SINGLE MOTHERHOOD, MEDIA, METHODS, AND MESSINESS: EXPLORING

VIRTUAL REALITY AS A TOOL FOR AUTOBIOGRAPHICAL EXPRESSION

by

Katherine Elizabeth Womby,

Bachelor of Arts, Ryerson University, 2003

A paper

presented to Ryerson University and York University

in partial fulfilment of the

requirements for the degree of

Master of Arts

in the joint program of

Communication and Culture

Toronto, Ontario, Canada, 2020

© Katherine Elizabeth Womby, 2020

Author's Declaration

I hereby declare that I am the sole author of this paper and accompanying project. This is a true copy of the paper, including any required final revisions, as accepted by my examiners.

I authorize Ryerson University to lend this paper to other institutions or individuals for the purpose of scholarly research.

I further authorize Ryerson University to reproduce this paper by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

I understand that my paper may be made electronically available to the public.

Single Motherhood, Media, Methods, and Messiness: Exploring Virtual Reality as a Tool for

Autobiographical Expression

Katherine Elizabeth Womby

Master of Arts, Communication and Culture

Ryerson University

2020

Abstract

This research/creation project documents my experiences of living as a single mother with minimal financial, family, and social support. Since research suggests that virtual reality (VR) can generate heightened empathetic response in users, I chose to develop my story using VR as the primary creative tool. This study required engagement with the creative and methodological approaches of arts-based research—a process of learning-by-making that prompts questions and reflections on ethics, techniques, aesthetics, value, and subjectivity. The finished project, then, is an exploration of my journey not only as a single mother, but also as a researcher exploring emerging technological affordances and their capacity to engender empathy and serve as tools of autobiographical expression. In this way, the work could further be understood as contributing to the emerging field of autotheory, in which the researcher's subjective and embodied experience is integrated with theoretical and philosophical approaches.

Acknowledgements

It is my pleasure to acknowledge the generous, creative, and brilliant supporters who helped make this research/creation project possible. Thank you to all the friends, family, and other folks who crossed my path while I was on my graduate student journey and who had a hand in helping me work through 'the messy.' The conversations we had over coffees, lunches, phone calls, and video chats helped contribute to the direction I found in the end, and I appreciate you for it more than I can adequately express.

I want to thank my photography instructors from The Chang School of Continuing Education, Jill Glessing and Joël Bénard, whose academic letters of reference supported my application to the Communication and Culture Master of Arts program. The photography certificate was something I did in preparation for graduate studies, hoping to undo some of the ugliness of my undergraduate transcript. It did so much more. Your passion for photography made me fall in love with the craft, but beyond that, your support made me believe that my larger goal of higher learning might be possible. I will forever be grateful to you both for giving me that vote of confidence, which helped carry me through periods of doubt as I worked to complete my master's.

Regarding the project itself, the technical hurdles of building in virtual reality could not have been overcome without guidance from Kieran Ramnarine of Ryerson's Digital Media Experience Lab. Not only did you put an end to my many months of wandering the vast and utterly mystifying world of Unity, but your technical expertise allowed me to make something I truly wasn't sure was possible—not to mention, your patience and enthusiasm helped buoy my spirits along the way. I so appreciated your dedication to helping me reach (and, in many ways,

exceed) my goals for the project, as well as your being there to share in the moments of frustration and jubilation along the way.

I am also indebted to my committee members, Dr. Elizabeth Podnieks and Dr. Caitlin Fisher, for the ways in which they each enriched the academic rigour and creative considerations of my work. I want to offer a special thank you to Elizabeth for pushing me to dig into the auto and maternal, and for your extended efforts in supporting my long journey. I am very grateful for the conversations we had along the way, and the ways in which your input deepened the significance of my work. To Caitlin, I am inspired by your trust in the idea of play and experimentation. It was difficult to shake myself out of the rigidity that sometimes controls me, but I found so much joy in finally being able to do so—not to mention that significant creative output was made possible by that letting go.

It is difficult to find sufficient words to convey my gratitude for my supervisor, Dr. Matthew Tiessen, who has been there literally since day one of my master's program. As I tried to navigate theories and concepts far beyond my reach and dealt with the messy thinking and constant questioning of what it was that I was or was trying to do, you were consistently there to support me, almost like an intellectual rock. You had a formative impact on my master's experience, and I can barely imagine getting through it without your guidance. You showed me patience and kindness, and you challenged me to push further but also to trust my convictions. Thank you for always encouraging me to 'follow my nose,' for your final push of motivation and support that allowed me to take this across the finish line, your superb editing, and, in general, your generosity in helping me unmuddle my thinking.

Closest to my heart, of course, is the little family I made: my daughter, Julia, and my husband, Marc. I have been a part-time graduate student for the past four years and was

previously taking photography courses for two years. I was working full-time throughout most of these years, which meant my time was stretched very thin. Marc and Julia, I need to acknowledge just how monumental of a contribution you each made in simply being there through it all—in putting up with my frenzied exhaustion, the half-assed suppers, the books strewn throughout our apartment… all of it. You saw behind the curtain the whole way through. You have that direct experience of bearing witness to exactly what it takes to achieve the goal of obtaining a master's—in my case, while coping with a temporary but significant illness, a lost job, and a lost loved one along the way. Your solidarity and love through that time means the world to me. Marc and Julia, you are my lifeline and I am eternally grateful to you both.

Dedication

This research/creation project exists because I am a mother. This is also why I exist. My dear Julia, I dedicate my paper and project to you. When I learned I was pregnant, you ignited a fire deep within me that has motivated me over the past fifteen years and pushed me to achieve things I never thought possible, including this thesis project. I know you have been observing me throughout my master's and think I am some kind of genius doing things completely beyond your reach. I know you think that, despite our many similarities, we are different when it comes to learning and school. I promise you; I fumbled my way through all of it. I did not know how to do this.

I wanted to give up at times. I questioned my ability to do the work, and whether I belonged in graduate school at all. When I felt especially tired and discouraged, and wondered if I should quit, you kept me going without saying a word. I wanted to make it to this moment right here, writing a dedication to you as I wrap up the final pieces of this journey. I wanted to show you that it's important to do things that push you to grow. I wanted to make you proud.

Although school diverted a lot of my attention and energy away from you in recent years, I'm hopeful that, ultimately, we will both gain something in knowing I got through this mainly by pressing forward until I reached the finish line. It wasn't until the final stretch that I came to realize there is plenty of room for messy thinkers in school and in the world at large. I learned to make peace with the scattered way my mind works and find value in it in spite of my worries. I hope with all my heart you can take from this the knowledge that the way your mind works is perfect just the way it is—that you are brilliant, creative, and special, and that your determination will take you wherever you need and want to go. I love you, my bean.

Table of Contents

List of Appendices

Single Motherhood, Media, Methods, and Messiness:

Exploring Virtual Reality as a Tool for Autobiographical Expression

1. Introduction

1.1. Personal Context

This research/creation project is about my journey as a single mother and my experience of living that identity. The project also serves as a way to externalize this experience and have it heard, and can also be understood as a form of catharsis. I have an academic and professional background in visual and written storytelling, and these experiences informed my creative choices. My post-secondary education focused on video production, writing, photography, and immersive media. In my career I have spent several years developing graphic design materials and written content for digital and print campaigns and communications. Moreover, from my experience as a storyteller, both of my own narratives and those of others, I know that one of the primary motivations in wanting to tell one's story is to feel heard by empathetic others—to have others 'get it' in a way that offers them deeper insights into their own lives. But how to tell this story?

During this project's early stages, I chose to use virtual reality (VR) as a suitable tool for generating empathetic experiences in response to my autobiographical story, despite having no prior experience of working in that medium. Dubbed 'the empathy machine' by filmmaker Chris Milk, VR is a medium that has been described as having the capacity to go further in terms of emotional affect than film due to its ability to invite audiences to truly feel like they are part of the represented scene (2015). This project, then, is an arts-based research (ABR) study about my journey not only as a single mother, but also as a researcher exploring emerging technological affordances and their capacity to engender empathy and serve as tools of autobiographical

expression. This project can also be understood to fit into the subcategory of autotheory since my subjective and embodied experiences of engaging with both material and process led to the generation of theory about which methods and media to employ in the production of both paper and project (for more on autotheory, visit sections 1.2 to 1.2.3, 4.3, and 4.5).

The VR story I developed for this project depicts a journey in my life that began when I found myself pregnant, less than a year after graduating from university. I was 22 years old, single, and working at McDonald's. I assumed correctly that news of my pregnancy would not be well-received by my conservative family. Indeed, I was exposed to a barrage of admonishment ███████████████████████████. In addition to suggesting that I give up my baby and chastising my irresponsibility, some family members chose temporarily to abandon me and refused to speak to me throughout the duration of my pregnancy. While few apologies were ever made, reconciliation came about slowly after my daughter was born. It was not until I reflected on this time in my life with intentionality for the purpose of this research/creation project and paper that I recognized that the shame and pain prompted by my family's reaction coloured my perception of myself as deviant and 'other' and led to my assuming for myself a stigmatized identity—that of 'single mother'[1]—for the first time in my

[1] I make use of the term 'single mother' throughout this project because of the prevalence of the term in contemporary culture and because of the ways it shaped my sense of self as a mother who was fundamentally different from the more socially-sanctioned, more normative version of mother as partnered individual. It was always clear to me that I was not a mother, I was a single mother. This term indicated that my motherhood identity deviated from the norm. Indeed, single

life. My impression of myself, my daughter, and our two-person family as 'illegitimate' was reinforced by social encounters that made visible my otherness through the juxtaposition of my experience and identity against more normative social categories and expectations.

Since my perspective and experience provides the foundation upon which the narrative for this project was produced, it is important to provide context to this study by addressing my social situation and how it evolved as I passed through three primary identity categories: pre-single mother, single mother, and (married) mother.

My parents immigrated to Canada from the United Kingdom in 1981 and I was born later that year—the second of what would become a total of four daughters. By the time I was eight, our family had achieved upper middle-class status. I grew up with the expectation that I would earn a university degree, even though no one in my family had yet completed university. While we lived frugally, we never worried about essential life resources like food and shelter. When I left home in 1999 at age 17 to attend university in Toronto, my family relocated to the United States and, aside from tuition support from my parents, I was responsible for my own finances and living situation.

My romantic relationships in Toronto were with men███████████████████████████
██████████████████████████. While I cared for them and tried to support them, I quickly fell below the poverty line, and lived in unsafe conditions with few resources. My life circumstances had shifted dramatically from my cushioned experience as a child and adolescent to my time as a young adult. Throughout my pregnancy and for the first year and a half of

mothers often face judgment and stigma as a result of their non-normative status (Caragata & Alcalde, 2014; Iyengar, 1991; Juffer, 2006; Motapanyane, 2016).

3

motherhood, I continued to rank as 'poor' on the Canadian economic class scale. Given my upbringing, I was acutely aware of the discrepancies in lifestyle each class assumes, and inherently understood my status and even myself at this time as 'less than' those who enjoyed greater economic stability. My unplanned pregnancy exacerbated this perspective in regard to economic status and, combined with my family's negative attitude towards my situation, greatly shaped and perpetuated my growing feelings of illegitimacy and deviance (feelings that I deal with in greater detail in section 4.5 of this paper).

I was a single mother for eleven years before getting married in 2016. Just like that, my single mother identity was erased! While it was certainly nice to wear a ring that visibly affirmed my new status as a mother with a partner, I also felt as though my time as a single mother, a time that had defined so much of who I was, had never existed. When this major chapter in my life came to a close it seemed like the only option was to celebrate the happy union between my partner and myself. At the same time, however, there was no tradition or practice to honour the experiences that my daughter and I were leaving behind. I remember feeling compelled to pay tribute to this transition somehow. At the time, I booked a henna artist to come into our home and literally marked the occasion by having her apply a temporary tattoo of a large feather breaking off into dozens of tiny birds flying away. This act in part foreshadowed this project and my desire to find meaning and empathy through creative expression.

1.2.   Overview of Study

This research/creation project is about my experiences as a young single mother and what it meant to me to assume that identity. I use VR as the creative tool with which to investigate my motherhood. The project can also be understood as an exercise in autotheory, insofar as the theoretical and creative methodologies I used were identified through the act of making. This

research paper includes a discussion of my methods, a review of relevant literature, an outline of my creative process, a reflection on lessons learned, and a consideration of how this work contributes to both theory and practice in the areas of arts-based research (ABR) and autotheory, as well as in motherhood, autobiography, and new media studies.

The creative part of this project is titled *Single Mother Voices: Maternal Inscape (Volume I)*. The reference to 'Volume I' is intended to suggest that this work could be further expanded (particularly given that my VR component serves more as a proof of concept than a comprehensive representation of the entirety of my experience). While the goals of this project are more about exploration and catharsis than about reaching external audiences, the methods used to execute such a work certainly demonstrate that these salutary goals could be achieved by anyone with adequate resources and time who has an interest in representing their own story using immersive media. Indeed, the techniques and methodological approaches I used could be applicable to any number of demographics interested in communicating their stories. That being the case, individuals belonging to, for example, single mother communities could potentially create a multitude of immersive autobiographical stories that add to this project, thus extending its potential reach and impact through a broader representation of the diversity of single mother experiences.

1.2.1. *Statement of Research Problem*

Making the creative VR project that accompanies this paper, insofar as it was cathartic and illuminating, can be understood as a form of expressive arts therapy—a way for me to establish agency amid the anxieties and insecurities wrapped up in my identity and experiences as a single mother. Many other mothers have used art to examine, engage with, and interrogate their experiences (Buller, 2016; Ciciola-Izzo, 2014; Irvin, 2016; Knight, 2009; Nelson & Combe,

2017; Wadeson, 1986). I wanted to join this tradition but to do so using a relatively new form of storytelling: VR.

Because of the strong sense of 'presence within a scene' that VR affords (Heeter, 1992; Papagiannis, 2017; Rose & Bailenson, 2016; Steuer, 1993), I used it to serve as an 'empathy machine' (Milk, 2015); my objective was to experiment with its ability to afford others the capacity to experience a deeper understanding of other people's identities and experiences. My VR experiments were motivated by the following question: Can immersion in VR environments counteract indifference, facilitate understanding, and generate empathy by offering insight using what our brains perceive as direct experience? By developing my motherhood story as a 360-degree autobiographical VR documentary—and by documenting the process and outcomes—I aimed to contribute to the advancement of research that relates to the effectiveness of communicating identity and lived experience through immersive storytelling.

As discussed in section 1.2, a secondary objective was to explore a new tool for self-representation that could potentially be used by others, including those belonging to single mother communities. This prompted a final area of research inquiry, including the following questions: What is gained or lost through the medium of VR itself? How can it enhance or detract from the goals I set for the autobiographical aspects of this study? Can the immersive format of VR overcome some of the shortcomings observed in traditional media representations of the single mother figure? Also, as VR production becomes more accessible to the masses, is it a viable and suitable new medium for amateurs to transfer personal knowledge of lived identity or experience to others—or is it still too complex, with too many technical hurdles yet to be overcome?

1.2.2.   *Theoretical Framework*

This research/creation project and its use of VR responds to the idea that direct experience

has a greater impact on affect than indirect experience (Whitmarsh, 2008; Zanna & Fazio, 1981).

It also responds to the argument that a high degree of presence in a virtual environment generates

a strong emotional impact (Diemer et al., 2015; Riva et al., 2007; Steuer, 1993) and that intense

emotional impact can significantly influence one's attitudinal and behavioural responses

(Festinger, 1962; Hovland et al., 1953; Loewenstein & Lerner, 2003; Petty et al., 2001). By

working with the understanding that VR has the ability to successfully transport viewers outside

of themselves and their environments through highly visceral, multisensory experiences that

mimic reality (Dartmouth College, 2016; Rose & Bailenson, 2016), my goal was to develop a

creative project that could engender responses such as empathy and understanding.

This project draws on the assumptions and theoretical underpinnings of ABR, insofar as

personal experience and feelings are privileged throughout (Barone, 2010; Barone & Eisner,

2011; Grbich, 2013). For example, in addition to basing the development of narrative content of

the VR component on my own memories and perspectives, many of my creative and technical

choices were based on how I reacted physically and emotionally to other VR works. I used a

journal to capture my response to dozens of VR projects, allowing me to reflect on effective

immersion and embodiment techniques that I experienced in the works of others. Excerpts from

my journal are included in section 4.4 of this paper.

