HUNTING THE IMPOSSIBLE

THE SCIENCE OF MAGIC AND THE EXPERIENCE OF IMMERSION IN ANALOGUE AND VR THEATRE

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FOR MY MOM ∞,
FOR MY DAD,
FOR MY GRANDMOTHERS ∞,
AND FOR IŞIK.

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ABSTRACT

This thesis is concerned with analogue and digital immersive environments and the ways to enhance their immersivity, by offering an interdisciplinary theoretical framework to study immersion across various contexts and applying this framework to draw parallels between stage magic and immersive productions, to understand how science of magic can contribute further to these productions, while also discussing how analogue immersive theatre can contribute to immersive productions in virtual reality.

I review various interpretations of the sense of immersion, and offer my own definition of immersion as an experience of an impossible situation where one has the impression of being bodily present in an unreal storyworld following a liminal situation that transports the subject into that world. I unpack the terms "interaction" and "agency", and provide an overview of how they can be situated across various artforms and media. I present the notion of a trajectory which is a useful tool in analyzing various immersive productions. I also discuss the video game literature on interactivity and agency, where parallels can be made regarding how to design artworks that allow for the relevant type of interactivity (a 'performer' type rather than a 'player' type) and that provide a stronger sense of agency. I also discuss the importance of curiosity and uncertainty for interactive storytelling productions.

Having set up this framework, I discuss how having a better understanding of the methods and effects of magic tricks can help us explore further research possibilities in immersive environments and can help immersive experience creators to understand how immersive environments work.
I present the idea that a salient parallel between magic tricks and immersive environments is how they provide the impression of experiencing something impossible. I outline various practices and types of magic tricks that could be useful for the design and study of immersive environments, providing an extensive literature review and the historical background of how magic has developed, and I point out the similarities between current immersive productions and magic in terms of how they relate to the new technologies of their time and to society's fascination with these technologies.

In the second part of the thesis I describe the genre of immersive theater and I offer a list of eight characteristics prevalent in 21st century Western immersive theater productions, characteristics that contribute to the immersivity of these productions and which make them qualify as a separate genre. I analyze the tactics that enable this genre to focus on the audience

members as central elements of the productions. I present two case studies, one taking place in an analogue environment (*Das Heuvolk* by SIGNA) and one in a mixed-reality setting (*SOMNAI* by dotdot). In the final chapter of the thesis, I analyze three theatrical VR productions (*The Tempest* by Tender Claws, *Finding Pandora X* by Double Eye Studio, and *Welcome to Respite!* by CoAct Productions and Ferryman Collective) that take place on bespoke-apps or social VR platforms. I discuss how these performances offer an illusory agency for their audience members and also enable the audience members to explore various formats of misbehavior, and how it is related to technical limitations of the productions and to the audience's embodied participation.

I conclude the thesis by pointing out that immersive productions that aim to offer a sense of wonder should offer as many possibilities as possible for the participants to experiment with the system, while successfully answering each challenge, in a way similar to how stage magicians offer possibilities to the audience members for entertaining various explanations while systematically countering them one-by-one, which deepens and sustains the feeling of wonder and impossibility.

ABSZTRAKT

Doktori disszertációm az analóg és digitális immerzív környezetekkel és azok immerzív jellegével foglalkozik, interdiszciplináris elméleti keretet kínálva az immerzió különböző kontextusainak tanulmányozására. Ezt a keretet alkalmazva párhuzamot von a bűvészet és az immerzív produkciók között annak céljából, hogy rámutasson milyen designstratégiákat kölcsönözhetünk a bűvészettudományából, miközben azt is megvitatja, hogy az analóg immerzív színházi előadások hogyan járulhatnak hozzá a VR produkciók megértéséhez.

Áttekintem az immerzió értelmezésének különböző lehetőségeit, ezután az immerzió érzetének újraértelmezését kínálom: egy olyan lehetetlen helyzet élményeként értelmezem, amelyben a résztvevőnek az az érzete, hogy — egy liminális helyzetet követően — egy nem valódi történetvilágba transzportálódik a megtestesülés (sense of embodiment) érzete által. Kibontom az „interakció" és az „ágencia" (hatóerő) fogalmait, és áttekintést adok arról, hogy ezek miképpen jelennek meg különböző művészeti formákban és médiumokban. Bemutatom a „trajectory" fogalmát, amely hasznos eszköz a különböző immerzív produkciók elemzésében. Kitérek az interaktivitás és az ágencia videojátékokkal kapcsolatos szakirodalmára is: ezek kiváló párhuzamot kínálnak arra, hogy hogyan tervezzünk olyan műalkotásokat, amelyek lehetővé teszik a megfelelő típusú interaktivitást (inkább „előadói", mint „játékos" típusú), és amelyek átfogóbb „ágenciát" biztosítanak. Kitérek továbbá az interaktív történetmesélési produkciók kapcsán a kíváncsiság és a bizonytalanság fontosságára, amely tovább növeli az immerzió érzetét.

A fogalmi keretrendszer ismertetése után, kitérek arra, hogy a bűvészmutatványok módszereinek és hatásának jobb megértése miképpen segítheti az immerzív környezetek alkotóit. Részletesen értekezek arról, hogy a bűvésztrükkök és az immerzív környezetek közötti kiemelkedő párhuzam abban áll, hogy a bűvésztrükkök a lehetetlen megtapasztalásának benyomását keltik – és hasonló érhető tetten az immerzív alkotásokban is. Felvázolom a bűvésztrükkök különböző gyakorlatait és típusait, amelyek hasznosak lehetnek az immerzív környezetek tervezésében és tanulmányozásában, átfogó irodalmi áttekintést nyújtok, és ismertetem a bűvészet fejlődésének történelmi hátterét. Ezután rámutatok a jelenlegi immerzív produkciók és a bűvészet közötti hasonlóságokra abból a szempontból, hogy hogyan kapcsolódnak a kor új technológiáihoz.

A dolgozat második részében az immerzív színházat mint önálló műfajt tárgyalom, és felsorolok nyolc olyan jellemzőt, amelyek a 21. századi nyugati immerzív színházi produkciókra jellemzőek és amelyek hozzájárulnak a produkciók immerzivitásához. Elemzem azokat a stratégiákat, amelyek az alkotások központi elmévé léptetik elő a közönséget. Két esettanulmányt mutatok be, egy analóg környezetben létrejött immerzív performansz installációt (SIGNA: *Das Heuvolk*), illetve egy mixed–reality típusú immerzív előadást (dotdot: *SOMNAI*). A dolgozat utolsó fejezetében három színházi VR–produkciót (Tender Claws: *The Tempest*; Double Eye Studio: *Finding Pandora X*, valamint CoAct Productions és a Ferryman Collective: *Welcome to Respite!*) elemzek, amelyek egyéni VR–alkalmazásként vagy közösségi VR–platformokon játszódnak. Megvitatom, hogy ezek az előadások hogyan kínálnak illuzórikus ágenciát a közönség tagjainak, és hogyan teszik lehetővé a nézők számára a „helytelen viselkedés" (audience misbehaviour) különböző formáinak felfedezését. Rámutatok arra, hogy ez miképpen függ össze a produkciók technikai korlátaival, valamint a közönség megtestesült részvételével.

Dolgozatom végén rámutatok arra, hogy a csoda érzetét nyújtani kívánó immerzív produkcióknak a lehető legtöbb lehetőséget kell kínálniuk a résztvevőknek az előadás „(szabály)rendszerével" való kísérletezésre, miközben minden egyes kihívásra sikeresen válaszolnak. Ez hasonlítható bűvészek élménytervezési stratégiájára, amely engedi, hogy a nézők különböző forgatókönyveket gondolhassank ki egy–egy trükk megoldásaképpen, majd ezeket a trükk egyenként megsemmisíti, ezáltal pedig elmélyül és fennmarad a csoda és a „lehetetlenség" érzete.

MAIN CLAIMS

1/ Immersion is a sense of being bodily present in an impossible world or situation brought on by the impression of a liminal transportation. These worlds or the situations are "impossible" in the sense that they are experienced as unreal, while, paradoxically, the experiencer feels to be present in them, in somatic, sensory, social and agentive levels.

2/ The experience of magic (that is, experiencing the performance of stage magicians and pseudo–spiritualist mediums) can be interpreted as an immersive experience. There are parallels between the experience of magic and contemporary immersive experiences, and there are also similarities in their socio–technological background, in terms of how these phenomena relate to the new technologies of their time and to society's fascination with these technologies.

3/ Immersive theatrical productions can be described through eight characteristics and these characteristics are there not as a matter of mere contingency: these are the features that are conducive to bringing about a psychological state of immersion as defined above. These characteristics are

- a 360–degree physical environment;
- involvement of as many senses as possible;
- having no meta–reference;
- integration of coincidental events into the storyworld;
- character–based improvisatory and interactive performance;
- a (false) sense of agency on the side of the participants;
- abandonment of everyday social rules; and
- intimacy.

4/ VR creators should reach out to theatre makers and magicians as they can offer design guidelines that can be adapted for VR productions. This way, not only the first time VR users but also the "veteran" ones can find surprising elements in the productions. It is also important to include human performers or orchestrators in the VR productions whenever possible in order to raise the intensity of the immersion.

5/ A key element of immersive VR theatrical performances is their offering an illusory agency to their audience members and also enabling the audience members to explore various formats of misbehavior. These misbehaviours are related to technical limitations of the productions and to the audience's embodied participation.

6 / The immersive productions that aim to offer a sense of wonder should offer as many possibilities as possible for the participants to experiment with the system, while successfully answering each challenge, in a way similar to how stage magicians offer possibilities to the audience members for entertaining various explanations while systematically countering them one-by-one, which deepens and sustains the feeling of wonder and impossibility.

TÉZISEK

1/ Az immerzió érzete egy világ vagy szituáció lehetetlenként való érzékelését jelenti, amely testi jelenlétet is követel, és amelyet egy liminális helyzet általi hirtelen transzportálódás idézhet elő. Az ilyen típusú világok vagy szituációk érzékelése abban az értelemben számítanak „lehetetlennek", hogy irreálisként érzékeljük. Eközben viszont — paradox módon — a tapasztaló úgy érzi, hogy teljesen jelen van bennük, szomatikus, érzéki, szociális és ágencia, azaz a hatóereje szempontjából is.

2/ a bűvészet élménye (vagyis a színpadi bűvészek és álspirituális médiumok előadásának átélése) immerzív élményként is értelmezhető. A bűvészet élménye és a kortárs immerzív élmények között vannak párhuzamok, kultúrtörténeti hátterük is több hasonlóságot mutat, főképp abból a szempontból, hogy a társadalom miképpen viszonyult vagy éppen rajongott ezekért az élményekért és az azokat lehetővé tevő technológiákért.

3/ Az immerzív színházi produkcióknak nyolc fő jellemzője van: ezek azok, amelyek elősegítik a fentiekben meghatározott immerzió állapotának előidézését. Ezek a jellemzők a következők:

- 360 fokos fizikai környezet;
- a lehető legtöbb érzékszerv bevonása;
- a történet metareferenciájának hiánya;
- a véletlen események történetvilágba való integrálása;
- az előadás minden szereplőjének teljesen kidolgozott karaktere, amely által az előadás improvizatív és interaktív produkcióvá válik (mivel nincs előre meghatározott szövegkönyv);
- a résztvevők (illúzórikus) ágencia–érzete;
- a mindennapi társadalmi szabályok elhagyása; és
- az intimitás és meghittség érzete.

4/ A VR–alkotóknak érdemes a színházi alkotók és a bűvészek élménytervezési stratégiáit is elsajátítani, mivel ők olyan design irányelveket kínálhatnak, amelyek a VR–produkciókra is adaptálhatók. Így nemcsak azok a VR felhasználók lesznek meglepve a médium lehetőségeitől, akik először próbálják ki, hanem a „veteránok" is találhatnak meglepő elemeket a produkciókban. Fontos továbbá, hogy lehetőség szerint az élő jelenlétet is biztosítsák (akár csak alkalmanként — előadók által): ezeket érdemes figyelembe venni VR–produkciók tervezésekor azért, hogy növeljék az immerzió intenzitását.

5 / Az immerzív VR színházi előadások egyik kulcseleme, hogy illuzórikus cselekvőképességet kínálnak a nézőik számára, és lehetővé teszik azt is, hogy a résztvevők a „helytelen viselkedés" különböző formáit is felfedezhessék. Ezek a „helytelen viselkedési formák" a produkciók technikai korlátaihoz és a közönség megtestesült részvételéhez kapcsolódnak.

6 / Azok az immerzív produkciók, amelyek a nézőiknek a csoda érzetének átélését is ígérik, a lehető legtöbb lehetőséget kell kínálniuk a résztvevők számára arra, hogy a produkció „szabályrendszerével" kísérletezhessenek, azok szabályait megtapasztalhassák. Eközben érdemes érvényesíteni a bűvésztrükkök befogadásakor érvényes folyamatokat: lehetőséget kell adni a befogadónak, hogy különböző megoldási szcenáriókat képezzen az adott helyzetről (annak lehetetlen jellegéről) majd ezeket az alkotók szisztematikusan megcáfolják, ezáltal pedig elmélyül és fennmarad a csoda és a lehetetlenség érzése.

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LIST OF PUBLICATIONS RELATED TO THIS DISSERTATION

Bakk, Ágnes Karolina. 2021- “Curate It Yourself! Game Mechanics and Pesonalized Experience in the Immersive Performance Installation”. ***Well Played*** (10/2): 116-134.

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TABLE OF CONTENT

"BUT IS THE FANTASY REALLY ABOUT PLAYING WITH STATES OF BEING THAT SPEAK TO A SUBCONSCIOUS FEAR WE ALL SHARE? COULD IT BE THAT BEING SOMEWHERE OR SOMEONE WITHOUT ACTUALLY OCCUPYING THE SPACE OR ASSUMING THAT SUBJECT'S POSITION GIVES US A CHANCE TO TRY ON DEATH WITHOUT COST? WHAT IS IT EXACTLY WE FEAR WHEN WE WAIT TO ENTER THE VIRTUAL REALITY SIMULATOR OR THE FUNFAIR RIDE? NAUSEA, A FEAR OF BEING DISCOMBOBULATED, OR TAKING OUR BODIES INTO A REALM THAT IS TOO CLOSE TO THE ULTIMATE UNKNOWN?"

Alison Griffiths *Shivers Down Your Spine*, 286

INTRODUCTION / 1 /

SUBJECT MATTER AND MAIN CLAIMS / 1.1 /

This thesis is about immersion in analogue and digital environments. With the proliferation of new technologies and our daily lives becoming more online–based, and with new trends in art and entertainment, immersive environments are becoming more common. However, immersion itself is not a new phenomenon, but something that has existed long before VR technology, and even if the new technology comes with the promise to fulfil our desire for full immersion, it has a long way to go. This thesis aims at contributing to the development of better immersive environments by providing conceptual distinctions, case studies, and design strategies, with a multidisciplinary approach that brings together elements from theatre studies, VR studies and the history and science of magic, and, to a lesser extent, video game studies, research on interactive digital narratives, history, and the sociology of the desire for immersion.

Immersion is a term which is often used too broadly. One of the aims of this thesis is to offer a definition of immersion that is more useful for the study of immersive media, one that includes in itself several elements of immersion and that allows us to see better whether a given production satisfies all the criteria for immersivity. I define immersion as a sense of being bodily present in an impossible world or situation brought on by the impression of a liminal transportation. These worlds or the situations are "impossible" in the sense that they are experienced as unreal, while, paradoxically, the experiencer feels to be present in them, in somatic, sensory, social and agentive levels.

This understanding of immersion requires us to have a grip on various concepts such as embodiment, presence, atmosphere, interaction, agency, liminality, framing, onboarding, transportation, trajectories, and the sense of impossibility, so introducing and clarifying these terms constitute another aim of this thesis. Based on this theoretical framework and looking at particular

immersive acts and productions, I define eight characteristics that truly immersive theatre productions have. Even though these characteristics are exemplified in artworks of a particular time and place, namely, contemporary Western world of theatre, these characteristics are there not as a matter of mere contingency: these are the features that are conducive to bringing about a psychological state of immersion as defined above.

I claim that immersive VR productions can benefit from looking at the successes and shortcomings of mixed-media and analogue immersive environments, particularly analogue immersive theatre. I also identify the experience of magic (that is, experiencing the performance of stage magicians and pseudo-spiritualist mediums) as an immersive experience, by showing the parallels between the experience of magic and contemporary immersive experiences. I argue that the designers of immersive environments have a lot to learn from magic tricks and the science of magic, in areas such as guiding the attention of the audience, building a captivating atmosphere, instilling feelings of uncertainty and curiosity, providing an illusion of agency and conjuring a sense of impossibility.

METHODOLOGY
/ 1.2 /

The thesis relies on literature review, analysis of several immersive performances, Spectator-Participation-as-Research (SPaR), and participant observation. The literature review includes theoretical, historical, and empirical work. In terms of theoretical literature, I look into the work that has been produced concerning immersion and the related notions listed above, in order to pick out the useful ideas, definitions, comparisons and taxonomies that can help us progress towards the aim of the thesis; along with various design suggestions already available in the literature. I review the historical work on immersion, immersive art, and magic, in order to introduce the reader into the relevant fields and to show the parallels between magic shows and contemporary immersive art and entertainment in terms of their structure, mechanics, psychological effects and also their societal and technological background. I review some of the empirical work on magic to better illustrate the mechanics used in magic tricks, which I claim to be relevant for designing immersive performances, and I also briefly look at empirical work from video game studies.

The above-mentioned theoretical framework will be applied to several immersive productions that I will analyse. These are SIGNA's analogue theatre production *Das Heuvolk*, dotdot's mixed-reality production *SOMNAI*, and three

VR productions: *The Tempest* by Tender Claws, *Finding Pandora X* by Double Eye Studio, and *Welcome to Respite!* by CoAct Productions and Ferryman Collective; all of which I have personally participated in as an audience member. As some of the analysis is based on my experience as a participant, that is, on the observation of the effects that the immersive environment had on me as a participant, the methodology is in line with the Spectator–Participation–as–Research (SPaR) approach. (For examples to SPaR approach, see Babbage 2016; Machon 2016a; Alston 2016a). However, I also conducted an audience survey with participants at several performances of a production by *Das Heuvolk*, to measure the specific effects of immersion on the participants and to find out their motivations for attending the performance. Through these analyses and both the third–personal and first–personal data, I identify the elements of immersion used in these productions, the strategies they relied on to establish these elements, and their shortcomings, to provide further suggestions for the design of immersive environments with the help of the above–mentioned theoretical framework that heavily relies on the comparison between immersion and magic.

Empirical research "have much to offer to our understanding of audience engagement in a range of settings, the position of an audience member who approaches immersive theatre 'from the inside' as an opinionated theorist can still be – and perhaps ought to be – harnessed as a critical position, even if it is not an objective position (which would seem a difficult ambition to achieve)." (Alston 2016a, 26)

As mentioned above, the research carried out for this thesis is highly interdisciplinary, involving theatre studies, VR studies, video game studies, interactive digital narratives, history, sociology, and the science of magic. Even though there isn't yet a well–established field of inquiry that calls itself "immersion studies", this thesis constitutes an example for the kind of research that is pointing towards that direction.

OUTLINE OF THE DISSERTATION / 1.3 /

In the second chapter, I discuss various definitions of immersion found in the literature along with various related notions such as presence, sense of embodiment, liminality, framing, transportation and sense of impossibility, and I offer my definition of immersion which I find the most suitable to study the

phenomena, and which I will rely on for the rest of the thesis: a sense of being bodily present in an impossible world or situation brought on by the impression of a liminal transportation.

The third chapter deals with interactivity and agency, central concepts for understanding and designing immersive environments, offering an overview of these two concepts,, distinguishing various types of agency, and discussing the importance of uncertainty for bringing about agentive and interactive behaviour.

In the fourth chapter I present the historical, technological, and societal background of magic shows and spiritualistic séances, and draw the distinctions between the particularly in terms of how they are framed by their performers. I draw parallels between them and contemporary immersive productions, arguing that experiencing magic is an immersive experience. I discuss various onboarding and atmosphere–building strategies of these performers and present some mechanics behind their tricks that guide the audience's attention and give them a false sense of agency. Drawing on all these, I offer design suggestions for contemporary immersive experiences.

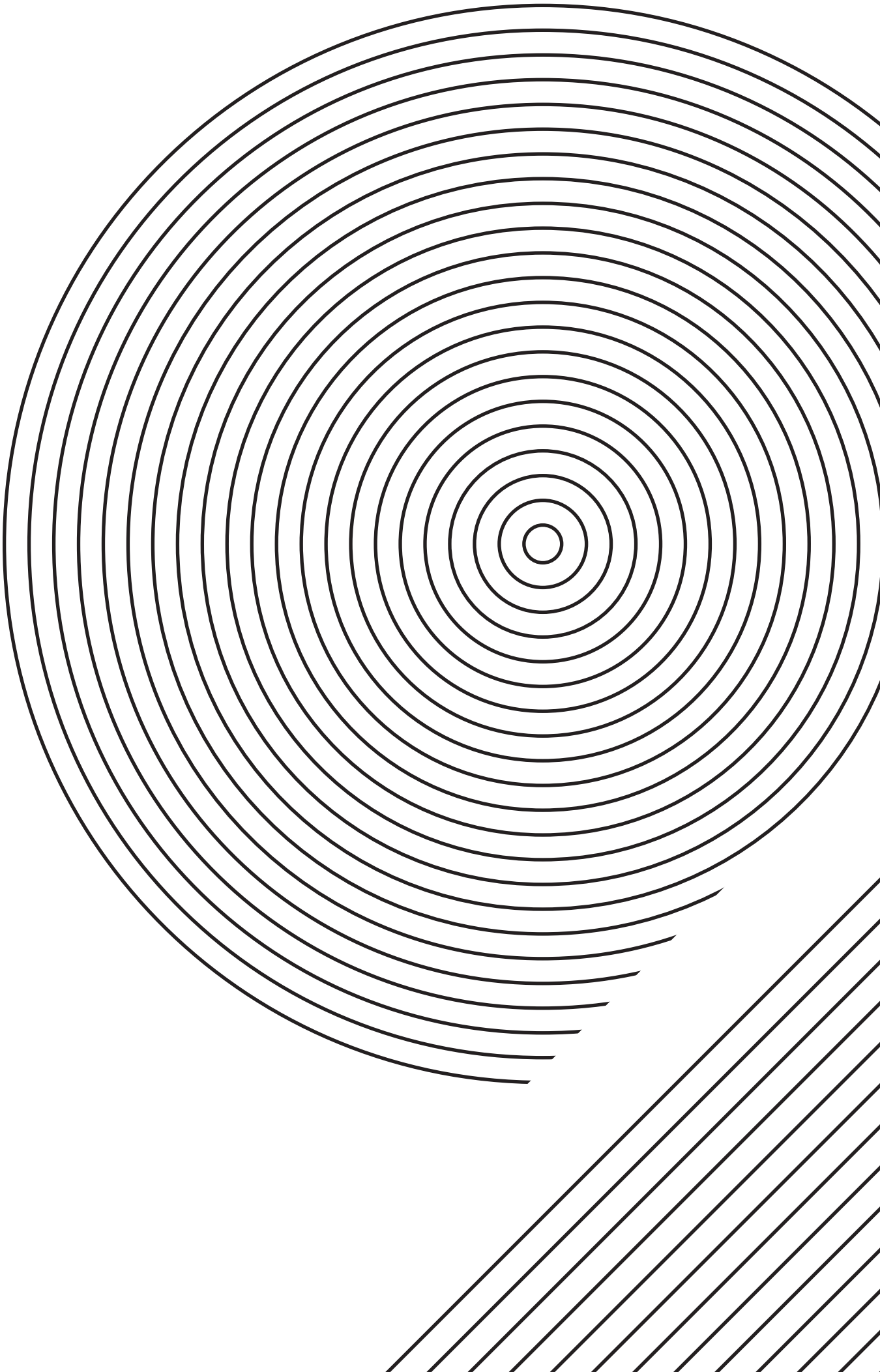
The fifth chapter delves into immersive theatre, presenting its defining characteristics, history, similarities and differences with other forms of art and entertainment such as traditional theatre, installation and video games, and some of its elements such as worldbuilding, onboarding, atmospheres, and audience participation. I argue that paradigmatic forms of immersive theatre do satisfy an 8–point criteria for immersivity due to their distinct characteristics and qualify as a separate genre.

In the sixth section, I describe and analyse the analogue immersive production *Das Heuvolk* by SIGNA, a production which, as I argue, satisfies the criteria for immersivity. Along with my experiences as a participant, I present the survey I conducted with the attendees of the performance, in order to better point out how immersion manifests itself in an immersive. I also look into some of the game elements, horror elements, and spatial features found in the performance.

The seventh section shifts the focus from analogue to mixed–media, presenting a discussion of *SOMNAI* by dotdot, a production based on the theme of lucid dreaming; which is preceded by a review of some of the previous literature on theatrical performances that rely on VR. The performance provides a useful context particularly to discuss trajectories, interfaces and intermediality and how they relate to immersion, as the participant's experience is defined by transitions between realities and media, which create both challenges and opportunities for designing immersive experiences.

The eight section continues with analyses of three theatrical VR productions (*The Tempest* by Tender Claws, *Finding Pandora X* by Double Eye Studio, and *Welcome to Respite!*) The section revisits the issue of the parallels between magic and immersion, this time with a focus on VR, and concludes with suggestions for designing more immersive VR productions with lessons from magic, with a focus on how magicians sustain the sense of impossibility and wonder.

In the concluding chapter I offer directions for further research, reflecting on some areas of inquiry that are not covered in this thesis, and briefly discussing immersion–related ethical issues that lie ahead, which are highly relevant for immersive productions but which fall out of the scope of this thesis. I end with a summary of the main strategies for designing immersive experiences.



// PART I //

// CENTRAL CONCEPTS //

IMMERSION / 2 /

The word immersion originates from the Latin 'immersum', which means being driven into or under something in a passive mode. Immersion became a widespread concept in psychology, cognitive skill development, and language learning (encountered via the term "language immersion"), but in spite of the availability of all these definitions, there is still no overarching definition applied to the term. Consequently, as a basis for further discussion, I introduce the below working definition of immersion which accommodates many facets and possible interpretations of the phenomenon.

Immersion is a psychological state (often enabled by a system which is designed to enable this psychological state) where the subject is separated from everyday reality and is perceptually, cognitively and emotionally fully involved in a make–believe world. Every immersive experience needs an entry point or a 'threshold' (a concept proposed by Murray (1997, 102) to which we will return later), which is made possible by the effect that the narration or the medium have on our perception, attention and emotions, to enable a transition into the immersive experience.

Lately, the concept of 'immersion' has become a buzzword, often used to describe productions and services without proper justification, and there is even the concept of "post–immersion". According to the authors of *The Post–Immersive Manifesto* (Ramos et al. 2020, 12), the main characteristic of post–immersive performance is not the 'escaping' or 'forgetting' of where or when one is, but "rather 'a remembering' of who one is relative to the experience taking place and the others experiencing it with you."

