll leave it to the interpretation of the reader.

I would like to thank my friends, whose thoughtful words have found themselves into this work.

I would like to thank our cat Ruka, whose purrs and snuggles have helped greatly in keeping me sane. Sadly, I had to remove her attempts at contributing to my thesis document as she never seemed to provide academic sources for her insightful reasoning (i.e., m2bh4oin8=foiqqeeeeeeeeeeeeeeeeeee).

And finally, I would like to thank Emily; my creative springboard, my sanity checker, my number one fan, my partner in life. This project wouldn't be the same without the smiles and laughs that you bring into my life, each and every day. Thank you for everything.

Table of Contents

List of Components

1. bevan_neverLeft.zip – a .zip file containing the project's Windows executable file.
2. bevan_neverLeft_demoVideo.mp4 – a video recording of a full playthrough of the work.

INTRODUCTION AND OVERVIEW

Virtual Reality continues to find itself in a delicate position, due to its prohibitive costs (Apple, 2024), significant barriers of entry (Ashtari et al., 2020), as well as the myriad of privacy and data sovereignty concerns (Maloney, 2020) that rightfully plague the pseudo-Meta-monopolized (D'Souza, 2024), sensor-ridden devices (Ni, 2024; Giaretta, 2022). VR also seems to be undergoing an identity crisis: Corporate fantasies of VR shopping malls and business meetings – best exemplified by Meta and their multi-billion dollar MetaVerse project (Harley, 2020) – struggle to find footing (Wagner, 2023), while terminally online, queer, and neurodivergent subcultures find respite in the ever-popular social sandbox VRChat (Krisel, 2023; Thibault & Bujic, 2022; Freeman & Acena, 2022). Entrepreneurs, journalists, and directors peddle VR's supposed ability to generate empathy (Milk, 2015), while queer and experimental game designers create scathing works of satire critiquing VR's fraudulent title as the "empathy machine" (Pozo, 2018; Ruberg, 2020). VR's relationship with social experience is similarly dividing. Mark Zuckerberg made "VR is *social"* the tagline of Meta Connect 2022 (Meta Developers, 2022), supporting his claim with clips of sanitized, smiling, and notably legless avatars huddled around virtual meeting tables. In an entirely different manner while still firmly being in the "VR is social" camp, the aforementioned VRChat subcultures use the platform's customizable avatars and niche communities to the fullest, allowing for social experiences which may feel to them as more 'real' than those in their physical life (Freeman & Acena, 2022; Acena & Freeman, 2021). Meanwhile, public perception is increasingly viewing VR as solitary and isolating, perceiving its attempts at social interaction being little more than a dystopian surrogate (Slivkin et al., 2025). Some within the art music community share in this perception of VR as isolating, but rather than dismiss the medium entirely, they have explored methods of performance which reconcile VR with the social experiences traditionally present in musical performance (Berkowitz, 2016; Lanier, 1993). How then, as a composer and digital humanist, can I create for VR in a way that remains cognitive of these divisive topics? Going further, instead of simply accepting these divisive topics around data privacy and sociality as unfortunate realities of using the medium, what would it look like if I instead worked them into the conceptual fabric of a VR experience?

As a work of research-creation which aims to explore these questions, *never left* is a solitary, reflective 10-15 minute-long VR experience which has the user fly through a large virtual space, dotted

with shapes engraved with text and glitch-y cubes which contain fragments of prose inside (for access to the Window's executable, see the ERA thesis repository). Upon loading into *never left*, the player is first shown an introductory cutscene which sets the mood and presents the question; *where do you call home?* As a reappropriation of the all-too-common demand from software and websites asking for our physical address, this question is what forms the basis of the player's reflection, and the basis for the work at large. The aforementioned bits of text engraved throughout the space are answers to the question sourced from my friends and family; the prose within the cubes, my own answer; the ambisonics heard while inside a cube, recorded in locations related to my sense of home; and the end of the piece, a virtual keyboard which invites the player to disclose their own answer. Musically, the piece is scored with an adaptive, procedural composition, gently responding to the player as they move throughout the space. The ways in which the composition responds to the player's orientation in space is conceptualized as metaphors for different facets of the self-disclosure process; namely agency, intimacy, and recontexualization. Made in the Unity game engine, *never left* utilizes Wwise – an industry-standard audio middleware solution which replaces Unity's default audio engine – to more easily facilitate its procedural and spatial audio.

Of course, all of this information necessitates further explanation. This thesis document is first and foremost an artist's statement, and details my motivations, inspirations, and processes for creating *never left*. It is divided into four major sections: software stack and experience description; VR, surveillance, and reappropriation; music, VR, and the solitary; and reciprocation, glitch, and empathy. Section 'zero' dives into *never left*'s software and provides a detailed description of the work for those who have not played through it themselves. Section one establishes the modern economy of targeted advertisements and the data harvesting which enables it, turning any disclosure of information into a commodity to be brokered, sold, and ultimately used to better manipulate people into purchasing products. I then speak to Meta's involvement in both advertisement and Virtual Reality, and tie it to the ways in which *never left* practices the act of artistic reappropriation. Section two explores music's "inherently social" nature and the ways in which the ubiquitousness of this phrase has led private and solitary musical experience to be unfairly dismissed. I then speak of VR's own complex relationship with sociality and relate it *never left*'s purposefully solitary design. Wrapping up section two is a deep-dive into the music and sound, detailing its conception, creation, and implementation. Finally, section

three establishes queer critiques of VR and empathy games, and how *never left* embraces these critiques by incorporating elements of critical distance, reciprocal storytelling, and glitch.

SECTION 0: SOFTWARE STACK AND EXPERIENCE DESCRIPTION

Software and tools

As *never left* is a thoroughly interdisciplinary multimedia experience, my workflow utilized close to a dozen pieces of software. At its foundation is the game engine; the software which is responsible for actualizing the experience and bringing together the art, sound, music, haptics, design, and more into one executable piece of software. In its current state and considering my use case, VR only has two viable game engine options for development: Unity, and Unreal (though the open-source Godot engine is ever-increasing its VR capabilities). As the two leading commercial game engines, Unity and Unreal have been behind countless games, installations, and experiences. Between the two of them, there is not a clear 'correct' choice for VR development. Both offer fully-fledged development environments capable of complex virtual worlds, cross-platform VR support, and plug-and-play VR tools that significantly ease the process. For the purposes of *never left,* I chose to use Unity due both to its well-documented VR support and my prior experience with the engine as VR development software. In most ways, Unity proved more than sufficient for the relatively simple requirements of the project, with its Shader Graph features proving particularly essential to the work's glitch-y visuals (discussed further in Section 3). However, an area that Unity could not satisfy my requirements for was audio. While Unity's default audio engine is sufficient for simple audio requirements, it becomes a hassle to manage when handling hundreds of assets, complex interactivity, and spatial audio – all essential components to *never left*'s sound.

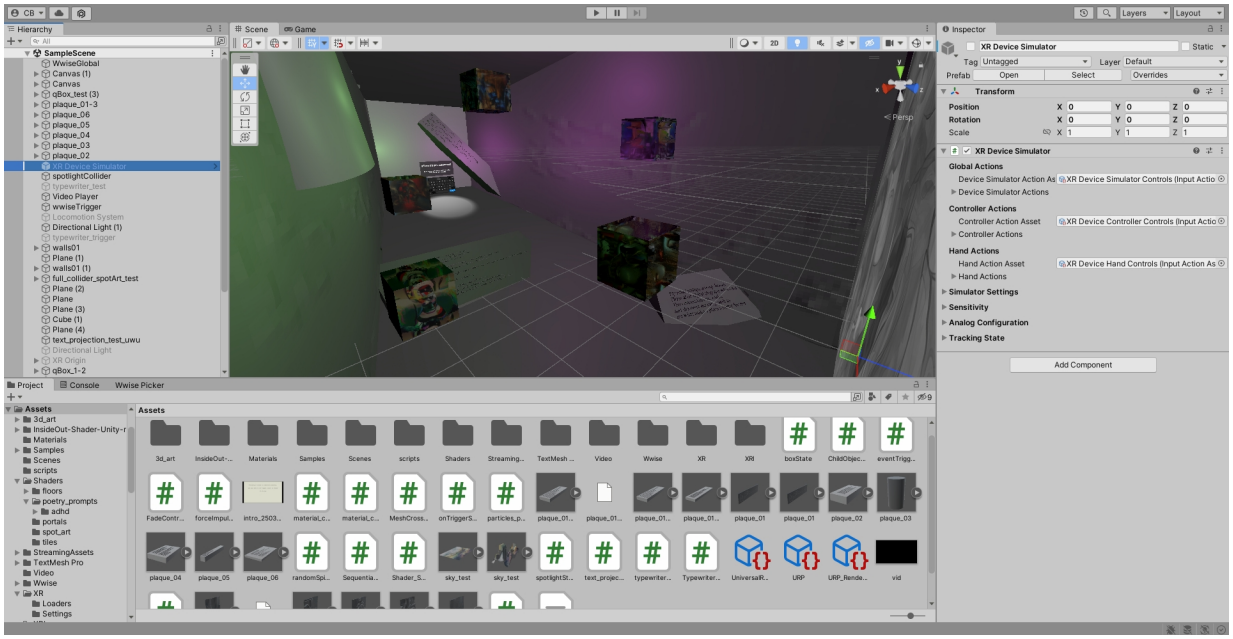

Figure 1: A screenshot of the project in the Unity game engine.

Thankfully, a solution exists in audio middleware. Audio middleware is software which essentially “rips out” the audio engine of whichever game engine you are using, and replaces it with its own, more fully-featured systems. Much like game engines, there are two viable options for audio middleware software: FMOD, and Wwise. If you have played even just a handful of video games in the past decade, there is a significant chance that – behind the scenes – at least one of them was powered by FMOD or Wwise. What makes these pieces of software so desirable is that they are developed specifically to meet the needs of sound designers and composers. Some important features include: built-in support for complex logic systems (including states, switches, weighted randomness, triggers, sequencing, blending, and more), allowing sound designers to quickly create highly interactive audio without the need for code; the ability to easily sync events and triggers to the beat of the music; extensive organization capabilities, even in the face of hundreds or thousands of assets; and powerful spatial audio features, including realistic reflection, occlusion, diffraction, and reverberation characteristics that can be tuned to not only the shape of a space, but also the unique materials of walls and objects within that space. Both FMOD and Wwise are exceptionally powerful and have official integration support with Unity, and while I have experience in both, I settled with Wwise due to my greater familiarity with using it in virtual 3D spaces. Wwise proved essential in my creation of the work’s navigable and interactive music systems (discussed further in Section 2). Despite their complexity, the C# code in Unity is only responsible for triggering a couple of events and sending some

values to Wwise; the vast majority of their logic is found within the nested and interconnected "containers" that Wwise uses to playback audio. Rather than simply triggering individual audio files, Wwise provides the ability to trigger different kinds of containers, each of which holds audio files or additional nested containers. These container types include "random" (which when triggered, randomly selects and plays one of the audio files which it contains), "switch" (which plays a different file/container depending on the current value of an in-game variable or state), "blend" (which enables gradual crossfading between separate loops in accordance to the value of an in-game variable), and more. Some common examples of how these container types may be used include using a random container to trigger random variations of a footstep sound upon each footstep, using a switch container to trigger different footstep sounds depending on whether the player is walking on grass or a wooden floor, and using a blend container to transition seamlessly between different loops of car sounds in accordance to the speed the car is going. This only scratches the surface of the creative implementation possibilities which Wwise makes incredibly accessible to sound designers and composers working in games. While the above examples could all feasibly be implemented within default Unity audio with the help of some C# code, the ease and speed of iteration that Wwise enables – particularly for people without strong programming backgrounds – is invaluable to creative audio in games.

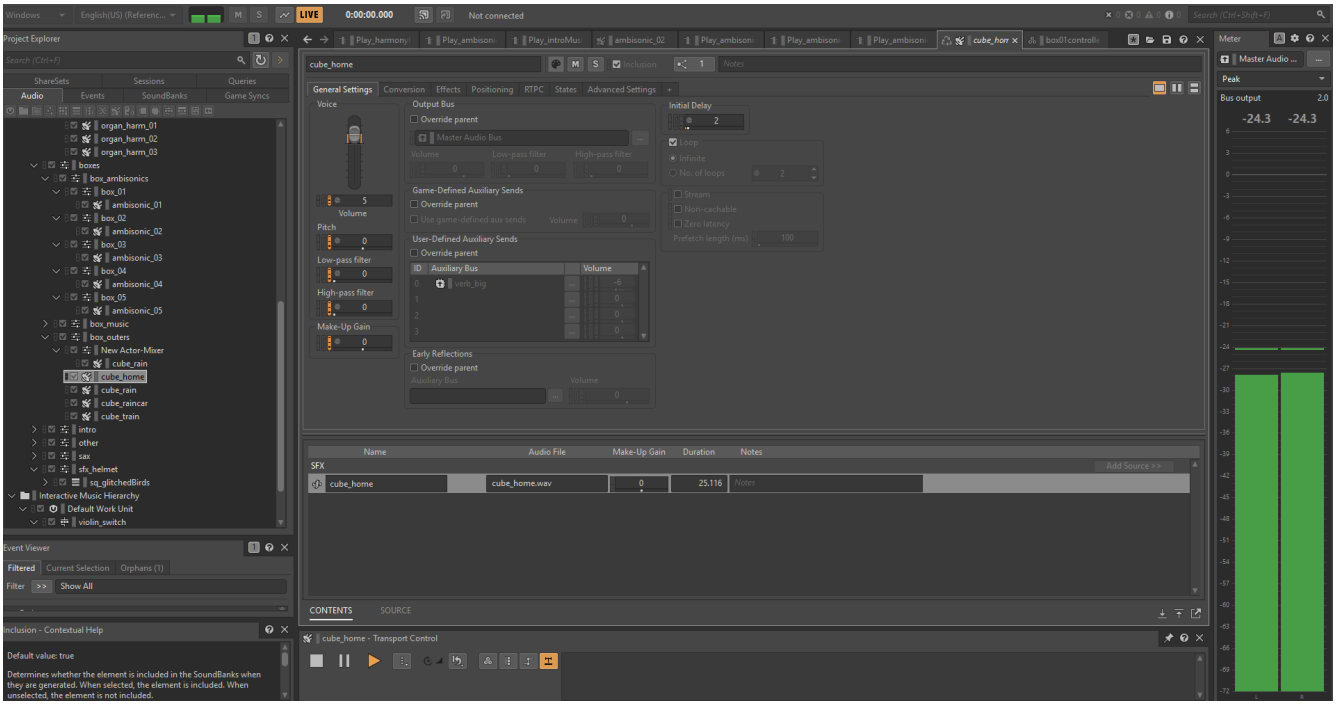

Figure 2: A screenshot of never left*'s Wwise project*

Once the game engine and audio middleware were established, all that remained was software to create the assets to put into the game. This came down first and foremost to personal preference. Ableton Live, as my DAW of choice for composition, was used to design the synth layers; Dorico was used to notate the violin part; REAPER, as my DAW of choice for audio editing, was used to edit, clip, and export the violin and saxophone recordings; the open-source IEM plug-in suite was used in tandem with REAPER to create ambisonic files from stereo recordings; Blender was used to create the engraved 3D shapes seen throughout the virtual space; Kdenlive was used to create the intro video; and Midjourney and various AI models on Huggingface were used to generate visual artifacts which formed the basis of the work's glitch-y cubes (described in Section 3). All-in-all, the interdisciplinary development of *never left* was the sort of project which frequently required me to have 8+ separate programs open at once.

Detailed walkthrough of the experience

The following sub-section is a description of what the user experiences as they play *never left* start to finish. For a video playthrough of the work, see: https://www.youtube.com/watch?v=08fwTDi3ro4.

Upon donning your headset and loading into *never left,* you are greeted with an introductory video, positioned in space directly in front of you. First, the video establishes some important meta information, such as controls, a declaration that your data is not logged or saved in any way, and an explanation that the answers found around the virtual space are sourced from my friends and family while the text on the insides of "objects" are my own answers. This makes more sense once you enter the virtual space, but for now, the intro video shifts in tone and the experience begins in earnest as lines of simple poetry are presented plainly, save for their possessive pronouns which randomly flicker between your/my/our/their/his/her/its at a speed almost too fast to process. The poetry is as follows:

listen to [my/your/our/their/its/his/her] heart beat /

reach through [my/your/our/their/its/his/her] veil /

explore [my/your/our/their/its/his/her] depths /

and revel in [my/your/our/their/its/his/her] self-disclosure /

It’s a set of instruction as to how to approach the work – to listen, to reach, to explore, and to revel – and an invitation to consider the different positionalities and of who or what they may consist (i.e., who is “me” in this case? Who is “you”? “it”? “us”?). The poetry is backed by a slow-moving, neutral, and vaguely yearning piano solo. Then, upon the 4th and final line fading out, the piano strikes a foreboding octave in the lower register as the video suddenly issues a demand – “ADDRESS: _”, the underscore blinking expectantly. Not long after however, the piano begins to lazily climb in register, before suddenly being cut-off to the abrupt sound of static as the word ‘address’ is violently stricken through in a brief flash of red. As suddenly as it appears, it dissipates; the piano resuming its climb as though nothing had happened, while the question “where do you call home?” is slowly scrawled across the screen. As the piano reaches it final, hopeful note, the video fades away and you are left in a dark, rectangular tunnel leading to a grey, translucent, smoke-like screen. The piano has left, replaced now by a lone synthetic drone; it is clear that there must be something beyond the smoke, the veil. And so, you gently fly towards it, as there is no gravity holding you down in *never left.* Wherever you direct your gaze, you gently fly towards as you hold forward on your controller.