The epistemological position from which I approached this study is that data, or

knowledges, are contained within the perspectives of single mothers. In this case I engaged with

myself, someone with lived experience as a single mother. In this way, I participated in this

project as an individual from whom to collect data. This focus on myself, however, went beyond

simply serving as the source of narrative content for the VR production. Given my lack of prior

exposure to methods of personal VR production, my subjectivity was also privileged as a site of knowledge creation for how to use VR as a tool of autobiographical expression. As such, perhaps overall this experimental work best fits into the emerging field of autotheory, which has been described as a way to integrate embodied practices of self-representation with engagement in critical theoretical approaches (*Autotheory*, 2018; Fournier, 2018; Zwartjes, 2020).

From a content perspective, both the creative and research components of the project explore the merits of the 'intensive mothering' approach—a term introduced by Sharon Hays in *The Cultural Contradictions of Motherhood* (1998) to describe the prevailing model of what is considered to be a 'good mother' in contemporary Western culture. Intensive mothering is characterized by constant doting and significant spending on the child, being perpetually available to the child, and being fully satisfied by the gift of motherhood (see section 3.2.1). In my creative work, I question how this ideology has both positively and negatively impacted myself and my child, particularly as a low-income single mother who worked to shed the stigma by finding economic and romantic stability.

1.2.3. *Methodology and Methods*

Arts-based research (ABR) provides the primary methodological approach for performing this research/creation project. ABR is a form of qualitative research that incorporates artmaking and creative engagement to facilitate greater insight while legitimizing enacted ways of knowing (Seregina, 2019). My memories, feelings, and perspectives were privileged as the primary source of information while developing this project's scope and script (Appendices A and B) and my creative output was shaped by an inquiry into my own personal experiences of single motherhood.

This approach empowered me by legitimizing my experiences as worthy of both investigation and creative expression—it was so cathartic and is an important characteristic of ABR. The idea of catharsis through artistic expression has long been one of my coping mechanisms for managing deep emotions including trauma and pain, and I can attest from personal experience that it has served to imbue a sense of empowerment and promote personal healing in me on many occasions. This is clear to be true for many, as revealed by a range of studies that tap into ABR as a way to foreground socially marginalized voices (Levy & Weber, 2011; Misra, 2019; Montgomery et al., 2019). I reflect on my personal experience of using ABR in section 4.5 of this paper.

The methods used for this study also overlap with those used in the approach known as autotheory. For example, this study benefits from the flexibility afforded by bridging theory and practice and by using the paper to think critically and reflexively about what was learned through making a project that turned to VR as a tool for autobiographical representation. Whereas in literature, autotheory often results in a combination of citation and narration contained within a cohesive, written work (for example, Maggie Nelson's *The Argonauts* (2015) or Chris Kraus' *I Love Dick* (2006)), this study intersperses narrative and theoretical content between project and paper.

1.2.4. *Ethical Considerations*

The ethics review process unearthed deep-seated triggers for me, prompting questions such as the following: What are my obligations towards maintaining privacy for the father of my child, who was never present for any part of her upbringing? How might my ethical obligations towards him affect my artistic freedom of expression? What could result from my revealing disparaging remarks from my family members, and outing some of my less-than-intelligent

choices as a young adult? And what about potentially compromising my privacy or that of my daughter? To avoid giving away our identities, I made use of pseudonyms and carefully selected what to reveal about those individuals involved. Anonymizing this autobiographical work allowed me to more comfortably expose my honest perspective—but regardless of the protection afforded by such privacy, ethical questions persisted, particularly related to the accuracy or inaccuracy of my recollections. For example, was my memory reliable enough to warrant the classification of my story as autobiographical? How could I justify the privileging of my take on shared experiences?

Throughout the scriptwriting process, I questioned constantly whether it was more or less ethical to be candid and to just 'write what you know.' In the end, as an attempt to address some of these ethical concerns, I included an introductory frame that opens my VR production stipulating my intent to provoke emotional response, and of its being a part of a broader academic work. The topic of accuracy in autobiographies is expanded upon in section 4.5, where I discuss some of the problematics of the genre.

1.2.5. *Discussion of Format of Creative Component*[2]

Drawing on my storytelling and artistic experience as described in sections 1.1 and 4.3, as well as my research into VR to help choose and create immersive and evocative visuals and narrative, the creative component of this project is a short (approximately five minutes in duration), full colour, 360-degree, three-dimensional (3D), immersive, autobiographical

[2] Much of the knowledge incorporated in this section was gained through one-on-one Unity coaching sessions and casual interviews with Kieran Ramnarine (2020; 2019; 2018) from the Digital Media Experience Lab at Ryerson University.

documentary with ambisonic sound (a full-sphere, surround-sound format of audio). Source material includes personal mementos, including journal notes, letters from family members and my daughter's father, and photographs. The project was built using Unity 2019.3.4f1. It was recorded in 360 degrees within Unity, stitched together in Adobe Premiere, exported as an .mp4 file, and uploaded to YouTube as an unlisted video so that only those with the link can find it. It can be viewed in 3D on all smartphones using Google Cardboard or a similar head-mounted device (HMD) or in 2D on a computer. As mentioned, pseudonyms are used both in the project itself and in the project's distribution (the YouTube host account name also does not reveal my identity) in order to offer another measure of privacy for myself and those involved in my story.

The immersive, virtual world I created invites audiences into close proximity with the single mother subject, travelling alongside her as she experiences fragments and vignettes of her story. The audience cannot control the speed or pathway of the camera's view, although they do control the direction of their gaze, which is known to enhance the sensation of being present in the scene (Kilteni et al., 2012; Rose & Bailenson, 2016). This is achieved by building the project in 360-degree format and filling the virtual world with 3D objects. Mobile users can tilt and rotate their device to adjust the point of view, while desktop users can adjust the view by clicking and dragging their mouse. Keeping user interactivity to a minimum in the VR world I created was a choice I made to keep the scale of the project under control, but also because research suggests that too much user interaction in an immersive digital story may reduce the feeling of presence by disrupting narrative flow (Gander, 1999; Mateas & Stern, 2006; Plowman, 1998; Ryan, 1999).

The project uses ambisonic audio—which covers a full spectrum of sound—allowing the mono-recorded narration, ambiance, and other sound effects to be placed as sound objects in 3D

space within Unity. By using ambisonic audio the recording camera picks up sounds as it passes sound objects and the doppler effect is picked up by the virtual camera's microphone. This is transferred to the audience experience through headphones or surround-sound speakers, further enhancing a sense of presence within the scene. While haptic (tactile) technology would accentuate that impact, the visual and aural features alone provide a strong sense of immersion (Steuer, 1993) and require significantly less time, skill, and financial resources to produce.

2.   Relevance to Program

Following the interdisciplinary approach of Ryerson and York Universities' *Communication and Culture* joint graduate program, this creative/research project probes the porous boundaries between multiple communication and culture fields, fields such as new media, autobiography, and motherhood studies, as well as ABR and autotheory.

3.   Review of Relevant Literature

3.1.   On Virtual Reality[3]

3.1.1.   *Early Examples of Immersive Media*

The power of immersion is illustrated in the mythic 1895 screening of the Lumière brothers' 50 second silent film *L'Arrivée d'un train en gare de la Ciotat* (Arrival of the Train at La Ciotat Station) which depicts a train pulling into a station. Despite the lack of colour and a slow frame rate per minute, spectators reportedly panicked and tried to run from the oncoming

---

[3] This section includes excerpts and reworked content from an unpublished essay I wrote for a graduate course in 2016, entitled "Humans in Virtual Environments: Tapping into the Power of the Suspension of Disbelief."

train (Loiperdinger, 2004). The attempt to replicate direct experience through the feeling of being present is common to a long line of visual technologies. For example, the nineteenth-century stereograph used special cameras to capture and then display two images simultaneously—thus mimicking human vision. When placed in a special viewing device called the stereoscope, the images combined to give an illusion of space and depth (Holmes, 1864; Warner Marien, 2015).

The stereograph offered an important moment in the evolution of immersive technology insofar as it objectified ways of moving beyond the ubiquitous screen in favour of more immersive ways of seeing and experiencing. When the medium becomes immersive by seeming to merge more closely with the viewer, it becomes easier for the represented world to be experienced as real. If the illusion is not disturbed by the viewer being aware of the technologies involved, we move closer to mistaking these representations for reality (Crary, 1990). Early experiments with sensorial (though primarily visual) immersion evolved from the Phantasmagoria, Diorama, and Panorama, and continued with early examples of film and television. Cinematography techniques that allowed audiences to feel more engaged in the program and scene, including breaking the performance wall with characters speaking directly to the audience, can be observed in films like *Men Who Have Made Love to Me* (1918), *Animal Crackers* (1930), and *Annie Hall* (1977), as well as in television programs like *The George Burns and Gracie Allen Show* (1950–1958) and *Colgate Comedy Hour* (1950–1955).

3.1.2.   *Presence and Telepresence*

Defined as the sense of being in an environment, presence is closely related to the phenomena of distal attribution or externalization that refer to the referencing of our perceptions to an external space beyond ourselves (Steuer, 1993). If 'presence' refers to this perception as it

relates to natural environments, 'telepresence' describes the mediated perception of an environment that we are not currently occupying, including those that defy space-time logic as well as completely virtual environments (Sheridan, 1992; Short et al., 1976; Steuer, 1993).4

Despite awareness of VR environments as virtual, people are quite happy to be 'taken away' to this other place where they can actively choose to suspend disbelief. In this place, people can participate in the experience as though they are engaging in an alternative form of reality. This does not imply that people are not able to distinguish between physical and virtual worlds but rather highlights that, in certain contexts, "people respond to mediated stimuli in ways similar to their real-life counterparts" (Steuer, 1993, p. 6). As our technology develops, we continue to close the gaps separating physical and virtual worlds. Studies have shown that, when done well, virtual environments cause your brain to react as though the environment were real (Dartmouth College, 2016; Rose & Bailenson, 2016), suggesting that people can truly feel present in virtual environments.

3.1.3. *Vividness and Sensory Depth*

The notion that people can feel present in virtual scenes provides the theoretical grounding upon which my idea of using VR as an 'empathy machine' (Milk, 2015) is based. The effect is facilitated by both the effacement of the distant screen and the successful employment of vividness—a concept that refers to the representational richness of both depth and breadth in a mediated environment. Breadth and depth dimensions combine to enhance one another, making

4 Because our sense of 'being there' when immersed in VR environments has been shown to be strong despite the virtual component, and for the sake of simplicity, I use the term 'presence' going forward in this paper.

them "multiplicatively related in generating a sense of presence" (Steuer, 1993, p. 14). Where depth deals with the resolution or quality of the representations, breadth is concerned with the number of sensory dimensions presented all at once.

Breadth is particularly interesting in terms of how a multi-layered perceptual experience contributes to creating a sense of immersion by tapping into multiple senses. Steuer notes that "the simultaneous engagement of multiple perceptual systems is an extremely effective means of engendering a sense of presence, even if some stimuli are quite low in depth" (1993, p. 14). The vividness of a scene is not generated by stimulating one sensory input but instead by engaging multiple senses at once. What specific sensory input has the greatest impact on the feeling of presence will depend upon the individual, though sight and sound have consistently ranked near the forefront of human experience (Biocca & Levy, 1995). It is for this reason that many immersive productions, including theme park attractions, use a high degree of breadth as it is known to achieve a simulated sense of presence (Steuer, 1993).

While media systems are limited by bandwidth in terms of their capacity for sensory depth, this may not be an issue in terms of achieving a sense of presence. In addition to Steuer's theory that breadth overrides depth in terms of importance, a study by Reeves et al. (1992) further supports this belief. Reeves led research that suggests that 2D representations of faces on television evoke a response similar to that which is observed in real life. Despite the low resolution, people respond in the same way as they would to richer sensorial representations. Moreover, simplified imagery can leave more to the imagination and potentially heighten interactivity, the ability to identify with an avatar, and the overall emotional impact (Isbister, 2016; McCloud, 1993). These findings, combined with my limited technical abilities in VR production, informed my choices regarding the level of aesthetic detail in my project.

Our technology is rapidly reaching the point of being able to produce virtual environments and experiences that are indistinguishable from reality. American psychologist and VR specialist Jeremy Bailenson runs studies that test how people respond to VR at the Virtual Human Interaction Lab (VHIL) he founded at Stanford University, which I visited in February 2019. He describes a simple scenario he has played out over two decades of experimenting with VR: the user dons the VR HMD and sees a representation of the room they are in, and a virtual plank is then dropped in the middle of the room for the viewer to walk across. In 1999, one user fell off the virtual plank and reacted as one would if the scenario were real: he jumped up at a 45-degree angle. This now happens a few times a week in Bailenson's lab. Bailenson points to such responses as an example of how advanced our virtual technologies have become in terms of replicating the real, and as proof of how completely immersed the user becomes in the virtual environment (2016). Read about my experience of doing the VHIL plank test in section 4.4 of this paper.

Bailenson's research takes the notion that advanced VR can create a feeling of presence that is so visceral that it effectively passes as a direct, real experience, and combines that with the theory that previously-held perspectives are most likely to shift when people experience something for themselves (Whitmarsh, 2008). As the development and democratization of VR reaches a tipping point, its capacity to replicate direct experience produces exciting possibilities. There is a vast amount of literature on the effects of 'media modelling'—the idea that, for example, spending excessive time playing violent video games leads to an increase in violent behaviour in the real world (Fox & Bailenson, 2009; Rose & Bailenson, 2016; Rosenberg et al., 2013). This suggests that if we apply the same concept of immersion to promote positive

behaviours, VR could influence perspective and, potentially, impact hard-to-change human behaviours related, for example, to environmentalism or racism.

3.1.5.   *VR as Empathy Machine*

Over the past several years, VR has increasingly been used as a means of inciting empathetic responses to non-fiction narratives. An important event in this timeline was the January 2015 United Nations screening of *Clouds Over Sidra* at the World Economic Forum in Davos, Switzerland. Representing the organization's first foray into VR production, this first-person narrative shares the perspective of a 12-year-old Syrian girl living in a refugee camp in Jordan. The story is told with the goal of "using the medium to generate greater empathy and new perspectives on people living in conditions of great vulnerability" (*Virtual Reality: Syrian Refugee Crisis*, n.d.). This raises important ethical questions around documenting the pain of others, as well as red flags in terms of the suggestion that a brief, virtual simulation can adequately capture the reality of such a scenario. As one reporter stated: "In our legitimate enthusiasm to experiment with interaction and immersion, we should be wary of reasserting privilege by sampling suffering, fetishizing otherness, or condoning/participating in cultural objectification" (Feinberg, 2016). This consideration for the power dynamics involved in witnessing, capturing, and making spectacle of the vulnerable 'other' plays out across the documentary genre (Hesford, 2004; Sontag, 2003). I share my personal reactions to *Clouds Over Sidra* in section 4.4, including an uneasiness around the jarring juxtaposition between the world inside my HMD and the one hovering just outside it.

The use of VR has also emerged in the field of journalism. For example, *The New York Times* launched a VR platform in November 2015 that provided subscribers with a free pair of Google Cardboard Glasses (a low-tech, low-budget HMD that works with most smartphones)

tucked into their Sunday paper (Kukkakorpi, 2018). Both the United Nations and a number of news outlets (e.g., VICE, the Wall Street Journal, PBS Frontline, and the Guardian) have continued to expand into VR production, reflecting an ongoing interest in exploring the capacity and affordances of this medium to generate empathy and understanding. Given that journalism is grounded on the principles of objectivity, the idea of deliberately painting a subject in sympathetic tones warrants significant ethical concerns. While intentionally presenting a narrative in journalism with the goal of eliciting empathy certainly has moral implications, it is not apparent that these concerns translate directly to all types of content. In section 4 of this paper, I discuss how I attempted to mitigate some of the ethical concerns addressed here in the making of my project.

The emerging and experimental nature of virtual technologies creates a challenge in that studies are few and lack broad scope in both number of participants and duration. However, a growing body of research conducted by the VHIL suggests that VR does indeed have the capacity to encourage increased pro-social and pro-environmental responses among users in comparison to other representations like fact sheets, written narratives, and oral storytelling. Promising results from studies that cover topics like homelessness, racial identity, and climate change consistently indicate support for this research (Groom et al., 2009; Herrera et al., 2018; Rosenberg et al., 2013; Ruggerio, 2014).