In this chapter, I will outline how the history of the concept of immersion developed and got more widespread in various fields. I will discuss immersive experience and define it in relation to various taxonomies and interpretations of immersion, reviewing varieties of immersion such as narrative immersion, perceptual immersion, and immersivity of a system, and I will also discuss related concepts such as illusion, engagement, and participation. Making these distinctions can help us develop better methods for analysing immersive experiences. This is important as there is no uniform understanding of the characteristics of an immersive experience. I will argue that for certain types of immersive experiences – those created with the help of technological devices (e.g., HMDs, technologically modified space) – the sense of embodiment is crucial for the participant to feel presence. After a detailed discussion of the importance of presence, I will provide a media–specific interpretation

of immersive spaces, and I will show the importance of liminality for the onboarding procedures of immersive experiences, which will be important in my analysis of specific artistic immersive experiences in the productions that I will analyse later in Chapters 6, 7 and 8. I will also introduce Erving Goffman's framing theory (Goffman 1986), which will be useful in analysing how the sense of embodiment lets the audience experience immersion, and I will discuss the notion of the 'impossible' which can help us understand types of immersion that are related to the sense of wonder.

IMMERSION: THE ORIGINS OF THE CONCEPT, ITS HISTORY IN ART, AND ITS RELATION TO ILLUSION / 2.1 /

In English language, the term "immersion" in relation to digitally mediated experiences first appeared in the 1960s. According to Robin Curtis, the term 'immersion' was mentioned in an aerospace research project that was using virtual reality for a more immersive experience (Curtis 2008, 90). In this case, the medium of VR was used to enhance the illusion of being in space and to facilitate a certain degree of perceptual immersion. Since the 1990s, the development of the fields of cognitive and transmedial narratology within humanities (see Herman 2008 and Ryan 2005 respectively), resulted in a bigger research interest in the concept of immersion, and with further development of VR technology and especially of VR headsets, users began to have higher expectations of immersion (although higher fidelity does not necessarily promise a higher level of immersion) from these experiences. Not everyone has experience with earlier forms of VR, but the way these technologies are advertised, coupled with the fact that many people are accustomed to high fidelity via other technologies (e.g. televisions, smart phones, computers) create these expectations that do not necessarily match what the VR technology can currently offer. The users presumed that they would have a strong sense of illusion when 'entering' the new environment (when, for instance, putting on the headset). As illusion is an important aspect of my proposed definition of immersive experience, I will thoroughly present Oliver Grau's take on virtual art that encompasses both the terms of illusion and immersion.

In his book *Virtual Art: From Illusion to Immersion* (2003), Grau explains how the pursuit for immersion can be traced back throughout the history of art. He describes in detail the transition of what he deems "illusionistic art" into the immersive form. According to Grau, artworks that have the primary goal of tricking the viewer into an illusionistic experience are relatively rare in art history, however, there have always been artistic attempts to create experiential art with the aim to 'transport' the viewers to a space and/or time other than the viewer's actual situation. (Grau 2003, 45)

Grau's aim in his book is to discuss the status of the image in virtual reality, and by mapping the complex tradition of the concept of an image, he aims to sketch the "almost revolutionary character that is emerging through the potential of interaction with and evolution of images." (Grau 2003, 11). According to him, virtual images in virtual realities expand real space into illusion space with the intention to create an illusion for the observer. Regarding the concept of virtual reality, Grau also applies the terms "possibility" and "impossibility", and states that possibility and impossibility are "formed by illusionary addresses to the senses" (Grau 2003, 15).

Grau defines virtuality "as an essential relationship of humans to images" and demonstrates "how this relationship is evidenced in both old and new media of illusion". (Grau 2003, xi) In his view, the technological convergence of (both old and new) media and image is due to our desire for illusion. According to Grau, virtuality is both a physical phenomenon and a psychological–perceptual phenomenon, which is manifested as a sensorial experience in the observer, and immersion is a complex phenomenon that involves what he calls "totalization":

"Immersion arises when artwork and technologically advanced apparatus, message and medium, are perceived to merge inseparably. In this moment of calculated "totalization", the artwork is extinguished as an autonomously perceived aesthetic object for a limited period of time. Then conscious illusion, as in the weaker form of trompe l'oeil, can shift right around for a few moments into unconscious illusion. [...] a constant characteristic of the principle of immersion is to conceal the appearance of the actual illusion medium by keeping it beneath the perceptive threshold of the observer to maximize the intensity of the messages that are being conveyed. The medium becomes invisible." (Grau 2003, 339)

Grau attempts to demonstrate how "new virtual art fits into the art history of illusion and immersion" (Grau 2003, 4) and that the main purpose of immersion is "to conceal the appearance of the actual illusion medium by keeping it beneath the perceptive threshold of the observer to maximize the intensity of the messages that are being conveyed". The immersion

reaches its maximal level when the medium itself becomes invisible.
(Grau 2003, 340)

In order to prove his point historically, Grau looks at image spaces of illusion: although the historical examples are not comparable to the illusions of the current technological developments, he states that in each epoch there were serious experiments conducted in order to maximize the sense of illusion. In the traditional medium of painting, the panorama itself was the first 'space' that offered a strong sense of illusion (similarly to the art technique of the Renaissance era trompe l'oeil that depicted objects in three dimensions). The panorama was the first to reach the level where immersion and illusion reached the peak point: here the personal subjective artistic expression is left behind due to the primacy of illusionism and immersion, otherwise the panorama would not have achieved its aim. (Grau 2003, 119) He concludes that virtual reality is not a new phenomenon, but it existed since creators of artefacts started to install an observer in a hermetically closed–off image space of illusion, a long time before the invention of VR headsets.

Some authors consider immersion to be a main characteristic of the moving image (e.g. Curtis 2008), which implies that early cinemagoers could also experience immersion. Zielinski describes the structure of cinema thus:

"[I]ts own, darkened room, where the spectators, like Plato's cavedwellers, are virtually held captive between the screen and the projection room, chained to their cinema seats, positioned between the large–size rectangle on which the fleeting illusions of motion appear and the devices that produce the images of darkness and light. Cinema as an environment for the enjoyment of art, for immersion in traumatic experiences, for hallucination, for irritation of real experience; and, what is more, with films constructed in deliberate opposition to the experiences of those who pay to enter the dark womb and be at the mercy of the play of light and sounds." (Zielinski 1999, 92)

Already by the time of early cinema, it is possible to talk about a multisensorial staged experience that offered a special entertainment for the viewers. 'Cinema of attraction', a term coined by Tom Gunning (1986), is a useful term to adopt in the context of immersion's relation to film. Gunning defines cinema of attraction as an artform that "solicits a highly conscious awareness of the film image engaging the viewer's curiosity." (Gunning 2009, 743) Rebecca Rouse (2016) further developed this concept and applied it to new media under the term 'media of attraction'. The concept offers a framing for interactive works created by using virtual reality or augmented reality techniques. The qualities that such productions have are the following: being participatory, interdisci plinary, unassimilated (i.e. not yet institutionalized) and "seamed." (Rouse 2016, 100) Rouse explains the property of being "seamed" as following:

"[...] because of [the] rich multiplicity of design approaches and structures exhibited by media of attraction, these media are not 'seamless' as technology industry rhetoric might have us believe. Instead, the media of attraction are decidedly seamed. Edges show between parts of a media of attraction experience, and the patchwork of ways in which multiple forms of representation come together are not hidden from spectators". (Rouse 2016, 101) Being seamed can therefore be understood as a characteristic of an old medium when it transforms into a new one, but with the help of other media.

This 'seamed' character is also a symptom of VR–productions at an early development phase. We can expand these points to immersive theatre, both in analogue and mixed–reality environments. Even though it has its roots in the tradition of performing arts, it is nevertheless a genre under construction, and, just like VR, it has yet to develop a seamless character. As I will discuss later in Chapter 7, there is a complicated relationship between the immersivity and the seamed/seamless character of interfaces. Moreover, there is a relation between illusion and seamlessness: just as a magician is trying to conceal the mechanisms of her magic tricks, immersive environment creators also try to hide the seams of their interfaces.

When discussing the relationship of old and new medium in relation to illusion, Grau states that:

"When a new medium of illusion is introduced, it opens a gap between the power of the image's effect and conscious/reflected distancing in the observer. This gap narrows again with increasing exposure and there is a reversion to conscious appraisal. Habituation chips away at the illusion, and soon it no longer has the power to captivate. It becomes stale, and the audience are hardened to its attempts at illusion. At this stage, the observers are receptive to content and artistic media competence, until finally a new medium with even greater appeal to the senses and greater suggestive power comes along and casts a spell of illusion over the audience again. This process, where media of illusion and the ability to distance oneself from them compete, has been played out time and again in the history of European art since the end of the Middle Ages." (Grau 2003, 152) One might argue that old technologies of illusion (such as trompe l'oleil) still work at the perceptual level despite the habituation, but nevertheless, habituation makes them lose their effect of novelty and surprise, and consequently their captivating character.

This cycle helps maintain the experiencer's expectation that her desires for stronger illusion will be fulfilled by the next medium. As we will see soon in a discussion about Janet Murray's concept 'Active Creation of Belief', artists are not alone in their attempts at tricking us: we are actively seeking to be tricked. But illusion has also had negative connotations throughout history.

Murray makes a historical observation about how each new medium was perceived in its times as initially illusionistic and therefore dangerous: "Part of the early work in any medium is the exploration of the border between the representational world and the actual world. It is commonplace in the twentieth century to point to elaborate simulations of reality (electronic and otherwise) as a new and dangerous thing, a distancing of human beings from direct experience." (Murray 2016, 106) This is similar to how Grau problematizes the characteristic of virtual art that has the potential to blur the borders between what is real and what is an illusion. This transgressional characteristic is further discussed by Griffiths. In her definition, immersion is "the sensation of entering a space that immediately identifies itself as somehow separate from the world and that eschews conventional modes of spectatorship in favour of a more bodily participation in the experience, including allowing the spectator to move freely around the viewing space (although this is not a requirement)." (Griffiths 2008, 10). She offers an even wider media archaeological interpretation of the medium and describes its development from cathedrals, through panoramas, planetariums and also IMAX movies.

In the following section, I will describe in detail various interpretations of the concept of immersion.

TOWARDS A TAXONOMY OF IMMERSION / 2.2 /

There are numerous definitions of immersion, and many owe their existence to video game studies and the hype around the recent incarnation of the medium of VR. The proliferation of these definitions is due to the variety of the disciplines which engaged with the topic during the last three decades. Also, opportunities where creators, researchers and participants could encounter the so-called "immersive experiences" became very widespread in venues such as museums, film festivals, new technology events and lately even on online social platforms such as VRChat, AltSpace and Mozilla Hubs.

Two main directions can be identified in the way immersion is defined in the literature: immersion as (1) technology/objective property and (2) immersion as subjective experience (e.g. see Craig and Sherman, 2018). This perspective is put forward by Marie–Laure Ryan in *Narrative as Virtual Reality 2*, where she states that immersion can be understood "from both a technological and a phenomenological point of view" (Ryan 2015, 9). However, these binary distinctions are insufficient to understand immersion in VR. For example, in video games studies, immersion is used to describe various levels of attention and engagement (Brown and Cairns, 2004) or presence in virtual environments (Slater 2003). Based on their systematic literature review, Nilsson et al. suggest a new typology for the concept, which consists of the following: "(a) immersion as a property of the system, (b) immersion as a response to an unfolding narrative, the diegetic space, or virtual characters, and (c) immersion as a response to challenges demanding use of one's intellect or sensorimotor skills" (Nilsson et al. 2016), and in the following I will rely on this categorization to offer a framework to understand the layers of the concept of immersion.

Immersion as Technology or Experience of Technological Device / 2.2.1 /

In his 2003, Slater provides the following definition of immersion: "Let's reserve the term 'immersion' to stand simply for what the technology delivers from an objective point of view. The more that a system delivers displays (in all sensory modalities) and tracking that preserves fidelity in relation to their equivalent real-world sensory modalities, the more that it is 'immersive'."(Slater 2003, para. 1) Slater also defines immersion elsewhere as "an objective property of a system, and higher or lower immersion as the extent to which a VR system can support natural sensorimotor contingencies for perception (O'Regan and Noe 2001) including the response to a perceptual action", adding that "aspects such as display resolution and stereo are intrinsically connected to perception." (2009, 431) Other things being equal, a system that augments all sense modalities is capable of offering a higher sense of immersion, compared to the cases where a subject can merely see 180 or 360 degrees with the help of a medium but cannot interact with the environment. Based on this type of system qualification, researchers can create taxonomies regarding how various systems (that offer a sense of immersion with the help of their technological qualities) can correspond to different levels of "the illusion of being in the virtual world (the place illusion component of presence), and the extent to

which people respond as if events in the virtual world were really happening." (Slater 2018, 432) However, while he focuses on illusion, it should be noted that Slater challenges the use of the word "belief" in the context of virtual worlds, claiming that it is impossible that people would believe that a "virtual world [is] the real thing." (ibid., 432)

McMahan distinguishes two types of immersion: perceptual and psychological (McMahan 2003, 77). Perceptual immersion can be defined as "the degree to which a virtual environment submerges the perceptual system of the user" (Biocca and Delaney 1995, 57) and is "accomplished by blocking as many of the senses as possible to the outside world and making it possible for the user to perceive only the artificial world, by the use of goggles, headphones, gloves, and so on" (McMahan 2003, 77) and by the system's responding to user actions in a naturalistic way (e.g. if the user looks to a certain direction, the visual field updates accordingly; ibid., 79) In this context, immersion is thus understood as a technical property of the system: an immersive system is a system that is able to provide natural sensorimotor contingencies to users (Slater and Sánchez–Vives, 2016). Hence, in this research tradition, immersion is usually considered as an objective property of virtual environments (Skarbez, Brooks, and Whitton 2017, 96:3), while other terms (e.g. *presence*, see below) are reserved to describe the subjective counterparts of the immersive experience.

Immersion as Perceptual Response to the System / 2.2.2 /

Immersion that is manifested in the perceptual response to the system can be defined as a psychological state in which the experiencer perceives "oneself to be enveloped by, included in, and interacting with an environment that provides a continuous stream of stimuli and experiences." (Witmer and Singer 1998, 227) These all mean that transportation requires an extensive mental process that requires total presence from the experiencer. In their previously mentioned literature review, Nilsson et. al. state that this type of experience is influenced by the following factors: "(a) the extent to which the user is isolated from the external physical environment, (b) the sense of self–inclusion within the mediated environment, and (c) egocentric motion perception and the ability to interact naturally with the environment." (Nilsson 2016, 112) The last factor has parallels with Ermi and Mäyrä's concept of sensory immersion (2005) that they deploy when discussing video games. Digital games have evolved into audiovisually impressive, three–dimensional and stereophonic worlds that surround their players in a very comprehensive manner. Even though

technology is not the only factor in immersion, large screens close to the player's face and powerful sounds easily overpower the sensory information coming from the real world, and the player becomes entirely focused on the game world and its stimuli. (Ermi and Mäyrä 2005, 43)

Immersion as a Response to Narratives / 2.2.3 /

An early occurrence of the term "narrative immersion" is found in Brooks (2003), and the concept is further developed by Adam and Rollings (2006). The term refers to the state of feeling oneself as being inside the story and "accepting the world and events of the story as real" (Adams and Rollings 2006, 30); though we will soon see that there are finer grained ways to talk about this cognitive attitude compared to the potentially misleading expression of "accepting as real". Narrative immersion was also defined as "[the] user's mental absorption in the [story] world" (McMahan 2003, 77). It is a state when the user feels emotionally aroused and absorbed. Mental absorption "does not necessarily allow users to feel the 'bodily presence' into the scene, but allows them to be cognitively identified and emotionally empathized with one of the characters of the story." (Zhang, Perkis, and Arndt, 2017) They conclude that this type of immersion is an emotional immersion which is more engaging than spatial immersion (ibid., 2). Ryan, after defining the concept of 'recentering' in the context of immersion, also states that "textual worlds" are the foundation of a poetics of immersion (2000, 103), and the building blocks of understanding the concept of immersion related to the textual medium should be constructed from the following fields: "cognitive psychology (the metaphors of transportation and being 'lost in a book'), analytical philosophy (possible worlds), phenomenology (make–believe), and psychology again (mental simulation)." Ryan also mentions that reading may give rise to narrative immersion, but she does not reserve the term only for non–participatory media. She also identifies three subcategories within narrative immersion, namely, temporal, spatial and emotional categories.

Busselle and Bilandzic (2009) propose the concept of narrative engagement, which is closely related to the concept of transportation discussed previously. They emphasize the process of recreating mental models of the story events as the basis for narrative engagement, and describe it as composed of four dimensions: narrative understanding, attentional focus, emotional engagement, and narrative presence. (Busselle and Bilandzic 2009, 343) Identifying these four different dimensions of narrative engagement

can be helpful in studying immersion, since they allow for a more nuanced analysis of how specific aspects of a narrative affect each of those factors.

Alternative terms in the vicinity of narrative immersion are "imaginative immersion" by Ermi and Mäyrä (2005), which Arsenault modified into the notion of "fictional immersion", arguing that immersion does not need to be dependent on the imagination of the experiencer (2005).

Immersion as a Response to Challenges Within the Virtual World That Demands Skills / 2.2.4 /

This type of immersion is applied generally to video games or to the challenges of VR. McMahan, while describing immersion on the non–diegetic level, discusses the player's devotion for the game and for the strategy (McMahan 2003, 68). Ermi and Mäyrä provide a similar description, stating that "challange–based immersion" provides a "satisfying balance of challenges and abilities" (Ermi and Mäyrä 2005, 43).

Immersion in video games is also discussed by Thon, who states that immersion "result[s] from a shift of attention to and the construction of situation models of certain parts of the game. The shift of attention is mainly goal–directed (i.e. endogenous), but certain properties of a computer game, such as objects that move suddenly, may also lead to a shift of attention that is at least partly stimulus–directed (i.e. exogenous)" (Thon 2008, 33). He later introduces the concept of multidimensional model of immersion, which consists of the spatial, ludic, narrative and social types of immersion, corresponding to four levels of computer game structure. This is related to the state of flow as defined by Csíkszentmihályi: "the holistic sensation present when we act with total involvement" (Nakamura and Csikszentmihályi 2014, 136) that need deep concentration and can result in "a loss of self–consciousness", leading to a sense of immersion (Nakamura and Csikszentmihályi 2014, 216).

Another term for the kind of immersion that emerges as a response to challenges is 'ludic immersion' – which is a bridge between the concept of immersion and interactivity. Thon describes ludic immersion as "a shift of the player's attention to the interaction with the game and [...] the possibilities for action within it" (Thon 2008, 36). The immersion that game mechanics can create is a "deep absorption in the performance of a task." (Ryan 2015, 246)

In this thesis, I will be operating with a conception of immersion that encompasses immersion both as a property of the system and as the perceptual answer to it. The users' experience of the presence depends on their bodies' sensorimotor response to the virtual environment, while the environment exists due to the properties of the virtual reality system.
All these merge into one illusory experience.

The Notion of Immersion in Relation to Interactive Digital Narratives

In the frame of the interdisciplinary field of interactive digital narratives (IDNs), we can find various frameworks that can help us situate the term immersion. In Janet Murray's framework, the digital medium is defined by four foundational characteristics: procedural, participatory, spatial and encyclopaedic. Murray understands interactivity as the product of the first two affordances. In concert with spatial exploration and encyclopaedic depth of the presented material, these characteristics enable the interactive digital narrative artefacts to reflect a certain level of complexity, but in order to do so, a given IDN needs to enable the aesthetic, phenomenological qualities of immersion, agency and transformation (Murray 1997, 92).

Murray lists eight features of productions that contribute to immersion:

1 / entering an enchanted place,
2 / liminal objects,
3 / finding borders between artefact and reality,
4 / structuring participation as visit,
5 / the Active Creation of Belief,
6 / structuring participation with a mask,
7 / structuring collective participation with roles, and
8 / regulating arousal.

Computers can be considered as an interface for 1 / 'entering an enchanted place' (and entering an interactive digital narrative can also be so considered, as these are interfaces into a world that is not governed by everyday social and physical rules), and for their transitional nature, computers and narratives can also be considered as 2 / liminal objects. Building on Turner's work on liminality (Turner 1996), Murray defines liminality as a mythopoetic experience "in which an object, a ritual, or a story occurs somewhere between the world of ordinary experience and the world of the sacred" (Murray 1997, 282). Besides the importance of the act of entering the magical place (by various

means), it is also crucial for the participant to find 3 / the borders of artefact and reality, where one ends and the other one begins. The participant should also be given a role; Murray frames this as 'scripting the interactor', and she argues that 4 / "the visit metaphor is particularly appropriate for establishing a border between the virtual world and ordinary life" (Murray 2016, 107). This way the participant can draw a clear line between the production's reality and the everyday reality. Murray also draws our attention to the relationship between agency and immersion, stating that 5 / "When we are immersed in a consistent environment we are motivated to initiate actions that lead to the feeling of agency, which in turn deepens our sense of immersion. This phenomenon can be thought of as the Active Creation of Belief." (Murray 2016, 93) 'Active Creation of Belief' is a concept coined by Murray in response to Coleridge's concept of suspension of disbelief. According to Murray, the make–believe involved in experiencing a world of narrative is not passive; we desire to believe in the storyworld and we interact with this world to believe in it further. Murray suggests that in digital environments this can also be enabled by objects that respond to our virtual acts (e.g. the buttons on a phone where one can call someone in–game): "Our successful engagement with these enticing objects makes for a little feedback loop that urges us on to more engagement, which leads to more belief." (Murray 2016, 111). Murray also suggests that 6 / participation with a mask can enhance immersion (however, it seems that her suggestion may not work at every case, as I will argue in Chapter 5.) 7 / Collective participation can be enabled if the participants receive various roles, and in this regard, LARP (Live Action Role Playing) offers a wealth of established design principles. (Murray 2017, 116) Murray points out that 8 / the level of arousal should also be regulated, for instance by designing the participants' trajectory in a certain way. Traditional narratives have their own conventions regarding how to do this, but interactive works can use, for example, the 'fade–out technique' (Murray 2016, 119). Even though the conventions of interactive digital narratives are still not yet institutionalized, we are getting closer to learning how immersion can be enhanced through magic and enchantment (Murray 2016, 122). Murray's properties represent a helpful list of mechanisms that can help creators design trajectories in an immersive environment, and I will be relying on some of these properties throughout this thesis.

A recent white paper published by the researchers of the COST Action INDCOR (Interactive Digital Narratives for Complexity Representations) offers a shared vocabulary and taxonomy for the characteristics and properties of interactive digital narratives (Koenitz et al. 2020). The taxonomy is based on Hartmut Koenitz' SPP model (2010, 2015, 2021) and incorporates Murray's aesthetic categories of immersion, agency and transformation, both as a design goal during the authoring process and as part of the experience of the participant. I will, similarly, consider immersion as relating to the aesthetic experience of the participant.

THE SENSE OF EMBODIMENT OR HOW TO BE PRESENT / 2.3 /

Researchers in the field of immersive virtual environments have paid particular attention to aspects of immersion that are related to perception, and the most widely used concept in this regard is the concept of presence. Presence is a controversial concept, and many definitions of it have been proposed (cf. Skarbez, Brooks, and Whitton, 2017), but in general it is understood as the perceptual illusion of *being there* inside a virtual environment:

"The whole point of presence is that it is the illusion of being there, notwithstanding that you know for sure that you are not. It is a perceptual but not a cognitive illusion, where the perceptual system, for example, identifies a threat (the precipice) and the brain–body system automatically and rapidly reacts (this is the safe thing to do), while the cognitive system relatively slowly catches up and concludes 'But I know that this isn't real'. But by then it is too late, the reactions have already occurred. This is the real power of VR, and, like any illusion, even though you know it is an illusion, this does not change your perception or your response to it." (Slater 2018, 433)

The concept of presence is constituted by several aspects that have been conceptualized differently across authors. Spatial presence, (which is sometimes called "telepresence") or place illusion (Slater 2009), refers to the feeling of being physically placed within the virtual scene, while plausibility illusion (Slater 2009; Slater and Sánchez–Vives 2016) refers to the illusion that the events represented in the virtual environment are actually happening. The illusion of embodiment and the related concept of body ownership (Skarbez, Brooks, and Whitton 2017; Hartmann et al. 2020) refers to the impression in the users that the body of an avatar is their real body or part of it. The concept of social presence relates to the social dimension of presence, and refers to the sense of being together with another social (human or computer–controlled) entity in a virtual environment, usually involving impressions of mutual understanding, intimacy, or emotional connection (Oh, Bailenson and Welch 2018).

Many credit Marvin Minsky, a cognitive scientist and early artificial intelligence researcher, for coining the concept of telepresence. Even though he has not provided a strict definition of the concept, his following remark hints at the intended meaning of the term: "The biggest challenge to developing

telepresence is achieving that sense of 'being there.' Can telepresence be a true substitute for the real thing? Will we be able to couple our artificial devices naturally and comfortably to work together with the sensory mechanisms of human organisms?" (Minsky 1980) Thomas Sheridan (1992) develops on the term and defines 'telepresence' as experiencing a sense of being physically present during exposure to multisensory stimuli generated by a computer. As we can see, this definition relates to both interpretations of the term immersion, combining an understanding of immersion as, on the one hand, a property of a technological device and, on the other, as the participant's perceptual answer to the technological device. In 1995, David Schloerb integrated Sheridan's two concepts into a single concept of telepresence, stating that telepresence contains all the elements of teleoperation and virtual presence; "objective telepresence" occurs when one can complete a specific task in this environment, and "subjective telepresence" occurs when the user can perceive his or her environment. (Schloerb 1995, 64) It has been suggested that the illusion of presence emerges in the user as a consequence of the immersive properties of the technology, such as a good tracking of user actions, a wide field of view, or stereoscopy (Cummings and Bailenson 2016).

For the purposes of this thesis, I will be particularly paying attention to the illusion of embodiment. Kilteni et al. (2012) provide an analysis of the conditions that are needed to feel with the body of the other in a suddenly changed environment, and based on their analysis, it is possible to point out several requirements for VR and other immersive environments to support a sense of embodiment. The sense of self-representation required for the sense of embodiment is characterized by:

1/ The Sense of Self-Location, defined as one's spatial experience of being inside a body and which involves "the relationship between one's self and one's body", while presence is "the relationship between one's self and the environment"; (Kilteni et al. 2012, 375)

2/ The Sense of Agency, defined as the feeling of having "global motor control, including the subjective experience of action, control, intention, motor selection and the conscious experience of will" (Kilteni et al. 2012, 376);

3/ The Sense of Body Ownership, defined as the feeling of the body as being the source of the experienced sensation and one's self-attribution of a body (Kilteni et al. 2012, 377).

All these elements can be enhanced by using synchronous visuotactile correlations, "where the tactile event is seen visually on the body from the first-person perspective position of the eyes" (Kilteni et al. 2012, 383), with

haptic feedback or with individualized avatars that could strengthen the feeling of ownership.