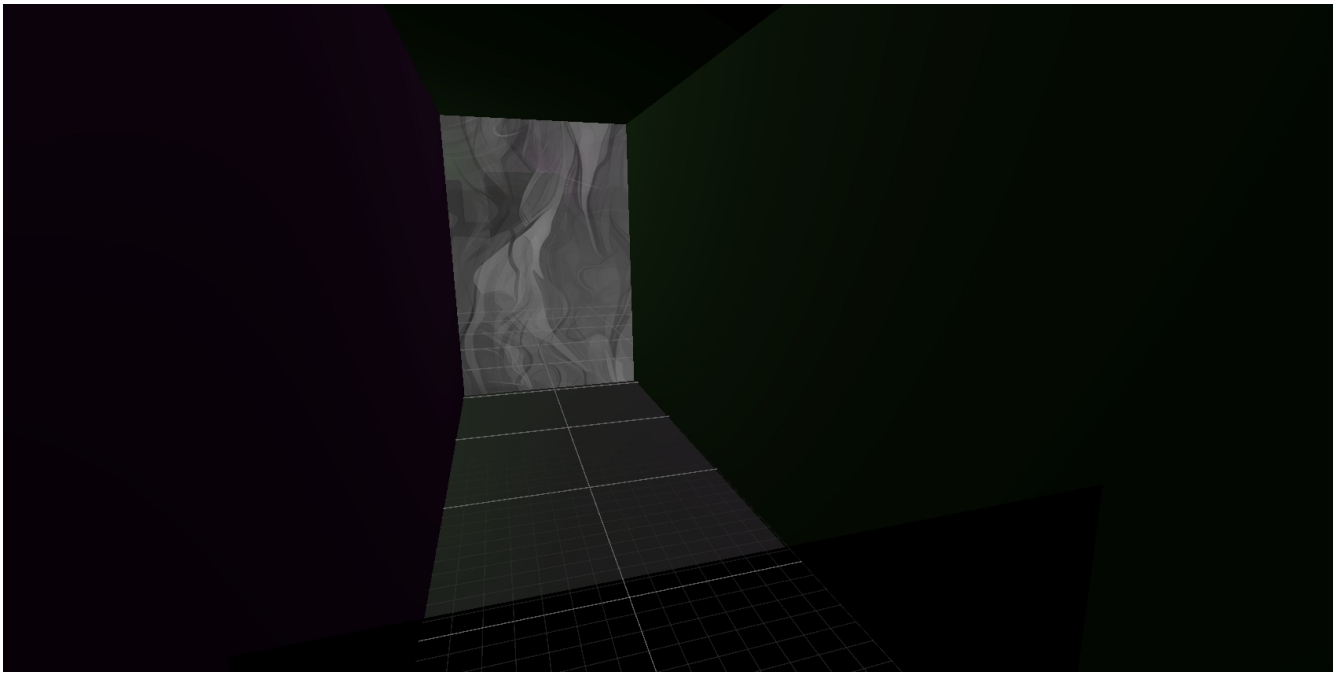

Figure 3: The introductory tunnel.

Upon flying face-first through the smokescreen, you find yourself floating at the edge of a massive rectangular space which narrows as it reaches the far side. To speak first of what you see, five colourful and glitch-like “cubes” – each face a distorted, nonsensical AI generated artifact – rotate slowly in place at varying distances and heights from your current position. Nearly ten large and 3D

shapes such rectangles and cylinders are jutting out of the walls, floor, and ceiling, with engraved text visible. Drifting slowly towards and past you are words and short sentences – “Alberta”, “my hometown”, “I don’t know” – these are answers to the very same question presented to you at the end of the introductory video. While the middle of this huge rectangular space is unlit, the left side is illuminated in a green, and the right side in purple. To speak of what you hear, the lone drone remains but is now accompanied by three new voices; a harmonic synth layer, a rhythmic and pulsating saxophone part, and a delicate and slow-moving violin part. The synths maintain a familiar chord, neutral and slightly yearning – the same chord which began the piano solo in the introduction. Meanwhile, the saxophone establishes a tempo through incessant and percussive eighth notes. Sitting gently on top is the violin, contributing a simple and delicate melodic phrase before fading out and returning a dozen or so seconds later. Where you’re standing – just outside the intro tunnel – the reverb is suggestive of a massive space akin to a cathedral.

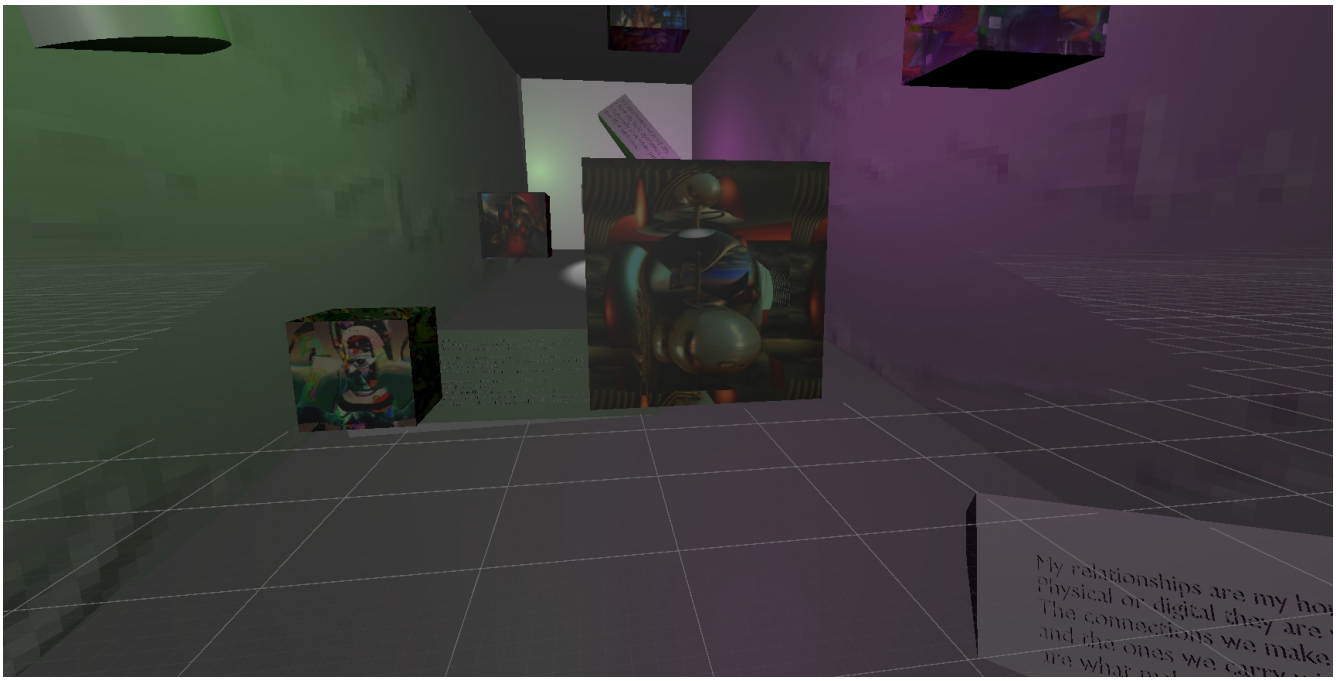

Figure 4: The player’s view when they first fly into the space.

Flying through the space, you get a closer look at the shapes engraved with text, discovering that they are answers to the same question. As you fly from shape-to-shape and reflect on their text, the music undergoes a series of shifts and changes in accordance to your position in 3D space. Moving into the left third causes the saxophone and harmonic backdrop to shift in tandem, while a green glow envelops the environment; to right, and the glow turns purple while new harmonic areas are explored. Approaching the ceiling causes the saxophone and violin to reach into their higher registers, while

diving to the bottom results in the opposite. Nearing the back of the space gradually causes the reverb to shrink in, until it eventually is suggestive of a small, intimate room. But the engraved shapes are not the only objects drawing your attention; there are still the colourful and glitch-y cubes which are slowly rotating in place. Getting closer, you can make out the extent of the art's distortion, each 2D face appearing more like a 3D artifact, with ridges, depth, and texture. Reaching a hand into a cube face causes a granular, static texture to be heard, inviting further exploration and suggesting that you may fly inside. Upon doing so, you become surrounded on all sides by the same visual artifact seen on the outside of the cube, now lit from the inside in a warm and intimate space. The 'outdoor' music fades away and is replaced by an improvisatory piano solo and a field recording made into a 360-degree sphere of sound which slowly rotates in tandem with the cube. On one of the inner walls is some text – a part of my own answer to "where do you call home?". My answer is split into five lines of prose – one for each cube – meaning you must visit the insides of all five cubes to piece together my full response. All together, the prose reads as the following:

I still struggle not to tear up when I visit locations from my childhood… /

… the park across the street, the shitty playground down the alley, the church next door… /

… part of me never left that place. /

nowadays though, I feel more nomadic… /

… and am lucky enough to have someone whose presence beside me is all I need to call anywhere home. /

Figure 5: The inside of one of the 'cubes'.

After you have explored the cubes, engraved shapes, and navigable music to your heart's content, all that is left is to enter the spotlight at the back of the space. Once inside the light, a keyboard manifests in front of you, and you are once more prompted with the question "where do you call home?", with a disclaimer that answering is completely optional. Upon pressing the Enter key, the game gently fades to black before closing itself.

Figure 6: The spotlight and virtual keyboard.

SECTION 1: VR, SURVEILLANCE, AND REAPPROPRIATION

> *"This investigation examines the dynamics associated with soliciting intimate information from consumers via computers. Implications for marketing research is discussed."*
>
> Youngme Moon, 2000.

Today, reading Moon's exploration of eliciting personal information for commercial intent is an experience not unlike uncovering ancient – and unheeded – warnings of an apocalyptic disaster. With each new and improved medium for accessing the web comes a new and improved method for harvesting personal data (Nair, 2023), and in the 25 years since Moon's article, global ad revenue has surpassed 1 trillion dollars (McNally, 2024). Notably, over half of that trillion comes from the 5 largest advertisers; Google, Meta, ByteDance, Amazon, and AliBaba. A familiar name populates this list: Meta, the company behind Facebook, Instagram, Threads, and the Meta Quest, the most popular consumer VR headset. Taking Meta's expensive, exorbitant, and often wildly unsuccessful ventures in VR (Wagner, 2023) and contrasting them to the 100 billion they made off Facebook ads alone in 2024 (*Facebook Ad Revenue Set to Top $100bn*, 2024), it isn't an exaggeration to say that Meta's industry-leading VR development is heavily subsidized by targeted advertisements which are augmented with personal data harvested off of their social media platforms – and even the headsets themselves. With a mandatory Facebook account and desktop app required for even running your Meta Quest, there is little doubt that part of what allows Meta to sell their headsets for so much cheaper than their competitors is by monetizing data harvested through the Quest to fuel targeted advertising (Johnson, 2022).

It is essential to emphasize and elaborate upon the word *targeted* here, as the nature of targeted advertising transforms a minor annoyance of a banner pop-up into a moral and ethical catastrophe (Drumwright and Murphy, 2009). Rather than showing random or pre-selected adverts to webpage visitors, targeted advertising – also referred to as surveillance advertising (Crain, 2021) – uses psychological profiles built through the user's web-traffic, search history, address, gender, age, bookmarks, and more to "customize" which ad is shown. This is not an isolated problem: a study of one million popular websites found that nearly 90% collect and exchange data with external third parties of which most users are unaware (Libert, 2015). In corporate speak, this process is framed as providing us with ads which are more "relevant"; as if

they are doing us a favour. However, I personally struggle to see the good intentions in data broker firm Cambridge Analytica's harvesting of 87 million people's Facebook data (Lapowsky, 2018), later used when they were hired by the 2016 Trump campaign to serve Facebook ads to particular groups of Democrat voters to discourage them from voting (Crain, 2021).

This is but one scandal of hundreds in the age of surveillance capitalism (Zuboff, 2023); as put by privacy researcher Matthew Crain, "the [advertising] industry's economic success is rooted in its virtually unrestrained monetization of consumer surveillance." (Crain, 2021, p. 1). Little to no transparency, little to no oversight, little to no ethics; even when one is aware of the manipulation of their personal data, it remains nearly impossible to avoid. Despite alternatives existing, our own publicly funded university necessitates the use of Gmail and Google services, a company with nearly 90% of their hundreds of billions in yearly revenue coming from surveillance advertising (Zuboff, 2023). And as much as I may want to scrub my name and image off the web, as an artist, it is virtually required of my career to maintain a social media presence and easy-to-find online portfolio. Online forms asking for names, addresses, and phone numbers, only to share them with third parties; "smart" devices requiring app downloads which log your location data (Sivaraman et al., 2018); empty promises of "we delete your data!" betrayed time and time again by hacks and leaks (Collier & Yang, 2025)…

It's frustrating. And it is out of this frustration that my initial motivations for *never left* were born. I wanted to take back the act of self-disclosing to technology, to take a stand against the sacrilege that is surveillance advertising by treating disclosure not as a commodity to be exploited, but instead respecting it as a sacred and deeply personal process. I wanted to create something which would make people feel safe and thoughtful in their disclosure, to restore a meaningful sense of self-reflection that is simply not present while filling out online forms or creating social media accounts. It is an artistic motivation that I have held for years now, originally seeing the light of day in a Max/MSP prototype which presented the user with a series of personal questions on a flat gray screen, accompanied by reciprocal answers fading in and out and scored by increasingly busy generative music. This project however, is different. This project is in Virtual Reality. But if data privacy and self-disclosure is at the crux of *never left*, why use a medium so laden with sensors and privacy concerns (Maloney, 2020; Nair, 2023)? Why use a medium which is virtually monopolized by Meta, one of the largest offenders of surveillance

advertisement?

Figure 7: The original Max/MSP prototype.

Artistic reappropriation

Using VR in a work like *never left* is meant as a statement; it is subverting expectations around both a piece of hardware (the VR headset) and an act (self-disclosing to technology) which are frequently exploited for the purposes of surveillance. *never left* is far from the only art piece which uses modern technologies in this fashion. Sterling Crispin's *Data Masks* series maladapts facial recognition and detection algorithms – typically used by police states to identify and surveil citizens with shocking ease – to work in reverse, blurring and disfiguring images of faces rather than making them clearer. These contorted faces are then 3D printed and glued to a mirror for gallery display (Crispin, 2013). Zach Blas's *Facial Weaponization Suite* is another take on protesting facial recognition software, creating grotesque masks made of aggregate information, such as the *Fag Face Mask*, generated from "the biometric facial data of many queer men's faces" and made in response to "scientific studies that link determining sexual orientation through rapid facial recognition techniques" (Blas, 2012). *Finding Way Through Maze* by Grace

Cho uses a laser-printed map of her university campus onto transparent plexiglass and red painted dots where security cameras are placed (Cho, 2020). The viewer is then tasked with attempting to draw a path through campus without passing a camera. On the contemporary music side of things, composer Stephan Prins's Generation Kill for percussion, electric guitar, violin, cello, four musicians with game controllers, live electronics, and video functions as a critique of modern warfare, surveillance, and the nature of responsibility in virtual combat zones (Prins, 2012). And finally, there is the especially relevant work of *Know Thyself as a Virtual Reality,* an interdisciplinary project led by Marilène Oliver bringing together artists and academics from the University of Alberta and other institutions to explore the ethics and aesthetics of medical data in VR (*KNOW THYSELF AS A VIRTUAL REALITY,* n.d.). Their piece *My Data Body* is of particular note, "[bringing] together different forms of [Oliver's] personal data such as medical scans, social media, biometric, banking and health data in an attempt to make visible and manipulable our many intersecting data corpuses so that in VR they can be held, inspected and dissected." (*My Data Body,* n.d.).