As an example, VHIL researcher Sun Joo Ahn conducted a study based on a *New York Times* article about the environmental impact of using high-quality toilet paper (2011). In the study, 50 people were given the details of the article: the penchant for soft, fluffy toilet paper amongst Americans has a serious impact on forests, including those that serve as an irreplaceable habitat for a number of endangered species (Kauffman, 2009). The group of participants was

divided into three subgroups: the first was told a descriptive, first-person account of sawing down two trees in a forest; the second watched a first-person perspective video of the same experience; and the third experienced it themselves in VR—they physically moved their bodies to make the saw move across the trunk of the trees, with haptic technology replicating the feeling of vibration during the sawing, as well as the sensation of the ground shaking when the tree crashed to the forest floor.

The researchers argue that while both VR and mental stimulation (MS) conditions can result in attitudinal shifts, the embodied nature of VR leads to significantly greater changes in behaviour in comparison to MS. Following the study, all participants claimed they would reduce their paper consumption; however, only the participants from the third subgroup demonstrated actual behavioural change. In follow-up questioning, the experimenter pretended to accidentally knock over a cup of water. Consistently, participants from the third group used 20 percent less napkins to clean up the mess. Although all groups expressed a deeper understanding and commitment to change following exposure to the content, it was only the VR group that in fact displayed this behavioural change in measurable terms. While this study involves only a small sample size, and it is unclear how long these do-gooder effects would last, the results imply that just a few minutes of an embodied experience can produce a behavioural shift.

Possible moderators include individual disposition for presence perception—meaning, some people are naturally more susceptible to the power of suggestion and, as such, may be more accepting of the virtual environment and experience as real—as well as pre-existing empathy towards, or concern about, the subject addressed in VR (Gutsell & Inzlicht, 2011). VHIL researchers used questionnaires to screen for such bias in their studies, offering a model for building this into research design when testing for empathetic response to immersive media.

3.2.   On Mothering and Motherhood[5]

3.2.1.   *Intensive Mothering and the Low-Income Single Mother*

The intensive mothering ideology introduced by Sharon Hays in *The Cultural Contradictions of Motherhood* (1998) and associated most commonly with middle- and high-income demographics is a parenting model in which children are put first above all else, and require significant and constant investment of both time and money (Freeman, 2017; Hays, 1998; McCormack, 2005). While this mothering ideal is unrealistic even for affluent mothers (single or coupled) (Blair-Loy, 2003; Caragata & Alcalde, 2014; Elliott et al., 2015; Freeman, 2017; Garey, 1999; Hays, 1998; McCormack, 2005), it is particularly challenging for the most common single parent—the young, poor single mother (Crittenden, 2001; Gregson, 2010). There is a tendency for these mothers to exhibit the intensive mothering model "in response to the expectation that they are incapable and delinquent" (Freeman, 2017, p. 676).

This puts significant pressure on a vulnerable group, who must contend with negative judgement for both their marital and economic status as mothers, as they try to 'make amends' for their perceived failures by adopting the intensive mothering approach. Studies indicate that the low-income single mother tries to "include [her] children in efforts to move out of poverty, thus fulfilling the role of a 'good mother' while exhibiting proper behavior for a poor person trying to achieve economic independence" (Freeman, 2017, p. 675). This attempt to atone for

[5] This section is largely extracted and reworked content from an unpublished essay I wrote for a graduate course in 2017, entitled "Vicarious Veneer: How *SMILF* Both Celebrates and Undermines Feminism in the Depiction of Bridgette's Intensive Mothering Approach to Single Motherhood."

their supposed deviance requires that single mothers overcompensate through self-sacrifice in order to be perceived as 'good' mothers, despite a lack of resources. In fact, research indicates that single mothers of all types "live with the imperative to demonstrate self-sufficiency" (Juffer, 2006, p. 3), which is compounded by an intense scrutiny of women across media (Feasey, 2012; McRobbie, 2004; O'Reilly, 2007; Podnieks, 2012).

Interviews with low-income single mothers reveal the challenges that result from the requirement to embody the ideal of intensive mothering, which runs alongside a second societal expectation of them—that they demonstrate their dedication to climbing the economic ladder (McCormack, 2005). Despite being clear about the priority they place on motherhood, single mothers overwhelmingly expressed that "this focus often seemed to conflict with the goal of reaching financial independence in the least amount of time possible" (Freeman, 2017, p. 680). The requirement for low-income single mothers to dedicate their efforts to lifting themselves and their child out of poverty in order to fulfil the conflicting expectation to place intense focus on both work and parenting (Freeman, 2017; McCormack, 2005) is further compounded by a lack of access to the resources that could alleviate these pressures (Freeman, 2017; McCormack, 2005).

3.2.2. *Performing the 'Good Mother' Role*

More often than not, women are encouraged to self-monitor, as evidenced by the ongoing production of mommy manuals, blogs, and networking sites (Friedman, 2013; Podnieks, 2012), which add to a long history of subjecting women to unrealistic ideals of maternity (Crittenden, 2001). By self-monitoring their performance of motherhood, single mothers extend and internalize the pressures of public scrutiny. This self-surveilled state effectively censors low-income single mothers by encouraging them to hide signs of their poverty and marital status while amplifying their performance of the 'good' or ever-doting mother under deprived

circumstances (Juffer, 2006). Through self-monitoring and self-evaluation, the single mother might successfully deter judgement from society or the state (Juffer, 2006). This demonstrates the importance of the self-surveilled and intensive mothering approach single mothers must take, as it alleviates some of the external pressures of whether she constitutes a 'good' mother.

The acute interest in how single mothers parent is due in part to the fact that "this family form is often portrayed as the source of social problems" (Freeman, 2017, p. 677). In response to the negative perception of their families, single mothers have been found to 'make amends' through intensive mothering by imitating two-parent families, compensating for their deficits, and hiding their marital status (Zartler, 2014). This helps to ensure that single mothers are fitting into the vision of what a family should be and how a mother should behave. Although women today have more choices about motherhood, they continue to be judged for these choices and "scrutinized in relation to their mothering practices and maternal behaviours," such scrutiny is in relation to "those issues surrounding what is perceived to be the 'correct' and 'appropriate' path to motherhood" (Feasey, 2012, p. 2), issues that exclude low-income single mothers, who must thus perform the ideal of intensive mothering to a higher degree. As the single mother is seen as having failed on two accounts—both in her inability to contain her sexuality and again, by giving birth to an 'illegitimate' child that she may not be able to afford—there is heightened pressure to demonstrate that she is fit to raise her child (Podnieks, 2012).

3.2.3.   *Mis-Representations in Popular Media*

Popular media contributes to our perception of what a 'good' mother's behaviour should look like, with a range of texts exacerbating the issue by raising the bar on the "standards of good motherhood while singling out and condemning those we [are] supposed to see as dreadful mothers" (Douglas & Michaels, 2005, p. 14). These texts tell us that the 'good' mother of

popular culture is "selfless, serene, slim and spontaneous and above all else, satisfied by her maternal role" (p. 110).

From the mid-1970s onward, family sitcoms began to frequently illustrate women's independence and empowerment through single mother figures who were depicted as 'good' either through their financial affluence or through their status as widowed or divorced. This is seen in sitcoms such as *One Day at a Time* (1975–1984), *Alice* (1976–1985), *Kate and Allie* (1984–1989), and *Who's the Boss?* (1984–1992), which exemplify the genre's dominant single mother archetype (Feasey, 2017; Podnieks, 2012). As the concept of post-feminism solidified in the 1990s, the backstories to explain the origins of a sitcom character's single motherhood became more nuanced and progressive, as illustrated in *Murphy Brown* (1988–1998), *Friends* (1994–2004), *Sex and the City* (1998–2004), *Mom* (2013–), *Better Things* (2016–), and *SMILF* (2017–). That said, despite this evolution, the theme of having to perform intensive mothering prevails.

These media representations perpetuate an unattainable or, at least, unsustainable performance of motherhood that includes the expectation that mothers exhibit an appreciation for their constant self-sacrifice (Feasey, 2012). In this way, popular media tends to idealize only the perpetually available, doting, resilient, highly intelligent, and self-monitoring among mothers. This contributes to the implication that these qualities and behaviours can demonstrate how single mothers might 'make amends' for their deviance, suggesting that the responsibility both for their situation and for finding a solution to that problematic situation rests squarely on the shoulders of the single mother.

The interpretation of the single mother as deviant may stem from the perception that the circumstances of single motherhood are an outcome of the mother's poor choices (Caragata & Alcalde, 2014; Iyengar, 1991). This public perception is centred on the idea that "single mothers elicit a 'blaming the victim' syndrome; they are considered particularly responsible for their economic circumstances and less deserving of governmental support" (Iyengar, 1991, p. 68). This is further supported by Caragata and Alcalde, who state that "the common presumption is that (single mothers) have made sets of choices, freely undertaken, that have created their present circumstance" (2014, p. 211).

The representation of single mothers as lazy—that their own shortcomings are the primary deterrent to their success—is dangerous since it "puts all the onus on the women while deflecting the responsibility society and government may have" (Caragata & Alcalde, 2014, p. 20) to support the single mother. In reality, in Canada, social assistance for a mother and child barely covers basic expenses, not to mention that single mothers (and mothers in general) spend an inordinate amount of time performing unpaid domestic labour (Caragata & Alcalde, 2014; Crittenden, 2001). In addition, single mothers are commonly borne out of circumstances that could not be helped, often related to psychological damage caused by encounters with issues such as inequality, abuse, poverty, addiction, and abandonment (Caragata & Alcalde, 2014). Moreover, "many of (these problems) are systemic, and the oppression that women and lone mothers feel is entrenched in patriarchy" (Caragata & Alcalde, 2014, p. 19). The tendency to blame single mothers for their circumstances reveals a deflection from governmental and societal responsibility to provide such support (Crittenden, 2001) and demonizes the single mother.

Additionally, although motherhood is touted as the ultimate role of self-sacrifice, a mother's value is not reflected in the policies of big business, government, and law, which

actually have the cumulative effect of imposing a heavy financial penalty for those caring for children, also referred to as a 'mommy tax' (Crittenden, 2001). While "we talk endlessly about the importance of family … the work it takes to make a family is utterly disregarded. This contradiction can be found in every corner of our society" (p. 5). While low-income single mothers are scrutinized for their role in becoming a single parent who cannot provide for their child without assistance (Freeman, 2017; Juffer, 2006), this intense focus on the individual "serves to divert the desperately warranted attention from this more disturbing social picture and the scrutiny it requires" (Caragata & Alcalde, 2014, p. 205). Rather than exposing the failings of government and society at large, the dominant framing of the issues of poverty and single motherhood "has the effect of shifting responsibility from society to the (disenfranchised)" (Iyengar, 1991, p. 67). This erasure of our societal issues further endorses the public perception that blame towards the single mother lies at the individual level.

3.3.   On Arts-Based Research

3.3.1.   Overview

Arts-based research (ABR) is a qualitative methodological approach that makes use of artistic practice as a primary means of investigation (McNiff, 2013). First labelled by Eisner at Stanford University in 1993, ABR serves both as a way of 'coming-to-know,' as well as a means of sharing and presenting research. In recent decades, it has gained traction as a mode of qualitative inquiry that privileges the artistic frame of reference as a means of bringing forth data that might otherwise not emerge (Barone & Eisner, 2011). ABR aims to convey meaning through the act of creative expression and multisensory, bodily engagement, leading to a heightened level of understanding and 'empathetic participation' that moves beyond the confines of traditional research and discussion (Barone, 2010). ABR assumes that "knowing does not come from

standing at a distance and representing but rather from a direct material engagement with the world" (Barad, 2007, p. 49).

3.3.2.   *Legitimacy of ABR in the Academy*

As a departure from traditional models of scholarly investigation and presentation, ABR critiques more conventional academic traditions and power structures. It questions how we come to know what knowledge is, how and when knowledge is created, and who is a part of knowledge-creation (Seregina, 2019). Subverting traditional ways of knowing, ABR has struggled to achieve legitimacy in the academy, despite being praised for the way in which its methods help to broaden perspectives by facilitating access to the unconscious mind (Irwin et al., 2008; Springgay et al., 2005).

3.3.3.   *Self-Portraiture, Autoethnography, A/r/tography, and Autotheory*

The use of self-portraiture to interrogate, uncover, and communicate personal experiences of identity, society, and perception can be seen throughout history in a broad range of media (Armon et al., 2009; Finley, 2008; Rojas, 2012). Like self-portraiture, autoethnography seeks to describe and analyze (graphy) the personal (auto) in order to understand the cultural (ethno) (Ellis, 2004; Ellis et al., 2011; Holman Jones, 2005). As an approach, autoethnography can facilitate self-discovery by means of requiring the artist-researcher to look deeply and with intentionality at their own life experiences and to consider the many intersections between internal and external forces. The opportunity to express without rigidly preconceived notions of what is expected or wanted can yield insights that may otherwise not emerge (Leavy, 2015), while empowering the artist-researcher to tell their own story.

Closely related to ABR and autoethnography is a/r/tography—a subset of ABR that developed from an appreciation for what can be gained from fluidity and 'in-betweenness'—

illustrated by the slashes in 'a/r/t' representing the folds between artist, researcher, and teacher identities (Irwin, 2010; Irwin & De Cosson, 2004). A/r/tography understands artistic and research practices as "active, contextually situated, and creative" (Irwin, 2010, p. 42). This concept of an active, living inquiry invokes an inherently flexible approach to data collection and analysis, where initial plans and research questions commonly evolve over time (Irwin, 2010; Irwin & De Cosson, 2004).

Because of how autoethnography attempts to investigate complexity among human relations (Carter & Triggs, 2018), it fits into the same vein as a/r/tography in terms of being well-suited to research that requires an investigation into 'messy' emotional topics that involve a deep investigation of self (Irwin, 2010; Irwin et al., 2008; Irwin & De Cosson, 2004; Springgay et al., 2005). The goal of intense self-examination is often rooted in a desire for the a/r/tographer to deepen personal insight into who they are and what they believe (Irwin, 2010; Springgay et al., 2005). This intentional act of examining one's own subjectivities may enable the discovery of deeper personal insights that provide context to the artist and audiences alike. These exercises in self-reflexivity and personal expression set against the backdrop of critical theory all anticipate the relatively new concept of autotheory, a term described in section 1.2.

3.3.4.   *Mother-Artists*

A/r/tography, in particular, has been used by a number of mother-artists as a means of examining and making sense of the motherhood identity and experience. Indicative of how this method sits on the fringes of the academy, I reference here not peer-reviewed publications, but rather a smattering of work by mother-artists found on the Artist Parent Index (Irvin, 2016). This searchable database, founded by artist Sarah Irvin, is focused on artworks about parenthood. Specifically looking for works by and about single mothers revealed artists like Lex Marie, who

makes use of abstract techniques to allow room for audiences to see themselves somewhere in the narratives depicted in her acrylic-on-canvas series titled *Mother and Son*. Marie discusses her intention to reflect the good and bad sides of motherhood, and how she uses her art as a reminder to herself that she is not alone despite her single mother status (Irvin, 2016).

In another example, Jennifer Bronwynn Copp uses photography as a tool to action what she refers to as her 'solo responsibility' for telling both her story and that of her daughter. The extension of panels used in her work captures the limitations of photographing within a small home, and the use of duplication to reflect the 'multiple-selves' she must inhabit, both speak to her role as a single mother. Copp describes her photography in cathartic terms, expressing the joy and peace that she finds in fixing memories as a way of making meaning (Irvin, 2016).

Browsing the database of artist statements and works, the idea of feeling empowered by their authorship and creation emerged as a central theme, along with the notion of being emboldened and fulfilled through the act of expressing and sharing their stories. These single mother-artists find strength through their autoethnographic artmaking, which centres their voices and experiences and creates channels of communication that open up a means to 'fight back' against stigma while also fostering a sense of belonging and community.

4. Making the Project

4.1. Overview and Intentions

As discussed in section 1.1., because of my experience living with the stigma of being a low-income single mother, I was compelled to capture and communicate this experience using VR production techniques. Given the stigmatized identity low-income single mothers assume, and that "the ideology of intensive mothering reduces a mother's identity to her relationship with her children [and] derides working mothers and present stay-at-home mothers with improbable

and impossible ideals" (Douglas & Michaels, 2005, pp. 22–3), I wanted to help disrupt this narrative by using the visceral medium of VR to offer a glimpse into what I experienced as the rich inner workings of my single mother experience.