There is a great number of empirical studies that deal with body illusions and illusions in virtual reality experiences. Liam Jarvis argues that "mounting evidence in body-ownership, the integration of body illusions as a mode of immersive 'spectatorship' and emergent/experimental technologized forms of cultural practice are modifying our perception of the world in radically new ways." (Jarvis 2019, 17). Immersive VR environments enable the illusion of transporting the experiencing subject into another environment, if the system offers a high-level immersion state. Writing at a time of lesser developed VR technology, Bowman already states about VR that it engages and entertains the user "by producing an experience that's usually impossible to achieve in the real world." (Bowman and McMahan 2017, 42). In the case of interactive VR experiences that I will focus on in this thesis, this transportation is experienced by the user as an almost impossible event due to its illusionistic character (as I will talk about more towards the end of this chapter), and after the experiencer gets used to this sudden change, she can find her body in a responsive immersive environment. In this process the experiencer's body is rendered into a new environment, but this is done while the user's sense of embodiment is maintained, which assures her that one can still have agency in this environment. Jarvis explains this type of embodiment as a perceptual embodiment where the fulfilment of "the immersive desire [is] to *feel with the body of the other*". (Jarvis 2019, 104)

The three characteristics of the sense of embodiment listed above are applicable for 1 / virtual reality experienced via head-mounted displays, 2 / mixed-reality, and also 3 / analogue environments, but should be interpreted somewhat differently in each case.

1 / In the case of VR productions where the experiences that are enabled via HMDs, the experience offers a technologically pre-designed sense of presence, meaning that the rendering of the images follows the body movements of the user and these images provide immediate feedback if the participant interacts with her virtual environment. The third characteristic, the sense of body ownership, in this case means that the users identify themselves with the avatar image that is synchronized to a certain degree with their real bodily movements.

2 / In mixed-reality environments or totally analogue environments, these properties are still highly relevant but should be re-interpreted. In the case of mixed-reality performances where VR and/or AR productions are blurred with the analogue space, the sense of self location should be connected to the physical space in order to enable the participants to experience the sense of embodiment. While the virtual experiences might be embedded in a mixed-reality performance

(like in the case of *SOMNAI*), the participant can nevertheless orient herself only by locating her position in the physical space. On the other hand, the designated spaces in this environment where virtual or augmented reality spaces manifest can be considered as portals to another reality, that is, a magical entry point. The sense of agency might be limited in these cases, but the agency, when encountering such experiences, can be analysed as the ability of the participant to switch between the digital and the analogue environment. The sense of body ownership is manifested in a different way than in the case of VR: as the digital and analogue environments have a different effect on the experiencer, the perceptual system of the experiencer is carrying out an active sense-making procedure, by which the proprioceptive senses of the participants can merge the two types of experience and become much more sensitive, which also raises the experiencer's sense of body awareness.

3 / In the case of analogue performances (like in the case of SIGNA), the sense of self-location can be interpreted as such: the experiencer should localize her body in relation to the overall space (of the immersive production). The audience members should be able to construct a certain type of mental map: this mental map can later be "re-written" or "re-interpreted" depending on how the participant's perception confirms or gets confused by the initial mental map. The sense of agency in these spaces means that the audience members not only have the "possibility" to move around, but also have a certain agency on the narrative and they are in control of what experiences they want to gather throughout the production (also see Alston 2013). As for the sense of body ownership: in digital cases, a heightened level of immersion is established if the system is designed in such a way that enables the participant to identify oneself with the virtual body, which is obviously not a requirement for analogue cases, as we (in non-pathological cases) identify ourselves with our physical body. However, a heightened level of the awareness of one's own body can be brought on by all the sensorial aspects of the analogue immersive space that can have an effect on the body.

> It is important that the designers of analogue and digital environments pay special attention to the sense of embodiment: in VR they can create immersive and responsive productions that provide the full illusion of being embodied and present with the body in experience. In analogue experiences (such as immersive theatre), it is important to experiment with the participant's body in order to 'manipulate it' as a reflexive surface that raises the level of arousal of the participant. In SIGNA's *Das Heuvolk* performance, the audience has to be offered something that is not common in our everyday reality: after spending 5 hours with the performers, the audience members could convert if they felt that they would like to try out the life in the cult. For this they had to get naked in a church, had to put on a white textile, and received many touches, hugs and went through other situations of bodily proximity to the performers, raising their level of adrenalin. They had a direct bodily experience of converting into a cult.

PARTICIPATION AND ENGAGEMENT IN ANALOGUE AND DIGITAL IMMERSIVE SPACES / 2.4 /

When discussing ludic immersion, we have seen that interactivity can be interpreted as absorbing and pleasurable, and it can help immerse a reader–player into the analogue or digital storyworld. These storyworlds are manifested in various types of spaces, but their most important property is being engaging and participatory. However, how the engagement and participation play out depends on the medium.

While for some researchers (e.g. Murray 1997) immersion is a totally absorbing experience regardless of the medium, other approaches seem to be more medium–specific. There are studies that take up the ambitious aim of creating a medium–based taxonomy for immersion, like Freitag et al.'s *Immersivity: An Interdisciplinary Approach to Spaces of Immersion* (2020). Freitag et al. suggest that while immersion happens in a designated space in the case of some media such as immersive theatre and theme parks, in the case of films, moving images and screen–based immersive experiences the sense of immersion is manifested in the interweaving of the represented and perceived spaces. (Freitag et al. 2020) Freitag et al. introduce a media–specific approach for all productions that can have an immersive character, however, they fail in offering a detailed presentation of how the differing properties of different types of media can alter the sense of immersion offered. However, as they state, an interdisciplinary approach is necessary to clarify how immersion and immersivity can differ in the case of these media.

I distinguish two types of immersive spaces/environments: analogue and digital immersive spaces. In analogue spaces/environments the audience encounters physical closeness and at times awkwardly intimate situations with the performers; in digital spaces/environments, the audience (which has become an 'experiencer') 8 /, faces and engages with the 'magical' capacities of new technology tools (including with other participants and actors in the form of avatars), but this magic is framed by a rule system and these environments "not only require activity on the part of their recipients, but they also orchestrate, control, and channel the resulting actions" 9 / – and later we will see that the mechanics of some analogue environments are not so different in this regard. Analogue environments, however, still fare better when it comes

to possibilities for spontaneity. In digital environments there is a lack of spontaneity, as these systems cannot (yet) fully answer the expectations of the recipients regarding immersion.

How a space enables us to discover it is also an important factor for the sense of spatiality it offers us, and also for engagement and participation. Griffiths also considers the performative and somaesthetic possibilities that various immersive media spaces can offer. She finds physical movement a very important factor and considers TV and film experiences less immersive, except in the case of horror movies that can send shivers down the spine. In immersive spaces, the level of arousal can be raised by participatory characteristics. Even the encyclopaedic character of the immersive storyworlds has the potential to enable the sense of spatiality (Murray 2016, 79). According to her, "the great advantage of participatory environments in creating immersion is their capacity to elicit behaviour that endows the imaginary objects with life." (Murray 2016, 111) Grau similarly states that "the more intensely a participant is involved, interactively and emotionally, in a virtual reality, the less the computer–generated world appears as a construction: Rather, it is construed as personal experience." (Grau 2000, 200)

In Chapter 6, I will provide an example of analogue immersive spaces, a performance of SIGNA, where the audience is facing the picturesque and structural elements of horror combined with relatively intimate situations with the performers, accompanied by pre–designed (or guided) kinetics on the spectators' side.

IMMERSION AS AN EXPERIENCE OF IMPOSSIBILITY / 2.5 /

Sense of embodiment, engagement and participation are key features of all the immersive production types that I will discuss in this thesis. They are features that make the participant to acknowledge that she is now transported into a different state and went through a liminal experience, providing a sense to the experiencer that something impossible has just occurred. In this section, I will talk about this sense of impossibility.

We can begin with asking the question of how a participant identifies that she is in a space for simulation, in an immersive simulation that does not jeopardize the safety of the audience members while still creating a liminal experience where the participant will take part in the Active Creation of Belief. Erving Goffman's frame analysis can help us in this regard. Goffman pursues William James's question "Under what circumstances do we think things as real?", and his frame analysis deals with the issue of how experiences are defined and organized, attempting to explain how various actions are acknowledged as, for instance, a 'play' or as 'serious'. If we see two girls, one running from the other one, we see this event as an exercise. This framework is, as he calls it, primary, as it does not depend on a more fundamental interpretation and it can be transformed into further scenarios. If we look again, then we can see that one girl is chasing the other one. Here, the primary framework has changed into 'they are chasing each other'. Goffman calls this transformation 'keyings', and this can take various forms such as make–believe, practicing or demonstrating. As an addition to 'keying', another way to transform meaning of an action is 'fabrication', which is an 'intentional effort of one or more individuals to manage activity so that a party of one or more others will be induced to have a false belief about what it is going on'. (Goffman 1986, 83). A crucial element of keyings is that, unlike fabrications, there are no false beliefs involved and the viewers are aware of the transformation.

The concept of keying can help us understand the perceptual process taking place when entering an immersive world. We perceive something that happens to us as something impossible, and we wonder about this impossibility while we also feel it as very real – we are the subject of a liminal experience. Yet immersion does not involve fabrication, it does not fool us; rather, we explicitly key this transformation as voluntarily entering an illusory or fictional world with the aim of being immersed in it. Smith et al. state that impossibility's logical nature can be interpreted "as an unresolvable contradiction between a perception–supported belief about a situation and a memory–supported expectation". (Smith, Dignum, and Sonenberg 2016) They argue that the "condition of impossibility is constructed not simply through misperceptions and misattentions, but rather it is an outcome of a trick's whole structure of events." (ibid.)

When discussing the act of putting on the VR headset elsewhere, I have argued that "by the combination of the use of 'human interface' with the ritualistic situation of taking on the virtual reality headset, participants can be part of an initiation ceremony, a rite of passage." (Bakk 2019, 156) These rites of passage are characteristic to the situation of switching between worlds, between immersive environments. These switching constitutes the 'keying' in this case: it is not a real liminal experience, but represents a threshold. I will talk more about these procedures in Chapter 5 where I will be discussing onboarding.

In the very act of starting or finishing a VR-production or stepping into an analogue or mixed-reality immersive theatre experience, all the actions that are accompanying these acts can have a performative effect (this is why all these environments should have the potential to be interactive). The participants of a VR production here enter the "magic circle", to borrow a concept used in Live Action Role Playing (LARP) design practices referring to the participants' entering the storyworld of a LARP. Freitag et al. introduce the similar concept of a threshold into the analysis of the concept of immersive spaces, and they suggest that "[immersive spaces] constitute materially and socially constructed territories that are offset from the everyday world by a threshold and governed by a limited number of rigorous and easily discernible rules concerning their sensoriality." (Freitag et al. 2020, paragraph 15) We will see later how the magic circle and the threshold have a parallel in magic.

Griffiths also mentions that spectacles create engagement, similar to large-scale images and imagining technologies, and have three defining characteristics "that not only separate them from ordinary two-dimensional representational forms but also come to infuse their very ontologies." (Griffiths 2008, 285) These characteristics are remediation (co-opting existing tropes and ways of seeing, but also "resignify[ing] within stunningly new environments" (ibid.); reverence (which is the "revered gaze" (ibid.), the response of the audience to the recognition of labour and effort involved in creating the spectacle; and, most importantly for our purposes, fantasy. Griffiths does not precisely define this characteristic, but states that "the desire to be elsewhere without actually going elsewhere seems to be hardwired into the human psyche as the evidence of centuries both secular and profane culture suggests. Immersive technologies bring that fantasy a bit closer to our reality." (ibid., 286) Fantasy is an important factor that can influence how intensely we feel immersed in a space, and the intensity of the feeling of being in an impossible situation. I will further discuss the relation between impossibility and spatiality.

Felix Barrett, the creative director of Punchdrunk, states that "The effect(s) of disorientation might also allow size to become more of an elastic concept that does not directly affect the experience of moving through individual rooms and settings" (Biggin 2017, 87). Here Barrett points out how disorientation can manipulate how we experience spaces. In this section, I will discuss what type of new spatial experience immersive theatre can offer by using all the worldbuilding and atmosphere creating elements, by focusing on the concept of impossible spaces.

Even though I will not be dealing in depth with this type of impossibility, one notion we should mention in passing, as it relates to the sense of impossibility, is the notion of an impossible space. Impossible space is a term coined by Suma et al. (2012) which refers to a design mechanic for virtual

environments that aims at maximizing the virtual space in which the experiencer navigates. Impossible spaces are virtual environments "that violate the laws of Euclidean space and because of that cannot exist in the real world." (Suma et al. ibid.) In VR, this concept is used especially for environments that use natural locomotion which we encounter in productions that rely on self-overlapping architectural layouts and create a maze-like trajectory for the experiencer, fitting large virtual environments into a small physical space, where the participants are guided in their physical location in a way that they do not encounter the boundaries, this way offering a seamless VR experience.

Suma et al. identify various types of redirection techniques that can be used when designing a digital virtual environment with the aim of creating the sense of an impossible space. By taking into consideration several aspects such as geometric applicability, noticeability to the user, and content-specific implementation details, the researchers point out two techniques, repositioning and reorientation:

1/ Repositioning: a method of continuously translating the user's position in the virtual world into her physical space, which "allows the user to walk to areas in the virtual environment that were not previously accessible within the confines of the physical workspace. This may be disorienting if the virtual world is translated unexpectedly, and may make the virtual environment appear unstable". (Suma et al. 2012, 44)

2/ Reorientation: a method of instructing the user to turn around when she reaches the boundaries of the physical space, during which a rotation gain is applied. (Suma et al. 2012, ibid.)

These can be considered as guiding techniques in space design that can provide the experiencer with a sense of magic, and seem to share commonalities with the forcing techniques that magicians use to guide their audience's attention, which I will discuss in Chapter 4. These design strategies have the potential to help creators better translate the science of magic into design guidelines and also to maintain the intensity of their audience's sense of wonder.

In this chapter I summarized various interpretations of immersion and discussed some related concepts like illusion in art, transportation, sense of embodiment, engagement, and participation, and I pointed out some definitions and taxonomies found in the relevant body of work that can help us in analysing the kind of immersive experiences that have a multisensorial effect and are enabled by a technology or by a predefined interactive environment. I conclude that immersion is made possible by a sense of embodiment and the impression of a liminal situation for the transportation into a storyworld, enabling an encounter with the impossible. In the next chapter, I discuss interactivity, another crucial element of immersive environments.

INTERACTIVITY / 3 /

As discussed in the previous chapter, the sense of immersion in analogue and digital environments is brought about by a sense of embodiment that also offers a sense of impossibility due to the change of environment and how the participants perceive this change. Another important element in immersion is the sense of agency, which is brought about by the interactive characteristics of an immersive environment. In this chapter, I will summarize the literature on these notions which will let us have a broad view of these phenomena from the perspective of theatre studies, literature, and video game studies, and which will help us make various conceptual distinctions and single out factors and design characteristics that enable a more interactive experience with a stronger sense of agency, which is required for immersive experiences.

The term interactivity has its origin in the early 1950s in the concept of feedback in cybernetics. Interactivity started to be a key component of new media in the 1980s, and later the concept of interaction focused on aspects such as the properties and features of the medium/message, user control, and participation. (Albaek et al. 2011). With the development of human–computer interaction (HCI), the term of interactivity began to involve communication between technology and people (Downes and McMillian 2000; Kiousis 2002). Interactivity, however, is a feature of both digital and analogue environments. Marie Laure Ryan states that we should also see the notion in a wider aspect as interactivity is not only made possible by cybernetics but "is a dimension of face–to–face interaction that was shut off by manuscript and print writing and reintroduced into written messages by the electronic medium, together with several other features of oral communication: features such as real–time (synchronous) exchange, spontaneity of expression, and volatility of inscription." (Ryan 2000, 204).

INTERACTION WITH WRITTEN TEXT: SPECULATIONS IN LITERATURE AND THEATRE / 3.1 /

Janet Murray begins her book *Hamlet on the Holodeck* (1997) describing the Star Trek episode where Kathryn Janeway, the captain of the Voyager starship, starts to watch her favourite "holonovel" by entering a Victorian looking scene. Captain Janeway can enter this illusory world which actually behaves like the actual world, and she can stop and re-start it. She can have interactive experiences in this world, and she can even kiss Lord Burleigh or drink a tea. Here Janeway does not have to interact with any device or interface, but can have a direct influence on her virtual environment, and she has tactile experiences when interacting with the system that provides her the story, which is very important for her immersive experience. The development of media technologies has shown how tactile feedback creates stronger engagement with the technology and the system.

Even though nowadays interaction is most widely discussed in the context of interactive digital media, interaction as a notion did not appear only with interactive digital media, but was a heavily debated phenomenon already by the 1970s (see Ingarden 1973, Iser 1978). In literature, we can see a rather speculation-based interaction type, where there is no real interaction in the sense that the reader's meaning-making procedure does not have an effect on the work itself, but only to the story that she constructs in her mind, directed by cues and personal experience. According to Wolfgang Iser, the literary text "exists primarily as a means of communication, while the process of reading is basically a kind of dyadic interaction." (Iser 1978, 66) When being the recipient of a fictional work, the reading process itself mimes the process of experiencing: the aesthetic aspect of fictional literature is actually in the act of recreating it. (Iser 1978, 134–136). Some parts of the text are determinate, some are indeterminate, and the reader's role is to figure out the meaning. This duality "conditions the interaction between text and reader, and such a two-way process cannot be called arbitrary." (Iser 1978, 24) The text instigates the meaning by creating performances of meaning. This meaning is not only constituted in time but is the outcome of the interaction between the reader and the text. Meaning is not only a spatial characteristic (spatial in the sense that it is hidden somewhere) but is also temporal, happening in the interaction that is enabled by the structure of the text. For Iser, the dynamic

between the text and the reader is constituted as an event "which helps to create the impression that we are involved in something real" (Iser 1978, 67). Iser admits that in reading there is no face–to–face situation for interactivity (Iser 1978, 166) as the text does not have the capability to adapt to each reader's specificity: "The reader [...] can never learn from the text how accurate or inaccurate are his views of it." (Iser, ibid.) While Iser discusses this interaction as a performance, it is actually a speculative interaction that rather refers to the immersive effects of the text. The literary text offers this by the initiation of meaning–making possibilities for the reader, and this is how its immersive effect is performed.

From the perspective of interactive digital narratives, Iser's approach about the interaction between the written text and the reader seems rather speculative, especially because the reader cannot be in a face–to–face situation for interactivity during the reading, and the text cannot give feedback on the reader's interpretation and reaction. This speculative type of interaction became a real one when in 1966 the interactive text artworks such as *ELIZA* were developed by Joseph Weizenbaum and this paved the way for further systems to be developed in order to create interactive narrative works. However, in his book Expressive Processing (2009) Noah Wardrip–Fruin points out how this artefact is problematic for digital media: its script titled *DOCTOR* gives the impression of a Rogerian therapy, and the first impression of the users is that they can get any kind of compelling answer to their problem descriptions. This generates the illusion that the computer system is more complex and capable than it is in reality (which is the origin of the term "Eliza effect"), while the interaction in this case is actually limited and is nurtured by the recipient's projection.

The speculative interaction type does not exist only in the context of literary texts, but we can also observe it in analogue theatre performances, especially those which rely on the traditional 4th wall.

Both media types (literary text and traditional theatre) have manifestations that allow only speculative interactions for the recipients, and they can offer only a limited type of agency. In the rest of this chapter, I will focus on types of media and performances that have a participative aspect. Participation is one of the four aspects of IDNs defined by Murray (alongside the three aspects of being encyclopaedic, offering procedurality and representing spatiality.) (Murray 2017, 72) In the next section, I will offer an overview on interactivity in regard to media specificity, by relying on Marie Laure–Ryan's taxonomy, and after that I will discuss how theatre, performance and improvisation can be useful models for understanding interactive digital narratives and for designing agency for curiosity–evoking VR productions.

Levels of interaction: introducing and further developing on the categories in Marie–Laure Ryan's taxonomy / 3.1.1 /

The notion of interaction is used as a broad term for media and genres that offer us an experience where we feel that we have some agency on how the narrative unfolds. For such compelling immersive experiences, novel tools for interaction and for experiencing the narrative can be designed with the help of HCI practices. There are also various theoretical approaches. Katie Salen and Eric Zimmerman (2004) defines interactivity as different modes of engagement with the media:

- Cognitive Interactivity; or Interpretive Participation with a Text.
- Functional Interactivity; or Utilitarian Participation with a Text.
- Explicit Interactivity; or Participation with Designed Choice and Procedure in a Text.
- Meta–Interactivity; or Cultural Participation with a Text.

According to Zimmerman, these categories are not entirely distinct, but they rather overlap, and they can be found in various forms in all media experiences. He further states that "When creating an interactive narrative, such conceptualization of interactivity seems to be relevant in a sense, that both cognitive and technological aspects are implied in the definition. Such a perspective on the concept therefore implies, that the interaction design in this project should support both, mental, non–participatory forms and the more explicit and functional forms of interaction." (Albaek et al. 2011, 13)

Having reviewed the existing literature on media interactivity in general, Weber et al. point out three concepts of interactivity: (1) technology–oriented approaches focus on the characteristics of the medium; (2) interactivity as a characteristic of the communication process, which is about the communication settings of a mediated environment (Weber et al. 2014, 82) e.g. whether the communication process is linear or non–linear, what kind of participation relationships there are (ibid., 81); (3) interactivity as a feature perceived by the user, which some believe to be more influential than objective media characteristics (Reeves and Nass, 1996), but this perceived interaction is more or less subject "to logistical factors such as turn–taking, feedback mechanisms,

and the quantity and quality of user choices available in the system" (Lee, Park, and Jin 2006). Weber at al. argue that these categories are not mutually exclusive. They define interactivity as "the possibility for users to manipulate the content and form of communication and/or the possibility of information exchange processes between users or between users and a medium." (Weber at al. 2014, 82) They present seven dimensions of interactivity: controller responsiveness, feature–based interactivity, customization, exploration, artificial intelligence, perceptual persuasiveness, and co–creation. One can see that interactivity and the manifestation of interactive acts can take several forms, and these always depend on the interface and the media as well.

In her article *Will New Media Produce New Narratives?*, Marie–Laure Ryan offers a typology of user participation in digital media (Ryan 2004, 339). She differentiates internal and external involvement, and divides the former into two further categories: ontological internal (interacting with other users as in–character behaviour) and exploratory internal (e.g. wandering around in a massive multiplayer online game more like a neutral user). In these cases, the users "project themselves as a member of the virtual world" (Ryan 2004, 339) by identifying with an avatar or by apprehending the virtual world from a first–person perspective. In the case of an ontological external mode the readers either "play the role of a god who controls the fictional world from above, or they conceptualize their activity as navigating the database" – but this opposition is not strictly binary. (Ryan 2004, 339)

Ryan provides a list of characteristics of digital media, and proposes that there are four properties that determine how digital media affect narrativity, one of which is a medium's "reactive and interactive nature", "reactivity" here meaning "responses to changes in the environment or nonintentional user actions" while interactivity is a response to a deliberate user action. (Ryan 2004, 338) Even though in 2004, at the time of Ryan's writing, VR was not as widespread as today and not much content was available to the technology, she also offered a speculative approach to how interactive drama might function given its characteristics, based on Murray's description of Holodeck. I present her taxonomy below to offer an overview, adding my own suggestions for an updated taxonomy, taking into account the developments in 3D interactive drama since the time of Ryan's original taxonomy. My additions to the taxonomy are marked with bold.

Genre /Properties Exploited	Narrative Mode	Techniques	Themes and Structures
Hypertext	Diegetic narration (telling)	Fragmented display; chunking and linking	Metafictional narrative/archival narrative
Interactive drama	Enactment through performative statements, dialogue, diegetic storytelling	Objects with internal behaviours, navigable space, written orality	Personal relationships, fantastic themes
Interactive drama	**Exploring the 3D panoramic world, tools, and following other actors present through an avatar**	3D panoramic display, presence of body in virtual world, navigable space	Attempted: aristotelian plots, recommended: fantastic themes, exploration, episodic narrative
Computer games	Enactment through actions defined by the system	Navigable space, objects with internal behaviour	Quest, evolution of complex entity, mystery stories
Webcams	Showing	Live, chronological presentation	Everyday life, sexual activities
Mixed-reality immersive performances	**Fixed trajectory to guide the participants through an experience cycle**	**Live, chronological presentation**	**Everyday life, sexual activities**

Involvement	User rule	Design problem	Performance of narrative
External exploratory	Putting scrambled story, searching archive	Maintaining logical coherence in multilinear environment	Central, but can be linked to non-narrative texts as part of collage
Internal or external; exploratory or ontological	Playing roles, exploring world and interacting with its members	Creating guiding script	Intermittent (dramatic action and storytelling alternate with small talk)
Internal Ontological or exploratory	**With the exception of LARP mechanic based VR theatrical performances, the user can seldom be a co-author, she is more of a silent audience member or passive follower intermittently allowed to interact**	Creating a well-structured script that allows little participation for the user, so that the actor can maintain the narrative logic and form	Central
All combinations except for external/ exploratory	Performing specific task	Lack of variety of plots, providing alternatives to violent themes	Instrumental
External, exploratory	Reader as voyeur, "grabbing" highlights	Too little narrative action	Intermittent (many dead moments)
Internal ontological	**Voyeur and/or participant**	**One guiding script, less possibility for improvisation**	**Dramatic action in real time**

(The original version of the table was included in Ryan 2004.)

The additions to the taxonomy present a general idea of possible improvements for interactive digital media, improvements that can allow a bigger level of freedom (or a stronger sense of illusory agency for the audience members). The possibility for improvement is grounded not only in the developments with these media but also in the recent experimentation done with interactive storytelling dramaturgies and their interactive applications. These categories will also help us acquire a better understanding of the case studies that I will present in the second part of this thesis.

INTERACTION IN THEATRICAL FORMATS / 3.2 /

The interaction model is often explained through the models and prototypes of theatre and drama, and it serves as a fertile ground for designing interactive storytelling experiences. In her PhD thesis, Brenda Laurel (1986) discusses the form of interactive drama. According to her, the user of the interactive system can experience the "willingness of the suspension of disbelief" and this way she can participate in the production emotionally without fearing the consequences of the real–world. She lists the qualities of the interactive drama as the following:

1/ The system should be able to enable an interactive experience. "The interactive requirement means that the user and the system must have mutual or reciprocal influence on the action that occurs."

2/ The experience must be dramatic and must present "an imitation of action which, through artistic formulation, excludes unnecessary detail and complication and makes visible the causal connections among events" so the system is able to structure the experience.