Each of these pieces embraces what Cho puts forth as the "responsibility" of art to make power visible again. (Cho, 2020). It is undeniably important that art does so; an unfortunate aspect of surveillance in the Information Age is that people rarely think of this system of control as oppressive, for the power remains "invisible and intangible" (Cho, 2020, p. 23). Power in the Age of Information is instead "like a gas"; omnipresent, ever felt, and yet somehow "unremarkable" (Deleuze, 2006). All of the above works do an excellent job at making artistic use of personal data and/or surveillance tools to draw attention to their misuse and the ways they hold invisible forms of power over us. However, none of these works share an approach wholly similar to my own. My largest inspiration instead came from Rafael Lozano-Hemmer's *Border Tuner,* a large-scale interactive installation which was erected along the US/Mexico border dividing the cities of El Paso, Texas, and Ciudad Juárez, Chihuahua. Using powerful searchlights on both sides of the border, *Border Tuner* creates "bridges of light" as participants use large wheels to rotate the searchlights and intersect them with one another in the sky. When that occurs, a bidirectional channel of sound is opened up between the participants at the controls for the two intersecting spotlights, allowing them to communicate with one another. As they speak and hear each other, the brightness of their "light bridge" modulates in sync, creating a glimmer similar to a Morse code scintillation (Lozano-Hemmer, 2019). In essence, Lozano-Hemmer takes a piece

of surveillance hardware – in this case searchlights – and uses them to connect people rather than oppress them. *Border Tuner* is less about making surveillance and power "visible" as it is about reappropriating devices of power as a site of artistic intervention, and it is especially poignant and effective given the political climate around the US/Mexico border and the role searchlights play in maintaining border surveillance.

Figure 8: Border Tuner *by Rafael Lozano-Hemmer.*

I have tried to approach *never left* in a similar fashion, reappropriating both VR hardware, as well as the act of technologically-mediated self-disclosure. Rather than use VR in the same way as its Meta overlords – as a high-tech data harvesting machine – I am reappropriating it for an offline, solitary experience in which no data is saved nor shared. Rather than use technologically-mediated self-disclosure the same way as advertising super-giants – as a commodity to broker and manipulate into a psychological profile – I am reappropriating it as a means of personal, private, and sacred self-reflection. The intro cutscene to *never left* visualizes this reappropriation by prompting the player with an ominous typing of "ADDRESS: _" on a

black screen, blinking as if waiting expectantly. I'm showing the player what they're used to, what they've come to expect; the incessant, dehumanizing plea for their personal information. After a handful of seconds it's cut short, replaced by a jarring red screen and the word ADDRESS crossed out. This frame lasts only a fraction of a second before we return to white text on a black background, but rather than be prompted for their address, players instead watch as the question "where do you call home?" is typed out one character at a time. After a lengthy pause, the cutscene gently fades away and the player is left to explore the virtual space. The rephrased question "where do you call home?" is meant to have the user re-examine answers they have given out countless times online, answers they have no doubt sterilized and given little thought. This is my attempt to demonstrate to the player that disclosure works differently in *never left*; that this is a space to not just provide an answer and check a box, but a space to better grasp what that answer means to them in the first place.

Figure 9: The crossed-out "address" frame from the intro video of never left.

Putting the 'sanctity' in re-sanctification

So, I've asked the player this question: now what? How do I allow them to answer? What (if anything) do I do with their answer? As a reappropriation and re-sanctification of self-disclosure, it is imperative to remain respectful of what, if anything, the player discloses to the

experience. Presenting the player with the opportunity to disclose their own answer is the end point of the work, as tucked away at the very back of the work is a spotlight which, upon the player flying into it, reveals a virtual keyboard for them to submit an answer. The first part of following through on remaining respectful of self-disclosure is to emphasize that it is not required and should only be given with consent. Hence, there on the plaque which restates the work's primary question, I add that it is OK to leave the answer empty. The second part meant avoiding heavy-handed attempts to "analyze" or "interpret" the player's response(s), such as using sentiment analysis or data sonification. While these methods have their places in facilitating new realizations about a set of data (Lenzi and Ciuccarelli, 2020; Scaletti, 2018; Astya, 2017), they are not suitable for potentially sensitive information (Rockwell and Berendt, 2017), nor *never left*'s aesthetic intent. *never left* is meant to reclaim the act of self-disclosure to digital entities as an artistic experience; not to facilitate rational understanding, but instead subjective, reflective experience.

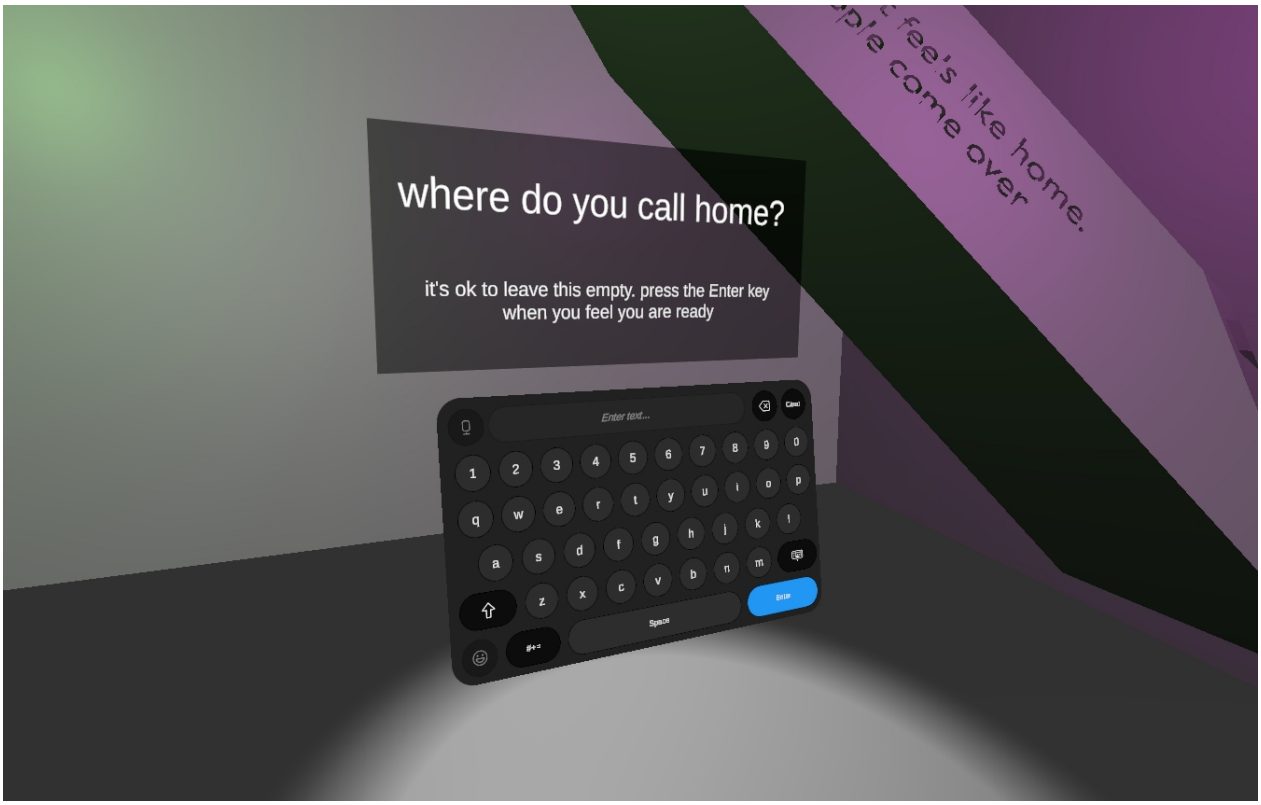

Figure 10: The back of the virtual space, featuring a keyboard for input.

After much internal back-and-forth, for the purposes of this shortened thesis experience in which only a single question (where do you call home?) is fielded to the player, I have opted to do nothing at all with the player's optional disclosure. It is not saved nor logged, interpreted nor analyzed; once the Enter button is pressed on the virtual keyboard at the back of the space, no matter what is in the text box the software begins its shutdown sequence, fading to black before closing itself. Simply put, I came to the conclusion that what the player chooses to disclose at the end – if they disclose anything at all – is not my place to incorporate into the work's design. After all, the user who gets the most out of this experience may not feel the need to type anything into the keyboard at all. A large part of what makes *never left* a re-sanctification of self-disclosure is that the self-disclosure is completely optional, done with consent and without manipulation. To somehow use, measure, interact with, or otherwise integrate the user's typed answer would be a form of betrayal against these tenets of consent and optionality that I hoped so dearly to return to technologically-mediated self-disclosure.

However, this is not to say that I had no other ideas to approach and react to the users engagement with *never left*, given I had the time and means to implement a larger scale piece. In a fully completed version of the work in which I fielded 3 or more questions to the user, my original plan was to include a musical epilogue which was built from the unique sounds and materials of the prior levels, with the mixing and presentation of its various musical layers balanced and pieced together in accordance to how much time the user spent with their corresponding question. In other words, the motifs and materials of the section the user spent the most time reflecting upon would be the most musically represented, while the sections the user did not appear to reflect upon as much would be less musically represented. I believe this would be a satisfying solution for the user, providing a proper sense of finality, having their reflective journey with the work still feel 'heard' and responded to, and feeling more reminiscent of a dialogue between the user and the experience than a one-sided analysis where their disclosure is put under a hypothetical microscope.

In summary, this section tackled one of my primary motivations for creating a VR work centered around self-disclosure; that of artistic reappropriation. How then does the rest of *never left* – its music, its visuals, its solitary design – contribute to this artistic vision? In what ways have I drawn together a medium as interdisciplinary as VR into a coherent experience focused on

self-reflection and disclosure? In the next section, I tackle the complex dynamics between music, VR, and social experience, and describe my approach to *never left*'s sound.

SECTION 2: MUSIC, VR, AND THE SOLITARY

"Dance like nobody's watching."

Susanna Clark and Richard Leigh, *Come from the Heart.* 1987.

Music is inherently social. Words I have heard countless times from colleagues and professors of various musical disciplines across a decade of academia, said as an aside, a statement of the obvious; as casually as discussing the weather. I happened upon this exact statement in a doctoral dissertation on music in VR (Berkowitz, 2016, p. 3), and louder than the words themselves I found the absence of a citation. This isn't to point my finger and shame, for it is entirely understandable how the statement "music is inherently social" has become uncontested – it's because it's true! A statement of well-known and accepted fact. Back in 1999 ethnomusicologist Christopher Small delivered a lecture on an isolated herdsman, guarding their flock in the African night with naught but their flute for company. They play. No one listens. And yet, their isolation does nothing to remove them from the social processes that produced the flute itself, nor extract them from the culturally and socially-informed stylistic materials of the music they improvise. In other words, even the herdsman's solitude is social.

Yes, it is true – music is inherently social. But I ask: did our flutist protagonist not play any differently in this isolated context than they would for an audience or in an ensemble? Was their choice in musical material not altered by the absence of potential judgment? Their ears not tuned by the silence left in the wake of isolation? Their motivations not influenced by the performance's agency of which they now reign over as sole heir? While Small's article successfully highlights the social and cultural undergirding of all musical experience, it has the side-effect of homogenizing solitary music-making with public performance; it is all 'musicking' (Small, 1999). As a result, the 'music is inherently social' mantra has been erroneously extrapolated to exclude solitary and private means of musical experience as invalid. The aforementioned doctoral dissertation on composing for VR used said mantra as their reasoning for pursuing VR performance art which takes from traditional audience-performer social dynamics rather than isolate users within solitary headsets (Berkowitz, 2006) – a pursuit shared with one of the original pioneers in VR music (Lanier, 1993). This is a valid artistic and musical approach which undoubtedly serves many projects best; but is it the right approach universally?

In a similar example, one of the foundational texts of ethnomusicology puts forth the unguarded statement that “music sound cannot be produced except by people for other people” (Merriam and Merriam, 1964, p. 6). While Merriam likely did not intend his remark to be taken so literally, its implications have been adopted by ethnomusicologists for decades, with Richard Leppert noting 30 years after the fact that “the history of private musical life remains largely unwritten” (Leppert, 1993, p. 15). As put by Andrew Killick, “[ethnomusicologists], while claiming to study music in all its diversity, have ignored one of the most prevalent forms of music-making going on all around them” (Killick, 2006, p. 273). Private, asocial, and solitary; public, social, and communal – thrown around carelessly, these terms can become misleading synonyms for one another. A cry that all musical experience is inherently social, never asocial (Shepherd, 1977), can be misunderstood to mean true musical experience aught to be public, never private; communal, never solitary.

Holicipation

In response to this blind spot of solitary musical experience, Andrew Killick devoted significant research to what he terms ‘holicipation’. Killick defines holicipation by comparison with “‘participation’ (taking part)”, where holicipation is “taking the whole, in that [...] the solitary music-maker personally experiences the whole of the musical event” (Killick, 2006, p. 273). The coining of a new term is not an act to be taken lightly, and Killick makes clear the historical disservice solitary music-making has received. Without a word or term available, ethnomusicologists have referred to holicipatory music-making only with adjectives featuring “connotations of loneliness and isolation”. “Solitary”, “lone”, even “self-pleasuring” (Kramer, 1995, p. 232); these expressions imply that making music by and for one’s self is nothing more than a substitute for “the real thing” (Killick, 2006).

Essential to Killick’s concept of holicipation are the ways which differentiate it from social music-making. Rather than homogenize the social and asocial, private and public, communal and solitary, Killick speaks to the unique motivations, feelings, and experiences of creating music by and for one’s self:

> “*When I make music alone, on the piano, the Korean kayaguˇm zither or the Northumbrian smallpipes, I feel I come much closer than a mere “participant” to experiencing the*

"whole" of the musical event – modest as that may be. Instead of taking part, I take the whole, and (selfishly enough) I have it all to myself." (pp. 274)

Killick continues to elaborate;

"The absence of an audience and of other players means that I can concentrate on the sounds I am making, hear them clearly and not have to worry about how they might sound to someone else. The playing may not be very distinguished, but it is mine and, if it pleases me, it serves its purpose. I do not want all my music-making to be like this – I enjoy playing with and for others at times – ***but playing alone does something for me that nothing else can****."* (pp. 274)

This is likely something many of us innately relate with, even non-musicians. It's the "dance like no one's watching" effect. While Hillick's study of holicipation is wholly concerned with the act of performance, the act of listening to music in private – as enabled by modern dissemination methods – is surely a vastly different experience than a concert. Music psychology research corroborates with this hypothesis, with a variety of experiments reporting everything from an amplification in perceived emotion when listening alone (Zhang et al., 2018), to a difference in the stress-reducing effect of music dependent on the presence of others (Linnemann et al., 2016), to a distinction between strong experiences with music being experienced in group settings and the self-regulation that comes from solitary listening (Lamont, 2017).

The above may sound obvious; after all, it is not much of a stretch to conjecture that *everything* feels different when experienced in private in comparison to public. Yet, this state of 'aloneness' and solitary artistic experience – despite recording technology changing listener habits since the interwar years (Volgsten, 2025) – is rarely targeted by contemporary composers. Being told that you did not get the "full", "real", or "intended" experience when engaging with art in private as opposed to at the concert hall, theater, gallery, or stage hall, is a frequent occurrence. Often, this is warranted – creating for these public spaces is as valid and important as it ever has been, and as discussed, solitary experience is not *better* than public, it is simply different. However, I challenge the reader to think of a time where the reverse was said to them; where the "intended" artistic experience was to be had listening to a recording alone in your room, at 3 in the morning, door closed, with a pair a headphones. While many contemporary

composers would likely consider their work agnostic to the solitary/public distinction and perfectly serviceable in either, finding works which are specifically designed for solitary experience proves a challenging endeavour.

Nonetheless, I would posit that some music of the Wandelweiser collective fits this description. A collective of composers and performers centered around Edition Wandelweiser – an independent publishing house and record label founded in 1992 – Wandelweiser grew in significance in line with the growth of CD production and at-home listening (Rutherford-Johnson, 2017, p. 45). While not wholly beholden to a singular aesthetic approach (Pisaro, 2009), the majority of music made under the Wandelweiser banner is experimental in nature, taking Cage's *4'33"* as an essential reference (Rutherford-Johnson, 2017, p. 46). Long silences, quiet and nigh imperceptible sounds, the utilization of objects such as leaves or rocks; all are common hallmarks of music affiliated with Wandelweiser. The other hallmark of Wandelweiser's output comes in the physical form of the CDs themselves, with their unmistakable minimalist aesthetic featuring plain white sleeves with black text, and plain black CD's with white text. But Wandelweiser's attention to the CD does not stop at their packaging – it extends to the act of listening. Wandelweiser composer Michael Pisaro speaks to the collective's awareness of the experience of listening to recordings:

> *"With recording [as opposed to live performance], sound is stored for use. How do you use a recording like [Christian Wolff's]* Stones*? Do you just listen to it like anything else (perfectly possible in this case) or do you find ways of listening to it that suit the recording in other ways: say playing it all day at low volume (so that it can be forgotten, except for those very few moments when a sound rises to the surface, reminding you it's still there). Or play it so loud that you hear everything. In other words, the recording can be viewed as open, something like an instrument – a particular instrument that makes a limited set of sounds that can nonetheless have a variable relationship in the environment in which they are played."* (Pisaro, 2009).

Wandelweiser's co-founder, Antoine Beuger, also speaks specifically to the solo performance experience in an interview with James Saunders:

> *"I am strongly convinced that there is something so to say ontologically different about a solo, duo etc. situation: it has to do with being alone, being 'zu zweit' […] So I think solo music at its best is revealing something about solitude, about seclusion.* calme étendue *(1996-7) in all its different versions to me is an exploration of this situation: someone sitting there, either performing a regular activity on his instrument or just sitting quietly, doing nothing. Silence all around him. No communication, no showing, no presentation of differences to an audience. Just sitting there, all by himself, sometimes doing something, sometimes not."* (Beuger, 2004).