In terms of the narrative content, I was mindful that scenes depicting myself as 'the doting mother' might contribute to the impression that the single mother is only lovable, respectable, and worthy if she performs to the expectations of the intensive mothering ideal by showing her constant self-sacrifice and thereby 'paying her debt' and 'making amends' for her wrongdoings. I also wanted to be honest about the darker and messier aspects of my experience, exposing the challenging reality of raising a child alone with very few resources.

VR, as already discussed, was chosen in response to my desire to probe the potential of immersive media to provoke empathic responses. Given the research suggesting that VR might enable a more profound emotional experience for users than traditional forms of media, as well as VR's recent introduction as a product accessible to the masses, I wanted to test it as a medium for communicating life-writing narratives. As access to self-authorship in VR becomes more readily available, I expect that there will be an increase in amateur VR artists looking to create immersive digital narratives to tell their stories. As for this project, my work was experimental since I found no existing methodological approach for developing an autobiographical VR production. As such, I had to iteratively develop my own theoretical, aesthetic, and methodological approaches.

4.2. Artist's Statement

My project uses VR to offer an intimate and nuanced snapshot of an identity—the single mother—that has long been tokenized by pop culture and stigmatized by both people and policy. Through recorded narration my voice is heard, claiming space for self-representation amongst

the broader single mother narratives. Further to this, expressing my own story deepens the level of intimacy the audience has with the subject and the subject matter itself. The details and emotions depicted are real, raising the stakes and making the real-life implications explicit and less easily ignored. My deliberate use of the autobiography genre imbues the VR experience with an authenticity and urgency that makes the content more compelling and emotionally potent.

By describing the complex inner workings of my experience and what it felt like to navigate a stigmatized identity, I attempt to make sense of my experience and emotions. While some scenes may evoke sympathy, I have no interest in portraying myself as a victim. I was empowered by the subjectivity I was afforded in writing the story from my own point of view. In the work, I reflect on a wide spectrum of memories and emotions, taking care not to suggest that moments of happiness or sadness negate one another.

4.3.   Creative and Technical Choices

As discussed in section 1.2.2., my creative and technical choices were focused on amplifying the degree of presence users feel within the VR world in order to augment the emotional and empathetic response. I also used an intentionally flexible ABR approach when developing the project, designed to encourage rich and emotionally driven creative expression. For example, to manage scope and to ensure intentionality when writing the script, I used a loose framework of questioning, such as the following: What has been your personal experience of single motherhood? Why do you feel compelled to explore this part of your identity? Who do you imagine your audience might be? This helped to focus the project's narrative while leaving room to uncover and express deep memories and emotions.

My background in visual storytelling (which includes an undergraduate degree in Radio and Television Arts, a certificate in Photography Studies, courses in Future Cinema, and

30

professional graphic design experience) provided me with a foundational understanding from which to approach the creative production. This, along with my experience as a writer, grounded many choices in the development of aesthetic and narrative content, and supported my ability to effectively convey meaning. That said, the technical hurdles of world-building using a VR platform was unlike anything I had done previously and proved to be enormously difficult. Having reflected upon my technical limits, I embraced the theory that stimulating multiple senses at once (breadth) carries greater impact in terms of feeling presence in the scene than does high-resolution and detail (depth) (Steuer, 1993).

Since presence is a crucial ingredient for achieving the desired empathic response and visual and aural senses have consistently ranked near the forefront of human sensory experience (1993), I was able to rely on a simple, impressionistic approach when composing the aesthetics of the work; that is, I reminded myself that our brains respond to even low-quality or impressionistic images as if real. Detailed visual elements mapped out in my original script (Appendix B) and storyboard sketches (Appendix C) were significantly altered in production to work at a level more befitting a novice immersive digital storyteller. (See the final, revised version of the script and visuals in Appendix A as a comparison.) I also limited the scale and scope of the project by producing only the first act of my script.

I used the TextMeshPro plug-in to develop the title card and other textual elements, and built the single mother figure in three versions—as an adolescent and as an older teen in two different outfits—using Adobe Fuse. From there, I exported the models to Mixamo, where they were 'auto-rigged' (automatically mapped) for animation. I applied actions like crying, sitting, falling, and walking one by one and downloaded them for Unity at 60 frames per minute as .fbx files (see production screenshot examples in Appendix D). I searched for and obtained

prefabricated, low resolution, 3D models from resources like the Unity asset store and open-source databases including Free3D and TurboSquid. These, combined with the terrain feature in Unity, allowed me to develop the environments in which the scenes played out. I used Unity's keyframe animation window and particle system to create movement and special effects, along with minimal use of coded scripts to control things like triggering precise timing for an audio track to play or making something like a neon sign flicker on and off (see VR screenshot examples in Appendix E). I used Adobe Premiere to stitch the recorded scenes from Unity together at the end.

4.4. Survey of VR

As I developed this project's creative component I engaged with a wide range of VR productions, including documentary, educational, and experimental genres, to gather insight into what might induce a strong sense of presence. By suspending pre-judgement of my experience, I was able to gain in-depth insights into which technical and creative choices best evoked the feeling of being within the scene while keeping physical discomforts like vertigo and nausea to a minimum (a very real issue with some VR experiences). Using my iPhone 8, I accessed many documentary and educational works from home using applications like *Within* and *New York Times VR*, and was able to experience immersion by placing the phone into a low-tech HMD while using the phone's speaker as well as stereo headphones to test the impact of spatialized sound on feelings of presence.

To extend my knowledge, I wanted to explore more advanced features of VR and see what directions it is taking as it evolves, so I ventured into the experimental genre through a variety of channels. Examples of such channels include graduate-level courses in Future Cinema at York University; coaching sessions at Ryerson University's Digital Media Experience Lab; a

September 2019 immersion drop-in and panel event at Ryerson's Social Ventures Zone titled *Virtual Reality as Empathy Machine*; and FIVARS (the Festival of International Virtual and Augmented Reality Stories). As mentioned, I also visited the VHIL at Stanford University in February 2019 to learn about the lab and test their 'walk the plank' simulation. I used this research to help inform aesthetic choices throughout the making process, referencing a journal I used to capture my responses across a range of criteria, including emotional and physical reactions to aesthetics, motion, narrative, and sound. I have included excerpts from early and late in that journal to illustrate the journey. Two days of these excerpts resulted in the following reflections:

Monday, May 8, 2017: Today I bought a $20 VR headset—Utopia 360 degrees by ReTrak. Probably not an option until fairly recently, unless you count the old ViewMasters. There was a learning curve. I first viewed *Clouds Over Sidra*, the VR film I heard of earliest in this process. The aptly-named Within app asked me if I was using Google Cardboard Glasses—to which I opted "no" since I had a different viewing device. I watched the eight-minute film. I felt impacted by what I saw. I felt in it.

I attracted my daughter's attention. Like Sidra, my daughter is 12 years old. I let her try out this new technology to view *Clouds Over Sidra* and encouraged her to look around. I had realized from my test-run that you could look around almost 360 degrees, but my movements didn't make an impact (until I bumped into the kitchen wall). The vision was blurred despite many adjustments of the dials. As she watched the VR short film, and I watched her look around Sidra's world, I took her photo. I watched her watching Sidra—her home gone, now in a refugee camp in Jordan for a year and a half, telling her story to Julia, in a humble-by-our-standards home, here in Toronto. The experience made me reflect on the roof over our heads, on the high-

tech viewing technology we were using. Our privileged situation was intensified by the reality of the immersive experience of the VR movie. I felt sick to my stomach. This visceral response was oddly encouraging.

After I sent Julia to bed, I started watching *The Protectors: Walk in the Rangers' Shoes*, an eight-minute, VR film by Kathryn Bigelow that depicts the lives of the Garamba National Park rangers in the Democratic Republic of the Congo. Again, I selected no Google Cardboard but couldn't accept the blurred view and, upon further investigation, realized I'd missed a step. Not bothering to read the instructions, I was learning on the fly. I started again a minute in, hit yes to the Google Cardboard question, and also realized I could scan a patch inside my headgear to identify for the app what headgear I was using to further customize the view. Now I was watching in 3D and I quickly became overcome with emotion. Yes, I was watching evocative, difficult material. But I was transported. I put in my ear buds for the binaural sound, which further transported me to Africa. Turning around, a ranger followed me too closely with his gun. The long grass moved out of my way. Again, tied to one spot but with 360-degree view. This one perhaps done better. The closed captions forced my viewpoint to shift to read the translations of what I couldn't understand. The visuals and the tangibility, the perceived proximity. I broke down and wept.

To alleviate this emotion and also to test my theory about the subject matter's impact on my reaction, I watched *Kids*, the music video by One Republic, next. This one made me particularly nauseous. Again, subject matter factors in, and there's a learning curve with the technology. I wonder if the learning curve is surmountable while simultaneously considering whether I'll quickly become addicted to this new, immersive way of viewing and consuming visual information.

February 20, 2019: I was giddy to visit VHIL at Stanford University today. I've researched so many studies out of this place. I was on a tour with what looked like an undergrad class. After the first simulation was introduced, I waited a moment to let others volunteer for the experiment but when no one went for it I knew this was my chance and threw my hand up. Once in the HMD (an Oculus Rift?), I found myself in a room just like the one I was in physically. A plank was dropped before me and I was asked to walk it. I felt somewhat embarrassed as I tentatively balanced my steps. I thought I was doing pretty good and then I was asked, if I was comfortable, to jump off it. The world around me the whole time on that plank was moving as I did. The physical sensation of being there was incredibly strong. I felt the terrifying pull of gravity and what it would mean in reality to jump. It was an effort of mental strength as well as an exercise in pride that got me to leap in the name of research.

4.5. Reflections on Making and Messiness

As a project based on the principles of ABR and a/r/tography as a form of active, living inquiry, working on this project was necessarily 'messy.' By allowing for such messiness, I believe I was able to offer a broader exploration of the experience of single motherhood. This was achieved in part through a flexible approach to building and adjusting narrative and aesthetic choices throughout the project's development, so that I could extend the emotional depth and authenticity by working with iterative themes as they naturally emerged.

For example, it was not until I took pause to intentionally reflect upon my experience as a young woman facing motherhood alone on a monthly income of $937 with little family support that I began to recognize how I had made efforts to hide my poverty and marital status through the performance of intensive mothering. This evolved into an understanding of the implicit shame I experienced while being a low-income single mother. Later in the process of working on

this project, I learned that my daughter's father had passed away from an opioid overdose, which catapulted another heavy load of emotions that affected my creative choices. Although reluctant to delay progress, I found the emotional weight of the work required me to take breaks at times, giving myself a chance to find new clarity and purpose through the affordances of space and time.

As discussed in section 1.2.4, there was also messiness to contend with due to this project operating within the genre of autobiography. While offering a useful tool to investigate and make meaning of one's life or experiences, the autobiographical narrator is widely understood by scholars in the field to be unreliable—often simply due to the challenge of perception and memory, but also as an intentional effect of novelistic strategy (Adams, 2011; Eakin, 1985). While I made no deliberate attempts to lie as an attempt to alter meaning, I found that because of the time constraints of developing my story using the unfamiliar medium of VR, I chose to leave out what I deemed to be negligible details. Instead, I opted to be more selective about which details were important to maintaining authenticity. For example, there was a technical incompatibility between Unity (where I built the VR world) and Mixamo (where I rigged and animated the characters) that caused models to break upon import. It took considerable time to correct, requiring me to manually prepare the material files and re-apply them individually to the model's body, hair, top, bottom, shoes, eyeballs, eyelashes, and more. The biggest issue this bug caused was in the main character's glasses. The usual fixes would not work, and I considered many times whether I should just remove them. However, my glasses were a key component of my identity as a child and adolescent and leaving them out felt inauthentic, so I continued working to find a solution. It took time to consider the justifications behind such choices to intentionally deviate from my memories. Of course, adjustments were also necessary to fit the

medium and the fact that two decades of living were being compressed into a VR production only minutes in length.

Furthermore, I battled the 'so what?' of my work at every turn, neurotically and incessantly questioning whether it was anything but narcissism and the tired ruminations of a little girl. Inherent to my feelings of illegitimacy, it was not until the project was almost complete that I recognized the cathartic value I was gaining from the exercise of making, as well as the study's scholarly and creative contributions as an exercise in autotheory. Over time I was also forced to shed my idealism somewhat and find grace and accomplishment in less grandiose objectives than I had originally set out to achieve (for example, the scope and scale of the VR component). This in itself was a profound lesson in humility and objectified some of the benefits of this 'messy' type of research/creation.

5.   Contributions to Theory and Professional Practice

As a research paper accompanied by an arts-based research project, this work contributes both theoretically and practically to autobiography, motherhood, and new media studies. With the conversation around human computer interaction (HCI) within VR active and rapidly evolving, this project adds to the nascent body of knowledge and literature on VR production— offering both audience and author perspectives on what it is like to engage with this platform. Given the growing interest in incorporating VR technology as a teaching tool (Carruth, 2017; Helsel, 1992; Hu-Au & Lee, 2018; Liu et al., 2017; Pantelidis, 2009), this study could potentially have implications for future educational and social engagement strategies.

The 360-degree VR documentary itself contributes to a limited repertoire of autobiographical VR productions created by or with the authors themselves. As with other visual technologies, a burgeoning new field of amateur production has been facilitated by free software

like the world-building programs Unity, Unreal Engine, Blender, and SketchUp. These platforms open up an exciting new frontier for life-writing and autobiographical/autoethnographic expression. As a genre that aims to externalize personal feelings and thoughts around one's identity and life experience, autobiographical experiences may be particularly well-suited to VR expression because of how audiences are encouraged to take the subject's point of view, thus allowing for an intimate connection with the material.

Furthermore, by revealing insights into the limited circumstances in which low-income single mothers make their choices, my VR production may help to remedy some common misconceptions of these women as lazy, non-productive citizens. Also, depicting both light and dark fragments of my motherhood experience may help to diminish the 'good mother' versus 'bad mother' paradox. My project potentially offers an antidote to the reputation of single mothers as unworthy by exposing the many factors that contributed to my poor socioeconomic status, revealing systemic gaps and complex circumstances that sabotage the single mother. By making others privy to the experiences of low-income single motherhood through the voice of that mother herself, perhaps the work goes beyond personal goals of catharsis and scholarly contributions to, for example, autotheory to challenge and potentially disrupt the stigma she carries while empowering others who may see a part of themselves in my story.

6.   Conclusion

Stories help us make sense of the world and encourage a level of engagement that affords an emotional response to the material. Tapping into what poet Samuel Taylor Coleridge referred to in *Biographia Literaria* as the 'willing suspension of disbelief,' engagement involves temporarily suspending awareness that something is 'pretend' (1817). This allows us to become emotionally absorbed in a story and be taken away to imaginary worlds in which we empathize

with fictional characters. In life-writing narratives like autobiographies and memoirs, the imaginary and fictional are replaced by reality as people work through various aspects of their lived experience and identity. This creates a powerful opportunity to be transported into someone else's memories, feelings, experiences, and even psyche (Green & Brock, 2000; Green et al., 2004). While this ability to step into someone else's shoes has been facilitated by storytelling for millennia, today's VR technology can enhance this experience through more visceral, embodied immersion techniques that heighten the emotional state through intense engagement and a sense of 'first-personness' (Steuer, 1993). In this way, digital technology can allow us to virtually step into one another's shoes for deeper insight and alternate perspectives about identities and lived experiences beyond our own.

As many other mother-artists and autoethnographers have observed, the intentional focus on the self works in the same way as does photography: the act of pointing the lens assigns value to that which is being observed. While I struggled mightily with feelings of illegitimacy throughout the entire process of putting together both creative project and paper, upon completion I found myself at peace with the fact that there was indeed great importance in the personal meaning-making that came from this close inspection of my complex and messy relationship to the single mother identity. That my work might positively influence even just a handful of others would be an achievement. In the end, it was through tapping into the power of a/r/tography and autotheory that I found the tools to unpack the complexity of my motherhood experience in a way that could be shared both inside and outside the academy.