3/ The system should be able to create a role for the user by which the user can interact with the system as "first–person experience". (Laurel 1986, 9)

Michael Mateas, when discussing Laurel's criteria, offers two considerations for creating interactive drama. According to Mateas, the objects with which the interactor could interact should "cry out" for the action to be taken, while the characters of the interactive drama should also be rich but consistent, so the player can interfere with them, and for this dialogue should be allowed in the system and should serve as a good tool to influence character behaviour. He concludes that "the mechanics of interaction (spectacle) provide the low–level resources for player actions. The mechanics provide the interface conventions for taking action." (Mateas 2001)

In interactive theatre, interaction can be understood primarily as taking place between the audience and the performer. But we can only speak about interaction in theatre when it has at least two participants (actors and audience) and when they can both influence the event. In a theatrical situation, the co–presence of the actor and the audience is necessary, even though there are those who question this. Philipp Auslander, in his 1999, states that the use of videotechnology had the difference between live performance

and technological reproduction erased. According to Erika Fischer–Lichte this should not call theatre's ontological status of liveness into question, as theatre makers always use the newest technological media, and the interactivity in the context of theatre can get to such extremities that it can even terminate the event, and this differentiates theatrical interactivity from mediatized performances. (Fischer–Lichte et al. 2014, 160).

Interactivity in theatre exists since ancient theatre. The choir often talked directly to the audience, by taking off the mask and stepping out from the fictional framework of the drama. Fischer–Lichte brings further arguments from theatre history regarding what interaction can mean (e.g. in comedies the actors often say things that reveal the theatrical nature of the play detail or by making the audience a "complice" in their acts) but these examples do not directly have the same potential effects of interactivity.

In many of Brecht's plays, the characters often talk directly to the audience, offering a commentary consisting of a capitalistic contextualization of what just happened on the stage. Even though there have been examples of interactive theatre before Brecht, Brechtian dramaturgical model of epic theatre of the 1930s has completely removed the border between the audience and the performers for the following generations in Western theatre, and everyone became a participant in the theatrical event. This, alongside other sources of inspiration such as rituals and the psychedelic counterculture, offered the original model to the hybrid forms of interactivity that theatres from Europe and North America adopted from 1960s and 1970s on. The creators of the happenings were inviting their audiences to continuous interactivity and without this the happenings would not have been possible.

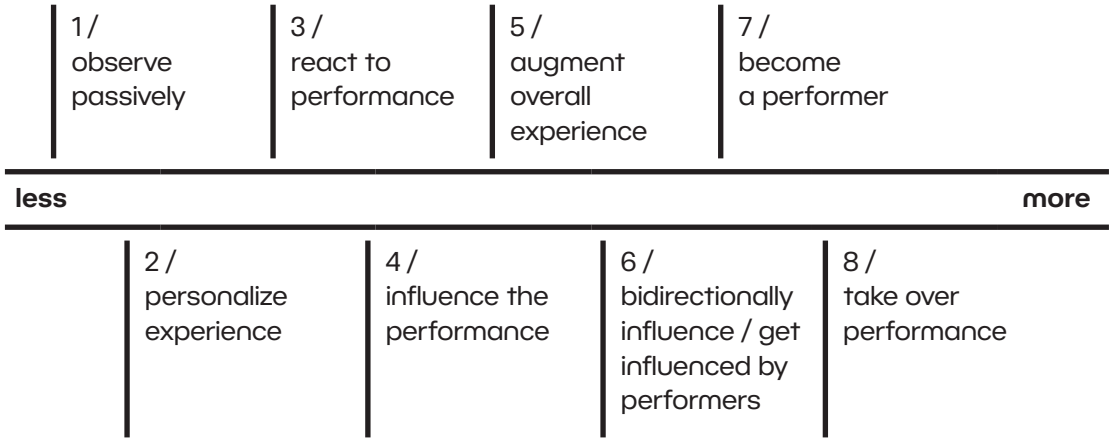
In 1977, Keith Johnstone developed the idea of theatre sports. He used the principles of professional wrestling: he would invite two teams to the stage which improvised a situation based on audience suggestions, followed by the audience judging their performance. In 1989, Augusto Boal developed his method of forum theatre, where the audience could get involved in shaping the actors' actions on the stage. What was happening on the stage was occasionally paused and it was discussed with the members of the audience whether the plot was following the audience's view, and if not, it was changed. The aim of this method was to offer a complex political education for the audience. By developing this format, Boal also coined the notion of a spect–actor: passive spectators who have delegated power to dramatic characters could be transformed into active political subjects (Boal [1979] 1985, 122) and they would be able to represent their own experiences of the world. The transformative experience aspect is a very important feature of participatory theatre performances, and in order to enhance its transformative aspect, it is useful to design the experience in such a way that the audience members

can also interact with each other and achieve something together, so that the agency can offer a rewarding experience not only on an individual level but also on the group level.

In their paper from 2019, Striner et al. discuss audience interaction possibilities and how the audience can be empowered with the capacities of transforming experiences. They classify the audience members as "bystander[s], spectator[s], customer[s], participant[s], [and] player[s]." (Striner et al. 2019, 216) The experiences can vary according to characteristics of the medium (physical or virtual), the location, formality and setting, ratio of participants and/or performers, audience influence and agency, and tools and technology. Even though interactivity in IDNs as well as in HCI is widely discussed and analysed in the literature, in this thesis I will mainly be dealing with analogue or mixed-reality experiences as well as theatrical VR productions, all of which require co-presence.

Striner et al.'s taxonomy of audience interactivity was developed in order to establish further collaboration in entertainment domains, as these collaborations enable a broad range of experiences. In their literature review, they bring up the concept of interactivity continuum: "interactivity ranged from passive to active experiences delineated by the agency of individual audience members" (Striner et al. 2019, 220), and point out that interactivity has been more prominent in some domains like theatre where interactivity is featured in order to influence and augment performances, while games use audiences as performers, and theme parks "create personalized and bidirectional experiences" (Striner ibid.), and they offer a new, revisited spectrum for audience interactivity:

Spectrum of Audience Interactivity for Entertainment



(Source: Striner et al. 2019)

With the appearance of mixed-reality theatre formats, theatre and its levels of interaction changed. Although in this section I mainly discuss how interaction developed in performance, there are many overlaps between performances and game mechanics. In his seminal work *The Digital Performance* (2007), Steven Dixon distinguishes 4 types of interaction: (1) navigation; (2) participation; (3) conversation; (4) collaboration; even though the examples by which he describes these categories might seem obsolete especially considering today's technological innovations and especially their applications in performative contexts. Dixon mentions many online and physically-realized productions and installations, and while many or sometimes all of the above mentioned aspects can be traced in these productions, usually one can be identified as a leading characteristic. These aspects help us to identify "ascending levels and depths of interactivity, and their openness in accommodating and incorporating the user's own creative inputs" (Dixon 2007, 597), and they are connected via the act of playing.

1/ Discussing navigation, Dixon states that it is the "simplest" form of interaction as one has to click and to surf on the web, but he also regards navigation in live performance spaces and interactive digital narrative artworks as similar to surfing on the web. (Dixon ibid., 572)

2/ Participation mobilizes audiences. Here, Dixon describes examples where the spectators can exert control over screen events, but he also discusses theatrical participation.

3/ Conversation concerns only "meaningful conversation", which is "a dialogue that is reciprocated and is subject to real interchange and exchange. [...] In works that operate on a 'conversational' interactive paradigm, there is often a complex relationship or negotiation established between the user/audience and the work, which is reliant on such issues as trust, cooperation, and openness." (Dixon ibid., 584-585) From a contemporary perspective, we can also include here the conversational chatbots and other AI-based IDNs such as Replika, and also immersive performances such as SIGNA's work that I will be discussing later.

4/ According to Dixon, "[i]nteractive collaboration comes about when the interactor becomes a major author or coauthor of the artwork, experience, performance or narrative. The collaboration may be between a single user and the computer / virtual environment, but more usually occurs when users work together with others to create new work by means of computer technologies or within a virtual environment." (Dixon ibid., 595)

These four possibilities of interaction which Dixon presents from a theatrical perspective is useful in figuring out how the audience members can influence the work. This is important because with the spread of immersive performances, the possibility of audience collaboration is increased, although it is less controllable.

In this thesis, I do not focus on the kind of performances that heavily build on major audience collaboration (In SIGNA's *Das Heuvolk*, which I will analyse in Chapter 6, there is a lot of audience collaboration, but it is totally up to the audience members whether they put any artistic creativity in their acting, and in any case, this has no effect on the overall storyline), and I will also not be focusing on inter–audience communication. There is not enough focus on audience inter–communication in contemporary literature on immersive theatre, because there are very few performances that feature this aspect and it is a phenomenon that is hard to study. (For a rare example, see Barnard and Meyer, 2020.) One of the few pieces of literature that discuss it briefly is Benford et al. 2009, in the context of a discussion regarding the term "trajectory". About certain performances that they analyse, they state that these performances "involve collaboration between participants, either as physically collocated groups or as remote partners." (Benford et al. 2009, 714) However, they do not discuss in detail how audience inter–communication emerges. Therefore, it is important to note what type of audience–to–audience interaction possibilities would be imaginable in other immersive theatrical works, especially taking into consideration various interaction possibilities in massive multiplayer games as well. In his paper *Interaction Forms and Communicative Actions in Multiplayer Games*, Manninen offers an insight into interaction forms that existed in the earlier multiplayer games by analysing the communicative and social aspects of these games. According to Manninen, interaction forms are "actions that can potentially be perceived by players. They can act as manifestations of interaction occurring between players, or between players and the game world, and are used to convey the actions of the player to oneself, as well as to others." (Manninen 2003) They argue that in multiplayer games, the level of psychological immersion and presence is raised by the communication, collaboration and coordination aspects. "Players of computer games, for example, do not necessarily require realistic implementations with every possible communication channel, but instead they willingly 'believe' they are immersed in the actions of the imaginary world concerned. The lack of more complex interactions is, thus, compensated using artistic and narrative elements." (Manninen, ibid.)

It will be useful to conclude this section with a note on the recent theoretical developments regarding immersive theatrical VR productions. Although many of the VR performances were developed only lately, especially during the lockdowns, a typology of interaction, developed by Yan et al., was already in

use for designing such performances. Yan et al. define three types of interaction: (1) Individual–based interaction (that concerns expressions of individual opinions, emotions or comments); (2) Scenario–based interaction (which enables audience to play directly with virtual stage props under guidance of the performer) and (3) Narrative–based interaction (where the audience's choice can determine the ending of the story).

In theatre (analogue, mixed–reality and VR), all these interaction formats listed above add not only to the aesthetic experience but, according to some interpretations, the interaction also constitutes a political act as it turns the participants into agents who speak out and influence the content of the performance. As Giannachi states, "interactivity is not merely an added characteristic; it provides the 'content' and 'message', and it is within this interactivity, within the encounter between the viewer, the object and the medium, that the work of art takes place." (Giannachi 2004, 26) But in order to create compelling experiences, the design of the experience has to be carefully made. Meticulous planning is very important in the case of immersive performances because test play possibilities are usually limited and no rehearsal is possible, as the real performance is unfolding in the interaction with the audiences. But as we will see later, interactivity is not much more than an add–on in some interactive immersive experiences.

AGENCY: SPATIALITY, UNCERTAINTY AND IMPROVISATION / 3.3 /

Agency is another concept to understand interactivity. Marie–Laure Ryan offers the term "internal exploratory interactivity" to capture agency in interactive narrative media. She describes these as systems where "the user exercises her agency by moving around the fictional world, picking up objects and looking at them, viewing the action from different points of view, investigating a case, and trying to reconstitute events that have taken place a long time ago." (2001)

Agency is a highly discussed subject in the field of game studies. In the context of video games, we find the first occurrence of the term in Mary Ann Buckles' PhD thesis from 1987, although a more well–recognized example

for an early discussion of the term is found in Janet Murray's *Hamlet on the Holodeck*, where she links agency to meaning–making by defining agency as "the satisfying power to take meaningful action and see the results of our decisions and choices." (Murray 2016, 123) Murray states that interactivity is a term used too often and which is therefore very vague, and "the pleasure of agency in electronic environments is often confused with the mere ability to move a joystick or click on a mouse. But activity alone is not agency." (Murray 2016, 128) For Murray, interactivity is a combination of procedural and participatory properties of the system, but the number of interactions is not the right indicator of the pleasure of agency. She differentiates agency (as an aesthetic pleasure) from participation (that is simply doing something that is expected from the player) and also from activity (actions that are not chosen by the player and that are not related to the player's intention). Murray (2016) points out that the experience of interaction can be enabled by two types of scripting: "coding the actions of the digital system" and "cueing the actions of the interactor". (Murray 2016, 148) Only when these two are in place then the interactor can have a satisfying experience of agency. The action should be motivated "by something in the story, by an anticipation of some story event or action or revelation, and when the response rewards that anticipation in some appropriate way, then the interactor experiences dramatic *agency*." (ibid.)

Spatiality is another element which Murray mentions when discussing agency. She discusses digital storytelling forms, but her discussion can be extended to immersive theatre to some extent. Murray focuses on maze–like spaces and states they allow us to "experience pleasures specific to intentional navigation" (2016, 125) and they embody "a narrative of danger and salvation". (ibid., 126) "Maze–based stories take away the moving platform and turn the passively observant visitor into a protagonist who must find his or her own way through the fun house." (Murray 2016, 129) Murray also talks about journey stories, stating that "One of the consistent pleasures of the journey story in every time and every medium is the unfolding of solutions to seemingly impossible situations" (ibid., 132), and she also claims that the most satisfying puzzles are those that "encourage the interactor to apply real–world thinking to the virtual world." (Murray 2016, 133) In Chapter 8, I will discuss a VR production that provides an example of puzzle solving.

Another important aspect of the pleasure of agency is that it "gives shape to anxiety". (ibid.) While Murray states that computer gamers can experience shiver or physical fear when they approach an unopened door (ibid.); but I would like to propose that this shiver can have a more enhanced sensual bodily effect if it is happening in an analogue, physical environment. The anxiety is related to the sense of uncertainty, which increases the feeling of agency, and therefore increases the immersivity of the environment. As I will discuss later, the visual, interior design elements of horror

can compel the players to act (or not to act) in certain ways, increasing their interaction possibilities.

According to Michael Mateas, players of video games experience agency when "the actions motivated by the formal constraints (affordances) via dramatic probability in the plot are commensurate with the material constraints (affordances) made available from the levels of spectacle, pattern, language and thought." He proposes that game designers should suggest "dramatically probable events" to create affordances for taking those actions and to provide underlying system support for "both the interpretation of those actions and the perceivable system response to those actions". (Mateas 2001) Doug Church, who also provides a definition of agency in his 1999, introduces the related term "intention": "[The] process of accumulating goals, understanding the world, making a plan and then acting on it, is a powerful means to get the player invested and involved. We'll call this 'intention,' as it is, in essence, allowing and encouraging players to do things intentionally." (Church 1999)

An important typology that Mateas created together with Andrew Stern is the differentiation between local and global agency. They define local agency as the type of agency involved in the situations where "the player's actions cause immediate, context-specific, meaningful reactions from the system" while global agency occurs when "the global shape of the experience is determined by player action." (Mateas 2008) Local agency is a momentary phenomenon that allows the player to understand the meaning of her actions in the gameplay and offers her feedback on how to continue the gameplay, while global agency can enhance the transformative experience of the gameplay (see Murray 2016). As Mateas and Stern point out, local agency would ideally mean immediate, meaningful, and specific responses, but this is not always feasible from a design point of view. Some interactions can be manifested as global agency in the ending part of the story, as in the case of the game *Façade* developed by Mateas and Stern ("the particulars of the narrative arc that lead to that ending are determined in a smooth and continuous fashion by what the player does [and] at the end of the experience the player can understand how her actions led to this storyline." (Mateas and Stern 2005, 5) — but it is not easy to include global agency in the design either. It might be easier in video games, but when designing artistic experiences, it is not easy to include design elements where the participants' actions affect the artistic content in a non-superficial way.

Global agency also encompasses the unforeseeable elements of the agency such as experimentation or improvisational play. This is particularly because in video games there are many actions that should be taken in minuscule timescales, as pointed out in Sudnow's *Pilgrim in the Microworld* from 1983, in which we also find an early discussion of various types of improvisa-

tional pattern play. Tanenbaum and Tanenbaum (2008), who rely on theatrical models when examining agency and propose, propose to shift the concept of the reader (or what they call "reader/player") from a player–centric model to a performer–centric model. In their understanding, interactions between the player and the designer are governed by some of the same rules that are in play between multiple performers in a piece of improvisational theatre. Their notion of a performer (based on Murray 1997 and Mateas and Stern 2005) holds in itself the expectation "that the interactor assume[s] a role, engage[s] in the narrative as a character, and act[s] in what might be described as a narratively salient way". (Tanenbaum and Tanenbaum 2008, 251) Meanwhile, the interactor as a player might behave in a self–gratifying, pleasure–centric manner, "subverting the story in his own quest to satisfy his desire for Agency". (ibid.) This means that the interactor is less interested in what she can do with the game world and more in what she can do to the game world. While interactors usually oscillate between the player and performer forms, video game designers aim to create primarily for the player type of interactors.

Tanenbaum and Tanenbaum suggest that "[i]f we can conceive of the relationship between the author and the interactor as one of equal participants in an improvisation, then the issue of interactor *agency* becomes one of performer *responsibilities*." (ibid., 261). They rely on a "typology of performative knowledge" developed by Lockford and Pelias (2004), by which they describe five different types of knowledge which live performers who are engaged in improvisational situations can rely on: communication, playfulness, sedimentation, sensuality, and vulnerability. This knowledge arises from the body and the mind and is a process that can be considered both epistemic and aesthetic, and the authors call this process "bodily poeticizing" because intuitive, affective and cognitive types of knowledge are intertwined with somatic knowledge in this process. Some of the aforementioned types of knowledge are harder to achieve while playing video games (e.g. sensuality) and they require responsibility both from the system and from the interactor. In analogue theatrical improvisational situations there is a social contract between the actors that encompasses a commitment, and in the case of interactive digital narratives we can assume that there is a similar contract and the interactor should be treated as a performer, and it is important to "recognize that performing in any context is a specialized skill that is learned over time, and not an intuitive ability that every interactor may draw upon." (Tanenbaum and Tanenbaum 2008, 260) As it is not possible to expect the interactors to have performance skills, the designers should explore techniques for training the interactors in the specifics of the respective narrative, the schema of the given production should be clearly communicated, and the interactor should be aware of the manipulation of the schema and she should master the navigation in the space as well. Tanenbaum and Tanenbaum state that "[e]ach participant has a responsibility to accept the dramatic offers given by the other, and each has

equal responsibility to the ultimate meaning of the narrative. In order for this performative dialogue to work, the author must design the system to be able to co–perform with the interactor" (ibid., 261), even though they acknowledge that (back in 2008) there were fewer interactive narratives that could adopt such kind of design. In their view, designing interactive digital narratives that feature performer type of agency requires two features: "(1) design systems that can train and guide interactors in how to perform within them", which is a feature that is rather about the systemic level compared to Murray's 'scripting the interactor' which is more about the narrative level; and (2) "reframing *agency* as a shared property of all participants in an interactive drama" (ibid., 262, italics in original).

What the aforementioned authors describe are game design practices that require trust both on the designers' and the players' side, but it is important to mention that on the player's side the shared property, trust, is nurtured also by the expectation of the uncertainty. Both parties are uncertain about what the outcome will be as it is based on the mutual creative input, which is improvisation. As many pointed out before, uncertainty is a key element in a gameplay experience (Caillois 2001; Costikyan 2013; Power et al. 2019), but it is not known how, when and why uncertainty becomes a motivating factor for players (Kumari 2021, 16). Uncertainty is nurtured by curiosity because it functions as a coping mechanism (Shin and Kim 2019). Curiosity can arise, for example, when discovering a new space or a new level with new challenges. New challenges can also nurture the feeling of player uncertainty. While Murray mentions navigation as one of the sources of uncertainty and therefore one of the pleasures of agency (which is also an important feature of immersive theatre productions), Kumari states that "[a]n important nexus of curiosity and uncertainty in games are choices or decision–making" but we do not yet fully understand what makes a choice interesting, although we know that players can become aware of their agency if they make a decision "which allows them to engage in the thrill of making risky/strategic/intelligent/winning choices." (Kumari 2021, 17) Uncertainty and curiosity are also addressed by video game creators (see e.g. Raph Koster's *Theory of Fun*, 2013), but they are also engaged by other artistic forms, such as stage magic, as we will see in the next chapter.

INTRODUCING THE "TRAJECTORIES" METHOD / 3.4 /

Designing the path of the audience means the creation of a predetermined path. Benford and Giannachi call this a "trajectory" (Benford and Giannachi 2008). Trajectory is the path of the spectator through the mixed–reality performance. We can see that the spectacular character of the interfaces, the dramaturgy of various technologies (meaning how they follow each other) and the careful spatial guidance enhanced by the strict trajectory do not offer too many options to the members of the audience. In this regard, these performances are very similar to the magic shows that have a very strictly constructed dramaturgy and the audience members do not really roam freely even though they have the illusion of having the agency for free–roaming. The spatial design, the elements that are used and the technology–created environments require strict timing in order to maintain the magical feeling of the performance. For example, in the performance *SOMNAI*, various elements of installation art, performance, computer game and escape room are juxtaposed in order to create a hybrid production in which the genres, such as new horror, abstract visualization–based screenings and situations reminiscent of escape games create a state of destabilization, in which the participants are in between the dichotomy of fictional/virtual and actual physical environments.

In their analysis, Benford and Giannachi state that the "mixed–reality performance is based on the underlying idea that these forms of events are constituted by a number of embedded and emergent trajectories through an experience." (Benford and Giannachi 2011, 14). According to them, the experience is a journey through this structure: it is a "progressive itinerary". Usually, the participants have to map these trajectories (ibid., 19), and this map also helps them with "learning to move between" the real and virtual elements. These are trajectories that offer a continuous experience, and the audience members only have to make decisions about which direction their experience should take. The characteristic of continuity is an important characteristic, because, to quote Tim Ingold, "as in life, what matters is not the final destination, but all the interesting things that occur along the way" (2016, 17). This is a fine description of the experiencer's aim, which is not solely to reach the end, the final destination, but participating in the process and journey of being engaged in a different world.

In order to offer this sense of continuity, the trajectories combine together four different key aspects: space, time, roles and interfaces (see Benford and Giannachi 2011). While trajectories pass through the above-mentioned hybrid structures, experiences are also always dealing with various transition points, which can be listed as follows:

- Beginnings of the experience
- Endings
- Role and interface transitions (e.g. handing over equipment)
- Traversals between the physical and the virtual world
- Temporal transitions between episodes
- Transition into physical resources

These transitions are accompanied by a careful orchestration by the performers or contributors of the performance and they aim at assuring that the continuity of the trajectory is as seamless as possible.

In mixed-reality performances, it is possible to make a distinction between the *canonical trajectory* and the *participant trajectory* (as suggested by Benford and Giannachi 2008). While the first one is the "prescripted and embedded into the original structure" of the production, the second one is emergent, incalculable and emerges from the actions of the audience members. The notion of a trajectory will be a key term for my analysis of mixed-reality production dotdot, as it can describe the user journey both from the author's perspective (canonical trajectory) and also the participant's unique journey through a production (participant trajectory). The term also contains the act of interaction with the storyworld, and it also has the capability to make us reflect on the interactive aspect of the given production (or on the illusion of interaction). It also encompasses the use of interfaces and the traversals between the physical and the virtual, therefore it is suitable to be used for complex user experiences, for example in designing the path for the ecologies of interfaces that guide the users to prioritize media or activity, and it also helps us to better understand "how experiences are framed, from the practicalities of scheduling, admission and flow in high-throughput experiences, to the role of briefings and the nature of giving instructions." (Benford et al. 2009, 712). As we can apply this to all types of mixed-reality interactive productions and it allows us to link physical and virtual realms, it will enable us to more precisely emphasize the various elements of the design strategies that I will outline in the conclusion of the thesis.

In this chapter, I introduced and unpacked the terms interaction and agency, and provided an overview of how they can be situated across various artforms and media, and I introduced the notion of a trajectory which will be useful in analysing various immersive productions. I also discussed the video game literature on interactivity and agency, where parallels can be made regarding how to design artworks that allow for the relevant type of interactivity (a 'performer' type rather than a 'player' type) and that provide a stronger sense of agency. I briefly discussed the importance of curiosity and uncertainty for interactivity and agency, a point which I will be returning to while discussing immersive installations in Chapter 5, and in the next chapter while discussing magic and how it relates to immersion.

MAGIC / 4 /

INTRODUCTION: THE SCIENCE OF MAGIC / 4.1 /

According to Rensink and Kuhn (2015b) "Magic is among the oldest of the performing arts." For a very long time, cognitive science has overlooked how magic tricks affect the human mind. Even though Binet was already studying magicians back in 1894 by using the most sophisticated methods of that time, only in mid–1980s researchers started to look more closely into magic tricks and their cognitive and perceptual effects (Rensink and Kuhn 2015b). In the recent years, the science of magic started to get more attention in pursuit of finding a new approach to studying various functions and processes of the mind (Smith, Dignum, and Sonenberg 2016).

In this chapter, I will suggest that having a better understanding of the methods and effects of magic tricks can help us explore further research possibilities in immersive environments, and it can also help immersive experience creators to understand how immersive environments work. I will outline various practices and types of magic tricks that could be useful in this regard, providing an extensive literature review and the historical background of how magic has developed, and I will be pointing out the parallel between current immersive productions and magic in terms of how they relate to the new technologies of their time and to society's fascination with these technologies. I will be touching upon various issues such as how elements of magic shows and séances can be identified in current non–magic performances and the potential for developing on these elements in immersive practices; the stages in experiencing some types of magic tricks (such as object permanency or constancy tricks); how magic tricks can be used for attentional selection and to provide a sense of impossibility; psychological mechanisms of the sense of agency and interactivity as, for instance, observed in psychological forcing techniques (such as the Equivoque technique or choice blindness) that can offer the audience a false sense of participation.

According to Jason Leddington, magic is "a form of theatre that apparently presents impossible events and *at the same time* represents them as impossible" (Leddington 2016, 256), which suggests that the experience of magic is a counterintuitive experience, where the magic does not take place on the stage, but rather in the perception of the spectator of the magical act. We can agree with Rensink and Kuhn's suggestion that the science of magic can be a suitable framework "to investigate human perception and cognition" (Rensink and Kuhn 2015a). Indeed, the science of magic can offer us new perspectives on several levels in analysing phenomena such as immersion. First of all, "adaptation of traditional magic techniques" might offer us new possibilities for making progress in current research issues. Secondly, it can help us investigate various psychological phenomena such as "the sense of wonder induced by an apparently impossible event." Also, the science of magic can offer us the possibility to find out large-scale patterns among magic tricks and, importantly, these patterns can help us better understand the workings of ordinary human cognition. As Smith et al. put it, investigations into conjuring tricks that "routinely and reliably bring about radical failures in how people make sense of the world, might open a new window into how that sense is normally achieved" (Smith, Dignum, and Sonenberg 2016). They write that "an important starting point for [our] account is to see the effect of a magic trick as an impossible state transition in which a situation passes impossibly from one state to another. We focus on tricks that fit this conception, describing them as *happenings*. In happenings, there is nothing intrinsically impossible, nor even anomalous, about the final state of objects on display (e.g., the non-existence of a coin in a purse, or the existence of a ball under a cup). Rather, the impossibility lies in how the present situation came about from the immediate history of witnessed events". (ibid.) The magic trick as an impossible state transition is similar to immersive experiences: the experience of being transitioned from environment a (initial environment) to environment B (immersive environment) which we have via sensory stimuli (especially via visual, auditory and proprioceptive stimuli) can be compared to the sense of wonder.