On one hand, much of Wandelweiser's lengthy and largely silent music makes for a uniquely contemplative form of solo listening, either as a devoted listening experience or as "mobile" or "soundtrack" music where it is listened to in the background while going about one's day-to-day lives (Bull, 2007). On the other hand however, as Rutherford-Johnson points out, much of Wandelweiser's output actually *resists* recording (Rutherford-Johnson, 2017, p. 49). It is not that the music doesn't work on disc, but rather that it is difficult to reproduce effectively. For some pieces, this is due to extremely quiet details which fail to transfer to recordings; for others, they are site- and/or time-specific, causing the recording to be missing a portion of its intended understanding or context. Yet other works are prohibitively long, spanning 9 hours (Beuger, 1996) or even multiple days (Frey, 1999). All in all, Wandelweiser encompasses far too large of a range of musical expression for me to claim their output is unilaterally suited to solitary musical experience; however, their awareness and recognition of solitary listening/performance and the ways in which they incorporate it into their compositions remained highly influential to my conception of *never left*.

To speak then of my own motivations with *never left*, the most important and foundational experiences I have had engaging with music have been in solitude. I do not expect that this is a sentiment shared by many, but given bipolar disorder often lights my mind aflame through the early morning hours while the world lays sleeping, over the past decade I have spent thousands of hours listening to pieces online and writing music in complete solitude. It is important to me that these experiences are afforded the respect I feel they deserve; that all my countless hours alone and in headphones are recognized as formative to the artist I am, and not dismissed as 'not the real thing'. *never left* is a personal work. And it's because of my own personal championing of

solitary artistic experience that I wished to make its solitary nature one of its key foundations; a cornerstone that was not only aesthetically important in its own right, but one which supported *never left*'s existing themes of self-reflection and self-disclosure.

I have spoken at length of music's relationship with social experience; but what of the very medium in which *never left* takes place? If anything, sociality's relationship with Virtual Reality is even more divided than music's.

VR and sociality

Interestingly, despite the enclosed and physically isolating nature of the hardware itself, VR has been described both commercially (Meta Developers, 2022) and academically (Scavarelli et al., 2021; Van Kerrebroeck et al., 2021) as a medium well-suited to enabling social experience. Mark Zuckerberg in his address during Meta Connect 2022 re-emphasized time and time again – as if it was the tagline of the entire 50 minute video – that VR "is social". It sounded like a plea; a plea which recognized that mainstream preconceptions of VR have come to view VR as dystopian instruments of isolation and a far cry from Zuckerberg's fantasied Metaverse utopia (Slivkin et al., 2025). As an example, a 4-panel comic which I've seen continually circulated online for years depicts a seemingly happy couple gathered around a fireplace on Christmas day. One of them remarks that the greatest gift of all is simply being together. The other responds that they think the greatest gift is VR goggles. The next panel then desaturates the once colourful room to dull grays and blues, revealing our protagonist is sitting alone in the corner of an empty room; VR headset donned. There is no fire in the hearth, no bright red curtains on the window, and no partner under the blankets. Just someone huddled up all alone, with the tinges of a frown on their face. The comic's lasting popularity neatly summarizes the commonly-held belief that VR – particularly its social elements – are little more than a mask, a fake; an unhealthy, incomplete, and dystopian replacement of what is "real".

Figure 11: The comic depicting the virtual utopia contrasted with the main character's reality. Alex Culang and Raynato Castro, 2011.

While the above can be generalized as the "mainstream" Western opinion, some portions of younger generations – particularly within queer and terminally online spaces – rely on VR and virtual worlds such as VRChat as the bulk of their meaningful social communications. To many of these people, who are often marginalized in their day-to-day lives, VRChat and its customizable avatars and international servers allow them to put forward a more 'real' version of themselves than in their day-to-day life (Freeman & Acena, 2022; Acena & Freeman, 2021). A queer, closeted teenager could be left stranded in an unaccepting environment, but still manage to find a sense of community within the virtual worlds of VRChat. Some artists have also embraced the 'realness' of virtual worlds as valid means of social performance, including Edmonton's own Kelly Ruth (Ruth, n.d.). In addition to multitudes of multimedia performances in the 'physical' world, Ruth has performed extensively on the virtual platform Second Life and attests to the unique social experiences it enables, including the live chat and the seamless ways which audience members can enter, leave, and join the performance.

Finally, rounding back to Zuckerberg during the 2022 Meta Connect, there is the "corporate" perception of VR sociality; the "metaverse". Defined by Meta itself as "the next evolution in social connection", the metaverse dares us to imagine such futuristic scenarios as "purchasing digital products", "attending launch events from anywhere in the world", or even "stepping into a space that embodies your favourite brand" (*What Is the Metaverse?*, n.d.). Meetings taken over video call, catching up with a friend over the phone; according to Meta, these are soon to be relics of the distant past, replaced by virtual avatars huddled around a virtual table and virtual projections dancing together at virtual concerts. One is hard-pressed to find a shred of humanity in promotional materials for Meta's metaverse. The sandbox and 'grassroots' nature of platforms such as VRChat and Second Life which facilitate the subcultures discussed above have been scrubbed away and sanitized for corporate consumption, leaving naught but the faint smell of Meta's hundreds of billions of dollars in data brokering and targeted advertisement revenue. To date, the metaverse has fallen flat in materializing much of anything (Wagner, 2023). Nonetheless, pockets of tech bros and LinkedIn addicts stay loyal to Zuckerberg's vision.

These differing views on VR's relationship with sociality can be summarized as the following: mainstream opinions which err on viewing VR as negatively isolating and a dystopian

surrogate for 'real' social experience; subcultures which socially and artistically validate virtual worlds as mediums with their own form of 'realness'; and corporate fantasies of consumption and high-tech immersion where the novelty of the technology is of greater importance than the humanity it is alleged to facilitate. When creating *never left*, I aimed to pull from the 'realness' of social and artistic subcultures, and reappropriate the act of self-disclosure that corporate tech has soured and commodified. However, unlike the live performances of Second Life or the social sandboxes of VRChat, *never left* is designed to be experienced alone; in a state of isolation not unlike that gray, empty room on Christmas Day. In the same way that I sought to validate music experienced alone, I also sought to validate VR experienced alone. In fact, I would argue that a private VR experience is particularly well-suited to a work centered around meditative self-reflection. A common theme expressed by VR creators is that VR often lends itself better to "being" than "doing" (Atherton & Wang, 2020; Ruberg, 2020). In other words, there is a certain slowness and discernment to the ways which players navigate through VR spaces, especially in comparison to virtual spaces on a traditional 2D screen (Walden, 2020). This purposeful slowness combined with a personal, private, and intimate solo experience is meant to give ample time and space to the player to engage with the work and encourage a meditative atmosphere.

Approaching, creating, and implementing the music

> "*Although music is a time-based art form, use of static materials and static musical structures can push it towards existing like a piece of visual art. The analogy with viewing an object from a number of different angles has been used many times before when talking about the minimalists/experimentalists and in a way it almost now sounds like a bit of an old cliché, but like most clichés it has a strong element of truth. I like to think of the materials that I work with in my music as objects of some sort or other, familiar objects maybe, but extracted from their previously familiar situations and placed into a different context.*"
>
> Laurence Crane, interview with James Saunders. 2009.

There were two primary relationships which formed my approach to *never left*'s music; the music's relationship to self-disclosure, and the music's relationship with the virtual space. I ended up settling on three facets of the self-disclosure process to form the basis of my

conceptualization; recontextualization, agency, and intimacy. Each is fundamental to mutual self-disclosure: recontextualization due to the ways in which our own understanding of self is recontextualized through learning of and about others; agency due to its importance in consensual and reciprocal sharing of personal experience; and intimacy due to the ways it evolves, shifts, and grows during the self-disclosure process. These aspects and their relationship to the music are not meant to be literal, obtuse, or obvious to the audience, but instead form a basis from which I could compose material and implement systems which were meaningful to the project from both an aesthetic and conceptual standpoint.

Music in *never left* is then conceived spatially in 3D space – not as spatial audio (which is reserved for sound design and will be discussed later in this section), but as an evolving composition which the player explores along all three axes of the game space simultaneously. VR artist and composer Zachary Berkowitz (2016) emphasizes that virtual space should be thought of not only in relation to novelty and immersion, but in relation to musical form; an approach *never left* takes inspiration. As the player moves throughout the space from cube to cube and shape to shape, the music undergoes changes and transitions in musical material. Essentially, the player's current position in 3D space is continually divided into three values, each corresponding to one of the three axes; x as left-to-right, y as bottom-to-top, and z as front-to-back. These three values are then fed into Wwise and control everything from harmonic sonority and melodic content, to reverb characteristics and level mixing, resulting in the music's "form" being directly tied to the space. Conceptually, each of the three values are 'musically responsible' for one of the three facets of self-disclosure that I chose to conceptualize around. I will address each of these facets and their associated axis in the order of recontextualization, agency, and intimacy.

Recontextualization has been explored in a variety of ways by contemporary composers, from the recontextualization of our own musical memory in the work of Morton Feldman (Harrison, 2019), to the recontextualization of old works in the Western Art Music canon in Berhard Lang's *monadologie* series (Dysers, 2022) or Michael Torke's *Ash* (Rutherford-Johnson, 2019, p. 63). My own exploration of recontextualization is more akin to that found in Laurence Crane's minimalist composition *Sparling* (Thomas, 2016). In *Sparling* – a duet consisting of a melodic instrument and harmonic instrument – the melody is nothing more than exact repetitions of a singular two-note motif of the same rising major 2nd. Meanwhile, the supporting harmony is

extensively varied; different chords and different rhythms completely reframe and recontextualize our understanding of the otherwise static melodic object. The result is a deeply reflective and meditative listening experience; something I hoped to replicate. *never left* represents this experience of recontextualization through an implementation which sees the pulsating saxophone part and background harmonies shift and morph with the position of the player on the horizontal X axis, while the melodic phrases in the violin remain within the same limited pitch classes and continue to sound out over harmonic changes without pause. As a visual cue to the player that their position in space is what is affecting the music, these shifts in harmonic content are accompanied by shifts in the work's ambient lighting (a la seeing something 'in a new light'), tinting the space from green, grey, to purple as the player moves from the left of the space to right. In other words, the violin's material is primarily static while the underlying harmonic bed shifts underneath as if to hear the violin from a new angle. The result is a musical recontextualization of this same melodic material.

Agency in *never left* is conceptualized as the vertical Y axis, and follows a straight-forward implementation: the music is more responsive and changes more often to the player’s position on the Y axis than the other two axes. These changes are handled in the rhythmic saxophone part, causing the saxophone to change material every time the player crosses over an invisible threshold dividing the space into vertical 5ths. As the player climbs higher into the space, the saxophone climbs in kind; as the player delves lower, the saxophone delves too. With the frequent changes in material, the vertical axis is quite literally the axis in which the player has the most agency.

Finally, intimacy is handled by the front-to-back axis, with the front of the work being conceptualized as “less” intimate and the back of the space being “more” intimate; a reflection of greater intimacy being achieved over time during disclosure. Musically, this is implemented by changes in reverb characteristics as the player moves deeper. When first entering *never left*, the reverb is suggestive of a huge, cathedral-like or even otherworldly space, but as the player approaches the end of the work towards the back, the reverb shrinks in until it is eventually suggestive of a small, cozy-sized room.

Music in *never left* is procedural; specifically, it falls under the category of adaptive music (i.e., music which adapts to states or values updated live from the game engine). Procedural and adaptive music is a mainstay of game audio (Collins, 2009) and has many desirable advantages over static loops, including the ability to generate near infinite musical variation from finite musical content, greater flexibility for greater reactivity, and allowing for smoother musical transitions (Phillips, 2014). As the music loses its through-composed linearity, it can be more challenging to write defined moments of musical arrival and development, but given I was approaching *never left*'s music as a static 'statue' to be viewed from different angles, the plane-like nature of procedural music was more of an advantage than otherwise. I was particularly drawn to the capabilities for subtle variation, as with *never left* being focused on reflection and using a method of flying control that may result in some users needing to take it slow, it was important to me to never let the music become grating or irritating, even if the user remains still for a dozen minutes at a time. However, procedural music requires a particular compositional approach and poses numerous theory challenges that the composer must plan around accordingly.

In practical terms, writing procedural music requires thinking in layers and fragments rather than in full mix-downs and compositions. This difference is most obviously demonstrated in the export phase when moving the audio files to the game engine. Where a music track written as a through-composed loop or one-shot is delivered as single audio file, procedural game music commonly necessitates that the music is split across multiple – often many – files. At its simplest, this may look like a percussion layer being exported separately from the rest of the music, enabling the two files to play in sync, but for the percussion to remain muted until a certain condition is met, such as the player entering combat. At its most complex, this may look like dozens or even hundreds of individual audio files, each consisting of specific instruments, specific phrases or parts of phrases, and/or specific processing variations. These files are then put through randomization, sequencing, blending and more, all subject to the logic established in the game engine and audio middleware. When composing complex procedural systems, one finds that the music theory behind their material is quickly put under intense scrutiny. It becomes impossible to manually check each combination and layering of musical material that may occur during the system's performance; instead, careful planning of material must be exercised in order to ensure that the music remains of the desired intent. Below, I detail my process for creating

never left's three musical layers and their procedural systems.

Endlessly triggered one after the other in a random order, the violin part consists of roughly two dozen arrhythmic 10-20 second-long musical phrases, spanning the entire pitch range of the violin. However, pitch classes are limited to only 4: C, G, D, and A. Chosen to suit the character of the violin's open strings, the limitation to 4 pitch classes which follow the circle of fifths creates a tonal sonority in which the vast majority of intervals consist of perfect 4ths, major 2nds, and their corresponding inversions (of the 6 unique pair relationships, only the C-A pair does not fit this category). While the emotional cognition of harmony is culturally informed and monstrously complex (Gabrielsson, 2010), I tend to hear P4ths, P5s, M2s, and m7ths as more "neutral", "muted", "static", or "uncoloured", as they lack the major/minor quality of 3rds and 6ths and the dissonance of semitones and tritones. Additionally, pitch classes which are a perfect 5th apart are likely to "fit" alongside one another over the same harmonies via harmonic extensions within the same general "family" (ie. a Maj7 extension which includes the extension up a 5th is now a Maj#11 chord; an Add9 chord would become an Add13, and so forth). In other words, if one is performing a melody over a static chord and draws a series of random notes out of the 4 pitch classes outlined above, the character of the harmony is unlikely to undergo significant change, instead experiencing only small shifts in colour and flavour. The result is a large quantity of musical material that can be randomly selected over any of the work's harmonic backdrops and continue to sound out over changes in the underlying harmony without clashing or implying musical development. As in the quote which opened this section, this approach is what allows for the violin part to sound as if it is a static material 'viewed' from new perspectives as the user moves throughout the work. Of the work's musical layers, the violin responds the least to the user's orientation in space, with some volume and reverb shifts as the player gets deeper into the space, and phrases with lower or higher pitch ranges being prioritized while the player is towards the bottom or top of the space respectively. The files you hear in game were recorded live by violinist Clare Pellegrin, with the mic positioned as reasonably close as we could get to the strings. I encouraged Clare to embrace small imperfections with the performance, as the music – being slow, quiet, and mic'ed so closely – was written specifically to sound fragile, delicate, and vulnerable, while retaining a simple and unassuming veneer. Gentle use of *sul pont* and tremolos were employed to further draw out imperfections from the violin strings. The string works of

composers Jürg Frey and Linda Catlin Smith were at the forefront of my inspirations and forwarded to Clare before we met to record.

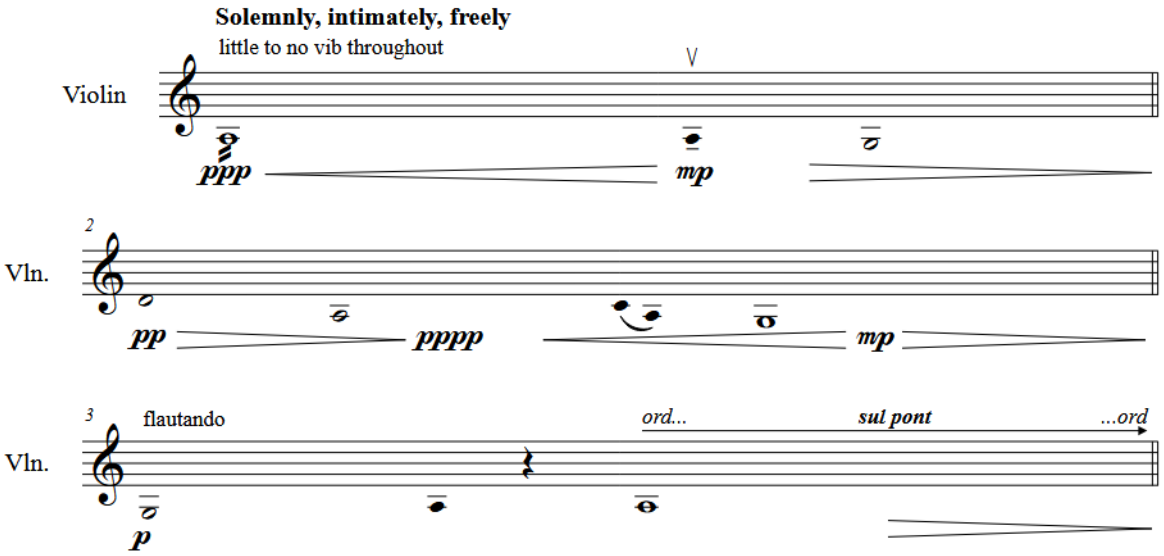

Figure 12: A segment of the violin score.