Making the project itself was an act of ABR that, on a personal level, empowered me by allowing for personal expression, catharsis, and the externalization of inner feelings and thoughts. While the technical challenges involved in developing the project in Unity were very

intense for a beginner, they were not insurmountable. Perhaps the main reason the viability of the medium is a challenge is due to the length of time it takes to learn such complex (and constantly evolving) software platforms. That being said, many concepts explored through my work can be applied to 360-degree video production, a simpler alternative. So, although the technology (Unity, etc.) required significant persistence and learning, the creative and cathartic process of making still fulfilled my research objective to explore VR as a potential tool for self-representation. As a major component of my research and in keeping with the evolving realm of autotheory, the creative parts of this project breathe life into the words on these pages, actualizing the challenges and complexities that I grapple with in this paper. Together, the project and paper combine to offer guidance for future autobiographical storytellers interested in working in VR to tell and share their stories.

Appendices

Appendix A: Revised Script

This revised script captures the voice-over narration as well as key animations and sound effects used in the VR production. Changes observed between this script and the original version (Appendix B) reveal how ideas and content were reigned in as I got deeper into the project's development and better understood the Unity software.

Unity Narration Rewrite

Scene 1

<camera up in daylight sky on title card with fade-in of birds chirping in the background; camera tilts and rotates to aerial view of rural environment; as it starts to swirl downward to sweep over scene, sparkle disappears>

<a beat after title text pulls out of view>

I've had this feeling for as long as I can remember…

<crow call>

this yearning, restless sensation…

<truck passes>

like I'm on the verge of something… I don't know… exciting. Something real, and raw…

<neighbours waving>

Something more interesting than a beautiful house on a quiet street,

<mother gardening>

where everyone looks the same and nothing dares be out of place.

<camera swoops over charlotte's house and round the back; the gold sparkle returns and stays in the shot with the camera as they start to dolly towards the window; as camera enters window, the chirping sounds fade>

Scene 2

<sparkle disappears as the camera enters the bedroom window; charlotte is sitting on her bed looking bored, swinging her legs>

10": Hi, I'm Charlotte. I live here with my mom, my dad, and my three sisters. Well, my older sister got out last year… and soon it will be my turn.

<montage of charlotte in her room: looks in the mirror, poses, cries>

20": I spent a lot of my teenage years bored out of my skull and trying to follow the many rules. I tried hiding the parts of myself that didn't fit. I tried not to be a nuisance.

<montage continues but scene turns to night lighting: writes at her desk, sits on her bed>

16": It felt like I was constantly messing up, but I really worked hard to please my parents. I did my chores and got straight A's. Everything was wrapped up in the hope of what my life could be once I was out on my own and free to be my true self.

<charlotte sits on her bed with an envelope in her hand, then the sparkle reappears and blows out of the envelope to surround charlotte, who reacts with disbelief and enthusiasm; she is then at her window looking out>

22": And one fine day, my getaway ticket arrived. <sound effect of swirl> I was accepted into my first choice of university—one that would put me right smack in the middle of urban buzz and brawl… a place that might bring me closer to the adventure I'd been looking for… somewhere I might actually belong. I couldn't wait to start my new life.

<camera flies out of window and up into the night sky, getting lost in the stars>

Scene 3

<up in stars, then tip and rotate to aerial on city at night, slowly zooming down to charlotte walking down a sidewalk near the dingy part of town>

16": The contrast was dangerous.

<charlotte stands in a dark, dingy area where she is looking around - sound effects from bar open door>

I still hate to admit it, but I wasn't prepared for the instant freedom, especially against the backdrop of a big city.

<charlotte starts to tentatively walk through the area; a motorcycle passes by>

35": In the day, I'd go to my university classes… most of the time. But I was exhausted, confused, and didn't connect with my peers. It was at night that I would come alive—when I would walk the city, soaking in its character and complexity.

<starts walking dingy area, passes drunk remy and catcalling james; charlotte is scared, but slowly becomes more engaged when she sees malcolm smoking outside the bar>

At night, it was like different layers of the city that had been concealed by the daylight would reveal themselves to me…

<malcolm points and beckons>

25": I found others who, like me, didn't quite fit. I felt like I was finally tapping into the sense of excitement and belonging I'd been yearning for for so long. It took me time to realize what I'd found was not in fact uplifting and fulfilling, but predatory instead.

<charlotte walks towards malcolm>

20": I was a naïve 17-year-old with no self esteem, ready to be chewed up and spat out by anyone who could tug at my heartstrings and charm me with their outsider story…

<charlotte heads towards park and walks down busier road w/ malcolm>

and that's exactly what happened, again and again.

<charlotte is now walking with bryce; they dance and drink in the street>

21": Through these relationships, I indulged my desire for adventure—throwing myself into a world on the fringes of society. It was a chaotic and risky time, but at least I was distracted from my boredom.

43

15": In my four years since leaving home, I had earned my degree but had nothing else to show for myself. I'd found some sense of belonging within a community of misfits, but I lost myself somehow, somewhere along the way.

<the camera speeds away from charlotte panhandling and finds her taking a breath on a nearby bench>

11": I was finally starting to recognize just how messy my life had become. I knew I couldn't play these games anymore.

25": But five years of indulgences in a series of relationships with abusive, alcoholic and drug-addicted partners… it had taken a toll. I knew it was time for a change <charlotte is updated into new clothing on the bench> but was so not equipped to make that happen. I tried to muster the strength and resolve to follow a safer and healthier path…

<charlotte gets up from the bench and starts walking towards the main intersection>

I had just started to take some steps to get my life back on track. And then, my life changed in an instant.

<charlotte comes upon the billboard and stops suddenly, reading in shock… the following paragraph reads while panning around billboard while it flashes, then charlotte starts to look around her down each path>

45": Of course I knew it wasn't an ideal situation for bringing a child into this world. I was 22 years old, and living well below the poverty line… I was single… Although I loved him, the father was a very lost man and we had already broken up. <charlotte continues to turn so she can look down each road>

My parents would be completely pissed. They would flip out entirely.

<charlotte starts to walk down a road and the sparkle reappears to follow her as she breaks into a run>

10": Honestly? I was terrified about all these things and more, but there was no question… I was going to be a mom.

Appendix B: Full Script

      For interest's sake, I am including the original script, which illustrates my ambitions in the early creative stages of this project. This script was drafted with consideration for voice-over narration, visual and sound effects, and timing. Having since developed more familiarity with Unity and what is helpful for building within that platform, I would build out more columns to specifically list required assets for each scene. I would also keep the story much shorter given my survey of VR and the physical discomfort that often crept in after spending too much time in an HMD, and would reduce special effects, animations, and character modeling work where possible.

Script: *Single Mother Voices: Maternal Inscape (Volume I)*

Total runtime: Apx. 22'30"

Act I

Scene 1: Introduction, character background (apx. 2'30")

Voiceover	Visuals
<20 second pause>	Open on title: Single Mother Voices: Maternal Inscape (Volume I). It is written in dark magenta lettering outlined in sparkly gold-pink glitter against a clear blue sky. The letters evaporate after a few seconds, with the glitter forming a dusty, sparkly swirl that floats like a magical feather. This will be a device used to naturalize and facilitate movement between settings as needed. The camera tilts down to an aerial view of a rural neighbourhood and begins swooping down with the sparkly swirl following in a floating, feather-like fall.

	We sweep over nicely manicured lawns with people out and about, emphasizing cookie cutter elements. Everyone is white, able-bodied, and conservatively dressed.
I've had this feeling for as long as I can remember… this yearning, restless sensation… like I'm on the verge of something big or… intense, at least. Something real and raw… Something more interesting than a beautiful house on a quiet street, where everyone looks the same and nothing dares be out of place.	As the camera continues sweeping down and along with the sparkly swirl, we see people washing cars, tending to gardens, walking dogs, waving at one another, walking hand-in-hand, emptying their groceries from their cars, etc. We land in front of Charlotte's house. It is large and modelled loosely after my childhood home.
I used to lie awake in my bed at night, the time of day I felt most alive but was meant to be even more quiet and still than usual. In the summer, I would listen to the distant sounds of motorcycles speeding along the country roads with curiosity… intrigue. It was like assurance for me that there was something interesting out there—not within my reach yet, but one day maybe.	Front door opens, swirl and camera swoop in and right up the stairs ahead of us, down the hall and into my room. On the way, we see family portraits on the walls, indicating a traditional nuclear family of six.

	Charlotte is in bed. She is about 14. She wears large glasses that don't sit straight, has lots of freckles, is skinny, and has long brown messy hair.
	She is in her pyjamas, staring at the ceiling, looking bored and in despair. Her room is untidy, with indications of her interests in art and music peppered throughout (e.g. medals, certificates, acoustic guitar, painting and drawing materials).
	Motorcycle sounds run in the background, and Charlotte goes to look out her window into the abyss.
	Objects and sounds to import: • Motorcycles • Crickets

I lived most of my days trying to behave. Trying to conform to all the rules of the place. Trying not to stand out too much in any of the wrong ways. Trying to hide the parts of myself that didn't fit.	Charlotte brushes her hair, taking care to keep it out of her face. She brushes her teeth. She straightens her glasses and her books, etc. The background is softened to distract from the fact that we haven't left the bedroom.
I worked hard. I did my chores and I got straight A's. Everything was wrapped up in the hope of what my life could be once I was out on my own and free to be me in this world. It was a bumpy ride, but I did what I needed to do. I got extra credits from taking piano and going to summer school. I was sprinting towards my freedom.	Charlotte washes the walls, vacuums the floor. She studies at her desk in the daylight. Daylight fades and Charlotte remains sitting at her desk, working by the light of the lamp, doing math equations and writing in her notebook. She is bored, frustrated and tired, but committed.
And one fine day, my getaway ticket arrived. I was accepted into my first choice of university—one that would take me away from the deafening silence and utterly depressing mundanity of this country life	Charlotte opens an envelope as she is lying in her bed. The camera is above her again as she opens it. Her face lights up, with equal parts disbelief and thrill.

and drop me right smack in the middle of urban buzz and brawl. Somewhere I might actually belong.	The camera starts to pull away from her, with the swirl, out of her bedroom window and up into the sky… as we pan out and the country neighbourhood gets further away, the night sky engulfs the full scene. There are a few stars, scattered and glittering.

Scene 2: *Freedom at a price (apx. 3'45")*

Voiceover	*Visuals*
The contrast was dangerous. I still hate to admit it, twenty years later. It was everything I had wanted for so long. I was in a big city, and had no rules to follow… at least, not my parents'. They left the country right after I left home. It wasn't just me who wanted to start a new life. The world was my oyster… or whatever. The freedom was here at last, and all at once. I didn't waste any time. I jumped, two feet in, with no plan and nowhere to land.	The star sparkles increase as they morph into the lights of a big city (skyscrapers, compressed neighbourhoods). The camera pans down with the swirl to join Charlotte, who is standing in the middle of it all. She is 17 now, no longer wears glasses and is dressed more stylishly.

I was not prepared. The excitement I thought was lurking just around the corner turned out to be predatory. I was a girl with no self esteem, ready to be chewed up and spat out by anyone who could tug at my heartstrings and charm me with their outsider story.	From Charlotte's perspective, the camera looks up and all around at the cityscape. It is big and looming.
My idealism was tested and failed time and time again, and still I did not learn. I fell in love. I had my heart broken. ███████████ ███████████████ ████████████████ ████████ I went to school, got bad grades but managed to keep it going. I danced around all kinds of dirty and dangerous things, trying to tap into that just-out-of-reach excitement. It was chaotic, risky and sometimes fun. At least I was distracted from the boredom.	Charlotte enters the cityscape, which distorts and shifts as she gets deeper into it. There are scary-looking, foreboding areas but also some patches of lighter, more colourful spaces. Charlotte weaves around and between these spaces throughout. There are allusions to what some of the dangerous and dirty things may be via billboards, graffiti, theatre signs, litter, etc. throughout the city.

By the end of four years, I had earned my degree but lost almost everything else. I had replaced ██████████████ ith something much darker. More interesting, but definitely more dangerous. I had found some sense of belonging within a community of misfits, but I had lost myself somewhere along the way. One year post-degree and I was finally starting to come to my senses. Recognizing what I had done and trying to figure out how to fix it. The allure of the shadows was more intense now, my defences weakened by my indulgences over the past five plus years. But I finally saw the very real risks. I'd almost lost my life more times than I even knew. At one point, that didn't concern me. But somehow some maturity crept in, in spite of myself. And I knew that it was time to smarten up, but had no idea how.	
And then—	Charlotte screeches to a halt as she bumps directly into a giant flashing sign that reads: YOU ARE PREGNANT!

	She realizes she is in the middle of an intersection, with many paths around her to choose from. The camera spins around her and offers some retrospective on her experiences in the cityscape.
	She stops suddenly. She sits down in the middle of the intersection. She is holding a pregnancy stick that reads positive. She is introspective, reflective, then ready to draw herself up and face the world.
Call it fate, call it irresponsibility… I don't care. You can call it whatever you like. When I found out I was pregnant at 22 years old, there was clarity.	Charlotte notices that the road she first looks to is illuminated with a subtle dusting of gold (her inner swirl/sparkle), and doesn't bother looking at the other paths anymore.
	She heads with determination and intention down that road.

Of course, I considered my options. I knew I was not in an ideal situation for bringing a child into this world. I was quite young, single, and living well below the poverty line. I had been partying for five years.

The father was a lovely and very lost man, ████████████████ ████████████████████████████████████. We had already broken up. My upper middle-class British parents would flip out entirely. I was terrified about all of these things… and more. But there was no question:

I was going to be your mom.

Charlotte continues down this road for a while, and at times looks somewhat uncertain, afraid of where it may lead.

Charlotte realizes she can't see what is ahead on this road but continues, gaining speed until she catapults herself over a cliff at the end with no fear or hesitation.

Act II

Scene 3: *Choosing motherhood (apx 1'00")*

Voiceover	Visuals
I assessed what I was heading into with a level of wisdom that matched my age. Yeah, I was right about what would take a hit over the many years ahead—career, intimacy, travel, quiet, anything selfish at all… Did I have any real comprehension of what those losses would feel like? The loneliness, the many, many years of fighting to get a career on track after everyone else seemed to have a giant head start? Did I understand at all the almost unbearable weight of being stained by the single mom stigma, and how that would affect my interactions and reputation—both out there in the world but also within my own family? I'm not sure anything could prepare me for it, and I'm glad I was emboldened by my immaturity and that I trusted my instincts.	The camera follows Charlotte as she falls, with "lost opportunities" passing by all around her in the form of text: • Career • Friends • Quiet • Youth • Intimacy • Travel

Scene 4: *Fear, pressure and anxiety (apx. 0'30")*

Voiceover	*Visuals*
I was going to become a mother, and almost as soon as I decided it, I was opened up to the endless barrage of expectations and rules that go along with that title… Everyone had an opinion, and most were judgy. It was hard not to be overwhelmed by it all, and impossible not to see myself as a fuck-up. But it was time to face the biggest critics of them all…	Charlotte lands in a clearing, surrounded by books. The camera slowly pans around a circle of book spines that surround Charlotte, speeding up to a dizzying pace and then stopping as we hear a phone dialing while the scene dims into a dark, hazy and lazy, slow spin. **Book titles to include:** - What to Expect When You're Expecting - Breast is Best - Titles that reflect rules of motherhood, families, society, patriarchy, etc.

Scene 5: *Sharing the news (apx. 1'45")*

Voiceover	*Visuals*
Hi, um, Dad? It's me. (clears throat) How are you? … I, um, I have some news that I should probably tell you and Mum at the same time… um, can you get her? <pause> Um, yeah so, uhhh… I'm pregnant.	The hazy, dark, slow spin continues with Charlotte in the centre while the number finishes dialling and the phone rings briefly. We can see now that Charlotte is sitting on a floating chair, looking nervous.
<Through the distance of the phone, we hear a severe scolding, in which Charlotte is belittled and shamed ██████████████████ ███████████. These become mixed with other similar criticisms, including vocalized excerpts from ███████████████████ ███████████. Interspersed throughout are vocalized excerpts from a letter from the father, which also appear in visual textual form. Some options include:>	Tears begin to flow as Charlotte is being admonished. They flow so heavily that they become a waterfall, knocking her off the floating chair and pummelling over. She gets hit by textual representations of the criticisms that are raining down as she falls down the cascading water—disoriented, hurt and alone.