Another reason why the science of magic can be a suitable framework to understand immersive experiences is that magic tricks have two aspects as a central important factor: The first aspect is the effect: this is "the phenomena consciously experienced by the spectator (e.g., seeing a deck of cards riffed by a magician; seeing a chosen card emerge from the magician's pocket)", and the second is the method, "the manipulations used by the magician to achieve the effect (e.g., the particular way the cards are riffed; the placing of the card in the pocket ahead of time)." (Rensink and Kuhn 2015b)

There is also a considerable amount of literature on the mechanisms of creating an effective feeling of impossibility in magic, which can be made relevant for VR as well. In his book *Experiencing the Impossible*, Kuhn et al. state that in his more successful films, Walt Disney followed specific magical rules whereby magic needed to be "plausibly impossible", meaning that it could violate some real-world expectations but not too many, concluding that "even in a world where nothing is impossible, some things are perceived as being more impossible than others." (Kuhn 2019, 28) And elsewhere, he writes that "magic relies on exploiting counter-intuitive errors and biases in cognition, and a force is only effective if people are unaware of this bias" (see Kuhn, Pailhés, and Lan 2019, 2).

In the coming sections, I will offer a short historical review of how séances made use of technological developments and set design for worldbuilding, and also how they made use of atmosphere-creating tools, and I will talk about their historical relation to magic shows.

By terms like "magic", "magic trick", "magic show" and "science of magic", I will refer both to séances and non-spiritual illusionist performances, except in cases when I am contrasting the two types of performances, in which case "magic show" refers exclusively to the latter category. The term "magician" always refers to the stage illusionist, while those who perform séances are "mediums".

A HISTORY OF MAGIC: THE SOCIOLOGICAL AND TECHNOLOGICAL BACKGROUND / 4.2 /

In this section, I will introduce various types of practices in certain performing arts and entertainment traditions since the 18th and 19th centuries (from the era of the re-enchantment of Western culture), I will describe the immersive practice types that capture and manipulate the audience's attention by enabling the feeling of wonder and those that make an allusion to the new electrical inventions by creating séances that often have a participatory characteristic. These practices have created immersive environments for audience members, in some cases even providing the illusion of agency and letting them face an impossible event. As Simone Natale states about this

type of séances, "despite often displaying a high degree of sensationalism and theatricality, [these practices] were presented to viewers and participants as authentic manifestations of spirit agency." (Natale 2016, 10). This period has been well-researched in many aspects, such as cultural history of psychiatry (Thurschwel 2001), or gender and women's role (Alex Owen 2006), but it is the prevalence of electricity and new technological innovations that puts its fingerprint on the developments of the Golden Age of Magic (see Roger Luckhurst 2002; Thurschwell 2001).

This period of Golden Age did not last long: the appearance of cinema and the appearance of the showmanship "as the main purveyor of wonders (and the mainstream theatre, in response, [clinging] ever more firmly to the tenets of psychological naturalism)" meant that the Golden Age of Magic was over (Mangan 2007, 118). This time period (roughly from 1840 to 1920) was also called the era of Modern or Popular Spiritualism. Modern Spiritualism persisted as a "recreational pursuit and a quasi-religious belief" (Sword 2002, 2) and it was also the result of the culture of mourning that was prevalent in the mid-19th century. Modern Spiritualism was based on the basic premise that it is possible to contact the spirits of those who passed away. Its fame started with the "Rochester Rappings" of the Fox sisters, and it was very fashionable until the 1870s with some periodical revivals until the 1st World War. It was pursued especially in the US and in UK. In the UK it was not only a middle-class interest, working class people were also regular visitors of spiritualist séances. The Modern Spiritualism "represented a sort of halfway house between the increasingly separate or separated God (and thus by implication the Church) of "hellfire" religious doctrine and the bare materialism of secularism or atheism." (Holloway 2006, 183) Besides these aspects, the practice also interacted with various discourses of science (Holloway 2006, 183). On the other hand, modern spiritualism had a strong economic feature as well: various merchandising products were produced including talking boards, spirit photographs and planchettes.

But this period did not last long: due to industrialization and, as Max Weber diagnosed, due to the world's "disenchantment", magicians also changed their direction. As Fred Nadis observes (1999, 7), magicians at the turn of the nineteenth and twentieth centuries went out of the way to deny any real occult status, to "make it clear that their effects were the result of trick mechanisms, practice and stagecraft", even though many of the famous magicians, such as Houdini or Maskelyne, were using such PR materials that depicted them in "occult situations" (such as having the devil whispering in their ears). But at the end of the 19th century they gradually turned to type of presentation of their tricks which was free of the occult.

Séances versus Magic shows: The importance of framing / 4.2.1 /

In his book *The End of Magic*, Ariel Glucklich describes the Indian city Banaras and the relationship between the local magicians and their clients in detail. He states that "the magician is the man or woman who creates the context in which minds enter a relationship, and this is often experienced as an 'occult' event. And although the experience is in fact extraordinary, it is completely natural". (Glucklich 1997, 13) This was the case not only in the Golden Age of Magic, but also in later periods when magicians and creators of these extraordinary experiences were doing everything to make their tricks seem untouched by the legacy of the occult while at the same time working on maintaining their audience's sense of wonder.

What Glucklich describes via the term 'context' is what I previously described as Goffmann's 'framing' (1986). This framing has two varieties that we can apply to Spiritual Modernism's séances and to secular magic shows. In order to delineate the two types, we can borrow Michael Fried's taxonomy of 'absorption' and 'theatricality'.

In his seminal work *Absorption and Theatricality: Painting and Beholder in the Age of Diderot*, Fried (Natale 2016, 40) describes two aspects of paintings in the context of the relation between the painted figure and the viewer. The first one, which he calls 'absorption', pertains to paintings in which the main figure is immersed in her intent; the second category, 'theatricality', includes those artworks where the main figure is the subject and is there to shape and/or direct the viewer's gaze and attention. In the latter, the spectator's role is acknowledged in the fictional situation. These two categories have a parallel with the following two types of magic performances that I will describe:

1/ Spiritual séances led by mediums,

2/ Stage magic tricks where the conjurers state that they do not rely on occult powers, but on well–rehearsed mechanisms, practice and stagecraft.

Stage magic performances that are built mainly onstagecraft and that want to create a sense of wonder in the audience are those that want to engage their viewers. Even though they can have a participatory characteristic, they do not want to make their audience believe in such impossible phenomena as the ghosts of those who passed away. Meanwhile, the spiritual séances,

as Natale argues, represent a peculiar situation: they combine absorption with theatricality. The ritual and its complex dramaturgy remind the audience that her role is to be a spectator, while the state of trance in almost all spiritual manifestations "was connected to an aesthetics of creative absorption that contributed to the spontaneous character of their performance." (Natale 2016, 40) Allison Griffiths also writes about this type of absorption when discussing the immersive effects of cathedrals. She states that "absorption itself, the idea of entering into the image, was not simply an unexpected outcome of religious devotional practices, but a fundamental pretext for the idea of immersion." Even though the direct connection between performing arts and religion might be unambiguous, this form of entertainment, merged with spectacular elements, could be seldom found in religious communities (see Natale 2016, 13) which is a cultural precursor to the similar mixture of spirituality and spectacle in séances. These spectacles of spiritual manifestation are examples of rituals that have a total immersive effect on the audience, made possible by their seemingly impossible nature. These performances are immersive because the audience's reality is merged with the reality of what happens on the stage: we do not feel alienated from the events on the stage, and this also affects our 'daily reality'. The level of this specific transgression could be sustained with events that gave shivers to the audience members where they were presented with impossible appearances of an impossible world, offering them an immersive experience.

I will rely on Lamont's interpretation of the frame analysis by Erwing Goffman (which I discussed in more in detail in Chapter 2) in order to analyse the mediums and their performances more precisely. Goffman explains the distinction between stage magician and spiritual medium as follows: "In the case of stage magic, a spectator would probably perceive the performance as a fictional spectacle that relies on trickery and sleight of hand; on the contrary, a spiritualist sitter at a séance might perceive it as a non–orchestrated event that opens a channel of communication with the beyond." (Natale 2016, 23) The latter type of framing is what makes the audience shiver as a result of the impossible character of the events. Peter Lamont, relying on Goffman's frame analysis, points out a distinction between magic and psychic fraud: "Magic clearly involves fabrication since there is an intentional effort to induce a false belief about what is going on, but this is typically only the case within the frame of the trick itself" (Lamont 2006, 24), and taking the frame analysis into consideration, magic tricks in general can be considered as an illusion of real magic (Lamont, ibid.).

Russian physicist Mendeleev also discusses the difference between magicians and mediums. He mentions that while the former usually stated that they were performing trickery, in the case of mediums "the intention is to induce a false belief not only about the details of the event, but also about its

authenticity. [...] the magician fabricates the effect but not the performance as a whole, while the pseudo-psychic fabricates not only the effect, but also the overall performance." (ibid., 24).

During performances of magic tricks the audience is situated outside of the fabrication frame, but in psychic fraud the medium puts the audience within the fabrication frame, and this way the audience members become participants. Magicians go through thousands of hours of exercise in order to perform their magic trick with visible ease, but mediums in contrast become, apparently, very tired after their trance. This display of tiredness also aims at increasing the realism of the experience: they became fatigued because connecting with the other world requires exhaustive physical effort; and this seemingly transcendental, spiritualistic effort is somehow not debunked by accompanying commercial elements such as advertisements, admission fees and business plans made by professional agents (Morse 1877).

Acting as mediums or magicians / 4.2.1.1 /

It is also noteworthy to compare the two types of performance from the acting aspect. The scale developed by Michael Kirby (1972), consisting of a continuum of acting types, can provide us with a useful taxonomy. The scale below shows the degree of "involved acting" by the performer, that is, the degree of complexity of acting required for his acting style, or, as Kirby states, how much is the actor concerned with the "amount of acting". On the two sides of the continuum is the Not-Acting and Acting.

NOT-ACTING				**ACTING**
non-matrixed performing	non-matrixed representation	"received" acting	simple acting	complex acting

(Source: Kirby 1972)

For "not-acting" he brings such examples as the stage attendants of Kabuki performances. They move props, help with on-stage costume changes or bring tea. In the next stage of the continuum, we find the performer who does not act, but who wears a costume that represents something or someone. Kirby names this 'symbolized matrix', as the performer bears referential ele-

ments but does not act as a performer. The next stage is the 'received acting'. Kirby describes this with the help of the following example: imagine a setting in a bar where a scene is filmed and some extras are told to play cards without having to react in any way with the main characters of the storyline. These men are not acting substantively, they are merely playing cards. "And yet we also see them as characters, however minor, in the story, and we say that they, too, are acting. We do not distinguish them from the other actors" (Kirby 1972, 5). According to Kirby this is not 'true acting'. One step closer to 'true acting' is what he calls 'simple acting': this type of acting can be observed in the case of public speakers who, for the sake of the message, theatricalize their deliverance, or even in the case of actors who are telling their 'personal' truth while talking to the audience. Kirby states that acting appears "at the point at which the emotions are 'pushed' for the sake of the spectators. This does not mean that the speaker is false or does not believe what he is saying. It merely means that he is selecting and projecting an element of character – i.e. emotion – to the audience." (Kirby 1972, 7). The ultimate stage of acting on the scale is called "complex acting", which involves the creation of several layers of a character. It also relates to the technical skills and abilities of the performers (as Kirby says: "anyone can act, but not everyone in a complex way" (Kirby 1972, 8). Kirby's scale measures the amount of representation, simulation and impersonation, which can be a helpful tool to draw a clear line between mediums and magicians.

If we look through the prism of Kirby's scale, we can see that the activities of mediums and spiritual séance leaders involves a complex way of acting, by using the mask of received acting (almost literally), their role supposedly being just an intermediary for the ghosts to deliver their message, even though they tried to avoid framing their trances as complex acting performances. Mediums, obviously, did not want to be debunked. Rather, they presented themselves as performing a natural ability – which is extraordinary for the other sitters, and to make their performances more spectacular they engaged in such acts as painting flowers while blindfolded, trance lecturing or automatic writing. They also used methods to prove their authenticity (e.g. being tied up during the trance or requesting special treatment for their extraordinary abilities). (Natale 2016, 33)

The type of acting involved in magic shows, especially at the end of the 19th century, falls under the category of 'simple acting'. The magicians are themselves; they do not portray anyone – they just show the proof of thousands of hours of practice by the ease of performing the given trick. They are aware of their audience, and they maintain their real character not hidden, and they need to be charismatic. They do speak to their audience, but it does not mean that they necessarily have to say something that is true or that has verifiable informational elements, but they do have to frame their tricks

with pseudo-explanations. And this constitutes the 'acting' element in 'simple acting'. There might be a character element in the magician's performance (e.g. acting out someone with conjuring powers), but there are no deeper layers to this character and it is mainly there to add atmosphere.

In the following sections I will discuss two types of magic performances: Spiritual séances where the mediumship offers for the audience members a presentation of another "world"; and those where magic tricks manipulate the attention of the audience and which give them a sense of marvel, and I will provide the sociological and technological context in which the magicians and mediums could develop their practices, before I discuss particular magic tricks and their psychological mechanics.

Spiritual séances and technologized culture / 4.2.1.2 /

In his memoirs from the 1880s, author John Wetherbee writes that he was very proud of his city, as there was such an abundance and concentration of spiritual events in Boston. (Natale 2016, 21) Many mediums left behind a theatrical career to become a medium, but they maintained their personnel necessary for show business, including managers for hiring, touring and PR. Their séances offered a chance for entertainment, and were carefully built up in the levels of dramaturgy and set design.

In his book *Supernatural Entertainments*, Simone Natale argues that the rise of the spiritualist movement as a religious and cultural phenomenon was closely connected to the contemporary evolution of the media entertainment industry. (Natale 2016, 1). The séances were part of a growing market of spectacular attractions and leisure. The city life also offered many free time activities for factory workers and for middle-class people, as a result of the increase in the pursuit of leisure since the 18th century (Golby and Purdue 1999). Not only the uncertainty (regarding whether real occult was involved in these performances), but also the latest technological developments were the driving factor of this high demand for spiritual experiences. In 1840s, when Morse organized the first intercontinental test for the telegraph, the participants could experience an immediate exchange of messages which was not possible beforehand, and they also experienced a way of communicating with an absent body. The invention of daguerreotype was also in this period, and Jeffrey Sconce (2000) argues that the disembodied communions were the most provocative feature of these new technological devices that offered

parallels with spiritual séances on a plate. Natale also states that "magic shows also benefited from the quasi–magical status of natural phenomena such as electricity and magnetism." (Natale 2016, 5)

Simone Natale lists three main characteristics of séances of the 19th century spiritualism that made them such a success:

1/ The spiritualist experience has a strong participatory character: "Spiritualist spectatorship was, therefore, interactive and performative in nature." (Natale 2016, 9).

2/ In order to create a successful event, the characteristic of uncertainty had to be included. This requires the coexistence of claims of authenticity with a spectacular frame, meaning "an authentic manifestation of spirit agency" which was inserted "within a broader array of shows and exhibits that played with the blurring distinctions between authenticity and forgery." (Natale 2016, 9)

3/ Due to the second characteristic, the productions (séances) and their creators had to remain open to different, potentially divergent interpretations of the event. (ibid.)

In what follows, I won't describe a large number of spiritual séances or list many mediums, rather, I will present the context of these séances and the possibilities for interpreting them in order to point out how important was at that time to suddenly create a "different space" or a "different reality" to the experiencers. In the few examples that I will describe, the level of agency and the level of immersion varies, but it is important to see what "otherworldly worldbuilding methods" were used by the mediums.

One of the forerunners of the mediums was Franz Anton Mesmer, the eponym of the word "mesmerize". Mesmer was an Australian healer living in the 18th century. According to his theory, the human body was governed by a magnetic fluid, and this fluid's becoming imbalanced can impair our health. Moreover, he thought that he can create a hypnotic state in which he can manipulate this magnetic force. Around the same time, Swedish philosopher Emanuel Swedenborg was writing about the afterlife, which he construed as being composed of three heavens and hells, and an interim space for ghosts. These two theories were merged by Andrew Jackson Lewis: he was claiming that Swedenborg's spirit was talking to him while he was in a mesmerized state. He published a book about his experience and the philosophy around it in 1847. It is no wonder that the Fox sisters rose to fame quickly in USA in this context. However, it has to be noted that the first séance appeared in early 19th century in France, presented by Etienne Gaspard Robert. During Robert's show, named "Phantasmagoria", an apparently materialized realistic ghost

figure appeared via a lantern projection – which of course gave shivers to the audience members. The magician was happy that he could offer some adrenalin to his audience: "I am only satisfied if my spectators, shivering and shuddering, raise their hands or cover their eyes out of fear of ghosts and devils dashing towards them; if even the most indiscreet among them run into the arms of a skeleton." (Meier 2013)

To go back again to an earlier era, Fox sisters got into the spiritual show business (or perhaps we should say that they established this show business) at a very early age, when they were 11 and 14 years old. Their older sister was their manager, and this family business led to a big success. They claimed that they communicate with spirits by rappings, and these rappings or knockings on a wooden surface were following them, so they were not site–specific. Initially they gained fame among Quaker communities in Rochester, US, but one year later in 1850 they were already performing in New York. They were performing with a specially designed table that made the rappings possible without the audience members observing how they happened. They had a very successful career, even though being regularly defamed by physicians and reverends of their time.

Due to numerous technological developments, especially the aforementioned invention of the telegraph, the audience members could easily understand and accept this communication form, even if only one of the communicators was bodily present. The Fox sisters (and later the performances of many other mediums) combined the discoveries of science, the invisible power of electricity, the religious belief in ghosts and the possibility of afterlife. The Fox sisters were using a simpler way of communicating, through rappings and later by using tables, and this simple form of communication was totally satisfactory for their audience members. Jeffrey Sconce states that "talking with the dead through raps and knocks, after all, was only slightly more miraculous than talking with the living yet absent through dots and dashes; both involved subjects reconstituted through technology as an entity at once interstitial and uncanny" (Sconce 2000, 28). This way, spiritualism attempted to find its place by aligning itself to "electrical science" (Sconce, ibid.). According to Sconce, electricity had an animating power that also gave "the telegraph its distinctive property of simultaneity and its unique sense of disembodied presence, allowing the device to vanquish previous barriers of space, time, and in the Spiritualist imagination, even death." (ibid.) The concept of telepresence that would emerge much later can be traced to this 19th century shift in the meaning of "present" that allowed presence without physically being somewhere. However, the same shift in the concept of presence, along with mass reproduction techniques, also brought on the idea that "[the] presence of the original is the prerequisite to the concept of authenticity". (ibid.)

Between 1850 and 1860, the first truly spiritualistic journal was published in the US under the name of Spiritual Telegraph, reflecting the special merging of these two trends. Researchers of the era, such as Emmar Hardinge in 1869, used the concept of "spiritual telegraph" when describing the Fox sisters. This became prevalent because, as James Carey (2018) argues, the telegraph not only served as the material foundation for a new communications network but also "opened up new ways of thinking about communication within both the formal practice of theory and the practical consciousness of everyday life. In this sense the telegraph was not only a new tool of commerce but also a thing to think with, an agency for the alteration of ideas." (Sconce 2000, 27)

After 1860's, a whole industry emerged around modern spiritualism due to its rapidly increasing popularity: one could go to ghost photography, spirit lectures and a whole range of spectacular and social events. After a while, the communication technique used in séances also changed: automatic writing and trance speaking started to replace the manifestations that were inspired by the Morse code. The conjurors have also figured out artistic forms of expressing themselves that went beyond verbal elements.

Another important female figure of mediumship was the Italian–born medium Eusapia Palladino. She travelled a lot around Europe and the US and although she was debunked many times, important personalities used to visit her séances regularly, including Pierre and Marie Curie who participated at one of her séances considering it as a scientific experiment. In 1905, Pierre Curie told the following about Palladino's séance:

"It was very interesting, and really the phenomena that we saw appeared inexplicable as trickery—tables raised from all four legs, movement of objects from a distance, hands that pinch or caress you, luminous apparitions. All in a [setting] prepared by us with a small number of spectators all known to us and without a possible accomplice. The only trick possible is that which could result from an extraordinary facility of the medium as a magician. But how do you explain the phenomena when one is holding her hands and feet and when the light is sufficient so that one can see everything that happens?" (Quinn 2019). The way Pierre Curie saw this performance in the beginning of the 20th century helps us today in delineating the distinction between being a magician and a medium.

The way Palladino framed her séance is interesting from the perspective of experience design and theatre business: she charged 125 USD for a private evening séance (an astounding price at that time), but customers could also pay an additional fee in order to have Palladino visit their house where the conditions were determined by the host. (Fink 2010, 55)

Around this time the séances were held in private homes or in other places where the séance was held with a standardized dramaturgy that was based on practices shared with the séances of other mediums. Usually, a minimum of three and a maximum of twelve attendants were allowed for the two-hour event. These events all started with a short prayer, or a musical presentation such as singing the hymn or playing the piano. After this, the participants had to join hands around the table, creating an embodied relation among those who are there. It was also very important to stay in stillness, especially because this way they could focus their attention on "normal and known relations between bodies and objects [that] were transformed as the sitters felt, witnessed, and often recoiled at the levitation of the séance table and other materials." (Holloway 2006, 184)

According to J. R. R. Tolkien, this type of séance enchantments "produces a Secondary World into which both the designer and the spectator can enter, to the satisfaction of their senses while they are inside; but in its purity it is artistic in desire and purpose. Magic produces, or pretends to produce, an alteration in the Primary World. [...] it is not an art but a technique; its desire is power in this world, domination of things and wills." (Curry 1999, 401) The mediums were relying on the effect of this enchantment that existed in the liminal spaces where the private séances took place. As we have seen above, they designed a fixed, strict trajectory for the participants, but while ensuring that everyone received a personalized experience as much as possible in terms of the content of the performance (e.g. the identity of the ghosts.) In order to enhance this experience, they also relied heavily on environmental design. Atmosphere-creating was crucial for the private séances: the room had to be well-ventilated, and it had to be lit dimly or left dark. According to Natale, darkness was a required condition for the séances and "enhanced the sense that the relationship between sitters and mediums might have sexual implications." (Natale 2016, 47)

On the other hand, the séances in private places often enabled the "creators" to offer otherworldly physical encounters not only on the auditory, but also on the tactile level. Many participants' bodies were touched by corporeal spirits (e.g. during Daniel Dunglas home séances). Sitters also very often felt "psychic breezes". These tactile encounters were possible not only because the medium organized it, but also because the audience's perception was framed in a way that any environmental effect was interpreted as a spiritual meeting.

We can place the performances of the Davenport brothers in the middle of the above mentioned scale. They created a more elaborate performance style with atmosphere creating tools, such as by using musical instrument sounds. Ira and William Davenport held their spiritual performances in

a cabinet. Here on the walls many types of instruments were hanged. Before starting their trance, they asked their audience to tie them to their chairs. After this participative moment, the cabinet was darkened, and soon various kinds of instruments were giving out eerie sounds, proving that ghosts are around the audience members and they are trying to communicate by musical sounds. In some cases, the audience members were tied up too, so they cannot move. Various debunking campaigns were conducted against them: once one of the audience members put fluorescent material on the brothers' hands, so when they let themselves free in the dark and started to play on the instruments, they were visible to the audience members. Their act can be considered as a performance with special set design elements where spiritual séances are augmented with characteristics of 'real' magic, such as the escapist trick.

The nature of the séances as live performances required the same type of artist management as theatrical performances, but with the difference that they also had to emphasize the unique selling point of their production: the uncertain nature of their performance. According to James W. Cook, "one of the most innovative marketing schemes in nineteenth-century show business resulted from the discovery that a degree of uncertainty about the authenticity of an attraction would contribute to the arousal of interest in the public and the popular press." (quoted in Natale 2016, 3) Certainly this ambiguousness was supported by the prevalent belief in ghosts. This idea had a big effect on the entertainment industry, especially on performing arts. They made use of sensationalism in order to attract wider audiences: "the subject of attention was a 'living curiosity', a phenomenon that escaped normality to enter the dimension of curiosity and wonder." (Natale 2016, 4). This characteristic also highlights the relationship between mediumship and performance: "the mediums were often accused with trickery and fraud and were therefore highly controversial within the spiritualist field. Given the number of documented exposures of fraudulent mediums, it was easy for opponents of spiritualism to argue that mediums were actors who did no more than perform an act." (ibid.)

As the Davenport brothers' performances relied more on the sense of immersion, a trend for stronger atmosphere creating tools and more immersive environments was already in demand. Middle class houses were also suitable for accommodating private spiritualist performances, where more than 30 people could participate, and the medium could situate the table where she could comfortably move it.

On the other end of the scale of séance immersion is the personalized experience for a single participant. The most famous arrangement that could offer this was created by Zanzic. He became famous when he purchased a house in Chicago in 1893, that had many trap doors, slides and panels. He

created a so called “spiritualist studio” (as an early flyer named his haunted house). He installed secret telephones and other tools that could mislead people and give them the illusion that a ghost is there. He was working with the best forgers, magicians and performers. Houdini called him “charlatan supreme”. The house he purchased could enable him to create the eeriest séance that could give shivers to anyone. His most famous séance, which also happened to be his last one, was with a widowed German man. Zanzic convinced him that he can make contact with his wife. The magician arranged the house, set up a dim light, and by using many curtains and hidden slide doors he could create an eerie environment that offered many surprises. The magician hired a young sex worker and her role was to “perform” the wife. All went good, but in the middle of the night the German man got a heart attack. The sex worker who played the role of the wife started to scream and Zanzic and his helpers ran in. The crew tried to hide the body but they could not do it, and so the scandal escalated quickly. Later, Zanzic got involved in more mundane frauds unrelated to spiritualism. This story, if true, proves how strongly a real immersive environment was demanded by the believers of Modern Spiritualism and how magicians strived to attain this in order to create an immersive atmosphere. Although haunted houses started to be prevalent since the 1930s, the haunted house of Zanzic was one of the visionary precursors to this type of entertainment. (see Heller 2015)

Based on these examples, we can conclude that in order to create believable spiritual experiences, often the mediums either had to have some experience in being a performer or they had to have a natural talent for creating the feeling of trance and thrill. These various séances can be placed on a scale of how much they rely only on the performers skills of creating an atmosphere where the spiritual communication is enabled. On the other end of the scale there are sessions where a whole set design is created for the special trance and, as we have just seen, this experience can even be personalized for only one experiencer. One peculiar thing that all types of mediums did was creating a more augmented performance, meaning that they would try to incorporate the unrelated, coincidental things that would happen in the course of the session into their séance. This is very similar to today’s LARP–originated practices where the uncontrollable events coming from the outside of the magic circle can be embedded into the storyline in order not to break the immersion. This requires creativity and an ability to react quickly.