As the constant backdrop of the work, the harmonic synths cover three chords which, by using Wwise states, crossfade between each other in response to whether the user is in the left, middle, or right third of the virtual space. The middle chord – which is always heard first due to the introductory tunnel guiding the player into the horizontal middle of the larger space – sets the tonal character and consists of the triad D-C-E, in that order. While suggestive of C major, the inversion of the D as the root note creates a minor 7th and major 9th interval with the C and E above it, resulting in a more ambiguous and neutral sonority. Moving to the right third of the work, the triad crossfades to a new triad of Eb-C-F. Perfect 4th and perfect 9th intervals are once again emphasized, with the upwards parallel voice leading of D->Eb/E->F shifting into a subdominant harmonic area in relation to C; a pitch which notably is still present in the triad. The left third of the harmony follows a similar pattern, with the triad consisting of Bb-C-Eb. This time, the lowest and highest note of the triad use downward voice leading, going from D->Bb/E->Eb while the C in the middle once again stays put, the harmonic language once more falling on the subdominant side of the circle of fifths in relation to the ever-present C. Importantly, the subdominant area contains significantly less forward harmonic momentum than the dominant

area, due largely in part to the tonal center's (in this case C's) continued diatonic presence. Additionally, remaining within the subdominant sphere of C allows for the violin's pitch classes – C major pentatonic minus the major 3rd – to avoid clashes of a minor 9th which would demand resolution and draw attention to itself in a fashion at odds with the reflective nature of the work. The overall result is a gently shifting harmonic 'plane' which slopes downwards as the user moves to the left of the work and upwards as the user moves to the right, all the while establishing a consistent tonal foundation of C and 'playing nice' with whatever the violin and saxophone parts happen to be playing at the time. As an added touch, the instrumentation gently crossfades from the space-y synth sound at the front of the work, to a more grounded and intimate organ sound as the player reaches the back.

Finally, the saxophone part is the most complex, dynamic, and procedurally generated layer, consisting of roughly 100 brief fragments of music just 2-4 eighth notes long, endlessly and randomly chained together one after the other to create a repetition-less wash of sound. Comprised of pulsating eighths and the occasional rest or 16th note, these fragments were precisely edited to fall exactly in tempo with one another. After the recording session with saxophonist Ben Whittier was complete, this editing was done manually in REAPER, with the grid locked to the eighth note value at 112 BPM. It then became a matter ensuring that each onset was exactly in place, and that each individual audio file was precisely 0.536, 0.804, or 1.072 seconds long, as these are the lengths of 2, 3, and 4 eighth notes at 112 BPM respectively. This precision was necessary; due to my Wwise solution triggering a new audio file the moment that the previous had completed, a fragment that was even just a twentieth of a second too short or long would result in a noticeable break in rhythm.

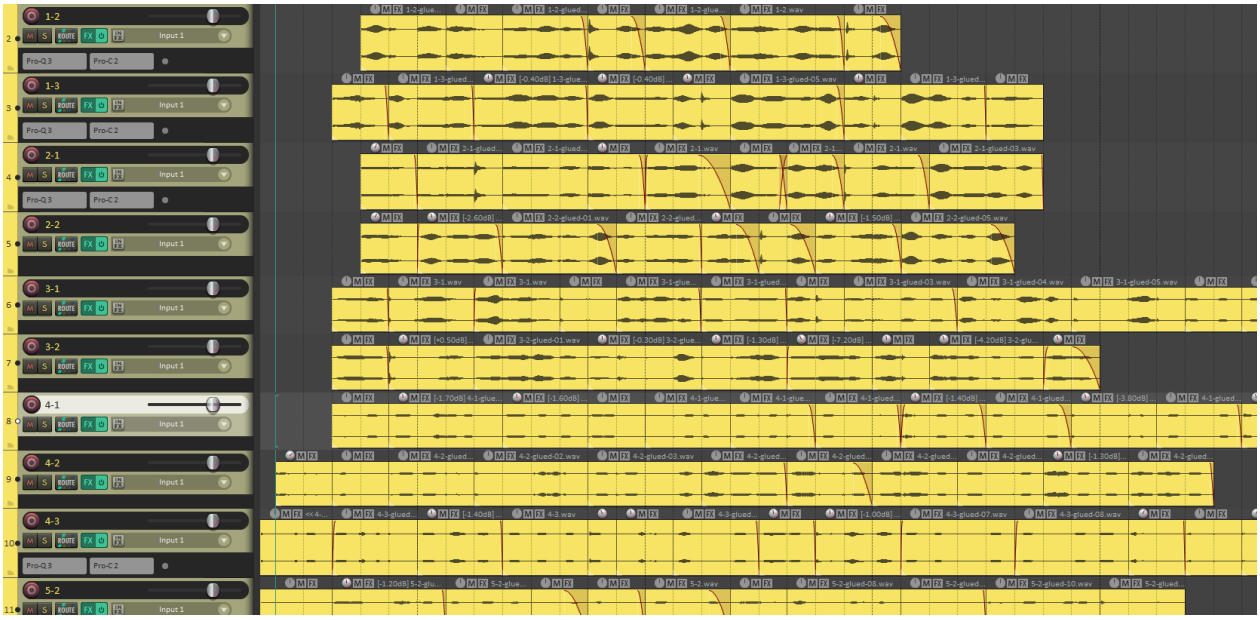

Figure 13: The saxophone files divided and edited in REAPER.

If the harmonic layer was conceived as the foundation of the music and the violin part was conceived as its voice, then the saxophone was conceived as its heartbeat. In Wwise, the 100 or so musical fragments are divided across 15 'pools' or buckets of audio files, with each pool's fragments consisting of only a single pitch class pair (i.e., one pool of musical fragments may contain only the notes C and D across all its material). Each of these 15 pools and their respective pitch class pairs are assigned across a 3x5 grid and trigger while the player is positioned within the corresponding values along the horizontal and vertical axes of the virtual space. In other words, the saxophone – just like the harmony – changes according to which horizontal third of the space the player is currently occupying. However, unlike the harmonic layer, the saxophone is additionally responding to how high or low the player is currently orientated. Rather than being divided into thirds, the thresholds which trigger a change in the saxophone as the player moves vertically is divided into fifths, resulting in a greater degree of dynamism. It is partially due to this dynamism – conceptualized in relationship to agency in the self-disclosure process – which necessitates the micro-length of the musical fragments. In addition to minimizing noticeable repetition, constructing the saxophone's wash of sound with fragments of such short length enables it to be more reactive and responsive to the player crossing thresholds and triggering new pitch content. This is due to my Wwise solution needing to 'wait' until an audio file has completed before triggering a new file from the new pool of fragments, as triggering the music

immediately upon the player crossing a threshold would result in a break in the constant rhythm. Having to wait only 1-2 eighth notes for a fragment to finish playing before moving to the new pool of pitch class pairs makes a huge difference in comparison to if I had created fragments of 5-9 eighth notes long; especially when the player is moving horizontally between thirds and the saxophone needs to change pools of pitch classes quickly in order to not clash with the change in harmony.

Figure 14: The hierarchy in Wwise responsible for triggering the saxophone fragments.

The saxophone's pitch class pairs consist primarily of major 2nd intervals and create an undulating wave punctuated by variations in articulation. Key clicks are also present for added percussiveness, in the form of a low Bb (all keys pressed down) quickly followed by the C# the 9th above (all keys released), resulting in a subtle *boom-chick*-like sequence as all keys are pressed then released. Sounding pitch classes are chosen to function as extensions of the harmonic sonority which is currently supporting them, featuring primarily neutral m7ths, M9ths,

P4ths, and P5ths while the player is positioned within the bottom of the work, and introducing more coloured extensions such as M3rds, Aug4ths, M6ths, and M7ths as the player reaches the higher echelons of the virtual space. The range of pitches also reacts to the player's vertical orientation, with the lower registers of the saxophone heard at the bottom of the space, and the highest registers heard near the ceiling. Similar to my recording session with Clare which aimed to bring out the fragility in the violin, I had Ben incorporate air into his playing for a more breathy tone. Frequent use of the octave harmonic and alternating fingerings further create a sense of fragility.

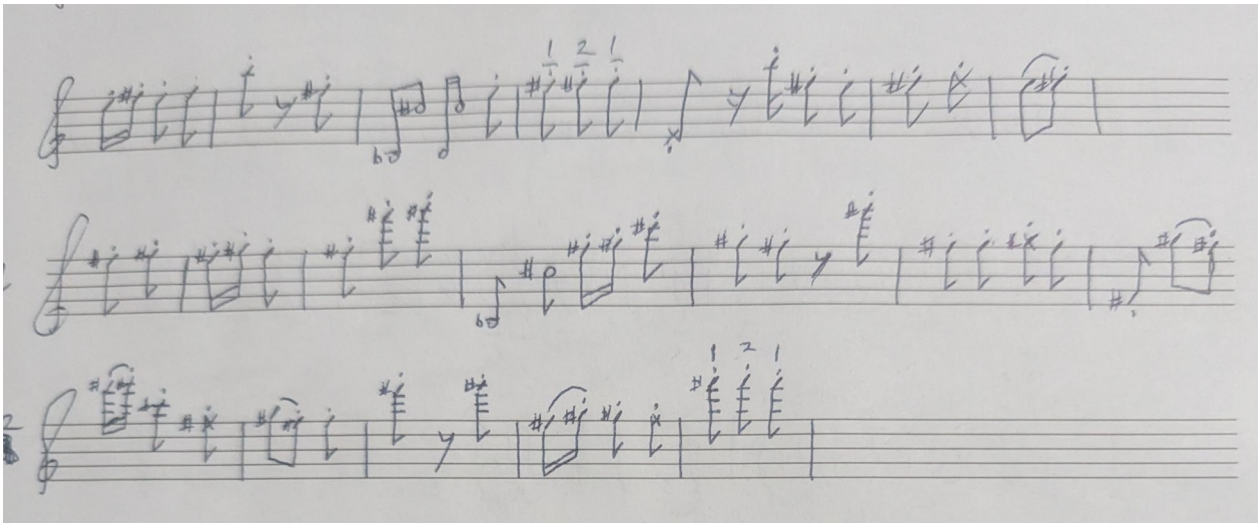

Figure 15: A photo of a small portion of the score used to record the alto saxophone part, written in Eb. Each 'bar' represents an individual fragment and audio file, which are triggered by Wwise at runtime to allow any bar to precede or proceed any other, resulting in virtually infinite combinations. Empty note-heads denote key-clicks, X note-heads denote slap tongue articulation, and 1-2-1 numbering denote alternating fingering.

	Left third	Middle third	Right third
Pitch pair at height 5/5	D/C	F#/E	A/G
Pitch pair at height 4/5	A/G	B/A	D/C
Pitch pair at height 3/5	C/Bb	D/C	C/Bb
Pitch pair at height 2/5	G/F	C/A	G/F
Pitch pair at height 1/5	F/Eb	A/G	Bb/G

Table 1: Each saxophone pitch class pair organized by their placement on the horizontal and vertical axis within the virtual space. The player enters the space at the middle third, height 3/5.

Sound and music within the cubes

Everything described above covers what is heard while the player is exploring the large virtual space, but another kind of space exists in *never left* – the insides of the floating, slowly rotating, glitch-like cubes. The insides of these cubes hold my own answer to "where do I call home?" and hold a greater sense of intimacy than what is outside, due not only to the 'cozier' space, but due to the self-disclosure written within knowingly being my own rather than anonymous like the disclosure engraved elsewhere (the player is informed during the opening cutscene that the text engraved across the space is anonymously donated from my friends and family, while the text within the cubes are related to my own answer). In other words, the insides of the cubes are more personal to myself as the artist, and hence the sound and music within them was approached in kind. As the player enters a cube, the outside music fades out and is replaced by a recording of a solo piano piece layered over an ambisonic field recording. The piano piece – the same in each cube – is a recording of my composition *To the Ends of the Earth*, commissioned by New Music Edmonton, performed by pianist Sahil Chugh, and completed in 2020. It's an important piece to me, and one which is topical to the themes in *never left*. *To the Ends of the Earth* is written as a solo meditation, featuring "modules" which the performer can choose to omit, repeat, and otherwise perform in any order. Rather than contain through-composed music, each module contains a pair of chords, a collection of pitches, and some simple poetry. Using these materials, the performer is asked to improvise as they wish. In the same way that the player in *never left* is asked to reflect upon the question "where do you call home?", the performer of *To the Ends of the Earth* is asked to reflect upon the question "what is it that you need right now?". The line of simple poetry which accompanies each module is then a possible answer to this question, starting with sensory needs such as the sight of sunset or the smell of rain, moving to emotional needs such as being understood or remembered, and ending with the desire for release, surrender, and ego death – "as one with all, to the ends of the earth". When the player exits a cube, the music gently swaps back to the procedural outside soundscape, but the recording of *To the Ends of the Earth* is programmed to remember its position upon player exit, meaning that even when the player enters a different cube, the recording picks up right where

they left off.

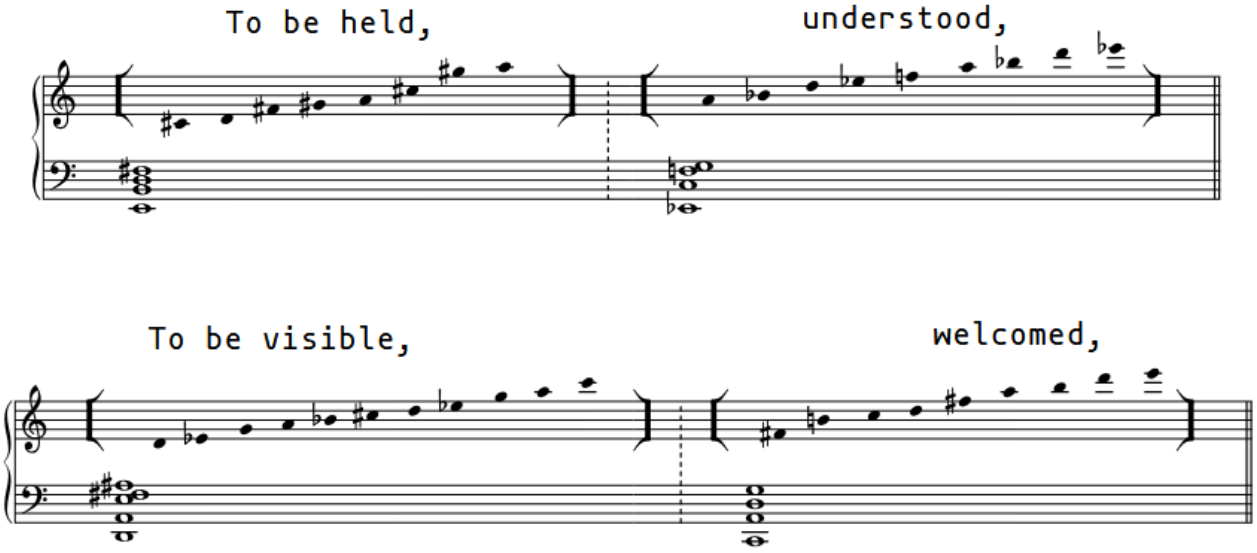

Figure 16: A segment of the score for To the Ends of the Earth.

Up to this point, I have only discussed spatial composition as it relates to adaptive music which reacts to the player's orientation within space as a means of musical form; what I have yet to touch on is spatial audio as it relates to sound which is heard as existing in 3D space (i.e., the experience of listening to an audio file on headphones and perceiving the sound as if it was coming from all three dimensions rather than just left and right). Spatial audio is a mainstay of VR, with studies showing that properly implemented spatial audio complete with occlusion, reflection, refraction, (all three of which are ways that sound interacts with physical objects while traveling through air) and binaural rendering can increase reported user immersion just as much as a five-fold increase in video resolution (Potter et al., 2022). The acoustics and science behind spatial audio is monstrously complex (Naef et al., 2002), but thankfully for composers and multimedia artists like myself, there has been a recent explosion of tools and pipelines which make the process of implementing spatial audio in VR very feasible.