	It remains dark and hazy throughout.
• ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮ ▮ ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ ▮▮▮	
When motherhood comes from an unplanned pregnancy, you're single, and you're not "of a certain age" or with a certain amount of money, it's not quite how you saw other pregnancies go down. You don't get	Charlotte eventually comes out of a disorienting whirl through the waterfall, landing in an oasis-like pool.

"congratulations" or smiles. People don't know if it's a good thing. It's awkward. I was happy, maybe for the first time. But every mirror I checked told me I shouldn't be. I was "damaged goods," "irresponsible"—I should be ashamed. I didn't give a shit. My maternal instincts were already set in motion, and nothing mattered except for you.	She is floating on her back with a small bump showing now and the hazy darkness begins to lift. The camera zooms in on her hands caressing her small bump, and pans from her viewpoint around her and starts to pull out of the whirlpool-like motion as it is freed. Charlotte ducks underwater briefly.

Scene 6: *Pregnancy and getting ready for baby (apx. 3'15")*

Voiceover	*Visuals*
As I picked up the pieces of me that had been shredded by my family, I emerged with a singular focus—everything was about my baby.	Charlotte emerges from the water looking even more pregnant. She steps into the foggy, leafy space surrounding the water and passes through to a new landscape.

	It is a city, but the buildings are made of baby products, e.g. giant baby powder, bottle, blocks.
I knew I would be doing it alone. I was tormented by the guilt of deciding that for everyone. The father wanted to be a dad but wasn't ready and might never be. I felt like I hadn't had a choice. I hoped he would do what needed to be done but couldn't wait for it and definitely couldn't count on it. I was working for minimum wage at McDonald's when I got pregnant. It was a crap job, especially for a university grad. My party days were over. I bought baby powder, baby wipes and books about how to parent. Anything to help me feel some sense of control over the situation. And then I did the unthinkable. I left my urban dream behind. I couldn't fight the many temptations that surrounded me there. I couldn't break away from all the ugliness. I needed to get away, fast, and give myself a chance to get my feet on the ground.	Charlotte walks through the city which slowly then quickly is replaced with small town scenery as she passes through. She continues forward until, at the end of the voiceover, she comes to a stop in front of a mid-rise apartment building, modelled loosely after the one I moved to. She enters the front door.

I packed up my apartment. I walked all day and night, trying to absorb as much of the city as I could. I reflected on how I had changed from the 17 year old who had arrived there five years before… and all the dreams that had been shattered along the way. The bad choices I had made, the bad people who had left their forever imprint on my body and my soul… I had failed. But I would put it all behind me and start again. You were my angel—you very likely saved my life.	
We were safe now. I had escaped the demons that had become my own, defied my parents, ignored the immense yanking at my heartstrings that I felt every time I considered what I was taking from the father and his family…	Charlotte enters the elevator, rides up, gets out, walks down the hallway and opens the apartment door.
For the first time in my life, I had clarity about what to do. Mama bear had been borne, and she was fierce. Rid of everything that had been dragging me down, I threw myself into making a home for us. A humble home, but our own.	Charlotte scrubs the apartment, reads to herself, decorates, talks to her belly, builds a crib, plays music for the baby using headphones on her belly, and

Maybe this wasn't about cleaning an apartment but rather, attempting to purify (ha!) I mean, cleanse myself. The whirlwind of the past five years finally started to settle… I began to recognize how scary the track I was on had been… How lucky I was to have even gotten out of there alive. I was beginning to heal. But I was left dirty. I felt filthy, actually. And I was becoming more and more aware of how marked I was by my identity as a young single mom. The dyed yellow hair likely didn't help matters. The low income and Mickey D's job certainly did not.	stocks a humble assortment of baby items (e.g. blankets, onesies, diapers, board books). There is tenderness, safety, warmth and calm. **Objects and sounds to import:** • Jazz music
My whole life I'd been rooting for the underdog… now that was me. I say bring it.	Charlotte assesses the ready space. She notes on her calendar that the due date is tomorrow, goes to bed next to the crib with a book, turns to one side to go to sleep and suddenly opens her eyes wide. (Her water has broken.)

Act III

Scene 7: *Birth, infancy and intimacy (apx. 3'30")*

Voiceover	*Visuals*
Right on your due date, you arrived and changed my world forever. Sheer and utter bliss. I mean, not the labour. Or the delivery. Yikes. But right afterwards, bliss… I was immediately and totally in love. My sister was there for your birth. She was the only family member I had nearby, and was interested in biology. Hospital staff were nice, but my "situation" didn't fit their forms. In those and many others, I would strike through the section for the father's info—birth record and certificate, naming ceremony documents…Even baby books couldn't get it right so I made my own instead of having a big gap.	Everything fades to a warm pink for a moment, like seeing inside your eyelids during a blink. A glow overwhelms all vision briefly. When the blink is over, Charlotte is now with her baby daughter, Olivia, embraced in one another and warm soft light, the apartment setting only vaguely apparent. Olivia's fingers are entwined in Charlotte's, reaching for her face. They make eye contact, and eventually Olivia begins making sounds.

When we got home from the hospital, all of a sudden, the reality of "just the two of us" set in. All the things… the feeding, the diaper-changing, the complete and sole responsibility for this tiny human's life… it was starting. Would I be a good mother? I started to wonder as any reliability I might have had on my brain dissipated rapidly through the ravaging that is pregnancy, labour, delivery and postpartum. I let you lead the way.	The apartment setting is clearer now but not in focus. Charlotte signs to Olivia and she responds in signs. The eye contact continues. Charlotte bounces Olivia on her knees, sings to her, nurses her, kisses and snuggles her.
When people have babies, they tell me they don't know how I did it alone. Honestly, I don't know how I could have tended to a partner during this— or at least, not any partner I'd ever experienced. You do what you gotta do. You know what you know. And I knew many others had it far, far worse. I was damned lucky. I can't deny I felt loneliness. I did, intensely at times. As a mother, in not having someone to share both in the responsibilities and in the joys of parenting you, and also as a woman with a big heart and a strong need and desire to connect. It was a drastic shift.	Charlotte spoon-feeds Olivia, reads to her, lugs her on her back, in the stroller through the snow… We see them having picnics in the park, swinging, swimming, doing groceries, taking public buses. Financial strain is apparent. We see Charlotte in solitude. Her baby and apartment are her whole world. These scenes all play out like projections on the four walls of the apartment that surround Charlotte and

I also felt guilt. I think that's just part of motherhood or parenthood in general, but I had so many extra things to feel guilty about: my McDonald's maternity payout was less than the monthly welfare amount, so I collected the top-up until my maternity year had passed and then survived on just the welfare for another five months. We were living off less than a thousand dollars a month. I didn't want a penny from the father. Just keep your drug-addicted ass away and let me do good by our daughter, that's all. I will never make you pay. We were in a tiny apartment. I still had yellow hair… I was single. I had a baby on my own. I was deviant and a failure, but I just kept putting one foot in front of the other and soaked up every ounce of your sunshine as I could along the way. You were the best companion I could have hoped for. You lifted me up in every possible way.	Olivia. The baby is getting bigger throughout each vignette.
The gift of you was all-giving… the cutest, sweetest, most vivacious little bean that ever there was. I followed your rhythm throughout…	Charlotte soothes Olivia to sleep, and then closes her eyes and falls asleep with her.

Scene 8: *Toddlerhood (apx. 1'45")*

Voiceover	*Visuals*
I got you into subsidized daycare and the next day, I landed a real, grown-up job doing administrative work. My income almost doubled… I was finally getting somewhere. I busted my ass every day. It was a blur. You were the light in an otherwise dull and isolated life. I had so much to make up for. I had so much to prove.	Olivia is almost a toddler now. We see the baby learning to walk then run, and climbing on a play structure at the park. Charlotte's yellow hair is now a natural brown like when we first met her. As before, these scenes continue to play out like projections on the four walls of the apartment, with Olivia getting bigger in each vignette. In the three-dimensional space of the apartment, we see Charlotte helping Olivia put pieces into a puzzle, we see Olivia clapping, etc. Charlotte watches her baby in earnest and awe.

As your world grew and we talked about and explored it together, so too did your awareness of families. Going to daycare no doubt accelerated that process. Soon the question came: Mommy, where is Daddy? You didn't need to see any forms. You noticed a gap.	Continuing as projections, we see Charlotte running for buses, running to daycare, checking her watch… Charlotte's look and style are becoming more mature and professional. We see summertime impromptu performances by Olivia on the sidewalks, Charlotte loading Olivia into winter gear to get out the door… We see Olivia drop her teddy out of her stroller, and Charlotte retracing her steps through the snow to find him right outside their apartment building. She cries as the snowflakes fall, and her vision begins to blur.
As you got older, I forced myself to get out there. I'd met a friend who was raised by a single mother, and I couldn't shake something she had once shared: Do stuff for you. Don't make your daughter your whole life. Otherwise, she'll grow up feeling too indebted to	The scene before her slips away and is replaced with sights and sounds of summer. Charlotte and Olivia are at the park now. They are snuggled on a blanket. Both of them notice other families playing at the park.

you—too responsible for your happiness to live her fullest life for herself. As much as I didn't want to spend a moment without you, I took it to heart. I started making an intentional effort to expand my world and identity beyond motherhood. It felt completely unnatural and unmotherly. But maybe I had to do this to become the right kind of mother.	The camera turns to focus on happy couples who are swinging their children from the front and back of the park swings. Others are swinging their child between them as they walk. Daddies are coming to the park in their suits with briefcases, kissing the mommies and relieving them of their duties. No one is coming to relieve Charlotte. She packs up their things and leaves the park with Olivia. The camera follows them as they walk through town.

Scene 9: *Preschool and beyond (apx. 2'30")*

Voiceover	*Visuals*
I made an online dating profile. That was so not a fit for my idealist, romantic notions, but anyways… I was not exactly out at the clubs, so this was my option. I had only dated alcoholics, addicts and ▆▆▆▆ up until	Along the walk back, the sparkly swirl picks up pace and bounces off buildings, trees, etc. as they pass, spreading to create a canvas on which to project

this point… usually a combo of all three. The online men weren't much better and the men I met in real life all seemed to have very suspicious and angry women attached to them. Could I only attract assholes? As I continued to have bad experiences with men and found myself constantly cast as the scarlet woman, I withdrew. Now I was ashamed of my sexuality too. I could barely even look at men anymore. And even though I knew I was attracted to women as well and was comfortable with my bisexuality, I continued fighting to make it work with men as though I had no choice in the matter. Maybe this was another attempt at achieving that elusive "good mother" status—that vapid but potent validation.	vignettes that illustrate scenes described in voiceover (e.g. dating, nasty looks from women, ogling from men). In one vignette, Charlotte looks in the mirror. Is she anything besides a mother at this point? Can she find her identity outside of that role? She puts on makeup, tries different hairstyles and outfits, alternating between conservative, seductive, preppy, etc.
I signed up for boxing. Like my dates, every minute away from my daughter had to count. Not just because of the babysitting costs, but because it was time away from my kid! Everything was approached with a certain intensity… hard and fast for boxing, walking, working, loving… and mothering.	As Charlotte and Olivia continue to walk through town, the vignettes continue, showing Charlotte boxing, dating, working, etc.

You showed more and more exuberance as you grew. You were zesty and glorious, but hard to handle. I was exhausted. One day you asked very loudly and firmly again: "Where is my Daddy?" This time, I was prepared. "There is no daddy in our family," came my response. This answered the question and reinforced that we were a family, despite our small size or unconventional makeup. It was true—your father had never been your daddy. I was OK with it, but would you be? Were you lacking? Was I robbing you of something essential? I thought I was immune from it, but it turned out I had completely internalized the standard recommended and assumed path of go to school, get a job, get married and have kids. I totally bought into the idea that I had done wrong…	Interspersed with vignettes of Charlotte are scenes of Olivia growing into a pre-teen. Olivia is full of life, creativity and fantasy.

Scene 10: *Conclusion (2'00")*

Voiceover	Visuals
Maybe I did. But maybe I didn't… or maybe we all do-- or don't. All I know is that I'm done feeling inferior. Who the fuck gets it all right anyway? And how much fun could that be, really?	Charlotte and Olivia are still walking together through the city streets, with the sparkly swirl surrounding them and following along. Only, the city is much bigger than the town they were in during the previous scene.
You're a teenager now. We ended up moving back to the big city, where I built in a significant way on both my education and career. I did marry, and gave you a daddy. Do those things make me a good mom? Does that legitimize this mother-daughter duo? Have we truly gained in me trying to make amends for my supposed deviance? Or perhaps might there be time, memories and more that we have lost as I pursued this impossible quest? I'm a lot older now than I was when I had you… More than fifteen years have passed since I got pregnant. Now my peers, having done all of the	They walk past billboards, posters, etc. that have headlines and images or videos to illustrate them moving back to the big city, Charlotte falling in love, working hard, getting married, and moving into a house. The swirl loops around them and flies upwards with the camera following. We get an aerial view of the city as we go higher, then twirl off into the

things you are meant to do before becoming a mom, are finally ready for their turn. Many aren't getting that chance and those who do are tired, working demanding jobs with dwindling energy.

Maybe my fumble-through-life kind of way, my backwards approach, my immaturity, sensitivity, naïveté, idealism, whatever… are exactly what is right for you and right for me.

I love you, bean.

atmosphere and burst into a shower of glitter that falls all around the entire scene and settles to what you then see has become a pink-gold glitter-covered floor.

When we look back up, we see the entire world is covered in this pink-gold glitter dust, and just ahead of us, the credits roll on this background in dark magenta.

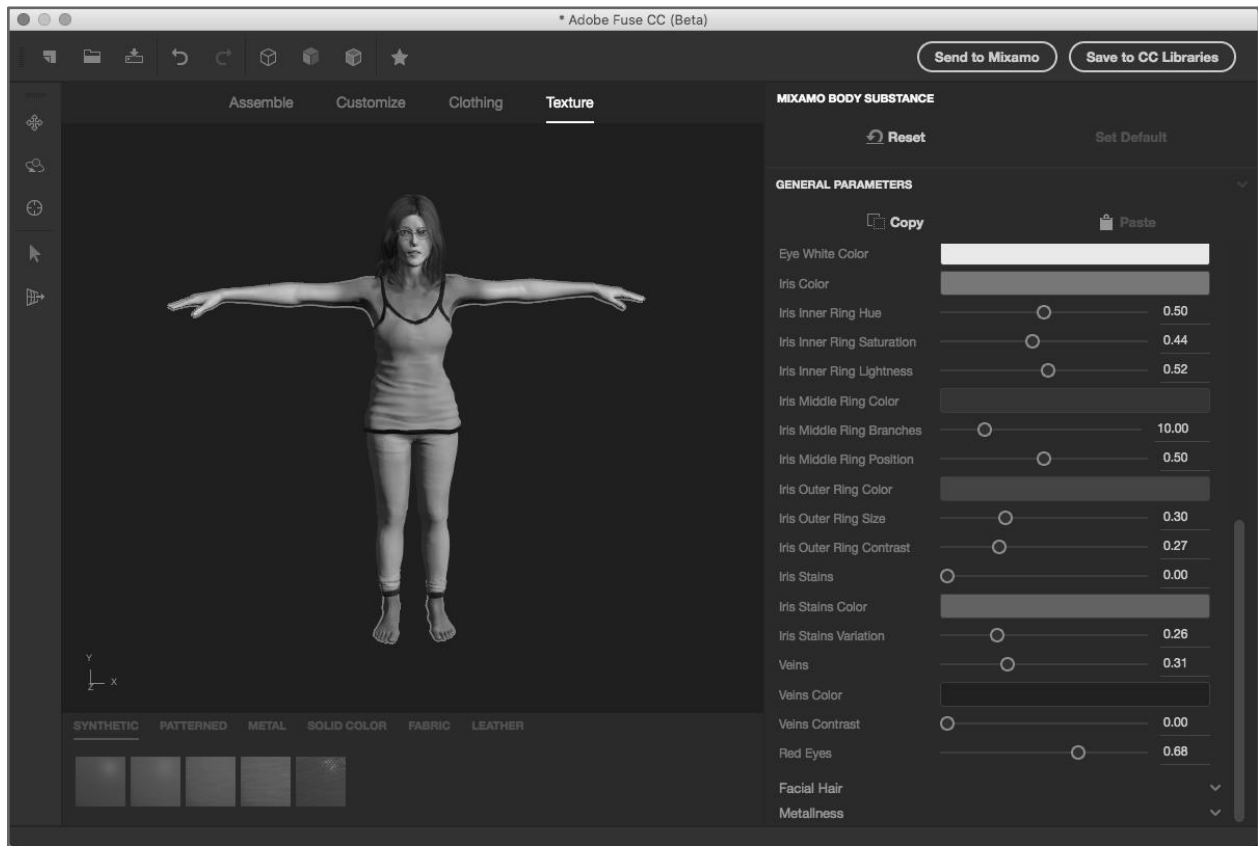**Appendix C: Original Storyboard Sketches**

These early sketches reveal the initial mapping out of story scenes within a 3D world, where I considered how to transition between scenes and settings while maintaining narrative flow. This practice of visualization provided direction for building in Unity and engaged the storyteller in me by drawing out themes, arcs, and plot points to fit within the blocked scenes.