Another important aspect of these séances was that they were also social events where an audience of great variety could meet. This gathering was shaped by a tension and suspense that culminated in the waiting for meeting with the spirit. The audience was also curiously looking forward to these occurrences involving spiritual agents, as the authenticity of these was always questioned, though this did not mean that some mediums and their

audiences did not believe in the spiritual claims. It was an interesting mixture of theatrical event and religious ritual (with claims of authenticity) and this was a defining characteristic of these events. Through the phenomenon of trance, the performers "shaped a complex dramatic space in which theatrical performance mingled with claims of passivity and authenticity." (Natale 2016, 22) Due to the social aspect and the setting where the sitters had to situate themselves very close to each other, a sense of sexuality was also present in the séances as mentioned before, which was not a negligible aspect. According to Holloway, even though the mediums wanted to keep away any kind of sexual allusion, "male and female bodies, both material and immaterial, touched and brushed up against each other" and so "corporeal proximity and sensuous interaction between differently gendered bodies allowed a deferral of polite society's codifications of "respectable" bodily practices and embodied relations." (Holloway 2006, 183)

Magic shows and technologies of illusion / 4.2.1.3 /

Talking about the escape artists that came after the spiritualists, Mangan states that "in terms of performance traditions, the step from the world of escapology to that of spiritualism was not a large one. On a metaphorical level, there is clearly an element of 'liberation' in the spiritualist enterprise: both for the medium who escapes the limitations of the flesh, and for the spirit voices who are freed back into the world of the living. On a more mundane level, however, the escape artist and the stage medium shared a common heritage of performance, since many of the spiritualist acts of the previous generation were also effectively escapology acts. Bound and restrained in various ways in order to 'prove' that the spirit-effects could not be made by any human agency, the Victorian medium's act depended on an ability to free him- or herself surreptitiously. Houdini and his fellow escapologists simply made explicit and central what had been functional and implicit." (Mangan 2007, 162)

In the era of Spiritual Modernism "a whole new breed of conjuror appeared who claimed that what s/he did was quite genuine and, in doing so, provoked the wrath of those who had been trying so hard to distance themselves from any notion of real magic" (Lamont 2004, 906). As I have written above, Houdini and Maskelyne belonged to that group of magicians who claimed that they have nothing to do with spirits and they were only relying on themselves. They were expressively closer to secular magic (see During 2021, 152–153), the kind of magic that does not have any serious claim to

contact the supernatural, but rather relied the ego, charisma and the skills of the conjurer. Also, these conjurers were fighting against modern spiritualism. Houdini fought against it so actively that he even offended Arthur Conan Doyle (whose wife was an active medium).

With the rise of technology, magic tricks that relied on technological developments started to be prevalent. While the most famous is Pepper's Ghost, which is considered as a milestone even today, theatre performances were already experimenting with such technologies that could give a hint of magic to these performances.

The first noted innovation is from the Corsican brothers' performance from London 1852. The playwright Dion Boucicault planned to include many trapdoors and fake panels into the stage design in order to allow the actor his way in and out from the scene to make quick costume changes. The most remarkable trick was the Corsican trap that is a gliding trap, that was later widely used by theatres. (see Shattock et al. 2021)

Not only theatres but also the Royal Polytechnic Institution, which was opened in 1838 and supported brand new innovations, played a key role in presenting magic tricks: they displayed them for the public, organized lectures around the topic and this way the institution became a popular center for entertaining exhibits and demonstrations for wondering or marveling. Although for 30 years the institute was home to crowd-pleasing shows, they were very much dependent on sensations more than any other theatre in London (Steinmeyer 2005). Its director was John Henry Pepper who regularly visited patent presenting fairs. He saw once the engineer Henry Dirck's patented invention called "Phantasmagoria", an invention that mainly aimed at the theatres and was meant to help them create optical tricks. Its technique relied on optical illusions, reflecting an action of the performers in an eerie, semi–transparent looking way from another part of the stage invisible to the audience. Because Dirck thought of his invention in a specific way (that the invisible part should require a total reconstruction of the theatres) he was not very popular as an exhibitor. Pepper became interested in phantasmagoria, and when he was experimenting with it together with Dirck, he realized that a different setup for its installation that did not require the reconstruction of theatre stages was possible. (The invention remained alive under the name of "Pepper's Ghost" and not Dirck's "phantasmagoria", even though Dirck tried to save his name for a while.)

The basic mechanism of Pepper's Ghost is a stage illusion, based on the optical beam splitter (usually a large, flat sheet of glass), that was operated in reverse in order to combine two images towards the spectator's point of view. Two images are merged on the surface, one that comes from under the

stage and the other that is an image of the scene itself. The reflected image (that can be enhanced by stage lightning, which can also make the reflection surface totally invisible) is usually a bit more transparent, giving a ghost–like nuance to the figures. (Steinmeyer 2005, 51)

This and similar creations offered the audience the sensation that they see something extraordinary which was created without any occult assistance. The basic methodology of Pepper's Ghost and other similar tricks was that they used optical illusions and they manipulated the audience's attention, so they could not figure out exactly how a trick was done. In the era, engineers and inventors were regularly visiting each other's magic shows and whenever they saw a new trick, they thought of scenarios about how these were made possible. But besides them, regular audience members were also visiting these stage design shows in order to have a feeling of marvel and shivering.

Optical illusion tricks often relied on mirrors or reflective glass. In the case of Pepper's Ghost, the glass was used to reflect something that is not on the stage, the reflection could place an object in a space where it is not expected to be. On the other hand, a mirror can also reflect emptiness. This was the case in Houdini's famous tricks where he made elephants vanish: An elephant would enter into a trailer and vanish in a couple of seconds, thanks to a mirror that is situated in the trailer in a particular angle, which made it seem as if the trailer would be totally empty, while the elephant is behind the mirror. (ibid., 243)

Another famous type of trick, that is still very prevalent, is mindreading tricks. The legendary Robert–Houdin was performing under the name of "Second Sight". While his blindfolded medium was sitting on the stage, Robert-Houdin gave instructions to the audience via sentences that also carried a code for his assistant, as in "Here's an interesting object. Yes, please hand it over. I'll ask you to concentrate on this."). He never mentioned the object, but by some words, the medium could figure out which object he is holding. An even more mysterious version of this was presented by Charles Morritt and his sister Lilian Morritt. Charles Morritt, who was usually very talkative, became very silent during this trick, he was only saying "yes, thank you, yes, thank you". This simple and monotonous rhythm and the accuracy of how Lilian guessed the objects were making their audience totally believe that the siblings have the capability of clairvoyance. (Later, a magician named Hercat together with a captain of the United States cavalry figured out that it was about timing, where the length and the structure of silences between words or sentences codified the message, like an inverted Morse code.) (ibid., 122)

While these methods are still widely used in contemporary magic, in terms of new technology Pepper's Ghost is the most famous forerunner when

bringing up examples about how technology can mesmerize the audience. The invention can be considered an early model of the hologram. Nowadays this trick is still used in Disneyland theme parks as well as in concerts.

The rise of secular magic in parallel with technological developments was not a coincidence: As Carolyn Marvin remarks, by this time "it was clear that science could do magic better than magicians." (Marvin 1988, 61) She adds a deeper moral to this observation: "What could be trusted was detached scientific knowledge originating in considered texts, able to produce not only the effects of the old magic, but other effects that the old magic could never produce." Consequently, magicians and engineers started to invent more and more spectacular shows to amaze the audience. These spectacular effects that were later used by others (e.g. Disney) also had a strong immersive effect. We will have a closer look at how magic relates to immersion in the next chapter.

For reasons of space, I will not be describing these productions' timeline in details within the frame of this thesis, but it's worthwhile to explain how the famous Pepper's Ghost functions, as it represents a prototype that spectacular magic shows that use new technologies have been relying on since then. All of the productions discussed so far and the contemporary productions that I will discuss and analyse in detail later have a similar characteristic: The audience members know that they are or they might be tricked: they see an illusion, but they prefer to stay in this illusion, to maintain the feeling of shiver.

With World War I, the public became more acquainted with technological horrors, and the audience somehow became immune to the idea of death, and consequently the content and the form of entertainment became nastier and fiercer. As Will Goldston wrote, (quoted in Steinmeyer 2005, 219) "The demand in entertainment, after the war, was for noise and excitement. Those magicians who were able to adapt their programs to meet the new condition did well, but they could not re-establish magic in all its old prestige."

In 1921, famous magician Selbit also premiered a trick which was a turning point in magic, the Sawing Illusion, where he sawed a woman into two pieces. Similar to the misunderstanding surrounding Dirck and Pepper's joint innovation, there also emerged a misattribution regarding the originator of this illusion: Horace Goldin immediately performed a very similar trick in the US, only that he also showed to moving legs of the sawn woman to the audience members. Even though Selbit tried to sue him, Goldin's trick was significantly different, so Goldin could not be accused with plagiarism.

Later, magicians had to face a new challenge: the television's availability to the masses. In the 1950s, they had to face the fact that they somehow had

to adapt to television in order to survive, which had its own difficulties in case of magic, especially given the natural suspicion towards TV technology. So that viewers would not think that a trick is done by some editing mechanism or special effect, magicians sought for ways to convince the television audience that they were performing real tricks without the aid of TV technology: They had their tricks carefully photographed with continuous and long shots and they even made live shootings in front of live audiences, so they could guarantee that the magic was actually happening in real life.

MAGIC AND IMMERSION / 4.3 /

There are many parallels that can be drawn between magic and immersive performances on many levels: sense of impossibility and wonder, illusoriness, and cognitive absorption. Researchers from many fields such as HCI, theatre, theme park studies and VR have recently been discussing this fruitful parallel. Steve Dixon, for instance, sees theatre as a virtual reality "where actors imaginatively conspire with audiences to conjure a belief" (Dixon 2007, 363). Leddington points at a similar parallelism when he suggests that "To depict an event as though it were really happening is neither to depict it as happening in some other possible world nor to depict it as happening at some other time. Instead, to depict an event as though it were really happening is to depict it as happening now, in this world—usually, wherever the act of depiction takes place. In this case, what is depicted is depicted as actually happening right in front of the audience, perhaps even to the audience. Consequently, to depict events as though they are really happening is to break the theatrical "fourth wall" between the audience and the action on stage. In this respect, the magician resembles the stage actor less than the standup comic, who speaks directly to the audience, and whose act, even if scripted, often incorporates improvisatory and audience-interactive elements." (Leddington 2016, 254) Researchers such as Tognazzini (1993), Kumari et al. (2018) and Kuhn (2019) have taken up the idea that we can use the science of magic to study different complexities such as video games, while, on the other hand, the media of VR has started to be used by magicians, as in Derren Brown's VR ghost train.

In Chapter 2, I discussed how for VR the concept of immersion relies on the properties of the system, and how, by its characteristic of transportation, it invokes a certain feeling of impossible related to the experience of wonder.

In the following I would like to explain how the effects of immersion can show similarities with the effects of a magic trick, focusing on examples from VR.

In many magic tricks, there are visual clues which indicate that something impossible and unbelievable has just happened in front of our eyes, inducing conflicting beliefs in the viewer (see Kuhn 2019) In perceiving a magic trick, a subject, even if she believes at the rational level that she is spectating an event that is meant to be illusory, still produces cognitive and behavioural responses that are caused by a surprising, counter–intuitive violation of physical law. This is similar to the cognitive state where the user of an immersive VR experience understands rationally that he or she is in an immersive environment, but her body can give reactions that do not match with this understanding, such as muscle reactions. That is, even if the experiencer is fully aware of the illusory nature of the immersive environment, she nevertheless produces some behavioural and cognitive responses as if she took the environment as not virtual but real. Leddington (2016) states that the audience of the magic performance acquires what Szabó Gendler calls a belief–discordant alief, a belief–like state where the behaviour of the subject is in disharmony with her consciously–held beliefs (Szabó Gendler 2008). Belief–discordant alief "immediately produces cognitive dissonance in the spectator" (Leddington 2016, 258): the participants of an immersive VR production also undergo similar cognitive and emotional states. These can be followed by spontaneous actions, "none of which necessitate a belief in the realism of the environment" (de Gelder, Kätsyri, and de Borst 2018).

Continuing with the parallel between magic and immersion, another similarity that can be pointed out between the two is a similarity concerning the nature of beliefs that are held when undergoing experiences of magic. Encountering magic does not involve passive "suspension of disbelief" but rather an active disbelief: the audience should actively disbelieve that what they are witnessing is a possibility. (Leddington 2016) De Gelder et al. (2018) similarly suggest that the experiencer accepts the "dual reality of the affective experience in VR". This is similar to accepting the dual reality of a magic trick, or similar to responding to it as what Lamont (2017, 5) calls a "seemingly impossible event". The magical experience is not unexpected; the audience's attention is guided in a way that creates expectations about what will happen. The attention of the participants of VR experiences are similarly drawn to what they should anticipate: they can understand that putting on the VR headsets and controllers will enable them to be in an immersive artificial world, a simulation, the truthfulness of which depends only on their imagination.

Another key point about magical experiences is that while "the experience of fiction requires imaginative success", the experience of magic, in contrast, requires an "imaginative failure". The design of a magic trick is about luring the audience to imagine how the trick is done, but while at the same time continuously preventing them from actually succeeding in imagining it. Leddington (2016, 260) also draws our attention to the importance of knowing the audience's cognitive resources and to the fact that the magician's job is "to anticipate explanations the audience is likely to consider and to develop a performance that 'cancels' them", and also to the design consideration that "performing for, say, a group of engineers may impose different demands than performing for a group of vision scientists." (ibid.) According to Peter Lamont, the experiencer of magic acquires a sense of wonder in response to a seemingly impossible event "that we understand to be an illusion, but the process through which this is achieved now invokes a greater number of possibilities going through our head, and a greater awareness that the magician is attempting to misdirect not only our eyes, but our thoughts." (Lamont 2017, 3)

In VR it is possible to find a parallel to this imaginative failure. VR, like magic, elicits a "how is this possible?" type of response. This is, of course, partly because the spectators do not necessarily understand the enabling mechanisms, as the deeper layers of the enabling technology is transparent. However, this is only a superficial element in the "how is this possible?" response. It results mainly from the novelty of the technology, and we are often not so much curious about the details of the underlying technology (the hardware and software) in a way that we are curious about the mechanics behind a magic trick. What we are curious about is the design aspect: we want to see how high the level of immersion is, and we wonder about how it is possible that such successful immersive environments are designed, in a way that we are curious about the skills and well-kept secrets of the magician while at the same time not wanting the magician to reveal the mechanisms, as this would terminate the performance. In VR experiences, and also in analogue immersive performances, we experiment with various actions (bodily movements, exploring the physical environment and the storyworld, improvisational verbal interaction with the performers) to test the limits of immersion, to see whether the sense of immersion and impossibility will break down at some point; some participants do this more consciously and try to push the boundaries, but these actions also include the ordinary actions of the "well-behaving" participants as they explore the immersive environment. A successful immersive production is one that offers a great variety of such attempts but cancels each and every possibility where the illusion could break down, like a magician cancelling every possible explanation to sustain the sense of impossibility and the sense of wonder.

In Daniel Kehlmann's novel *Beerholm Vorstellung* (Beerholm's Show), a magical experience is described as having a long-term effect on the way the audience perceives the world. The protagonist describes how he experienced the environment totally differently after attending a show by his magician idol Jan van Rode. The same can be said for experiences of strong immersion, where the experiencers feel that their senses have changed after experiencing the production. In case of VR experiences, this might be because our perception and sense of embodiment is affected by the virtual reality environment and the computer-generated imagery. But this can apply to analogue performances too: My own experience has showed that after a performance of 5 to 12 hours during which the participants are continuously exposed to various types of interaction in a world that has different rules than our everyday life environment, the sense of embodiment is also affected on physiological and psychological levels.

As I noted before, one important reason why science of magic has the potential to offer a suitable framework for studying immersive experiences is that it offers two important tools to analyse magic tricks. The tricks can be described based on their effect (what effects do they have on our cognition) and their method (how they are made). Immersive experiences can also be described in a similar way: while the audience members or participants perceive the multisensorial space, the creators are using various methods to create this illusory experience.

One common aspect of magic tricks and analogue and digital immersive experiences is that both offer an experience of cognitive absorption. In video game studies cognitive absorption is widely discussed (for example in Agarwal and Karahana 2000), and in performance studies we find works such as Bruce McConachie's *Evolution, Cognition and Performance* (2013) that relate to the topic, where he discusses conceptual blending with the concept of 'suspension of disbelief' in the background, in order to provide an explanation for the general duality of theatre: He states that 'to describe this process [of conceptual blending] at its most fundamental level, when an actor plays a character, she is able to blend a concept of herself with a concept of the character to be played' (McConachie 2013, 20). This constitutes a good starting point because the immersive experiences that I discuss throughout this thesis also "script the interactor" into the plot (to borrow Janet Murray's useful term, by which she means that an interactive story should include a guidance, a script for the audience so that they can be fully present in the story). This means that the audience members, just like the actors, can feel the same blend of themselves and the specific role that they have to take on when stepping into these environments.

MAGIC, INTERACTIVITY AND THE FALSE SENSE OF AGENCY: DECISION MAKING PROCESS, FREE CHOICE, "AGENCY OVER ACTION AND OUTCOME" / 4.4 /

In the previous chapter, while I discussed agency in the context of the nature of interactivity, I focused more on how the experiencer's choices and their interactions can offer a certain sense of agency for them. In this section, I will point out how our sense of agency is prone to illusions and how magic tricks rely on this to achieve their effect. This might be another point where the science of magic can inform us about our cognitive mechanisms, and consequently, inform us about how to design more immersive productions.

Agency and the illusion of agency

While in the case of immersive theatre the participative character is obvious, in the case of magic shows it may not be immediately so, but I will explain why I consider them participative. While theatrical formats have their own approach to interactivity (a point that I will discuss later in this chapter) magic shows do not tend to have a high interactive feature. In literary text and in traditional theatre performances, the recipient is invited to use her imagination to visualize the depicted events, which might even be impossible in the real world, but in magic performances "impossible events actually appear to happen." (Leddington 2016, 257) Magicians, except for séance holders, do not want the audience members to *believe* that what they see is real, and "the audience must believe that what they are apparently witnessing is, in fact, impossible." (ibid., 256) In order to create the sense of impossibility at the dramaturgical moment when the magic happens, magic shows have to be highly prescriptive (and also replayable) and have to bring the audience very close to the performance, because further away the magic happens, the more difficult it is to produce the magic. As Leddington states, "Spectators are likely to believe (usually correctly) that if they had a closer look, they would see through the illusion. Thus, 'stage magic' is almost always less powerful than 'close-up magic', which takes place right in front of the spectator and more easily leaves the impression that everything is open to view." (Leddington 2016, 259) The spatial proximity brings the first aspect of participation to magic shows, but in some magic shows the audience becomes a participant by

being involved in various actions that are necessary for the trick to be played out (going on stage, picking a card, etc.) – and in this section I will focus on this kind of participation and interaction.

We like to believe that we have control over our actions and our environment, but we can be a victim of an illusory sense of control, not only regarding our control over our environment but also over our cognitive processes and actions (see Langer 1975; Sweeney et al. 1979 Wegner et al. 1999). "The experience of will is like magic" as Daniel Wegner and Thalia Wheatley (1999, 489) state. "The experience of will is the way our minds portray their operations to us, not their actual operation. […] The real causal mechanism is the marvellously intricate web of causation that is the topic of scientific psychology." This means that our sense of free will is easy to manipulate. We may have the feeling that our thoughts are the cause of an action also in cases where they are not the cause. According to Gustav Kuhn's interpretation of the results of Wegner et al., in order to have the experience of conscious control of an action (even if that action was caused by a factor from the outside) three conditions have to be fulfilled: "(1) the thought of the action must appear in your consciousness immediately before the action; (2) it must be consistent with the action; and (3) it cannot be accompanied by any conspicuous alternative cause of the action." (Kuhn 2019, 165). This latter one can be called the *principle of exclusivity*. It is what makes us feel like having total control and gives us the illusion of agency. On the other hand, there are also cases at the opposite end of the spectrum, where one can have an illusory feeling of control by another agent on one's own thoughts or actions, as in the phenomenon of thought insertion that we find in schizophrenia, hypnosis and in some performances of magic. In stage magic practice, mentalism is a separate branch that involves mimicking the patterns of unusual mental phenomena like telepathy or thought insertion.

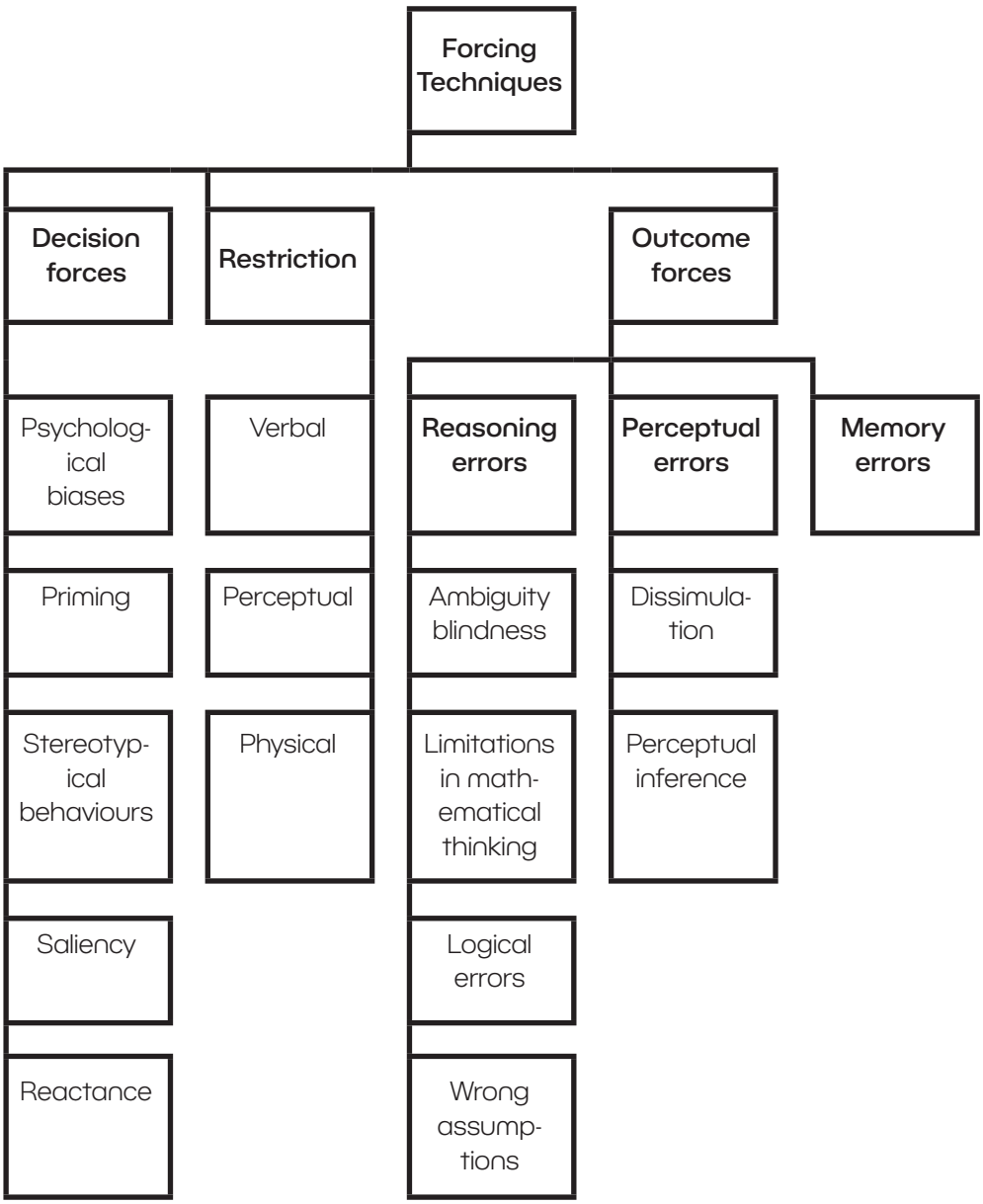
Even though the existence of perceptual illusions is easily demonstrated and well–known, "our conscious experience of agency is just as malleable." (Kuhn 2019, 166). Moreover, Diego Shalom and his colleagues proved that participants do not observe the difference between choices that they made with their free will and those that they made as a result of psychological force (e.g. "Freely choosing a card in a riffle was heavily weighted by the position of the card, with the majority of subjects opting for one of the last two cards of the deck." (Shalom et al. 2013) – which implies that there is an illusory type of agency involved in the latter case. According to Pailhès and Kuhn (2020) people can also experience an apparent action causation, which provides the illusion that our actions caused an unrelated outcome of the event sequence. They state that "it is possible to experience an illusory sense of agency over an event outcome even when the deception is fully transparent" (Pailhés and Kuhn 2020, 4), which means that we usually ignore inconsistencies.

In what follows, I will describe various types of forcing techniques that involve our interactivity without letting us observe what is actually happening around us and how our senses, thoughts and feelings are manipulated. In their taxonomy of forcing techniques, Pailhés and Kuhn rely on the list by Theodore Annemann (1933), who was famous for reinventing mentalist techniques in the beginning of the 20th century. Although he had a very short life, he wrote many practice books for magicians and many mind manipulation tricks are still based on his descriptions. He also compiled a volume where he listed *202 Methods of Forcing* and the examples he gathered still represent a good pool for choosing techniques: Unprepared and prepared cards, deck changes, number forces and miscellaneous forces, and many others.

Forcing techniques

There is no overarching definition of what forcing techniques are. In these techniques the magician's aim is to influence a person's choice without the person's awareness. It is usually framed in a scientific framework, as in the case of Darren Brown's "unconscious priming technique". An efficient forcing technique has two key features: It has to affect the participant's decision, while the participant has to feel that he or she has the free choice and is in control of what they get. It is important that the spectator does not realize that his or her decision was influenced as it would make the magical effect vanish. Sustaining the illusion is very important, and "spectators generally fail to notice that their decision has no impact" (Pailhés, Rensink, and Kuhn 2020, 2).

Pailhés and Kuhn (2020) divide their taxonomy of forces into two categories. (As a psychologically–based taxonomy of magician's forcing techniques, it does not include the kind of methods where the magicians mark the cards or rely on similar tricks.) The first category consists of "decision forces" which "rely on directly influencing the spectator's decision". The magicians covertly manipulate or influence the audience's decision. Among these techniques are the visual saliency of the target card or subtle gestures that prime a specific card. These techniques have been empirically investigated and they are highly effective, but it is not guaranteed that they will work, and therefore magicians have to have a plan B. The other category consists of "outcome forces": the magician offers the possibility of a free choice to the audience while the choice has no influence on the outcome of the trick. Here it is guaranteed that the audience members will end up with the forced item, therefore magicians rely on these forces much more often.