Spatial audio in *never left* consists of binaural rendering and the aforementioned ambisonic audio files. Binaural rendering is designed for 2-speaker stereo systems positioned next to our ears, such as headphones or VR headsets, and refers to the process of taking 3D audio information as input and outputting 2-channel stereo audio which attempts to maintain the

impression of 3D space by using algorithms which ‘mimic’ the ways our ears locate sounds in space (Møller, 1992). In more layman terms, imagine the sound of a bird that has just chirped up in a tree about 45 degrees to our left. Our brain’s task is to process the minute differences in how that sound hits our two ear drums in order to infer its location. It accomplishes this in two main ways. First, our brains recognize the incredibly small difference in timing between the chirp hitting our left ear drum and our right ear drum. Sound does not travel instantaneously, and because the sound is on our left, our left ear hears the sound first. The second way location and direction are inferred is by how the sound is filtered as it interacts with the shape of ears and head. As soundwaves interact with shapes and objects they collide with, their frequency content is altered; some frequency ranges may be reduced, while others may resonate and become more prominent. Through the walls of a nightclub, only the thumping bass can still be heard, while singing a particular frequency can cause a wine glass to resonate and shatter. Human ears are designed to subtly filter sounds in such a way that even a slight tilt of our head causes the frequency profile of what we are hearing to change (Sundar et al., 2021). A sound from above which hits the top of ears is filtered differently than a sound in front of us or a sound behind us. Our head also plays a large role, as in our example with the bird to our slight left, our left ear hears the bird before it passes through our head, while our right ear hears the bird only after the sound has traveled through and around the top of our head. This is why binaural microphones consist of two mics spaced roughly a head’s length apart and buried within the ear canal of a prosthetic ear. By situating the mics in a way which mimics how our ear drums are situated, the sound is filtered in familiar ways and causes our brain to perceive not just left/right, but front/behind and above/below dimensions to the sound.

Figure 17: Photograph of a popular binaural microphone.

Thankfully for game audio, there is no need for expensive binaural microphones as a binaural renderer can handle spatial audio on the fly. However, in order for it to do that we need two things: the renderer itself, and a 3D spatial representation of the sound for the binaural renderer to convert into a 2-channel file for playback on headphones or a VR headset. For the first part of the equation, I settled on using the Resonance Audio plugin for Wwise. Formerly developed by Google and now open-source, Resonance Audio is a popular plug-and-play solution for binaural renderers that works on a wide variety of platforms, including Wwise/Unity (Gorzel et al., 2019). Next, I needed sound with 3D information to pass into Resonance Audio. Thankfully, Unity and Wwise are intelligent enough to have any spot sound capable of being put into the game scene and “just work”, doing the dirty work of calculating the relationship between the sound’s position/orientation and the player’s. This works great for sound effects like a bird chirp or footsteps, but it is unfortunately not suitable for field recordings or other audio files

which consist of many layers in one file. Positioning a field recording of an outdoor park as a spot sound in virtual space would feel flat; the entire sound of that park would be heard as though it was originating from that one singular point in space. Thankfully, a solution exists in the form of ambisonics. Ambisonic files, unlike the 2-channel stereo audio we consume the vast majority of the time, commonly consist of 4, 9, 16, or even more channels, depending on the “order” of ambisonic used. I won’t pretend to fully understand the science behind how they work (see; Malham, 1993), but the end result of using ambisonics is that rather than having a stereo audio file which can only represent a left and right channel, ambisonics cover an entire sphere of sound. This sphere of sound proves exceptionally useful in VR, as it allows users to sit *inside* of it and experience the sound in three dimensions. This is precisely what I wanted for the insides of the cubes; for the player to float within a sphere of sound that is rotating in tandem with the cube’s rotation, and to hear that sound as coming from all dimensions of 3D space. One hurdle remained however; creating the ambisonic files in the first place. Recording directly to an ambisonic file is a challenging endeavour, requiring large and expensive specialty microphones, ideally set up in a controlled environment. Thankfully, by using the free and open-source IEM plugin suite and REAPER (Rudrich, n.d.), I was able to convert simple stereo field recordings I had taken of locations significant to my sense of home into ambisonics. While the landscape of spatial audio is still constantly evolving, knowing the right tools that are out there can produce solid results without advanced technical knowledge; ideal for artists such as myself.

A musical postmortem

Ironically, despite all the complex systems and planning which went into creating *never left*'s procedural music, a common theme during play-testing was that users did not realize their movements or position had any impact on the music at all. While it caught me off-guard at first, it does demonstrate that I succeeded in making the system as seamless as possible; seamless to the point that many users assumed they were listening to a single 3-5 minute through-composed loop rather than a living and explorable piece of music which was responding to the user's movements through space. While not inherently a bad thing, I do feel that themes of exploration and agency which are central to *never left* become muted when the user is unaware that they are not just listening to the music, but in a dialogue where the music listens back. In an audio-first experience, especially one such as *never left* where subtlety, minimalism, and static-ness are

aesthetically important, it is a challenging problem to tackle. There is evidently an assumption when engaging with audiovisual works such as games and VR – whether the user is conscious of it or not – which tends to relegate sound to being a *result* of what can be seen, rather than having agency of its own. Perhaps this bias can be extrapolated to partially explain why audio is so often an afterthought for VR artists and researchers alike (Çamcı & Hamilton, 2020). In an attempt to more easily draw attention to the player's relationship with the music, I added visual components which shift at the same moment as particular elements of the music. Each harmonic third has a different colour of ambient lighting associated with it – green to the left, gray in the middle, and pink to the right – which crossfade between each other using the same trigger that the harmony uses to crossfade between its triads. Moving vertically and triggering a new pool of saxophone fragments also simultaneously morphs the pixelated pattern on the space's walls. And in the same way the auditory space/reverb 'tightens up' as the user approaches the back of the work, the walls of the space gradually close in towards the back. Despite these additions, it is still far from obvious that the music is interactive – and that's OK. I wished for the music to still remain demanding of its listener, and to reward auditory curiosity. Due to music's temporal nature, it is easy to overlook changes in its material as just 'part of the composition'. So while my hope is that *never left* results in the player recognizing musical shifts and asking themselves if perhaps they're the one responsible – to try, out of curiosity, to replicate the conditions under which the shift occurred – it is not aesthetically practical for me to 'guarantee' that realization occurs, nor is it necessary for the procedural elements to enhance the experience. It remains enough that the user naturally experiences consistently fresh musical material as they move from plaque to plaque and box to box.

SECTION 3: RECIPROCATION, GLITCH, AND EMPATHY

> *"Like Heidegger's hammer, we become most aware of semiotic systems and their machinations when they break or refuse to act in a seamless, predictable way."*
> Hawreliak, *On the Procedural Mode.* 2018.

Watching *never left*'s opening video, the player is met with a sequence of four lines of prose. Each is presented in plain white text on a pure black background and given a handful of seconds before it cuts to the next. While the verbs associated with each line are in direct reference to what is asked of the player during the experience – to *listen*, to *reach in*, to *explore*, and to *revel* – the viewer's primary attention is no doubt drawn to the flurry of constantly changing pronouns which occupy the middle of each line. Besides its dramatic and aesthetic affect, this barely perceptible flicker of possessive pronouns – alternating randomly between my/your/their/our/her/his/its every 0.083 seconds – importantly serves to situate the player as playing as themselves; as "you". There is no avatar, no player character, no metaphorical shoes belonging to another; players of *never left* are asked to simply come as they are. As noted by Bell and Ensslin (Bell & Ensslin, 2011) and expanded upon by Waszkiewicz and PS Berge (Berge, 2021a), the use of the second-person in video games "creates an impression of a direct communication" which "draws attention to and emphasizes the specific player as an agent responsible for their actions" (Waszkiewicz, 2020, p. 49). In addition to the second-person "your", the use of the first-person "my" highlights my own presence as the artist, with "their", "her" and "his" meant to emphasize the agency of my friends and family whose volunteered answers are found throughout the space. Finally, "its" can be interpreted as referring to the software and game itself, while "our" – the final pronoun upon which the video settles – emphasizes the joint act of self-disclosure in which all the above actors partake. But why go to such lengths to situate the player and interrogate individual agencies in the introductory video? Why is it important to *never left* and its themes of self-disclosure and reflection? And how does the rest of the work and its aesthetics relate to the themes of the introduction?

Empathy, games, and VR

> *"It seems like the people with the greatest investment in the 'empathy game' label are the ones with the most privilege and the least amount of willingness to improve themselves."*
>
> Anna Anthropy, Interview with the Wall Street Journal. 2015.

never left is highly influenced by the work of fellow trans experimental game designers; designers with much to say about the label of "empathy games". Since roughly 2012, empathy has become a buzzword in games discourse, even reaching the likes of UNESCO and the UN (Ruberg, 2020). While empathy can be broadly defined as the ability to understand and appreciate another's feelings or experience, in the context of video games empathy is "the purported ability of video games to allow players to experience the feelings of others, with a focus on those who are seen as diverse or disadvantaged", and ultimately is "commonly simplified [to] feeling what someone else is feeling" (Ruberg, 2020, pp. 2–3). Some commercial games, such as the queer love story *Gone Home* (Riley, 2018) or the Syrian civil war simulator *Bury Me, My Love* (The Alternative, 2018), are comfortable being included in the discussions around empathy and games which frequent commercial game development conferences (Ruberg, 2020). Even in the realm of spatial audio, works like *En Amour* peddle themselves as using "immersive hyperreal sound technology" in order to facilitate "emotional connection" (Mondot & Bardainne, 2024). However, in other cases the label has been parroted and unconsensually assigned – particularly to games made by indie and experimental queer and trans creators. From representations of the challenges of gender passing in merrit k's *Lim* (merrit, 2012), going through gender transition in Anna Anthropy's *Dys4ia* (Anthropy, 2012), to day-to-day aggressions faced by a trans woman of colour in Mattie Brice's *Mainichi* (Brice, 2012), each was co-opted by outspoken cis people as helping them "understand what it *feels* like" (Ruberg, 2020; Pozo, 2018; Cárdenas, 2021) to be trans. This occurred despite the games' creators stating their work was made explicitly for personal expression or for fellow trans folk, such as in the preamble to *Dys4ria* (Anthropy, 2012).

Figure 18: Mattie Brice, Mainichi. *2012.*

It can be all too easy to think of empathy as a label with nothing but positive connotations, but queer critiques have highlighted how the rhetoric of empathy games – particularly when applied to media created by, about, or for marginalized people – can be deceptively problematic. Firstly, this is due to the empathy rhetoric minimizing the lives and identities of those who are seen as "different" or "other" (Ruberg, 2020). Though a piece of media may provide a glimpse into a marginalized experience, nothing can translate the entirety of said lived reality to its audience. Anthropy responded to those claiming to understand what it feels like to be trans after playing *Dys4ia* by telling a reporter "if you've played a 10-minute game about being a trans woman don't pat yourself on the back for feeling like you understand marginalized experience" (Ruberg, 2020, p. 7). Secondly, the rhetoric of empathy wrongly assumes that so-called empathy games have been developed primarily for "the edification of more privileged, normative players" (Ruberg, 2020, p. 7). By framing these games around empathy, it is implied that they belong by default to players of dominant positionalities and that these games exist solely to educate. Similarly, the rhetoric of empathy assumes of its target that it has been created solely to be consumed and ogled at by those safely removed from the realities of its subject matter; a phenomenon Lisa Nakamura (2002) describes as "identity tourism". Finally, the rhetoric of empathy finds itself shoulder-to-shoulder with the self-congratulatory underpinnings of allyism – the assertion that one is "on the side" of one more marginalized than they are – only to act as though they are immune to criticism from the very people they claim to support. Mattie Brice in particular was shown the true extent of the so-called 'empathy' her game generated when she became a

target of the game-related transphobic hate movement Gamergate just a couple of years after *Mainichi*'s release (Bevan et al., 2024). The game dev community was good for naught but crickets, complacency, and complicity.

Queer designers have been swift to respond to their games being appropriated, with each of the three aforementioned artists releasing a follow-up piece directly critiquing "empathy-first" readings of their work. merrit k's *Empathy Machine* (2014) is a tongue-in-cheek Twine game which opens with the text "have you ever thought" / "what if" / "you were like, a different gender?" / "can you imagine?" / "of course you can't" / "but now, we can show you" / "you can experience *empathy*". The game then goes on to direct the player to touch their screen, asking afterwards if they feel any different. "No?" / "…" / "Of course not." Anna Anthropy's interactive installation *Empathy Game* (2015) presents its participant with a treadmill and a pair of Anna's worn shoes, encouraging them to try and "walk a mile in my shoes" and tally and compare their "empathy score" (distance walked) on pen and paper. Mattie Brice's interactive installation *empathy machine* (2016) presents her earlier game *Mainichi* on a screen while Brice's body is hooked into the computer and serves as both the controller that the player must physically touch to control the game, and a physical mirror of the in-game protagonist, mimicking her actions. All three are intensely satirical and refuse to provide players with the comfortable trauma tourism to which they believe themselves entitled.

As it happens, Virtual Reality as a medium also finds itself front and center in controversial conversations around empathy. In 2015, video creator Chris Milk gave a TED talk titled "How Virtual Reality can create the ultimate empathy machine". Milk speaks of his collaboration with the UN, producing a 360-degree video for VR that follows a day-in-the-life of a 12-year-old Syrian refugee. This video – of which Milk emphasizes its immersive qualities – was then brought back to white lawmakers in western countries in an attempt to have them "feel empathy". "VR is a machine […] that makes us more empathetic […] more human", closes the talk. If a simple 2D video game was already capable of having a more privileged person "*feel*" what it was like to be trans, or racialized, or in poverty, or a refugee, or gay, or a victim of sexual assault, or all of these forms of marginalization and more combined – just imagine for a moment what an immersive VR game could make them feel! How much of a better ally they could become! An immersive, sanitary, 360-degree zoo of marginalized suffering; right in the comfort of your own home. Don't forget to take off your headset if you feel too

uncomfortable! Or in academic terms; “aesthetic representations that allow temporary emotional tourism without demanding structural change” (Pozo, 2018).

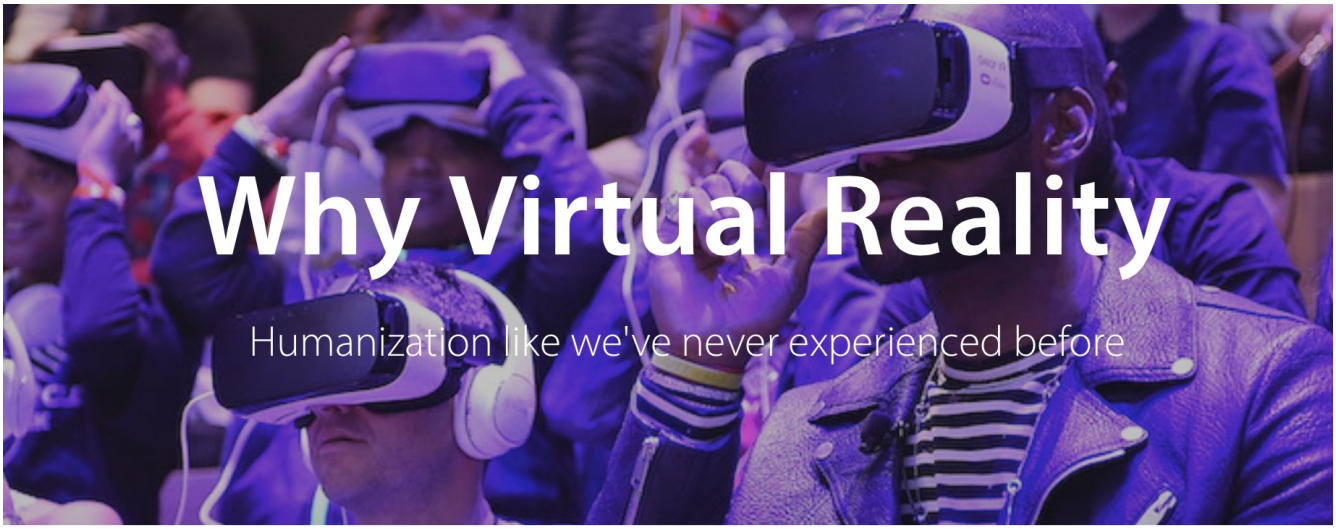

Figure 19: Benefit Studio, Project Empathy.

Unlike the vast majority of TED talks which fade into obscurity within the week, the message of Milk’s utopian VR has enchanted a certain strain of tech enthusiast and gained mainstream popularity. Brice (2020) – who attended an engineering school – remarked on how “everyone was talking about empathy in virtual reality”, leading her to say “Oh, God, we’ve been talking about empathy in queer games but there’s something more at stake here, because virtual reality feels more general than games overall”. It was in response to both the growing narratives around VR and the co-optation of her earlier work *Mainichi* that led to Brice creating *empathy machine.* The title is of course no coincidence, and merrit k’s aforementioned *Empathy Machine* was also made in response to VR and empathy. And while opinions are split (Seinfeld et al., 2022), some scholars and academics have also criticized Milk’s dogma, asserting empathy-orientated VR creates an “improper distance” through which irreducible alterity is translated into familiarity and intimacy (Nash, 2018). The notion of “toxic empathy” has also been put forward by Nakamura (2020), a notion that refers to the ‘empathy’ arising

through VR experiences as nothing more than something which allows privileged people to claim that they have experienced what life is like for a disadvantaged population while not actually changing their behaviour. In the meantime, the very same people on their screen – generally women and children in a ploy for "infantilizing peace" (Malkki, 2010) – are stuck in the realities of refugee camps and worse (Ponzanesi, 2024). Andrejevic and Volcic (2019) rightly point out that the "step-into-the-shoes-of-another" design language of many VR empathy experiences is completely at odds with how empathy is construed and enacted in day-to-day life. Rather than preserve and respect otherness in all its alterity, these VR experiences instead seek to collapse the other's experience unto one's own. BeAnotherLab is a VR dev team whose entire identity is built around this kind of experience and marketing, including their flagshit – ahem, flag*ship* – experience *The Machine to Be Another.* Supposedly capable of "credibly facilitating body swap", the VR experience is most famous for allowing the user to "gender swap", and hence, finally revealing to cis people everywhere what it's truly like to be trans.