Scene 1: Pre-awareness of pregnancy   ominous

tone/mood: (dark cloud) (darkest)   jump over cliff
dark; dangerous; sinister;
embed/objects: patches of   excitement
sneaks; drugs;
party; no;
assaults?
exploitation? allusions
only. neon signs?

tone/mood:
beauty; serenity; colour;
vibrancy; warmth
embed/objects
degree; career; flowers; trees;
cute/friendly animals

dark   dark   infancy (sc. 5)

sc. 1   (lifts: sc. 4)   river

light   club   (higher: sc. 2)   age 1-5

                        fog (slower/ground)   (lifts: sc. 4)
                        (sc. 3)

light   river appears   (waterfall/rapids)
                                            AC. 5

                        enduring bond?

phone call   while ge 4/pg   while spinning   camera moves
to parents   is happy now (to him) through; belly grows above mom

Scene 2: Decision time   Scene 3: Overwhelm/fear/   Scene 4: Peace, happiness,
    (falling)   pressure/prep.   isolation, loneliness

                        (purchases)   (books parenting)   fog — begins lifting
                                                            as
                            (fog)   become
                                                            mom
                            (spin)   embrace
                                                            motherhood
                        parents
                        sisters
                        grandparents baby shower   music for ?
                        embed/objects: letter from Nana   transition; bright light
                        books; baby supplies/gear;
                        tea;

Scene 5: New type of intimacy   Scene 6: Expanding world
    + love (infancy)   adventure; fun
                                  (toddler, preschool)

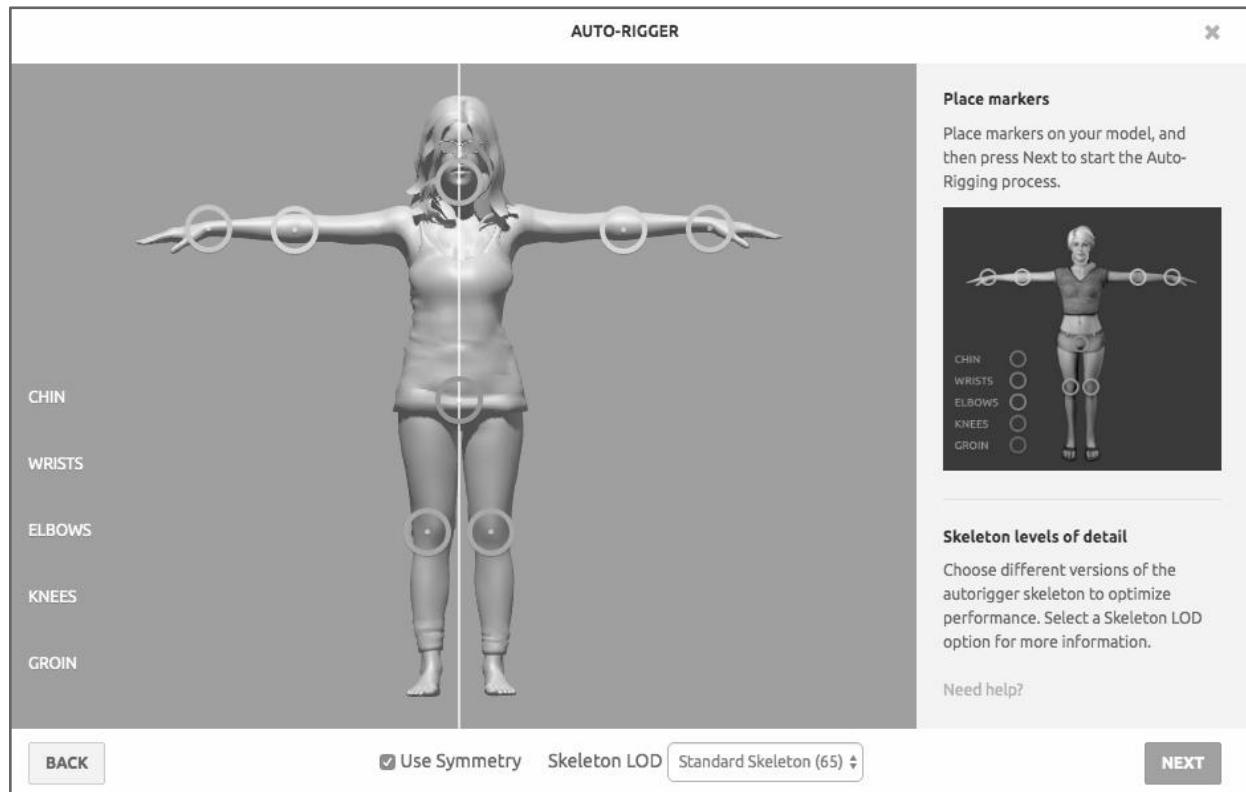**Appendix D: Production Screenshots**

These screenshots help to illustrate some of the steps involved as well as the various capacities of the technology used to develop digital assets and import them into Unity.
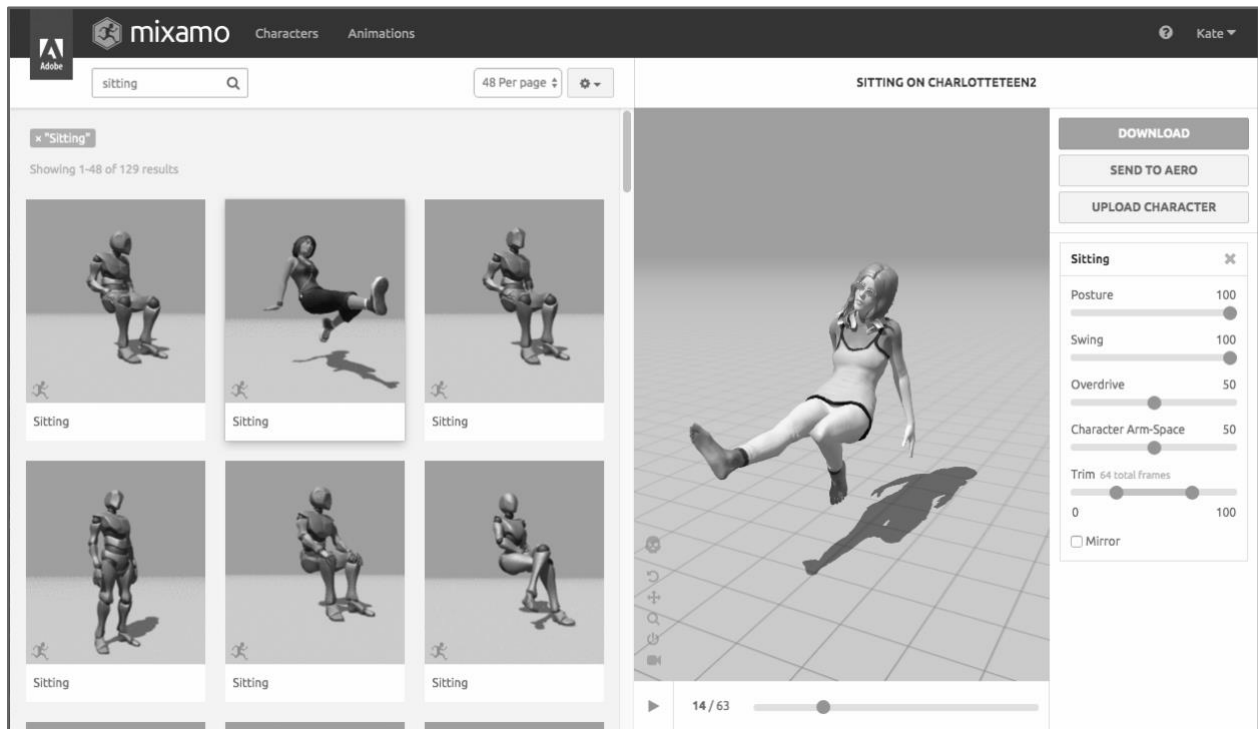
D.1 Adobe Fuse CC (Beta)

Adobe Fuse provided the ability to mix and match head and body components that could

then be customized from clothing right down to colouring, textures, facial expressions, body

proportions, and even details like eyeball veins. These avatar models can be downloaded as

objects for importing to Unity or can export to Mixamo for auto-rigging and animation (see

D.2). I used Fuse to create the character of Charlotte in a way that felt authentic to my identity.

The free Mixamo auto-rigger prepares your model for animation by prompting users to place triggerable markers on specific body parts and joints. It offers a "skeleton level of detail" that enables the ability to control more fine-tuned movements like independent finger motions. This provided the structure to do things like attach a pencil to the fingers of a model so that when she is animated to write, the pencil moves with her fingers (as seen on Charlotte in the bedroom scene).

D.3 Mixamo Animations

Once auto-rig mapping is complete, users can apply premade animations like walking, sleeping, crying, dancing, and more. These animations can be customized to a limited degree. For example, adjustments can be made to the space between the model's arms and body, the model's posture, the rate of speed at which they move, and the length of the clip.

This screenshot shows the Mixamo-animated model embedded into the Unity scene. The rigging dictates the position of dozens of marked points throughout the model's body, allowing it to change shape as appropriate to the scene.
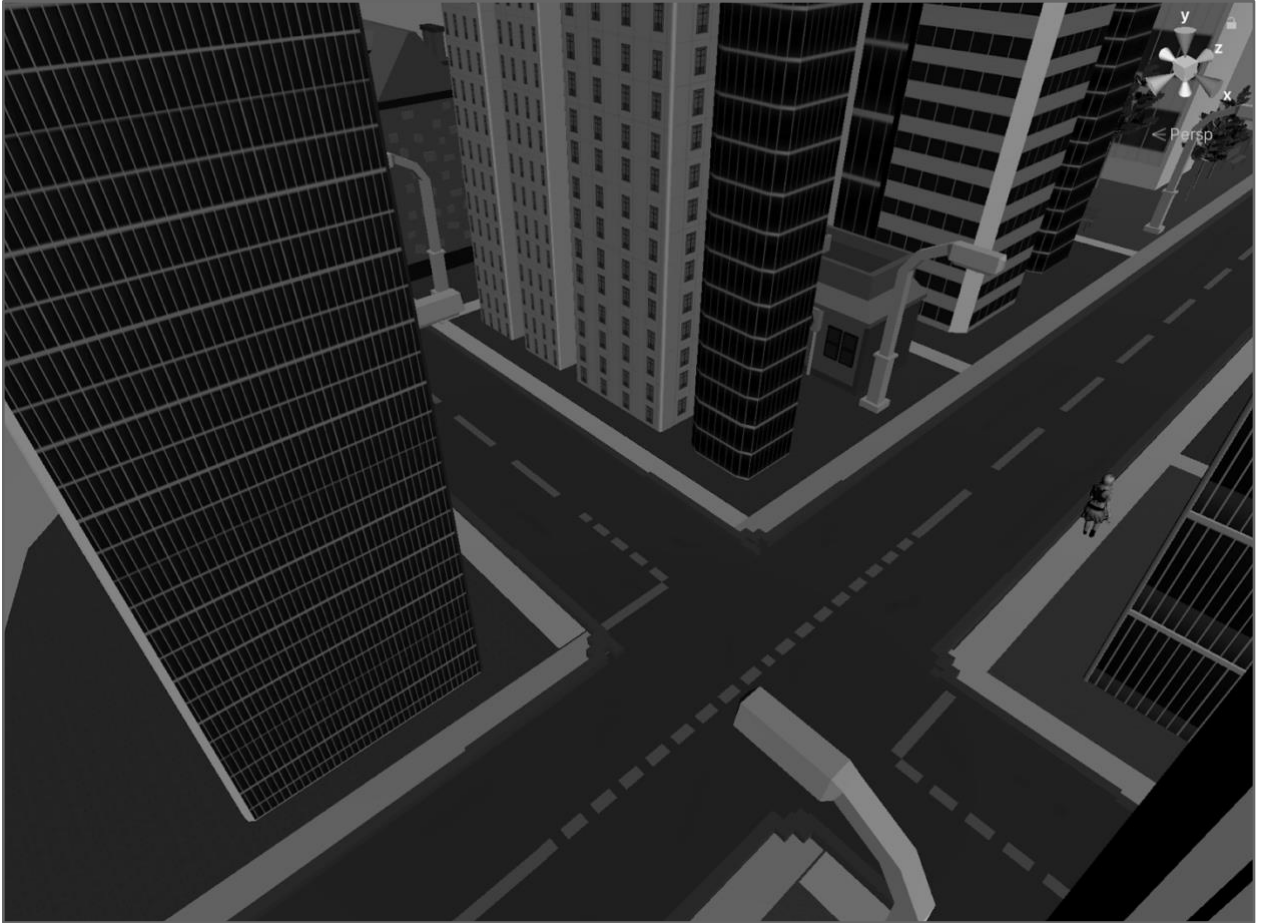
Here, the mechanics of moving between Mixamo animations is revealed; a number of animated Charlotte models are positioned in Unity, where I applied keyframe animation to time when each would appear and disappear, in a way that would create the illusion of movement.

Appendix E: VR Screenshots

A few examples of scenes from a user perspective are provided here, in addition to those in Appendix D.4, to provide a sense of the completed proof of concept. These additional screenshots from Unity serve as a sample of the user's perspective inside the VR story. This perspective is anchored by a virtual camera that has been animated to move through the scenes. Attached to that virtual camera is another that views in 360 degrees, offering users the ability to control the direction of their gaze.

Bibliography

Adams, T. D. (1990). Telling lies in modern American autobiography. UNC Press Books.

Ahn, S. J. (2011). Embodied experiences in immersive virtual environments: Effects on pro-environmental self-efficacy and behavior (Doctoral dissertation). Stanford University, California. https://vhil.stanford.edu/mm/2011/ahn-embodied-experiences.pdf

Armon, J., Uhrmacher, P. B., & Ortega, T. (2009). The significance of self-portraits: Making connections through monotype prints in Letras y Arte. *Art Education, 62*(6), 12–18. https://doi.org/10.1080/00043125.2009.11519040

Arora, G., & Milk, C. (2015). *Clouds over Sidra* [Video file]. Here Be Dragons. https://with.in/watch/clouds-over-sidra/

Autotheory. (2018, April). Lauren Fournier. http://laurenfournier.net/autotheory

Bailenson, J. N. (2016, May 21). *Can virtual reality really save the planet?* [Video file]. Stanford+Connects. https://stanfordconnects.stanford.edu/watch/can-virtual-reality-really-save-planet/

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.

Barone, T. (2010). Arts-based research. *Encyclopedia of Curriculum Studies*, 43–45. http://dx.doi.org/10.4135/9781412958806.n24

Barone, T., & Eisner, E. W. (2011). *Arts based research.* SAGE Publications.

Bigelow, K., & Ismail, I. (2017). *The protectors, walk in the ranger's shoes* [Video file]. National Geographic. http://www.walkinginrangersshoes.com/

Biocca, F., Kim, T., & Levy, M. R. (1995). The vision of virtual reality. *Communication in the age of virtual reality,* 3–14. Lawrence Elrbaum. https://dl.acm.org/doi/10.5555/207922.207923

Blair-Loy, M. (2003). *Competing devotions: Career and family among women executives*. Harvard University Press.

Buller, R.E. (Ed.). (2016). *Reconciling art and mothering.* Routledge Press.

Caragata, L., & Alcalde, J. (Eds.) (2014). *Not the whole story: Challenging the single mother narrative.* Wilfrid Laurier University Press.

Carruth, D. W. (2017, October). Virtual reality for education and workforce training. Paper presented at the 15th International Conference on Emerging eLearning Technologies and Applications (ICETA), Stary Smokovec, Slovakia. https://ieeexplore.ieee.org/abstract/document/8102472

Carter, M. R., & Triggs, V. (Eds.). (2017). *Arts education and curriculum studies: The contributions of Rita L. Irwin.* Routledge Press.