(Source: Pailhés et. al. 2020)

Decision forces

Decision forces can be psychological biases and restrictions. Psychological biases rely on our natural behaviour and magicians take advantage of them by manipulating the context or by using the four psychological principles: priming, stereotypical behaviour, saliency and reactance. For example, verbal and non–verbal primes can have significant impact on card choices. Pailhés et al. suggest that "this type of technique opens the door to many interesting opportunities to investigate phenomena such as priming with gestures, the influencing of thoughts and decisions, and the failure to notice that choice

is being manipulated." (2020, 5) Stereotypical behaviours have been known at least since 1894 when Binet observed that magicians "often exploit spectators' 'laziness' without the spectators becoming aware of it." (Binet 1894) Our stereotypical behaviours include both mental selections and bodily actions. To the first category belong cases such as those where the audience members have to name a number between 1–10, in which case they tend to choose 7 (when 3 is excluded). To the second category belong cases such as those where the magician asks us to pick one card among four, in which case we tend to choose the 3rd from the left (if we are right handed.) Visual saliency is also used in a very subtle way, like showing the target card slightly longer than the others.

Reactance and Restriction

"*Reactance* is the psychological process which occurs when one's freedom is perceived as threatened, and one then acts to re-establish this freedom" and "the spectator tries to maintain their freedom of choice by choosing the least obvious / most odd card—and in doing so, ends up in the trap" (ibid.). *Verbal restrictions* can also be used, e.g. when the participant is asked to name a number within 1 and 10 and this narrows down their choices to 8 numbers. These restrictions can also be *perceptual or physical*.

Outcome forces

When using the techniques in the "outcome forces" category, the magicians do not want to influence the choice of the spectator, but rather rely on controlling the impact of the participant's choice. In these cases, the decision of the spectator does not have any impact on the outcome of the trick and neither do they know that their decision does not matter at all. These can rely on *perceptual errors*, for instance when the chosen card is switched. Another technique that evokes an illusory sense of agency is the *dissimulation* or *choice blindness:* Here the magicians carry out hidden deceptive procedures that camouflage the switch between the participant's choice and the magician's desired choice that changes the outcome. In the case of encountering such a trick, the audience members "accept the switched outcome as [their] own." (Pailhés, Kumari, and Kuhn 2020) A similar mechanism is involved in *errors in perceptual inference*. These errors can happen in the case of some card mixing tricks, such as those where the spectator is asked to stop shuffling and therefore suffers an illusion of agency, while in reality the card is just prepared to be shown. *Memory errors* constitute yet another category. In the famous

Criss Cross trick, where the spectator has to cut the cards, the magician distracts them by engaging them into a conversation, and when the magician "reveals" the chosen card the spectator actually misremembers her choice. According to Pailhés et al. "the key mechanism appears to be attribute substitution, a heuristic in which people replace a complex and unfamiliar event with a simpler and more typical one. Applied to the Criss–Cross, this means that spectators substitute the unfamiliar cutting procedure with a more typical one, 'remembering' that they cut to a card and got this one." (ibid.)

Besides these, there are reasoning errors and ambiguity blindness (e.g. when the audience members do not recognize that their answer can be interpreted in various ways, a technique that might prove to be very helpful for future IDN production design guidelines. A famous example for this is the Equivoque technique, where the magician predetermines a target card and offers to the spectator a set of free choices. The magician is asking the audience member to choose from a set of cards by touching one of them, and if the desired card is not chosen, then with the right textual accompaniment the magician eliminates the touched card. The magician can deal with the unpredictability of the audience member's choice thanks to the ambiguity of wording (e.g. not asking the audience member to "pick" a card, but to "touch" a card). In their study *Mind control tricks: Magicians' forcing and free will,* Pailhés and Kuhn (2021) show that participants who were subject to Equivoque technique "experienced illusory sense of agency" and the participants felt that their decision had actually an impact on the output. The Equivoque technique maintains its effect even when it is repeated in a slightly different framing, even though the golden rule of magicians is not to repeat the same trick with the same method.

Other types of forcing are tricks that use mathematics or logic (relying on limitations in mathematical thinking and logical errors), and these work mainly because the audience members do not have the appropriate information or knowledge.

The techniques listed above can be used by the creators of immersive experiences. Magic can find itself a home in the performing art genre, but magic tricks are not yet recognized and extensively utilized in theatre, even though video game designers have already started to rely on them (as it can be observed, for instance, in role–playing video games.) The higher demand for stories in video games and in the field of interactive digital narratives puts a higher pressure on creators to create an abundance of stories. This is an extra amount of work for the creators, while only few players can explore it. To combat this, a research carried out by Fendt et al. (2012) has demonstrated that the "typical player is not able to appreciate this rich content, since only a small amount of the player content is explored". The researchers showed

that reducing the number of branching stories "is possible and most of the player's sense of agency is preserved in this reduction". The problem was also connected to the science of magic, with the authors suggesting that this problem in game design can be combatted with the "identical choice" type of tricks (Kumari et al. 2018).

DESIGN SUGGESTIONS FOR IMMERSIVE PRODUCTIONS BASED ON MAGIC / 4.5 /

I will conclude by proposing four design suggestions concerning how immersive productions could rely on the science of magic to enhance their immersive effect, relying partly on the body of work that I have discussed in this thesis, and partly on my hands–on experience in designing my own VR experience *Don't You Dare* (expected release: 2023). Some of the suggestions are based on work by Kumari et al. (2018), but while they connect strategies in magic with video games, the suggestions can apply to most types of immersive productions and environments, such as analogue immersive theatre and VR. These suggestions can also help designers maintain the sense of immersion for non–first–time users and their "positive reappraisal of arousal and affect" (Vorderer and Hartmann 2009), given that the "wow–effect" of VR is diminishing after the first experience with the medium. (Shapiro and McDonald 1992)

1 / Perceptual causality.

The principle of perceptual causality is used by magicians "not just to create illusory causation, but also to surprise the audience by violating existing causal expectations or establishing then breaking new ones." (Kumari et al. 2018) This principle can also be used in immersive environments to help with the presentation of a believable world where various interactive acts can create the sense of magic in the experiencer (such as specific movements with a virtual object which can have a surprising effect due to the use of the imaginary affordances of the objects in the VR environment.) Designers of immersive experiences can benefit from looking into various ways this causality is established in magic shows.

2 / Being always one step ahead of the participant's problem–solving strategy in order to achieve a surprise effect. (Kumari et al. 2018)

This point is related to the above-discussed feature of magic shows where the magicians create and then cancel various explanation possibilities. Magic shows present a large repertoire of these strategies. However, it should be noted that achieving the surprise effects should not be done by complete randomness. As Marie-Laure Ryan notes, the technologies should have a degree of "predictability of the response [which] demonstrates the intelligence of the system. The user must be able to foresee to some extent the result of his gestures, otherwise they would be pure movements and not intent-driven actions." (1999, 123)

3 / Offering the impression of free choice, which would help the experiencer to have a sense of autonomy.

As I have also discussed above when presenting forcing techniques, magicians offer various choices to the audience, creating a sense of autonomous participation even though the outcome of the trick is predetermined. The relevant findings of cognitive psychology are already used by video game designers as I discussed it earlier. Kumari et al. 2018 present a detailed list of such techniques. These techniques, along with the forcing techniques I listed above, can be used to create the illusion of free choice (also taking into consideration the discussion about agency I presented in Chapter 3.), for instance when designing trajectories that should be followed by the audience.

4 / Staging the transition process from the initial environment to the immersive virtual reality environment.

I have previously discussed liminality, onboarding and the LARP practices' use of the magic circle. Even though magic shows often do not include a process in the beginning of the show which can be considered a parallel to onboarding, presenting each magic trick includes guiding the viewers' attention in a way that prepares them for entering the realm of the impossible, and the above-mentioned attention-guiding and atmosphere creating mechanisms from stage magic and séances can also guide the creators of immersive productions in designing transition processes.

In this chapter, I presented the historical context of magic shows and séances along with the atmosphere-building and attention-guiding mechanisms that they make use of, and I drew parallels between these performances and immersive environments. I have argued that magic (and science of magic) deserves more attention from designers of immersive productions due to these parallelisms. Magicians have extensive expertise in creating magic tricks that use suspense and mystery in order to raise the audience's curiosity and to surprise them. They have a long history of expertise in studying the audience's attention and emotions and they carefully build up their tricks in order to create the sense of surprise and thrill with a proper, well-calculated dramaturgy. Hence, magic has the potential to provide inspiration for designers of immersive performances and environments. In the next section, I will focus on the genre of immersive theatre.

IMMERSIVE THEATRE / 5 /

"Immersive theatre" is not any theatre performance that happens to be immersive. As I have discussed before, many artforms have some degree of immersivity, as I will also soon discuss in the context of traditional theatre. In this chapter I will outline the constitutive elements of immersive theatre and try to show that immersive theatre is a genre of its own, with its defining characteristics. I will offer a brief history of immersive theatre and compare it to traditional theatre, installation art, performance art and video games, and then I will discuss onboarding mechanisms along with worldbuilding and atmosphere-building elements in immersive theatre. I will try to show that in immersive environments interactivity is an outcome of our curiosity, which is, in turn, an outcome of uncertainty. I conclude by arguing that a very important, distinctive element of immersive theatre is active performance on the side of the audience which makes them active elements in the storyworld rather than passive observers.

WHAT IS IMMERSIVE THEATRE? / 5.1 /

In this section, I will outline important definitions of immersive theatre that can help us get a better grip on what immersive theatre is, and I will also offer a list of what I see as key characteristics of the genre. There is a very strong theoretical interest towards immersive theatre (Babbage 2009; Machon 2007; 2013; White 2013; Dinesh 2016; Frieze 2017), and while many use Punchdrunk company's productions as the main starting point for a discussion of immersive theatre, in the next chapter I will be drawing attention on another company, SIGNA, which is important for bearing some characteristics which are worth discussing and analysing.

According to Josephine Machon, who studied Punchdrunk's practice in depth,

"Immersive theatre is discernible as that practice which actually allows you to be in 'the playing area' with the performers, physically interacting with them. This can extend to sensual engagement via a clever use of intimate sound in headphones, despite the action being geographically separate to you. The direct participation of the audience member in the work ensures she or he inhabits the immersive world created. This live(d), *praesent* experience, the participant's physical body responding within an imaginative environment, is a pivotal element of an immersive experience and a defining feature of immersive theatre. Where virtual or mediated technologies are employed these accentuate sensual involvement and playfully manipulate a visceral–virtual perception. This creative agency, involving processual interaction through the experience, shapes the unique journey for each participating individual." (Machon 2013, 68)

Rose Biggin defines immersive experience as "a sensation of complete engagement to the point of forgetting anything outside the immediate moment" (2017, 13), while immersive theatre is "a genre of theatrical work in which certain audience configurations might be expected, but in which immersive experience itself can only be allowed for, not guaranteed." Theresa Schütz defines the term immersive theatre as a genre–like umbrella term for all contemporary performance installations which fulfil three criteria. According to Schütz, productions that are immersive are those that "(1) create fictional worlds actualized in large–scale site–sympathetic environments, that (2) involve activated 'spect–actors' in a certain role or function, and that (3) transgress the traditional boundaries of illusionistic performance through 'real' interactions and intimate encounters." (Schütz 2019, 179)

While many researchers have offered definitions of immersive theatre and immersive experiences, Adam Alston states that immersive theatre is a "loose term", which "can describe practices that precede the currency of the immersive moniker, just as understandings of immersive theatre will probably – hopefully – continue to evolve as practitioners' experiment with audience engagement." (Alston 2016, 6). Other researchers even avoid to define immersive theatre: James Frieze, the editor of *Reframing Immersive Theatre – The Politics and Pragmatics of Participatory Performance* (2016), does not address the problem of defining immersive theatre in the book's introduction; rather, he simply calls it "participatory performance", which makes it unclear whether he considers the two as separate genres or not.

Characteristics of immersive theatre / 5.1.1 /

Adam Alston (2013, 130) states that "Once spectatorship is acknowledged as an embodied and potentially affective activity, all theatre and performance is, or at least has the potential to be, an immersive activity." Even though this statement could be used as a springboard for our discussion, it is too broad as it includes a large variety of interactive theatre formats, so for our current purposes it should be narrowed down to the genre of immersive theatre performances. The approach of Doris Kolesch's can be useful for this purpose. Even though it might be subtle, it exactly points out where immersive theatre performances could re-define themselves in contrast to other types of commercial immersive productions made purely for entertainment. "Immersion is much more about a subtle choreography of diving in and surfacing, about the play of illusionment and disillusionment. Next to their perceptual intensity, a distinguishing characteristic of many contemporary immersive experiences is also their physical-corporeal dimension, whether it creates disorientation, dizziness, shock or (the impression of perfect) bodily control" (Kolesch 2019, 9) and she emphasizes how important it is in artistic practice to always change the perspectives of the participating audience, and the importance of occasionally revealing the "interface" of the immersive performance, by creating disorientative sensations or even dizziness. (In the next chapter, I will be analysing a performance where, in the level of the story arc and in the level of intimacy between the performers and the participants, these disorientations, shocks, and states of illusionment and disillusionment can be observed.)

Many researchers refrain from offering specific definitions, but I believe figuring out some common characteristics of immersive theatre productions can help us to understand the genre, see how it differs from traditional theatre, and study it in better light. Below I present a list of these characteristics, developing on the work of above-mentioned researchers.

1/ Panoramic 360-degree physical environment (however limited), where the set-design which the performance takes place can be explored in very fine detail by the members of the audience, enabling the spatial storytelling to unfold.

2/ Involves all senses of the audience members, that is, it involves not only the visual and the auditory senses, but also the senses of touch, taste, warmth and cold, and even the sense of balance, in order to create a strong immersive effect.

3 / The medium of immersive performance bears no meta-reference (for example it is not an adaptation and it is not based on an existing well-known narrative, e.g. a Shakespeare play) – which I will talk about more in Chapter 6.

4 / Anything that independently happens in the vicinity of the performance (such as the ambient sound from the surrounding environment) can be integrated into the storyworld of the performance.

5 / The performers of an immersive performance don't have a fixed text, but rather a well-defined character, which they express through improvisation and interacting with the members of the audience.

6 / The audience can have the sense that they have some control over the plot, even if this sense of agency is only illusory.

7 / These performances also have a lawbreaking characteristic, that is, the participants abandon their everyday social boundaries and rules (which is related to the sociological point I mentioned before, that most people who attend these performances are not ordinary theatre-goers.)

8 / A common characteristic of these performances is intimacy, which arises (usually) from interpersonal relationships and interactive practices, and which is a crucial element in the formation of the atmosphere, creating a compulsory need for the audience to have a participative attitude. I also find the practice of intimacy (especially in the context of LARP practices) a discursive practice, especially due to the close body encounters that happen in spontaneous ways and that offer the possibility for expressing deep feelings even between two strangers who have just met for the first time. Also, we should note here that contrary to what Murray (1997) suggests, masks might constitute an obstacle for the sense of intimacy. While in some of the performances by Punchdrunk the audience members have to wear masks, in SIGNA this is not practiced in order to assimilate the audience members into the performance world better and offer possibilities for spontaneous and boundaryless conversations.

In the next chapter, we will see how SIGNA's performance fulfils all these characteristics. But it is not a necessary feature of immersive productions that they possess all of these characteristics at once. Not all immersive theatre productions or productions that aspire to be immersive have all of the characteristics above. Immersion and immersivity are graded phenomena. The more of these characteristics a production has, the more immersive it is; and the more immersive a production is, a stronger sense of impossibility it provides. As Machon also points out, the context and form of various productions that are called "immersive" can vary, but a main factor that "defines the experience as totally immersive is the fact that the audience are integral

to the experiential heart of the work and central to the form and aesthetic of the event." (Machon 2013, 72) When describing immersive theatre productions Machon relies on a distinction made by Calleja (2011), who has also offered a taxonomy for immersive theatre productions by taking into consideration various types of immersion: immersion as transportation can be found in performances that engage their participants fully "in terms of concentration, imagination, action and interest" (Machon 2013, 62); while immersion as transportation can be spotted in the kind of performances where the experiencers are "imaginatively and scenographically reoriented in another place." (ibid.) These performances "afford actual, physical cohabitation and contact between human bodies, thereby fusing imagination, interpretation and interaction." (Machon 2013, 63) Machon also describes a third category which comprise theatre performances that have a total immersion effect on the experiencers: this category involves both types of immersion mentioned above and leads to an uncanny recognition of the participant's own presence within the production: "Where total immersion occurs, there is always the experience of formalistic transformation in that the audience–participant is able to fashion her own 'narrative' and journey." (Machon ibid.) This sense of journey is very similar to my proposal of the sense of immersion proposed in Chapter 2: it provides the experiencer with a sense of impossibility. This sense of impossibility does not happen to the experiencer unexpected; she is guided into this special journey by going through a transformation.

Bourriaud defines relational aesthetics as a "set of artistic practices which take as their theoretical and practical point of departure the whole of human relations and their social context, rather than an independent and private space." (2002) His concept pertains to artistic productions that aim to erase the boundaries between the spectator and the artwork, and the artist replicates already existing (social) environments for the recipients who can participate in the artwork. Although Bourriaud's concept might seem questionable to some critics, I suggest that it picks out one of the aims of immersive theatre which involves human relations and their social contexts. Even though "impossibility" is not a term Bourriaud uses, the concept relates to immersive theatre's aspiration for blurring the boundaries of the fictional and the real and creating a sense of impossibility.

THEATRE AS CONTEMPORARY EXPERIENCE MACHINE: THE SOCIOLOGICAL FACTORS THAT CONTRIBUTED TO THE RISE OF IMMERSIVE THEATRE / 5.2 /

In order to understand the recent boom in immersive business, it is useful to digress and look at the history behind the commodification of experiences and its relation to the notion of immersion. Certainly, the roots of the desire to experience immersion is not only related to carefully curated or created artistic events, but it is widespread in the daily life of the society. It did not take much time for the concept of immersion to infiltrate into the field of film studies, video games and theme parks, but theatre studies took up the term relatively later around 2010s (Mücke 2019, 11). Although the origin of immersive performances can be traced back to the mid–20th century (see Bishop 2012), the use of the adjective "immersive" in the context of performance began with the rise of the UK–based company Punchdrunk.

Doris Kolesch notes that immersive environments all have a narcissistic or hedonistic aspect: "Extra–aesthetic immersive worlds of consumerism, employment and computer games primarily seek to promote feelings of self–assurance, subjective potency, sometimes even narcissistic hubris. In contrast, artistic designs tend with striking frequency to bring the dystopian, unsettling and jarring aspects of immersion to the fore." (Kolesch 2019, 9) Even though Kolesch is right that artistic productions also rely on negative feelings for their artistic effect, I will be offering some reasons to think that the rising popularity of immersive theatre is not independent from the rise for a demand for immersion which is connected to a pursuit of experiences with a positive valence. Below, I will outline some paradigmatic sociological works regarding development of the concept of immersion, which can also help us understand better how the demand for immersion emerged.

In his book *Die Erlebnisgesellschaft* (Experience Society) published in 1992, Gerhard Schulze argues that the German society after the 2nd World War turned from outward orientation towards inward orientation, meaning that their behaviour was not only influenced by external conditions like material wealth, but was also motivated by the "experience orientation": they wanted to achieve a "nice life" that is aesthetically valuable. In 1999, Pine II and Gilmore published their influential work *The Experience Economy*, in which they explain the concept of experience economy as the last stage of an

economic progression that goes through the phases of commodities, goods and services. Some goods and services offer transformative experiences to their consumers, for which there is a rising demand, and these experiences constitute the unique selling point of these goods or services. Parallel to these developments was a storytelling boom, as noted by Sujatha Fernandes in her *Curated Stories* (2017), where she coins the concept of "the political economy of storytelling". The term has two intertwined meanings in the context of neoliberal economics and the subjects within it: "production, circulation, and consumption of stories that are mobilized toward certain utilitarian ends"; and "a second activity which involves the deployment of stories in processes of subject–making" (Fernandes 2017, 11). The latter refers to the "curated storytelling practice" which, according to the author, is a tool for "producing subjects who are guided by these principles of upward mobility, entrepreneurship, and self–reliance." Developing on this idea, Andreas Reckwitz proposes that "in the mode of singularisation, life is no longer simply lived; it is curated." In the late modernity, the subject is living in a context that dominantly orientates toward the new and the "singular" (unique), which turns the experience society towards being an innovation society, where always a new and unique good, service or experience has to be created. (quoted in Kolesch 2019, 11)

Balides is another author who drew parallels between developments in immersion and the economic factors that societies are embedded in. According to Balides, the speed–orientedness of the 2000s has been transformed into moving image creation strategies, which operate with immediate visual sensations that tend to create immersive effects via movement. (Balides 2003) Balides considers the current immersive strategies of the "movie ride" as an "aesthetic reflex of the rationality to which the prevailing economic system aspires" (2003, 325), and also states that the neo–Fordism of the present period "blurs the boundaries of various kinds, for example between spaces of production and reproduction, between work and leisure, and between person and machine" (ibid., 327).

Theatre researcher Adam Alston (2013) formulates the concept of "entrepreneurial participation" in relation to the neoliberal aspect of our society, and considers immersive theatre to be a "participatory theatre style" that aims to serve or to produce sensory stimulations and free–roaming experiences within a space or set of spaces for its audience with the audience usually being "implicated in a situation". Although he uses this concept when discussing analogue immersive theatre productions, it is possible to use it in a wider context as it can be applied to all digital immersive productions of all kinds. The experiences of the players/participants may vary between being hedonistic or narcissistic in character, "bolstered by receiving the fruits of one's own participatory effort as well as the efforts of others."

(Alston 2013, 136) Alston further remarks that immersive theatre is the "experience of risk" and lists in what ways risk can be manifested, which include:

- an audience member's not understanding the protocols of a given immersive practice;
- participatory rules being unclear, resulting in a need for a structure to guide audiences through an event;
- production of affect and emotion, such as embarrassment, awkwardness, guilt and shame.

Here it is important to mention that according to Josephine Machon these performances are not visited by mainstream theatregoers, but they rather attract alternative audiences, which was also one of the outcomes of the survey that I conducted which I will discuss in Chapter 6, and these audiences might not even perceive the performance as a theatrical production (Machon 2016, 23).

Another factor that has contributed to the prevalence of the concept of immersion is its connection to the VR technologies and their promise of transporting their users into another, totally immersive environment. The concept of VR or of the 3D–image seen through a stereoscope has already been around since the mid–19th century. More than a hundred years later, engineers developed various types of virtual reality headsets, and from the 80s on each decade brought a new wave of these technologies, and each wave promised us that this time these technologies will work out and will be widespread. In 2020, this promise is still with us, and not totally fulfilled: the VR headsets are not accessible for everybody, their price being an important factor in this (see, for instance, the price of Oculus Quest). The content that is created today for VR still cannot satisfactorily entertain the VR users fully. However, game engines and cinematic content creation modes are constantly being developed further, and some technologists consider that we might be in the era for make–or–break for VR. (Hardawar, 2019)

BRIEF HISTORY OF IMMERSIVE THEATRE / 5.3 /

It is likely that ever since the emergence of ritualistic events, the longing for immersion has been with us. Tactics and techniques that are rooted in ancient rituals and ceremonies are used in various types of events, performances and acts. These require the act of embodiment (e.g. during shamanistic rituals when shamans offer their bodies to mediate between the powers of nature and the members of their community) and also participation (e.g. in religious events and festivities). They also involve visceral experiences, like for church members in liturgical dramas (provided as a historical example of theatrical engagement; see Rouse 2015).

Even though immersive theatre, broadly construed, goes back to older times and to various cultural traditions, I will be focusing on the more recent history of immersive theatre as it is manifested in contemporary Western theatre, which has salient roots in the early 20th century. In the modernist period we can observe some features that can be considered as characteristics of immersive performances, which can be traced to Wagner's concept of *Gesamtkunstwerk* that served as an inspiration for modernists. Wagner defined *Gesamtkunstwerk* as a total artwork that is supposed "to include all phases of art and in doing so to consume, to destroy each one, so to speak, in favour of the total purpose of them all." (Wagner 1912, 115) Wagner darkened the auditoriums where his performances were held and also created a surround sound system. Dadaists were heavily influenced by Wagner, as witnessed in the performances at Cabaret Voltaire that aspired to shock the audiences. (Carlson 1993, 343)

Based on Wagner's idea, László Moholy–Nagy also developed a related concept, that of 'theatre of totality'. According to Moholy–Nagy, written drama and the presence of the actor is of equal importance to other elements of theatre such as stage design, costume, lighting, and sound as well as technological innovations. As mentioned by Salter (2010, 39), Moholy–Nagy is also one of the first creators who considered technology as an integral part of theatre, which he thought of as encompassing a 'material apparatus' and an 'immaterial' one, and viewed it as something that not only enhanced the participation of the audience but could also transform the human organism. Moholy–Nagy did not work in a theatrical context for a long time, but his vision left its fingerprint on further theatrical imagination. According to Salter (ibid., 41), the Bauhaus thought on theatre was built on four specific aims: (1) the removal of the line between spectating and performing by changing

the relationship between the stage and the viewer; (2) the integration of mechanical and media apparatuses to create a total sensory experience; (3) the exposure of technology as part of the performance itself; and (4) the transformation of static performance space into dynamic space by way of technical means. These design strategies are very similar to many immersive theatrical performances as, back then, they also incorporated and presented a new view on theatre.

Even though they were more theoretical rather than practical compared to the ideas of Bauhaus or Moholy–Nagy, Antonin Artaud's thoughts served as a fertile thought experiment that influenced many creators from the generations that came after him and had a strong effect on the development of performance art. According to Artaud, "theatre will recapture from cinema, music–hall, the circus and life itself, those things that always belonged to it. [...] Thus on the one hand we have the magnitude and scale of a show aimed at the whole anatomy, and on the other an intensive mustering of objects, gestures and signs used in a new spirit." (Artaud 1958, 66)

In the 1960s, many creators relied on the writings of their precursors in order to rebuild theatre from scratch. The importance of liveness became important especially with the appearance of performance artists. Allan Kaprow and Jackson Pollock created many acts the aim of which was to erase the boundary between everyday life and art. Kaprow preferred the notion of "happening" instead of the notion of "performance" as it expressed the spontaneity of these acts. Kaprow's aim was to create a heightened version of everyday experiences and make it possible that the audience members loosen their identity (Bishop 2006, 102). In his proposed guidelines for the criteria or 'regulations' for an event, Kaprow suggested that the regulations should "provide for a variety of moves that make the outcome always uncertain". (Kaprow 1995, 239) Kaprow and Pollock were going to play a big role in the work of creators such as Roy Ascott (2003), who emphasized the role of cybernetics in the art; and also in the Living Theatre or the French Theatre du Soleil's work, and in the work of many other artists who helped shape the currently existing immersive theatre practice.

Kaprow was also part of the Fluxus, an international and interdisciplinary community of artists. They developed several types of playful installations and performances. Fluxus was active in Europe, its counterpart was the New Games movement in USA in the West Coast that emerged in 1960. The latter was going to gain a stronger institutionalized presence, developing participatory public games that involved non–aggressive and non–competitive behaviour. (Montola, Stenros and Waern, 2009, 55–6) According to Westling, "Fusing practices from the New Games movement and Fluxus, pervasive games in the United States adopted a transmedial aesthetic from the mid–1960s, when

mediated storyworlds were extended through live action role-playing or LARPing." (Westling 2020, 21) In the case of these productions, the existing urban space constituted an important part in the storyworld, and the productions were extended throughout space and time.