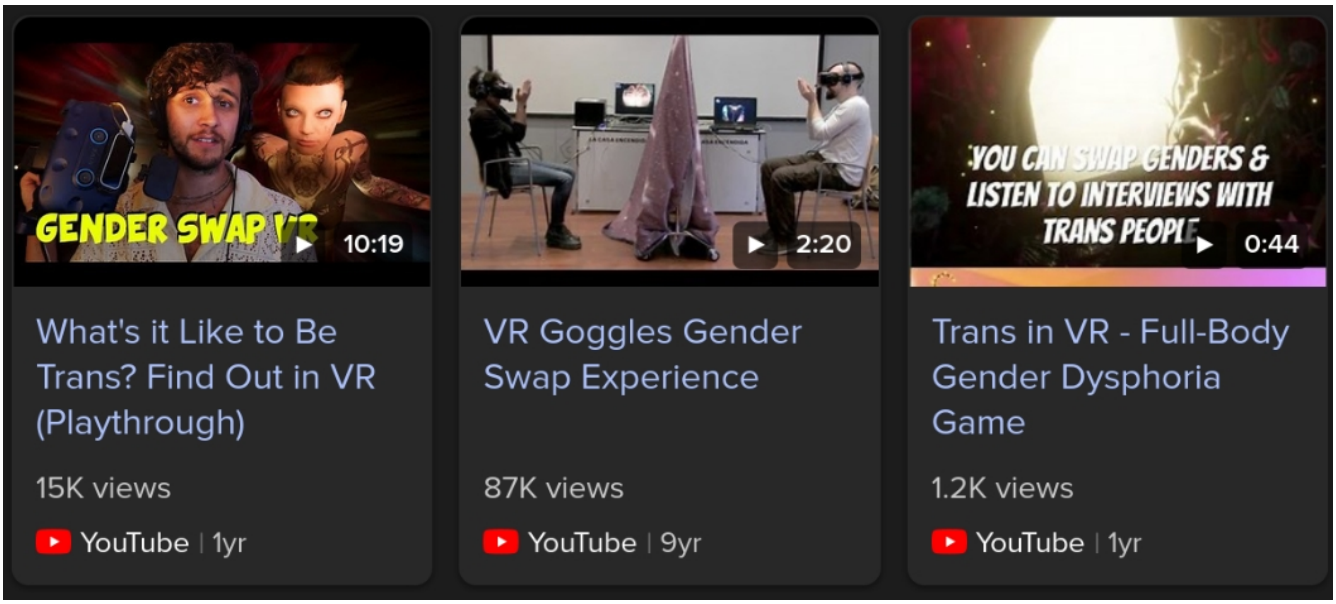

Figure 20: Results from an online search of "trans gender swap vr"

Between being designed for the so-called "Empathy Machine" and involving self-disclosure and reciprocation – close cousins to empathy – *never left* is positioned at the confluence of these controversies. Queer critiques of empathy rhetoric proved vital to the ways in which I hoped to share stories not as an object to be consumed nor an experience to be folded unto the player, but instead as a distanced invitation to mutual self-disclosure. Thus far, I have spoken only of the "dont's". What of the

do's? Where do I go from here? In response to the complications around empathy, VR, and games, *never left* draws from three interwoven approaches; reciprocal storytelling, critical distance, and glitch.

Reciprocal storytelling

> "*But of course there are disclosures and there are disclosures. A matter of testimony and position, a matter of guilt, of whether one had been compelled by the impoverished morality of the age, the discourses of empowerment, for the edification of the people who stood idly by, or whether it was a matter of bringing into confidence, imposing an expectation of reciprocity that had not been invited in the first place but the refusal of whose terms would nevertheless result in an irrevocable debt or, if accepted, in yet another piece of intelligence used to exact or enact one man's will.*"
>
> Sarah Bernstein, *Study for Obedience*, p. 142. 2023.

A key tenet in *never left* is that the player should not find themselves disclosing alone; inviting reciprocity without imposing expectation. As a re-sanctification of self-disclosure, *never left* is modeled after mutual story-telling and rejects the clinical nature of interviews and forms. This distinction between one-sided interview and mutual self-disclosure is a defining characteristic of the Indigenous research framework Etuaptmumk/Two-Eyed Seeing (E/TES) (Latimer et al., 2018). In contrast to western approaches which engage participants in set strategies that maintain a sterile and objective setting, E/TES comes from "kinship and relationship building … [allowing] a natural conversation setting for the storytelling process" (Sylliboy, 2022, p. 2434). In order to facilitate this, E/TES maintains cultural traditions of building trust and establishing a safe space through the reciprocal swapping of stories (Sylliboy, 2022; Latimer et al., 2018). Indigenous practitioners of E/TES additionally speak to how exchanging stories is a process of inter-relationality between interviewer and interviewee to respect knowledge sharing as a collective action (Smylie et al., 2014), and how it is similar to sharing 'tea' through how the mutual storytelling prepares the space for knowledge interaction (Castleden et al., 2012). It would be irresponsible and remiss of me to purport that *never left* adheres to or utilizes a E/TES framework. However, Etuaptmumk/Two-Eyed Seeing and the way it seeks to create safe spaces for disclosure via reciprocal storytelling has formed a key artistic inspiration.

The distinction between online form and reciprocal storytelling is made blatant in *never left*'s introductory video, when an ominous blinking image of "ADDRESS: _" is violently struck through in a glitch-like manner and replaced with the question "Where do you call home?". This question is then what all actors engage with in their respective disclosure and storytelling.

Reciprocity in *never left* comes from three sources; my friends and family, myself, and the 'machine'. To first address my friends and family, their storytelling is found throughout the play space, with longer answers engraved into simple shapes and shorter answers floating gently through the air. Deciding how best to collect these answers proved a complicated process; especially earlier on during ideation when I considered collecting answers from as wide an audience as I could, such as online forums. While it was apparent that I was dealing with potentially sensitive information, VR and multimedia artist Marilène Oliver and Voariono et al. (2019) point out how traditional ethics review processes "are not equipped to evaluate artists' proposals" (Oliver, 2022, p. 5) due both to a lack of familiarity with research-creation processes (Cox et al., 2014), and a gap existing between the values of ethics boards and the values of the artistic community (Bolt, 2016). This inadequacy is only amplified further when modern technology is involved (Oliver, 2022). From the perspective of the law and ethics boards, artistic work is generally exempt from data protection regulations. However, Oliver points out that it is still important for creators using personal data to understand what regulations exist and why.

Indeed, *never left* does not – in the eyes of the University – require an ethics review. Nonetheless, information ethics and E/TES helped to guide my decisions in actualizing my own personal ethical guidelines; namely anonymity, agency, and privacy. First, answers were sourced through an anonymous survey hosted on the End-to-End encrypted service CryptPad, an open-source and fully encrypted collaborative suite developed in France. Importantly, responding to this survey required no account and no directly identifying information was associated with any submissions, staying consistent with the themes of privacy in *never left* and treating disclosed answers with careful consideration. Secondly, the decision to only solicit the survey to friends and family was made to maintain a degree of mutual vulnerability and dampen the western interviewer/interviewee dynamic. The survey was simultaneously circulated to roughly fifteen people (of which roughly a dozen responded), all of whom I would feel comfortable engaging with – or have already engaged with – a

degree of vulnerable and mutual storytelling. It is notable that although these were people with whom I could engage with face-to-face and swap stories in a similar vein to E/TES, I opted instead for the anonymous survey. This was a conscious decision, and one which was made for the same reasons that *never left* was designed to be experienced in private – to differentiate 'the alone' as a valid and unique means of experiencing art, and by extension, self-disclosure. It is true that I could have invited those interested in taking part in the work to coffee and talk with them at length about our respective stories of what home means to us. But in doing so, they would have disclosed a different answer. Not a 'better' answer, nor a 'worse' answer, but an answer unique to the context of that social experience. Their answer provided to the anonymous survey is also unique; unique to the context of anonymity and privacy which was afforded by the technology. Due to the way I circulated the survey through an online space and received 12 responses out of a possible 15, I am not even certain which of my friends answered, let alone what their answers are. Again, this was not necessarily make for a 'better', more honest, or more vulnerable answer. It simply made for an answer that was borne of the responders' private reflection, more closely resembling the experience of the player answering the very same question at the end of the game. All 12 responses were then integrated into the game, with longer responses engraved onto shapes and shorter responses seen slowly floating through the air.

In the spirit of said private reflection and in providing the greatest degree of agency on behalf of the discloser as possible, the survey included a brief preamble which established that there were no word limits nor tones which were more desirable than others; all answers were valid, even none at all. One discloser submitted "I don't know", an answer that is still gladly included in the work with all the rest. Through exploring these responses, it was my hope for the player to come to a better understanding of their own.

Figure 21: an in-game block engraved with a reciprocal answer.

My own disclosure and storytelling is differentiated from that of my friends and family through its placement inside of the work's five large and colourful boxes. My answer to the work's question is written in the form of a simple five line poem, with each box containing a single line. While I considered affording myself the same anonymity given to my friends and family by displaying my answers in the same manner as theirs, I felt that the audience-artist connection would be have been sacrificed to do so. Unlike my friends and family, my name and identity is inextricably entangled with this work. Many of the people who will experience *never left* can put a face to the very words I write. As such, there's an additional degree of closeness to my personal piece of the reciprocal storytelling pie; a closeness that is spatial represented in-game through its placement inside of small, intimate spaces.

Across a whole audiovisual experience such as a VR game, this usage of the boxes to house my disclosure is but one aesthetic decision of dozens. In addition to the use of space, what other aesthetic and design strategies do I employ in my implementation of reciprocal self-disclosure, and what

strategies do I use to differentiate mutual storytelling from experience tourism? The solution I sought lies in the aesthetic concept of critical distance.

Critical distance

Despite similar origins, *never left* is noticeably less confrontational and satirical than Mattie Brice's *Empathy Machine* or Anna Anthropy's *Empathy Game*. *never left* resembles what Teddy Pozo terms "haptic game design"; queer games through which players "are invited to fill with their own experiences and interpretations, exploring their own lives and memories in conversation with a game" (Pozo, 2018). Rather than rejecting empathy entirely, Pozo draws from research on frameworks for feelings (Anable, 2018) and being moved by games (Isbister, 2016) to argue that queerness and games can utilize haptic game design strategies to "exceed the limitations of 'empathy games' [...] by contextualizing empathy within a broader repertoire of queer design strategies focused on affect, embodiment, and tactility" (Pozo, 2018).

Crucial to these aspirations of haptic game design differentiating itself from empathy games is "maintaining balance between closeness and distance" (Pozo, 2018). There are several aesthetic strategies which Pozo suggests help maintain this balance, including haptic visuality, gestural distance, and textural gender. Queer game designer Llaura Dreamfeel's *Curtain* (Dreamfeel, 2017) is one such game which employs haptic design. Tackling the uncomfortable and deeply personal subject matter of an abusive romantic relationship, *Curtain*'s pixelated, indistinct, shifting and impressionistic visual style mirrors Laura U Marks' framework of haptic visuality (Marks, 2000; Pozo, 2018). Laura identifies key aesthetic approaches which mesmerize and disorient, from changes in focus, under/overexposure, graininess, low pixel density and more (Marks, 2000, pp. 172–176). Through this visual mesmerization, Marks argues that haptic images "refuse visual plenitude. Thus they [...] prevent an easy connection to narrative, instead encouraging the viewer to engage with the image through memory" (Marks, 2000, p. 177). Dreamfeel speaks to this effect in an informal Twitter interview, describing how she "didn't want to impose [herself and her] view onto the player", and instead emphasize the player's own agency; to "give them space [...] By respecting [the] player as a peer, the creator/game is both close and distant, both listening and detached" (Pozo, 2018). In other words, games with haptic aesthetic such as *Curtain* use open-ended imagery and narrative which result in players 'filling them out' with their own memories and experiences. Doing so allows creators to breach

sensitive subject matters while avoiding the tendency of empathy games to flatten marginalized struggles into a consumable product to be toured and gawked at.

Figure 22: Llaura Dreamfeel, Curtain. *2017.*

never left taps into haptic visuality through the design of its glitchy quasi-3D 'boxes'. My intentions with the art – distorted, non-sensical, and 'poorly' generated AI images with a misused and uncanny 3D illusion – are two-fold. The first is to evoke the mesmerization and open-ended imagery of haptic visuality, as to give the player the space to form their own interpretations and to contextualize the art with their own memories and experiences. The second is to maintain an unmistakable digitality to the work's visual aesthetic. While the former is clearly related to my hopes of creating a space for self-reflection, the later is related to the work's – specifically the machine's – reciprocity with the player.

Creating the box's images was a three-stage process. While it would have been simple enough to feed a state-of-the-art Large Language Model image generator instructions related to the subjects in each box's prose (ie. 'the park across the street' in the work's 2nd box), such an approach is likely to produce bland, uninteresting results which are at odds with haptic visuality and unmistakable digitality. Instead, I used Midjourney's earliest generation models, with prompts including nothing more than

suggestions of colours, texture, depth – important for the 2nd step – and random strings of symbols and letters (ie. $#oin8bB90-snfo^&@v). While this usually resulted in a baseline I was pleased with, I wished to further accentuate the 'AI-ness' of the images; to emphasize that the images were not generated with the intent of mimicking human art, but to wear its mechanical origin on its sleeve. To do so, I misused Midjourney's "Remix" feature, which allows the user to 'remix' a generated image with a new set of instructions; an intended use case may be to add an animal to a previously generated forest for example. Rather than adding, subtracting, or otherwise altering the original source image, I found that repeating the exact same prompt often resulted in a 'resonance'; traits of the original image became accentuated, often to the point of intense exaggeration. Additionally, Midjourney allows users to change the generative model with each remix, which can result in (desirably) unpredictable outcomes. To get the results seen in game, I would chain together 4-8 subsequent 'resonating remixes', jumping back-and-forth from Midjourney's oldest to newest models, until I arrived at a result I felt was open-ended, mesmerizing, and unmistakably digital.

Figure 23: Step-by-step timeline of image generation.

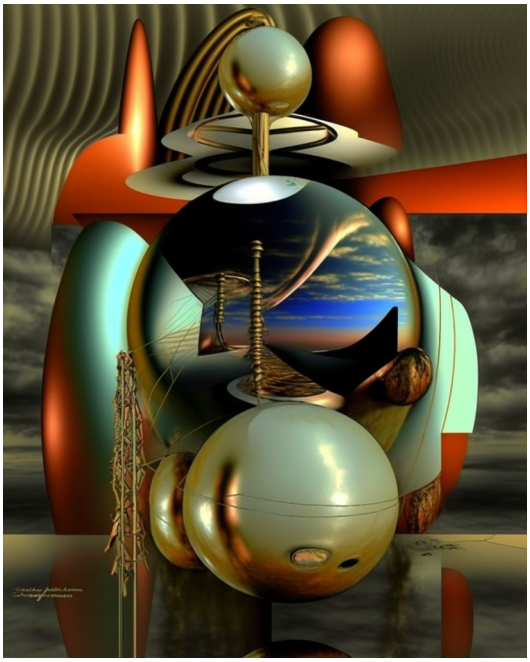

Figure 24: Final Result.

Steps two and three are responsible for the pseudo-3D effect seen in game, which first requires a depth map for each image. Depth maps are gray-scale images where each pixel's intensity estimates the distance from the point-of-view to the corresponding point in the scene; brighter pixels indicate closer objects, while darker pixels are farther. Numerous AI models – primarily deep learning approaches such as Convolutional Neural Networks (Abdullah et al., 2023) – output a depth map from a provided 2D image, and are commonly hosted on sites like Huggingface.co. While robust, I quickly noticed that these models were trained almost exclusively on photographs, realistic art, and other images with clear, definable subjects situated in clear, definable environments. In other words, these models are not well-equipped to accurately, consistently, and precisely estimate the depth of the abstract and nonsensical images that were generated in step one. In the spirit of *never left*'s unmistakable digitality, this is of course extremely desirable rather than unfortunate. Figure 25 demonstrates one of the game's images side-by-side with its generated depth map. Once I had the depth map, I then used Unity Shader Graphs to achieve the stereoscopic illusion seen in game. The steps for doing so I learned and maladapted from this YouTube tutorial (hitlab, 2023). Notably, the tutorial instructs the user on how to achieve a degree of immersion and realism – fine-tuning the depth map, removing the image background, using an image designed to 'play nice' with depth detectors, imposing certain viewing angles so as to better maintain the illusion – it was by experimenting with forgoing these extra steps that the glitch-like sculptures came to be.