Ciciola-Izzo, R. (2014). Mother / art: A journey into selfhood, motherhood and art education through personal works. (Master's thesis). Concordia University, Montréal. https://spectrum.library.concordia.ca/978600/1/Ciciola-Izzo_MA_S2014

Coleridge, S. T. (1817). *Biographia Literaria*. Rest Fenner.

Crary, J. (1990) *Techniques of the observer: On vision and modernity in the nineteenth century.* The MIT Press.

Crittenden, A. (2001). *The price of motherhood.* Henry Holt and Company, LLC.

Dartmouth College. (2016). Real or virtual: Can we tell the difference? *ScienceDaily.* https://www.sciencedaily.com/releases/2016/02/160218144928.htm

Diemer, J., Alpers, G. W., Peperkorn, H. M., Shiban, Y., & Mühlberger, A. (2015). The impact

    of perception and presence on emotional reactions: A review of research in virtual reality.

    Frontiers in Psychology, 6, 26. https://doi.org/10.3389/fpsyg.2015.00026

Douglas, S., & Michaels, M. (2005). *The mommy myth: The idealization of motherhood and how*

    it has undermined all women. Simon and Schuster.

Eakin, P. J. (1985). *Fictions in autobiography: Studies in the art of self-invention.* Princeton

    University Press.

Elliott, S., Powell, R., & Brenton, J. (2015). Being a good mom: Low-income, Black single

    mothers negotiate intensive mothering. *Journal of Family Issues, 36,* 351–370.

    https://doi.org/10.1177/0192513X13490279

Ellis, C. (2004). *The ethnographic I: A methodological novel about autoethnography.* Rowman

    Altamira.

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: An overview. *Historical*

    Social Research/Historische sozialforschung, 273–290. http://dx.doi.org/10.17169/fqs-

    12.1.1589

Feasey, R. (2012). *From happy homemaker to desperate housewives: Motherhood and popular*

    culture. Anthem Press.

Feinberg, P. P. (2016, August 15). Empathy or insight? Reflections on virtual reality. Phi

    Centre. https://phi-centre.com/article/fr-empathy-sensory-stories-2016/

Festinger, L. (1962). *A theory of cognitive dissonance.* Stanford University Press.

Finley, S. (2005). Arts-based inquiry: Performing revolutionary pedagogy. *The Sage Handbook*

    of Qualitative Research, 3, 681–694.

https://www.researchgate.net/publication/292606852_Arts_Based_Inquiry_Performing_Re volutionary_Pedagogy_Sage_Handbook_of_Qualitative_Inquiry_3rd_edition

Fournier, L. (2018). Sick women, sad girls, and selfie theory. Autotheory as contemporary feminist practice. *a/b: Auto/Biography Studies, 33*(3), 643–662. https://doi.org/10.1080/08989575.2018.1499495

Fox, J., & Bailenson, J. N. (2009). Virtual self-modeling: The effects of vicarious reinforcement and identification on exercise behaviors. *Media Psychology, 12*(1), 1–25. https://www.tandfonline.com/doi/abs/10.1080/15213260802669474

Freeman, A. (2017). Moving 'up and out' together: Exploring the mother-child bond in low-income, single-mother-headed families. *Journal of Marriage and Family, 79*(3), 675–689. https://doi.org/10.1111/jomf.12378

Friedman, M. (2013). *Mommyblogs and the changing face of motherhood.* University of Toronto Press.

Gander, P. (1999). *Two myths about immersion in new storytelling media.* Lund University.

Garey, A. I. (1999). *Weaving work and motherhood*. Temple University Press.

Grbich, C. (2013). *Qualitative data analysis: An introduction.* SAGE Publications.

Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology, 79*, 701–721. https://journals-scholarsportal-info.ezproxy.lib.ryerson.ca/pdf/00223514/v79i0005/701_trotitpopn.xml

Green, M. C., Brock, T. C., & Kaufman, G. F. (2004). Understanding media enjoyment: The role of transportation into narrative worlds. *Communication Theory, 14*(4), 311–327. https://journals-scholarsportal-info.ezproxy.lib.ryerson.ca/pdf/10503293/v14i0004/311_umetrotinw.xml

Gregson, J. (2010). *The culture of teenage mothers*. SUNY Press.

Groom, V., Bailenson, J. N. & Nass, C. (2009). The influence of racial embodiment on racial

bias in immersive virtual environments. *Social Influence, 4.*

http://dx.doi.org/10.1080/15534510802643750

Gutsell, J. N., & Inzlicht, M. (2011). Intergroup differences in the sharing of emotive states:

Neural evidence of an empathy gap. *Social and Cognitive Affective Neuroscience, 7*(5),

596–603. https://doi.org/10.1093/scan/nsr035

Hays, S. (1998). *The cultural contradictions of motherhood.* Yale University Press.

Heeter, C. (1992). Being there: The subjective experience of presence. *Presence: Teleoperators*

& Virtual Environments, 1(2), 262–271.

http://commtechlab.msu.edu/randd/research/beingthere.html

Helsel, S. (1992). Virtual reality and education. *Educational Technology, 32*(5), 38–42.

www.jstor.org/stable/44425644

Herrera, F., Bailenson, J. N., Weisz, E., Ogle, E., & Zaki J. (2018). Building long-term empathy:

A large-scale comparison of traditional and virtual reality perspective-taking. *PLoS ONE,*

13(10). https://doi.org/10.1371/journal.pone.0204494

Hesford, W. (2004). Documenting violations: Rhetorical witnessing and the spectacle of distant

suffering. *Biography, 27*(1), 104–144. www.jstor.org/stable/23540432

Holman Jones, S. (2008). Making the personal political. *Collecting and interpreting qualitative*

materials, 3(205).

Holmes, O. W. (1864). *Soundings from the Atlantic.* Ticknor and Fields.

Hovland, C. I., Janis, I. L. & Kelley, H. H. (1953). *Communication and persuasion:*

Psychological studies of opinion change. Yale Paperbounds.

Hu-Au, E., & Lee, J. J. (2017). Virtual reality in education: A tool for learning in the experience age. *International Journal of Innovation in Education, 4*(4), 215–226. https://www.sc.edu/about/offices_and_divisions/cte/teaching_resources/docs/virtual_reality_education_tool_learning_experience_age.pdf

Isbister, K. (2016). *How games move us: Emotion by design.* The MIT Press.

Irvin, S. (2016). Artist parent index. www.artistparentindex.com

Irwin, R., & De Cosson, A. (2004). *A/r/tography: Rendering self through arts-based living inquiry.* Pacific Educational Press.

Irwin, R., Springgay, S., Leggo, C., & Gouzouasis, P. (Eds.). (2008). *Being with a/r/tography.* Sense Publishers.

Irwin, R. (2010). A/r/tography. *Encyclopedia of Curriculum Studies* (42–43). SAGE Publications. http://dx.doi.org/10.4135/9781412958806

Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. University of Chicago Press.

Juffer, J. (2006). *Single mother: The emergence of the domestic intellectual.* New York University Press.

Kaufman, L. (2009, February 25). Mr. Whipple left it out: Soft is rough on forests. The New York Times. https://www.nytimes.com/2009/02/26/science/earth/26charmin.html

Kilteni, K., Groten, R., & Slater, M. (2012). The sense of embodiment in virtual reality. *Presence: Teleoperators and Virtual Environments, 21*(4), 373–387.

Knight, L. (2009). Mother and child sharing through drawing: Intergenerational collaborative processes for making artworks. *International Art in Early Childhood Research Journal, 2009*(1), 1–12.

Kukkakorpi, M. P. (2018). Immersive journalism: Presence and engagement in conflict news

stories. (Master's thesis). University of Helsinki, Helsinki.

https://pdfs.semanticscholar.org/8ff6/217345a108e9e81b42cb8ff19accce328c72.pdf

Leavy, P. (2015). *Method meets art: Arts-based research practice.* Guilford Publications.

Levy, L., & Weber, S. (2011). Teenmom.ca: A community arts-based new media empowerment

project for teenage mothers. *Studies in Art Education, 52*(4), 292–309.

Liu, D., Bhagat, K. K., Gao, Y., Chang, T. W., & Huang, R. (2017). The potentials and trends of

virtual reality in education. *Virtual, augmented, and mixed realities in education*, 105–130.

Loewenstein, G., & Lerner, J. S. (2003). The role of affect in decision making. *Handbook of

affective science, 619*(642), 3.

http://conferences.wcfia.harvard.edu/sites/projects.iq.harvard.edu/files/lernerlab/files/loew

enstein_lerner_2003.pdf

Loiperdinger, M., & Elzer, B. (2004). Lumiere's Arrival of the Train: Cinema's founding myth.

The Moving Image, 4(1), 89–118. Project MUSE. https://muse.jhu.edu/article/171125

Mateas, M., & Stern, A. (2006). Interaction and narrative. *The Game Design Reader: A Rules of

Play Anthology, 1*, 642–669. https://users.soe.ucsc.edu/~michaelm/publications/mateas-

game-design-reader-2005.pdf

McCloud, S. (1993). *Understanding comics: The invisible art.* HarperCollins Publishers, Inc.

McCormack, K. (2005). Stratified reproduction and poor women's resistance. *Gender & Society,

19*, 660–679. https://doi.org/10.1177/0891243205278010

McNiff, S. (2013). Introduction: A critical focus on art-based research. *Journal of Applied Arts

& Health, 4*(1), 5–12. https://doi.org/10.1386/jaah.4.1.5_1

McRobbie, A. (2004). Postfeminism and popular culture. *Feminist Media Studies, 4*(3), 255–264.

Milk, C. (2015). Chris Milk: *How virtual reality can create the ultimate empathy machine*

[Video file]. TED Talks.

https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empa

thy_machine?language=en

Misra, S. (2019). 'The plastic ceiling project': Advantages of using arts-based research to

explore the pain of mothers that work and study. *International Journal of Art & Design*

Education, 38(3), 691–699. https://doi.org/10.1111/jade.12238

Montgomery, P., Mossey, S., Rice, C., McCauley, K., Chandler, E., Changfoot, N., & Underhill,

A. (2019). Healthcare providers' experiences as arts-based research participants: 'I created

my story about disability and difference, now what? *Canadian Journal of Nursing*

Research, 51(4), 255–263. https://doi.org/10.1177/0844562119835130

Motapanyane, M. (Ed.). (2016). *Motherhood and single-lone parenting: A twenty-first century*

perspective. Demeter Press.

Nelson, M.B. & Combe, J. (2017). Mothering - ArtAdemics: Intersecting identities of strength.

Journal of the Motherhood Initiative for Research and Community Involvement, 8(1–

2). https://jarm.journals.yorku.ca/index.php/jarm/article/view/40458

O'Reilly, A. (Ed.). (2007). *Maternal theory: Essential readings.* Demeter Press.

Pantelidis, V. S. (2010). Reasons to use virtual reality in education and training courses and a

model to determine when to use virtual reality. *Themes in Science and Technology*

Education, 2(1–2), 59–70.

http://earthlab.uoi.gr/ojs/theste/index.php/theste/article/view/22/17

Papagiannis, H. (2017). *Augmented human: How technology is shaping the new reality.* O'Reilly

Media, Inc.

Petty, R. E., DeSteno, D. & Rucker, D. D. (2001). The role of affect in attitudinal change. *Handbook of Affect and Social Cognition*, 212–233. http://www.psy.ohio-state.edu/petty/documents/2001AFFECTHNDPettyDeStenoRucker.pdf

Plowman, L. (1998). Getting side-tracked: Cognitive overload, narrative and interactive learning environments. In Virtual Learning Environments and the Role of the Teacher, Proceedings of UNESCO/Open University International Colloquium, Milton Keynes, United Kingdom.

Podnieks, E. (Ed.). (2012). *Mediating moms: Mothers in popular culture.* McGill-Queen's University Press.

Ramnarine, K. (2020, March 13). Personal interview at Ryerson University's Digital Media Experience Lab, Toronto, Canada.

——. (2019, July 24). Personal interview at Ryerson University's Digital Media Experience Lab, Toronto, Canada.

——. (2018, May 4). Personal interview at Ryerson University's Digital Media Experience Lab, Toronto, Canada.

Reeves, B. R., Lombard, M. L., & Melwani, G. (1992). Faces on the screen: Pictures or natural experience? Paper presented at the conference of the International Communication Association, Miami, Florida.

Riva, G., Mantovani, F., Capideville, C. S., Preziosa, A., Morganti, F., Villani, D., Gaggioli, A., Botella, C., & Alcañiz, M. (2007). Affective interactions using virtual reality: The link between presence and emotions. *CyberPsychology & Behavior, 10*(1), 45–56. https://doi.org/10.1089/cpb.2006.9993

Rojas, F. A. (2012). Re-constructing the self: Self-portraiture as exploration of personal and professional identity. *Creative Approaches to Research, 5*(3), 34–61.

http://ezproxy.lib.ryerson.ca/login?url=https://search-proquest-com.ezproxy.lib.ryerson.ca/docview/1758008277?accountid=13631

Rose, C., & Bailenson, J. N. (2016, August 15). *Virtual human interaction lab: Charlie Rose*
[Video file]. Bloomberg. https://www.bloomberg.com/news/videos/2016-08-15/virtual-human-interaction-lab-charlie-rose

Rosenberg, R. S., Baughman, S. L. & Bailenson, J. N. (2013). Virtual superheroes: Using
superpowers in virtual reality to encourage prosocial behaviour. *PLOS ONE*.
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0055003

Ruggerio, D. (2014). The effect of a persuasive game on attitude towards the homeless. *Society
for the Advancement of the Science of Digital
Games*. http://www.fdg2014.org/papers/fdg2014_paper_26.pdf

Ryan, M.-L. (1999). Immersion vs. interactivity: Virtual reality and literary theory. *SubStance,
28*(2), 110–137. http://faculty.humanities.uci.edu/poster/syllabi/readings/ryan.html

Seregina, U. A. (2019). Co-creating bodily, interactive, and reflexive knowledge through art-
based research. *Consumption Markets & Culture*, 1–24.
https://doi.org/10.1080/10253866.2019.1634059

Sheridan, T. B. (1992). Musings on telepresence and virtual presence. *Presence: Teleoperators
& Virtual Environments, 1*(1), 120–126.
http://www.mitpressjournals.org/doi/abs/10.1162/pres.1992.1.1.120?journalCode=pres

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications.* John
Wiley & Sons.

Sontag, S. (2003). *Regarding the pain of others.* Farrar, Straus and Giroux.

Springgay, S., Irwin, R. L., & Kind, S. W. (2005). A/r/tography as living inquiry through art and text. *Qualitative inquiry, 11*(6), 897–912. https://doi.org/10.1177/1077800405280696

Steuer, J. (1993). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication, 42*, 73–93. http://www.cybertherapy.info/pages/telepresence.pdf

Virtual reality Syrian refugee crisis. (n.d.). United Nations. http://unvr.sdgactioncampaign.org/cloudsoversidra/#.XmzV_5NKg6g

Wadeson, H. (1986). The influence of art-making on the transference relationship. *Art Therapy, 3*(2), 81–88. https://doi.org/10.1080/07421656.1986.10758828

Warner Marien, M. (2015). *Photography: A cultural history.* Prentice Hall, Inc.

Whitmarsh, L. (2008). Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *Journal of Risk Research, 11*(3), 351–374. https://doi.org/10.1080/13669870701552235

Zanna, M. P., & Fazio, R. (1981). Direct experience and attitude-behavior consistency. *Advances in experimental social psychology, 14*, 162–202. https://www.researchgate.net/profile/Russell_Fazio/publication/287012901_Direct_Experience_and_Attitude_Behavior_Consistency_in_Advances_in_Experimental_Social_Psychology/links/58dceeb6458515152b6c0a95/Direct-Experience-and-Attitude-Behavior-Consistency-in-Advances-in-Experimental-Social-Psychology.pdf

Zartler, U. (2014). How to deal with moral tales: Constructions and strategies of single parent families. *Journal of Marriage and Family, 76*, 604–619. https://doi.org/10.1111/jomf.12116

Zwartjes, A. (2020). Under the skin: An exploration of autotheory. *Assay: A Journal of Nonfiction Studies, 6*(2).