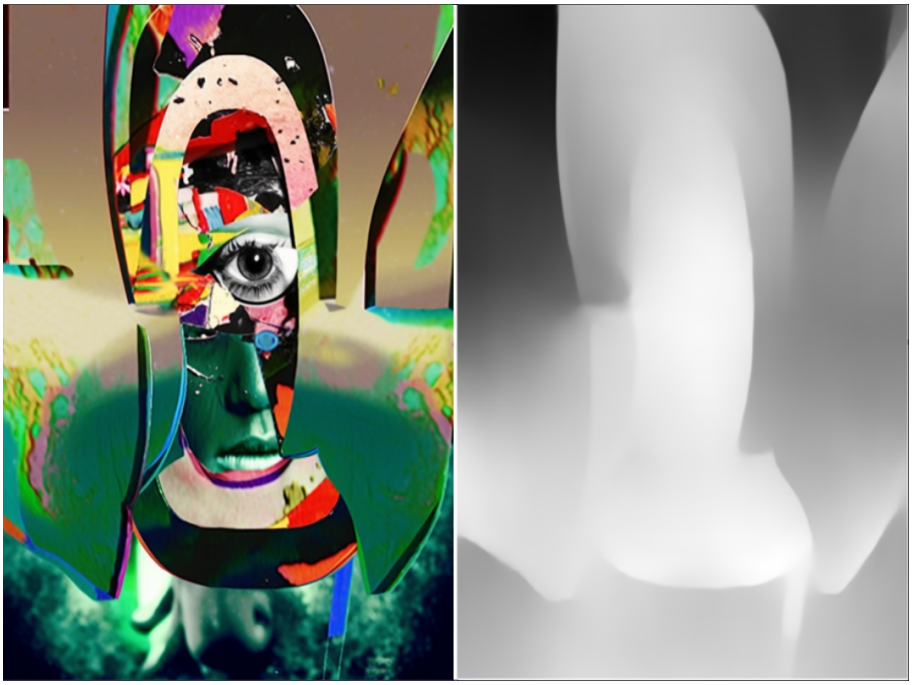

Figure 25: A depth map pair.

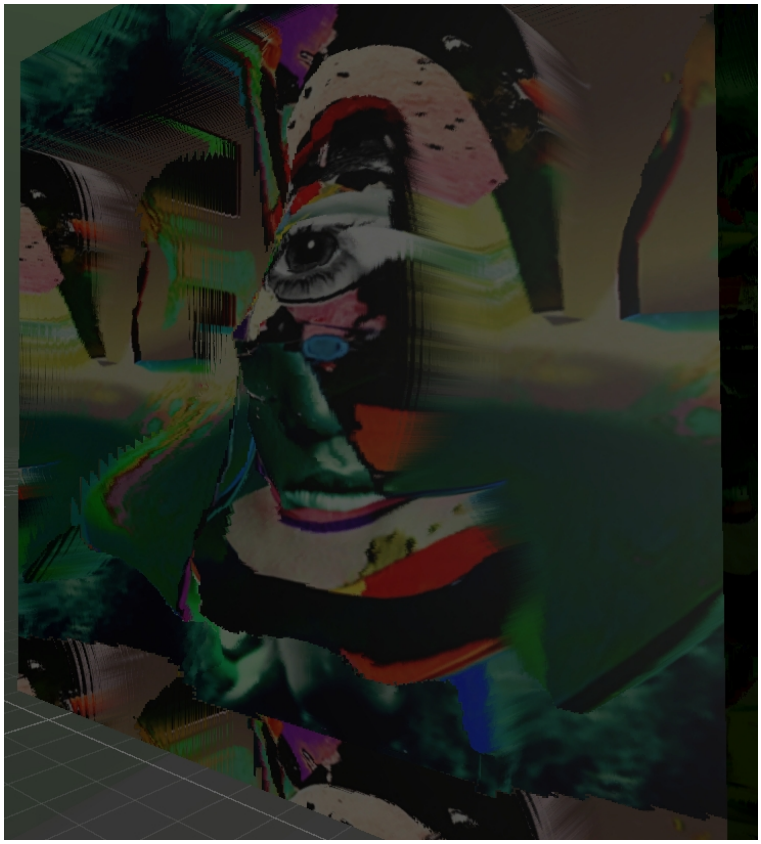

Figure 26: Result in-game.

It is important to address that AI-generated art – much like VR – is rightfully plagued with its own set of controversies (Giacomin Da Silva, 2024). These include the “consent and copyright crisis” (Pasquale & Sun, 2024), large commercial models’ exorbitant environmental impact (Berthelot et al., 2024), AI’s close-knitted relationships with Big Tech (Acemoglu & Johnson, 2023; Giacomin Da Silva, 2024), implications on the creative job market (Salazar et al., 2024), and the overall distaste of AI-generated art that many people hold as they zealously become experts on what does or does not qualify as “art” (Fortuna & Modliński, 2021). As I hoped to have already demonstrated, I do believe that there are still artistic applications to be found in AI-generated art when used thoughtfully and transparently, and for its own unique traits as an AI-generated object rather than as a replacement for artist-authored work. However, the other controversies have obvious conflicts with my stated ethical guidelines. So why use generative AI at all? Besides the already stated aesthetic intentions, the use of AI-generated objects in *never left* hearkens back to the aesthetic foundation discussed in section one – artistic reappropriation. In the same way that *never left* reappropriates VR – a medium ridden with sensors and virtually monopolized by one of the worst culprits of surveillance advertising – it also seeks to reappropriate AI-generated objects. Just as *Border Tuner’*s use of searchlights as a means of human connection takes an ethical stance and enables it with something contradictory, *never left* takes VR and AI-generated art and uses them to support an artistic statement around self-disclosure.

Glitch and vulnerability

As touched on above, my motivations for pursuing an 'unmistakably digital' aesthetic is related to my goals of mutual reciprocation with the player. Glitch artist Rosa Menkman astutely remarks how “innovation is […] assumed to lie in finding an interface that is as non-interfering as possible, enabling the audience to forget about the presence of the medium and believe in the presence and directness of the immediate transmission” (Menkman, 2011). However, are presence, immediacy, and other attempts to mask the medium – if they're even achievable (Bolter, 2007; Manovich, 2002) – as universally desirable as the dogmatic pursuit from tech entrepreneurs would have us believe? In addition to the queer game designers discussed above who forgo frameworks of empathy-via-immersion in favour of achieving a balance between closeness and distance through techniques like haptic visuality, composers working in the intersection of VR and music have expressed a similar concern over the erasure of the medium. Zachary Berkowitz posits that "the audience should see the human behind the technology.

They should feel human connection, not just technical awe" (Berkowitz, 2016). Jarron Lanier – a pioneer in the area of Virtual Reality, music, and performance – speaks of the misguided intentions some creators have of leaving the audience "awestruck" and making the artist/performer seem "invulnerable", believing that approaches which leave the technology apparent can gain a more "meaningful and urgent audience/artist connection" (Berkowitz, 2016). I find myself agreeing with these points, and it became a defining design point in *never left* – particularly due to my focus on self-disclosure and reciprocity. While Berkowitz and Lanier unmasked their technology by presenting their work through VR stage performance (Berkowitz, 2016; Lanier, 1993), *never left*'s queerness and validation of the private led me instead to the aesthetics of glitch.

Defining glitch can be as tricky, a murkiness which Menkman addresses by providing her own definition: "... a (actual and/or simulated) break from an expected or conventional flow of information or meaning within (digital) communication systems that results in a perceived accident or error" (Menkman, 2011). Notable is the distinction that glitch can be "actual and/or simulated" – an accidental bug, or a purposeful act from the artist – so long as the result is a *perceived* accident or error. These purposeful acts have historical roots dating back to Luigi Russolo's Art of Noise (Russolo, 1913), and have since evolved to encompass everything from the magnetic circuit-bending of the 1960's (Scarlett, 2017), to CD-wounding (Sangild, 2013), to the stray pixels, granular noise, fuzz, jagging, and distortion that make up the artefacts of contemporary glitch art (Scarlett, 2017, p. 47). Because they emerge when a digital entity does not function as expected, glitches "have traditionally been figured as resistant signifiers" (Scarlett, 2017, p. 47), with several artists and theorists relating the resistance of glitch art to queer expression (Brooks, 2015, 2015; Halberstam, 2011; Pow, 2021; Ruberg & Shaw, 2017). Gass speaks specifically to the ability of glitch to circumvent empathy game pitfalls for trans creators, affording "transgender creators forms of distance and discretion that more overt narrations of transgender life do not" (Gass, 2024). Finally, Menkman's work and theory posits that glitch is a "revealing of the machine" (Menkman, 2011); a form of virtual self-disclosure and reciprocation with the player. Whit Pow echoes a similar sentiment, speaking to how glitch “makes the user aware of the construction of the computer system, and the user's own interpellation (or lack of interpellation) within these systems” (Pow, 2021, p. 203). Taken as a whole, glitch simultaneously intersects with my goals for creating critical distance, as well as representing mutual vulnerability and reciprocation on behalf of the machine. Within *never left*'s conceptual framework, this machine – the software unto which the user

discloses to and the hardware which they wear – is positioned as having its own agency equal to the player and artist. Through glitch and the aforementioned use of 'its' in the work's introductory video, I hope to encourage the player to remain cognitive of their relationship with the work's software and hardware. How then does glitch appear in *never left*?

In games, the means through which glitch highlights the agency of its software often simultaneously revokes the player's own sense agency and control. This is commonly and effectively used to alienate, frighten, disorientate, or discomfort players for artistic effect (Gass, 2024; Hawreliak, 2018). One popular example is the game *Doki Doki Literature Club* (Salvato, 2017), a psychological horror game which presents itself as a carefree dating sim for the first several hours of gameplay before abruptly and violently wresting agency away from the player through acts of glitch, including manipulating save files, corrupting images and text fields, and even requiring the player to delete a game file from their hard drive in order to continue (Oudenalder, 2020). Another is *Anatomy* by queer designer Kitty Horrorshow (Horrorshow, 2016), a horror walking simulator in which the player explores a living house with objects that becomes increasingly glitched (move into surreal arrangements, flicker in and out of existence, etc.) as the player progresses. Other approaches seen in queer games such as *Problem Attic* (Ryerson, 2016) or *Strawberry Cubes* (Schmidt, 2015) instead present glitched and counterintuitive game logics from the very beginning of the game (Gass, 2024). In the case of *never left*, alienation and discomfort were not results which I considered desirable in a work based on meditative self-reflection. In other words, while I desired the unmasking effects of glitch as a means of reciprocation on behalf of the machine, I wanted the player to still feel comfortable reflecting and disclosing – critically distanced, not lacking in agency.

Figure 27: Dan Salvato, Doki Doki Literature Club. *2017.*

As such, I opted to gently and statically borrow from glitch-like aesthetics rather than suddenly break/glitch elements of the game's foundational design and the player's core expectations. This is once again best seen in the boxes discussed above which feature unchanging tearing, jagging, stray pixels, distortions, and a stereoscopic 3D illusion. These objects and their glitchy presentation are static besides gently spinning in space; an important distinction from glitch in *Doki Doki* and *Anatomy*, where glitches are abruptly introduced after player expectations have already been established. From my own time spent playing games with glitch, I find that it's precisely this break in established in-game convention that revokes the player's sense of control and leaves them feeling apprehensive, alienated, or frightened. Glitchy aesthetics or behaviours which are present from the start maintain their ability to unmask the machine and critically distance the player, while helping to minimize the chances of creating an unwelcoming or uncomfortable atmosphere.

Besides their distorted and nonsensical visuals, *never left*'s cubes are also glitchy in their 3D stereoscopic illusion, which becomes a particularly mind-bending visual and violation of expectation upon the player discovering they can pass inside of them. The artificial illusion of depth on the 2D surface becomes exaggerated to the point of breaking just as the player's camera passes through the

wall's threshold. Importantly, this is a 'glitch' that the player experiences at their own will and at their own pace. They can back in and out of a box anytime they wish, and they relinquish no control to the machine in order to facilitate the glitch. It is worth noting that the ability to move through seemingly solid objects unimpeded is not new nor even wholly unexpected in VR art; many pieces in the *Museum of Other Reality* for example are comprised entirely of ghostly sculptures and objects which do not as much as make a sound while the player glides through and views them from the inside-out. Yet, despite its relative ubiquity in the medium, the act of plunging one's virtual head into a solid wall never manages to feel completely natural or expected. It feels like a glitch. While Menkman highlights the ways in which glitch is subjective and socially, culturally, and technologically informed (Menkman, 2011), a glitch like this hearkens partially to our physiology; it upends the user's embodied immersion and enters the realm of what Gonzalo Frasca terms "outmersion" (Frasca, 2001). A deliberate distancing of the player from an embodied avatar experience (Berge, 2021a), outmersive game design would appear to be completely at odds with the immersion-forward marketing tactics of consumer and empathy VR, an incongruence explored in detail by Berge (Berge, 2021b). But by the very same attributes that have advertisers shilling for VR's immersive capabilities and Chris Milk speaking to its capabilities to instill empathy, head-mounted displays find themselves especially suited to the outmersive. It is one thing to run through a ghostly object while experiencing a game on one's monitor or TV, and another entirely to experience it while using hardware which associates one's physical head with the in-game camera. I found the experiences I had moving through solid surfaces in VR and the ways in which it violated my physiological expectations to be breathtaking, which then became my initial inspiration to experiment with ghostly surfaces that invited the user's touch through their illusion of depth.

Finally, the sound in *never left* also borrows from glitchy aesthetics, best heard in the spatialized sound effects of "glitched" natural sounds which randomly trigger around the player's head. While earlier conceptions of the work used harsh, fully corrupted and glitched audio files, I later swapped to highly processed, but still recognizable sounds of birds, wind, and waves. These sounds still feature hallmarks of corrupted audio and the detritus which arises from malfunctioning audio hardware – such as skipping, cuts, stutters, warbles, and pops – but avoid the risks of scaring or alarming the player in order to better suit the reflective atmosphere I hoped to create. The distinction of manipulating only naturally-derived source material (ie. birds, wind) was also a purposeful choice; an auditory

engagement with the complex dynamics between real and virtual, nature and technology, human and machine. These dynamics were also behind my instrumentation choices for the work's interactive music. While originally I sought only to work within digital and synthetic means – as to fit an 'unmistakably digital' aesthetic – I eventually came to feel that a balance of human-recorded and synth-based music ultimately served my intentions best. *never left*'s long, drawn out violin phrases and percussive, incessant saxophone part were performed and recorded by violinist Clare Pellegrin and saxophonist Ben Whittier respectively. Underneath, the human performances are supported by a gentle cloud of synths. The human/machine dynamic is present at a more micro detail as well. While the saxophone part sounds as if it is a single running line, in reality it consists of over 100 sound files less than a second long, edited with extreme precision and strung together with controlled randomization in Wwise. These individual micro fragments of music may sound human in origin, but the way they are endlessly chained one after the other with not so much as a single breath in between is decidedly not humanlike; it is robotic.

SECTION 4: CONCLUSION

In conclusion, *never left* for Virtual Reality reappropriates VR hardware as a site of artistic intervention which seeks to re-sanctify the act of technologically-mediated self-disclosure that has been soured by surveillance advertising practice. Simultaneously, *never left* seeks to validate the solitary as a valid means of experiencing music and art, particularly for pieces like this which have an impetus on self-reflection. Supporting *never left*'s aesthetic goals is an explorable and 'statue'-like procedural music system conceptualized as an abstraction of self-disclosure, a visual approach meant to preserve critical distance, and an overall design approach which emphasizes reciprocity and consent.

Speaking a bit more off the record, *never left* is research-creation which pulls from so many different parts of me. The ticked-off digital humanist with strong feelings about data sovereignty; the introverted composer with crippling sleep problems; the experimental trans game designer with a love of glitch. In the spirit of self-disclosure that is at the crux of this thesis, let me disclose: the interdisciplinary nature of where my research has taken me over the past five years has left me feeling fragmented and numb, as though I've lost any clear semblance of an identity. Perhaps *never left* was my attempt at tying myself back together again; to take all these new pieces of me and have them talk to one another in a singular dialogue, a singular work of art. At the time of me writing this, it is still too early for me to know if *never left* really accomplished anything in that regards. But that's not really the point, is it? It's a part of me now. And whether or not I go on to become fully invested in interdisciplinary research and creation, or become more specialized in a single creative passion of mine, or – and this is admittedly the most likely by far – continue to drastically redefine myself every couple of years (months?) for seemingly no reason and then ricochet back-and-forth on what it is that I even want to do or see or hear or feel, all while dealing with the identity crises that stem as a result… No matter what happens – *never left* is a testimony to all the different things that are important to me right now. And if I'm lucky; maybe it will become important to someone else too.

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