Richard Schechner created a framework of "environmental theatre" that is important to mention here, as it can offer a historical embedding of the predecessor of the genre of immersive theatre. In his paper titled "6 Axioms for Environmental Theatre", Schechner describes (as the first axiom discussing the theatrical event as a related transaction set) a continuum of theatrical events, that starts from the impure life form (these are public events and demonstrations, intermedia happenings, environmental theatre) and at the other end of the continuum is what he calls the traditional theatre, as a pure art (Schechner 1968, 41). He states that it is important to offer relational definitions (ibid., 43) and that there are related transactions that comprise the theatrical event: these can be among performers, among members of the audience, and between performers and audiences (ibid., 44); but on a secondary level, production elements and the space are also playing an important role. In the second axiom he states the importance of space and its explorability. In the third axiom he emphasizes how environmental theatre should learn how not to bifurcate the space and not to segregate the scenery: if equipment is there, it has to be shown. He argues against the total transformation of spaces: the elements of the space should not be disguised but explored; "the random ordering of space" should be valid (Schechner ibid., 54); the scenery has to understand the space; and the audience members should also be able to create new spatial possibilities. In the next axiom he also delves into the possibility of offering multifocus perspectives to the audience members: the audience members "must move or completely refocus [their] attention to catch everything that is going on" (ibid., 58) while actors should acknowledge that not every audience member can see intimate situations or whispered communications, but nevertheless, "local whirlpools", as Schechner calls them, make theatrical productions more complex (ibid., 59). In the fifth axiom, foreseeing postdramatic theatre's characteristics, Schechner argues that the performer's presence and movement should be considered equally but they should also form a contrast within each other. In the last axiom he also questions the importance of the text, and suggest that it should be a "map with many possible routes". (ibid., 64). One can also see how Schechner's ideas foreshadow contemporary immersive theatre: they tackle the idea of space, of immersive theatre's constituting elements (such as the performer or atmosphere), describe the complexity of the actions and the flexible nature of our relation to the scripts.

While there were many immersive works that required large spaces and a great deal of production and coordination, in 1970s the theatre company Living Room was performing in Prague in intimate spaces and private apartments in front of small audiences, in order to escape censorship. This is very similar to the practice of Squat Theatre, a Hungarian theatre group from the same period, which was wandering from one flat to another in order to avoid the local authorities, which blacklisted their productions. It is worth mentioning that their performances were based on a prescripted scenario that did not involve improvisation and it was only because of the intimate environments that their performances had a reminiscence of the immersive aspect found in the "living-room performance" type, which is closely related to the concept of the totalization of the room, "that is achieved through the dissolution of the separating dispositif that is the fourth wall in theatre, and through the expansion of classic object art into space-consuming works." (Gronau 2019, 24)

According to Machon (2017), the first mention of the concept of immersive theatre was about La Fura Dels Baus performance presented in 1983 in the UK, in relation to their visceral-visual, physical theatrical aspect. (Machon 2013, 63-65) In 1995 the term was explicitly used for an installation by Robert Wilson.

Another term that is used for immersive theatre is 'promenade theatre'. According to Carlson (2012) the use of this term was more common in Britain and is still used for performances that are similar to immersive theatre genre: these performances do not contain "a single line of action, but multiple scenes playing simultaneously, so, although audience members could not move totally freely, they could freely decide which of a number of these scenes they would watch or what character they would follow." (Carlson 2012, 20).

Among those that are considered to have popularized the term, the most renowned company is the UK-based Punchdrunk that was founded in 2000 by its artistic director, Felix Barrett. Critics first characterized this type of theatre as "site-specific" (Carlson 2012, 17) and later the British Council, which also sponsored these events, tagged these events as "immersive" in an introductory blog post, which resulted in the total replacement of the term 'site-specific' in around 2012. Since then, Punchdrunk established several venues around the world including in New York and have built up a fan base. Carlson points out that the term of immersive theatre is very broadly interpreted and is used in various ways for marketing purposes. In the first decade of the 2000s, the term 'immersive theatre' suffered criticism even before it got more widespread. As Biggin (2017) remarks, in 2009 Charlotte Higgins already asked the question "*Immersive Theatre—Tired and Hackneyed Already?*" questioning how much this term got "empty".

TRADITIONAL THEATRE VS IMMERSIVE THEATRE / 5.4 /

In the scholarship that discusses immersive theatre, the most central element is the audience's freedom to roam and/or to interact with the environment and the performers. This is what constitutes a major difference between traditional theatrical formats and immersive theatre. "Traditional theatre" is a somewhat vague and problematic concepts, though, for practical purposes, it is hard to find a replacement term. I use the term roughly to refer to theatre in the Western tradition that preceded contemporary forms of interactive and immersive theatre and their precursors in the modern and postmodern periods.

The traditional theatre situates the audience usually in a dark space, in the auditorium, and the members are usually sitting further away from the proscenium or from the dedicated place for the performance, contributing to the construction of a 4th wall that stops the interaction between the world built on the stage and the audience. In traditional theatre the audience remains seated and there is no or very little interaction possibilities for the audience watching the plot unfolding on the stage. However, the spatial blending of the audience and the performers may not necessarily result in a total removal of the characteristics of traditional theatre:

"The most immersive theatre now being made—or the most interactive, or that in which the audience is most mobile, or that in which actors and audience most concertedly share the same 'space'—may very well in the event replicate and even reinforce the power structures of 'conventional' theatre; it may offer carefully crafted simulations of freedom and power sharing that, once tested at their borders, turn out to be the most disappointing apparitions. Indeed, it's these supposedly free-range experiences that often have to operate under conditions secured by extremely precise and accurate control mechanisms in order to achieve the audience's sense of fluency in movement and curiosity." (Goode 2015, 223)

Here, Goode is emphasizing that in immersive theatre the freedom of agency is just illusory and the productions require much more planning compared to conventional theatre, so that the audience, which are present among the performers, can participate in the play feeling that they have some freedom and that this feeling does not break apart in the course of the performance.

An important element in establishing a sense of agency is what Fischer–Lichte identifies as a sense of strong presence: "The spectator and performer share the same space; presence is merely the act of being present for the gaze of another" [while] strong presence is "the actor's ability to occupy and command space and to attract the spectators' undivided attention. [...] The spectators sense that the actor is present in an unusually intense way, granting them, in turn, the intense sensation of themselves as present." (Giannachi, Kaye, and Shanks 2012, 108–109) Even though Fischer–Lichte is talking about performance art, the distinction can be applied to theatre as well. In immersive theatre, it is partly due to the strong presence that the audience members have the illusion that their acts do actually have an effect on the narrative unfolding, while in traditional theatre the sense of presence is weak and the audience members do not have the sense of agency at all.

It is also important to note another aspect of how traditional theatre and immersive performances differ in terms of story structure. Benford and Giannachi differentiate theatre and digital performance art practices as follows: "In the theater, by convention, a core dramatic action or plot is structured within and around a series of peripheral events that are derived from the story and generate subplots." (Benford and Giannachi 2011, 124) This creates perspectival points via peripheral events, but offers a perspective for the audience to focus on the central event. The audience members occupy the role of voyeurs, as they are not inhabitants of the storyworld.

In conclusion, we can state that a salient difference between traditional and immersive theatre is that the latter focuses on the audience and strives to create an illusion of agency for them. This requires careful planning of the paths and mechanisms of audience engagement in many levels so that the audience trajectory is smooth and safe, and the creators have to make sure that the audience experiences what is in alignment with the overall aim of the production, because creators should "mistrust audience participation" (Kwastek 2013, 25).

Audience trajectory and its design is very much related to installation design. As Machon states, "The intimate aesthetic and participatory relationships of current immersive theatre experiences owe much to the installation and live art practice of the 1960s." (Machon 2013, 39) In the next section, I will analyse what are the possible commonalities between immersive theatre and artistic installation design.

IMMERSIVE THEATRE, INSTALLATION AND VIDEO GAMES: MEANING–MAKING AND UNCERTAINTY / 5.5 /

The canonical audience trajectory, as I mentioned earlier, is the path designed by the creators that the audience would ideally experience. Throughout the trajectory, the recipients can come across various interfaces and practices of art such as video art, performance art and site specific spatial art works, and many theorists draw our attention to the importance of the audience's bodily presence in understanding installation art. Machon writes that "Total installation was inherently interdisciplinary; where technologies were involved these fused the human and the technical to foreground embodied presence, thus reaffirming, rather than alienating, corporeality." (Machon 2013, 39) Bishop similarly mentions that what heightens the effect of this art form is "the viewer's awareness of how objects are positioned (installed) in a space, and of our bodily response to this". (Bishop 2005, 6) Echoing this, Reiss states that "spectator participation is so integral to Installation art that without having the experience of being in the piece, analysis of Installation art is difficult." (Reiss 1999, XIV)

Many creators refer to their work as installation, such as SIGNA whose members construe their productions as immersive performance installation. Installation art requires that the audience is mobilized, in order for them to understand the complexity that the spatial artwork represents, and this also applies to immersive performances. These immersive theatrical performances can also be considered as a new type of installation, as the actors in them have a prescripted biography that does not allow them to move out from their own 'algorithm', making them similar to objects in an installation. An extreme example for this is the installation *The Death of a Lady* (Tod Einer Dame) by Ragnar Kjartansson from 2019 which was staged in Kunstmuseum Stuttgart, where a performer was lying for several hours under fake snow and could not move.

Including live performers in an installation–like environment but not offering them interaction possibilities (that are based on live improvisation) might make the audience members feel that they are left alone with their own meaning–making strategies. Later I will discuss how the bodily presence of the recipient in an art installation creates new types of meaning–making

procedures and how these might be overlapping with meaning-making procedures in interactive digital narratives, and how a double hermeneutic approach that has been applied to understanding meaning-making in video games can also be applied to immersive performances.

Kwastek's working definition of an interactive artwork is "an artistically configured interaction proposition that concretizes its gestalt only through each new realization by a recipient." (2013, 47) In her book she compares and borrows from various notions of performance arts in order to understand better the nature and the gestalt of installation arts. She states that in comparison to performance art where the creator is present, "[interactive art] presents an action proposition that is generally not modified by the artist while being exhibited. Production and reception are clearly distinguishable, although the work is implicated in both processes, but the interactive work — and this is what distinguishes it from traditional visual artworks — doesn't manifest its gestalt in the absence of reception." (Kwastek 2013, XVII) When experimenting within an installation work, the recipient has the responsibility and also the agency to reveal the gestalt of the artwork, which later helps her with the meaning-making procedure, but this procedure is not possible without personal (embodied) experience. The aesthetic analysis of the artwork "must look beyond the formal structure and interpretability of the interaction proposition produced by the artist, for the aesthetic experience lies in the action of realizing the work." (ibid., 48) Here, Kwastek is pointing out the fact that an interplay between the experience and the recipient's reflection on this experience is needed in order to interpret these artworks, and a comprehension of the signs present in the artwork is not enough, and "the recipient's activity oscillates between physical experience and cognitive interpretation." (Kwastek 2013, 88) The embodied presence and the physical experience creates the possibility for interactivity and for the illusion of agency – but the artwork is not fully constituted without the presence of the recipient. This echoes also what some creators think about interactive art, such as Roy Ascott when he states that the aesthetics in interactive works "lies in the behaviour of the observer." (Kwastek 2013, 48)

The meaning-making process in interactive productions differs from traditional media formats. The behaviour of the observer and her meaning-making repository of interactive media is an often-discussed theme also in video game studies. According to Karhulahti, a double hermeneutic format can be applicable to video game studies, as the player's interpretative process affects the interpreted game: through interaction, the player and the game establish "a cycle in which interpretation leads to configuring action and its feedback. The knowledge gained from the feedback can be explicit or inferred, meaning that players may perform specific actions to obtain specific information, or they may alternatively learn by interpreting information they did not

attempt to obtain. In both cases the feedback nevertheless affects skills and knowledge on which the player's future actions are based, labeling the cycle as hermeneutic." (Karhulahti 2012) This can be equally applied to interactive art forms, where the participant's interpretation of the work can alter the work itself, which, in turn, affects the participant's actions. And this is not the only commonality between video game mechanics and interactive art: while there is no single way to play a video game and no single trajectory to take, "the game supports some and opposes some interpretations" (Arjoranta 2011) and only specific ones can contribute to successful gameplay, as in installations and immersive theatre; and in the meaning–making process in video games, the player's body is not contributing strongly to interpreting the interactive work, but her gameplay technique, intention and the actual gameplay experience are important factors for the meaning–making process, as in the case of interactive works.

Another shared element between the meaning–making procedures in video games and interactive art is the uncertainty of the experience. As Costikyan points out (2013), uncertainty in video games can have various forms. Uncertainty can also be a feature of the information gathering process and it can result in disorientation that can at times be very high, leading to a heightened sense of uncertainty (Power et al. 2017). Uncertainty is an element that creators of many interactive art forms are pursuing in order to create more self–reflexive experiences for the recipients. In order to achieve the right level of uncertainty, that is, in order to keep it at a workable level, certain reference elements should also be included. Installations aim to create a close relationship between the recipient and the artwork, and this close relationship can work only if the audience has certain reference points that can help her to unfold the installation world, this way enabling the audience to interpret what they have experienced. This meaning–making procedure is enabled only if the reference points are from the personal lives of the audience members and have a direct connection to their everyday activities or environments. The installations situated in everyday space emphasize the everyday "real life" (Machon, ibid.), and the functions and the ways of operation of interfaces are often inspired from the everyday life. Kwastek also draws our attention to "another aspect of the intersection between art and daily life [which] is even more significant for the aesthetic experience of media art: Because the technical devices with which media art operates are increasingly becoming everyday objects themselves, new questions are now arising about the boundary between the artistically configured work and the everyday environment" (Kwastek 2013, 18), which heightens the sense of uncertainty while viewing or participating in an artwork.

Immersive performance creators are also aiming at establishing a level of uncertainty in their work. (see Jakob-Hoff, 2014) This sense of uncertainty is heightened by the level of intimacy created by the actors and by the audience members' continuous sense-making procedure that is involved in trying to figure out whether they are speaking to a performer as a non-fictional person or to her role identity, and to situate themselves in between role-playing and being their ordinary selves. Gronau has a similar approach to immersive theatre: "Immersive theatre is born from the convergence of practically contrary production principles, namely illusionism and participation, the pleasure of make-believe while being involved oneself. The artistic potential lies in the tension that arises between these two paradoxical currents in art and theatre history." (Gronau 2018, 29)

WORLDBUILDING AND ONBOARDING / 5.6 /

Marvin Carlson writes that "The way an audience experiences and interprets a play, we now recognize, is by no means governed solely by what happens on the stage. The entire theatre, its audience arrangements, its other public spaces, its physical appearance, even its location within a city, are all important elements of the process by which an audience makes meaning of its experience." (Carlson 1989, 2).

For environmental worldbuilding, immersive theatre performances generally use a set design from a very specific era, which immediately helps the audience members to identify the historical era and get an idea about what their behavioural possibilities are. Worldbuilding is also important to generate the kind of behaviour from the audience that would require little introduction but would be in line with the storyworld. Mark J. P. Wolf states that "the experiencing of imaginary worlds has always required the active participation of the audience, whose imaginations are called upon to fill gaps and complete the world gestalten needed to bring the world to life" (2018, 138). But the audience's imagination should be triggered in alignment with the storyworld of the performance. In order to achieve the right kind of interactive behaviour the creators should design onboarding methods that allow the participants to understand their role, but without too much textual briefing. The onboarding process is what Murray calls "scripting the interactor", in a discussion about video games where she explains how specific genres can create expectations for players about what should they be doing (or not doing) without having

to provide explicit instructions or explicitly constraining their actions (Murray 1997). An important element in scripting the interactor is framing the participants' visit as an experience that can symbolize a metaphor for the border of the virtual world and ordinary life, and this also should be taken care of during the onboarding. When discussing detective games, Clara Fernandez Vara also makes a point related to the importance of onboarding, when she writes that "Fiction genres thus generate behavioural scripts that the player can reproduce or, in terms borrowed from performance studies, restore behaviour, so that the goal of the game is to reproduce those behavioural scripts." (Fernández–Vara 2018)

Although onboarding may initially appear to be something that can be created easily, it has to contribute to the creating of a coherent storyworld. Below I provide a tentative list of possible types of onboarding acts that can motivate the audience members to act interactively:

1/ to find out something (as a detective)
2/ to save someone/something
3/ to learn something/acquire a skill
4/ to become a part of a community or a recipient of something by passing an exam/liminal transformative experience

Based on her studies on detective video games, Fernandez–Vara (2021) also divides detective games into two categories according to their approach and focus:

Whodunnit	**Thriller**
the story of the crime is prevalent	the crime is an excuse to trigger the story of the investigation, the investigation takes over
the focus is on the crime	the focus is on the detective
The drive of the experience is curiosity	the drive of the experiencer is suspense

(Source: Fernández–Vara, 2021)

Suspense is also a very important element in magic shows, helping create an experience that shares similarities with thrillers. Ryan distinguishes four types of suspense in literature:

1/ what suspense (what will happen next?);

2/ how suspense (how did it come to be like this? / how did this happen? — the reader desires to learn what prehistory results in the present moment);

3/ who suspense (commonly found in the whodunnit: there is no sadness in the murder, but interest in the puzzle);

4/ Metasuspense ("critical involvement with the story as verbal artefact" — such as wondering how the author is going to finish the story or what will become of all the plot threads (2001, 143–145).

In video games, it is important that the creators dose just enough information to raise the suspense in players, and this is also an important aspect in theatre. Emily Short offers valuable insight into Punchdrunk's worldbuilding strategies and how they create suspense and disorientation (Short 2018). She finds their strategies similar in many ways to level design strategies used in video games. According to Short, the creators are using environmental storytelling technologies in various ways to guide the audience's attention and to tell about hidden layers of possible mysteries that the given storyworld can offer. Environmental storytelling is also a good way to disorientate the audience members. Short presents the following list of worldbuilding strategies:

- **Abstraction**
  Examples for abstraction are spaces that relate to the storyworld but have an awkward or surreal character: they have a design that would not exist in a non-fictional setting. These are particularly spaces where actors are not often present and where participants can have a break from the performance without leaving the storyworld.

- **No very direct clues or communications**
  A very important difference between video games and immersive theatre performances is that theatre performances do not have to communicate a goal or a main message.

- **Performers activating props**
  When comparing immersive performances to video games (even though Short is making a comparison with escape rooms), it is also important to note that props are not activated by the audience but by the performers.

- **Density and repetition**
  Compared to the props, the set design is much denser (both in Punchdrunk and SIGNA's productions), this way the recipients feel that they are overwhelmed with messages that should be digested and understood,

which is an important part in the meaning-making. (although Short notes that the audience is "given the *idea* of variety, but not *actual* variety; the evocation and wonder of discovery, but less true knowledge-to-wonder-at than we'd find in a few feet of homely steel stacks in the basement of a university library". (Short, ibid., italics in original)

About Punchdrunk's performances, Short remarks that she is "always left a bit wanting, [...] the space excites a curiosity and eagerness that it is unable to satisfy." (ibid.) This is likely caused by the limitations of the space: although all these elements offer a sense of overloadedness, due to the lack of direct and surprising improvisatory interactions with the actors, these set design elements will tend to weaken the gestalt of the production.

ATMOSPHERES / 5.7 /

The notion of atmospheres has become very widespread in performing arts. According to Fischer-Lichte, "the performative space always also creates an atmospheric space" and it is a very strong element of the spectator's first impression of the world of the production (Fischer-Lichte 2008, 114). The idea of creating an atmosphere in a theatrical context can be observed in Wagner's aforementioned writings as well as later in Schechner's idea of interaction between the stage and the spectators. Gernot Böhme writes that atmospheres are floating in between the subject and the object (2013, 3), between being subjective and objective (1993, 122) and they are 'spatial bearers of moods' and simultaneously 'affective powers of feelings'. (ibid., 119) Shyldkrot identifies two strands in the study of the atmospheres. One of them attempts to understand the atmospheric encounters "and make sense of our experiences by unravelling the epistemological and ontological criteria of those encounters" (Shyldkrot 2018, 148) while the second sees atmospheres as purely materialistic and "examines, practically, the different ways in which light, smell, sound or temperature may generate or shape a sense of space" (Shyldkrot, ibid.) but, according to Shyldkrot, what atmosphere is remains an open question. He also offers a working definition that describes an atmosphere as something emerging "from the interaction between the constellation or assemblage of natural and aesthetic elements in a particular space and time: in a particular 'meeting' or interaction. This relationship, in turn, can affect those who are part of that interaction and can impact the way in which they perceive, feel or make sense." (Shyldkrot 2018, 149)

Atmospheres always imply the perceiver's felt, bodily participation (Böhme 2001, 59 f.), which can be easily observed in theatre, where the co-presence of the audience and the performer co-create the theatrical production. But already before the rise of interactive theatre, some theorists have pointed at the importance of atmosphere, such as Hans Thies Lehmann when he states that "the presentation of an atmosphere" might be more dominant than the narrative show (2006, 63). Griffero describes this postdramatic atmosphere as such:

"The theatregoer, who today could even be defined as a 'guest', insofar as they have an aesthetic experience that is exclusively possible in this type of theatre (cf. Rodatz 2010, 151), generates a specific atmosphere through all their conducts and behaviours, thus contributing to the scenic one. The audience especially focuses their attention on their own emotional perception rather than being narratively redirected to extra-theatrical realities." (Griffero 2019, 181)

Atmosphere is an important phenomenon in strengthening the intersensorial sense of presence, which, in turn, strengthens the immersive effect, as the experience becomes a 'shared experience' (Shyldkrot 2018, 153). Shyldkrot identifies four design strategies that address the composition of the atmosphere: 1. first impression of space (Griffero 2016, 30–31); 2. the ecstasies of things; 3. contrast/immediacy; and 4. duration. These elements present many commonalities with the modalities and dramaturgical elements which help the magicians design their magic shows (see Leddington 2016).

1/ The first design strategy contains suggestions that highlight the importance of the first impression of space. This is similar to the magician's strategy of preparing the audience for seeing a magic trick by guiding their attention. The first impression of how a magic trick is introduced to the audience has the power to manage the audiences' expectation. When creating atmospheres, designers should be aware of the immediate affective and perceptual effects that the atmosphere will have on the audience. This is important given that "atmospheres are seductive" (Shyldkrot 2018, 154), and what the audience members see when entering the world of the performance "continues to influence their perception throughout the performance" (Fischer-Lichte 2008, 115). This also applies to the moment in interactive immersive performances when the audience enters into the magic circle. In the case of SIGNA's *Das Heuvolk*, the audience arrives on the site of the performance on a bus, and when the bus enters the street the audience members can see actors wearing costumes similar to those of the Pre-Christian Alpine tradition, that causes a kind of shivering. This onboarding process lasts for a short time and sharpens our senses to all the contextual stimuli.

2 / The second design strategy is about the ecstasies of things, to borrow a phrase from Böhme (1995, 121). According to Fischer-Lichte this phrase describes "the presence of objects more accurately. Presence brings forth humans as what they already are: embodied minds. Ecstasy, in turn, makes things appear as what they already are but usually remain unnoticed in everyday life because of their instrumentalization." (2008, 100) "Ecstaties of things" does not refer to the parameters of the elements of the atmosphere (e.g. sound, smell, colour), rather, ecstasies "account for the expressive qualities and the effects things emit onto their surroundings" (Shyldkrot 2018, 155), and Böhme states that ecstasies "demand a different orientation in the room, filling it with tensions and suggestions of movement." (Böhme 1993, 121) Various set design elements become lively with our "haptic vision", that is, how our vision makes us anticipate the tactile sensations offered by the objects, which, as Machon states (2016) is important for atmosphere building. Some set design elements can also be touched, offering an additional experience that affects the perception of the atmosphere, as Rosalyn Driscoll, a contemporary sculptor, describes: "Touch as an energetic interaction between elements within a universal field generates a much larger picture of what occurs in the sensory exchange" and she also emphasizes the importance of "energetic exchange to the nonhuman, 'non-sentient' elements in our environment, such as tables and stones." (Driscoll 2007, 111) Böhme also suggests that darkness can transform a space, and Shyldkrot also explores how "obstructed vision – specifically using haze and darkness – in performance and installation [can be used] as a means of investigating what atmospheres are through the process of their production." (Shyldkrot 2018, 148)

3 / The third design strategy is contrast and immediacy: "Atmospheres are wrought not only through the first impression but also through their contrast to previous situations, circumstances or spaces." (Shyldkrot 2018, 160) The sudden changes and the contrast can also be built into the performance design. The sudden changes of atmosphere also resemble the state of entering an immersive environment and the impossible character of the environment (as I will discuss in Chapter 6 and 7). While discussing the previous strategy, I mentioned that haze and darkness are considered to be important atmosphere building elements, but I would like to suggest that these are not the only luminal phenomena that contribute to the atmosphere: dim light, or very strong light combined with specific type of things (e.g. in the case of the set design of *Das Heuvolk* in which the furniture styles resemble the trends of the 1980s) can not only help with representing the referenced era, but also invoke knowledge about the popular culture and the trends of that age. Griffero puts forward a similar idea when he argues that the perception of atmospheres relies on the co-perception of past and expected atmospheres: "You feel the tense atmosphere of a play precisely because you anticipate the following situation, heavily influenced by title, name of the author, genre, previous performances, etc." (2017, n.p. quoted in Shyldkrot, 161).

4 / The "duration of an atmosphere" refers to the highly ephemeral characteristic of an atmosphere's scenography. Atmospheres are temporary and they "emerge in the interaction between matter, place and state of mind in a particular moment" (Shyldkrot 2018, 161) and this temporariness can motivate the participant to have a more neoliberal hunting attitude.

All these characteristics help us understand how the creation of atmospheres can be a suitable way for creating a trajectory and guiding the experiencer through it. However, Shyldkrot does not present a detailed discussion about the atmospheric contribution of the bodily feelings brought on by co–presence and interactivity. A discussion of the affective aspect of art can be found in Bogart: "Affect means feeling associated with action. Our blood rushes faster, our mirror neurons spike new synaptic activity throughout our bodies, adrenalin courses throughout the system [...] This visceral experience, one of the leading attributes of all encounters with art, is a large part of why we bother to engage with art in the first place. The increased adrenalin resulting from the experience sharpens the mind and focuses the attention." (Hurley 2010, xii). Even though Bogart is talking about the effect of adrenalin in sharpening our attention and enlivening our cognition, I would like to propose that it is the other way around in the case of atmospheres: it is the attention that raises the level of adrenalin, because the experiencer is entering the flow of the atmosphere and begins to attend to various features of the production. But the set design (which can offer only limited interest points – see Emily Short's note above) is not the only element that heightens the attention of the audience members: the intimacy that is aroused by live improvisation also allows the audience members to feel the suspense, which is an attention–raising element. Intimacy is an aspect of the creation of the narrative (that can be created with the help of improvisational interaction – see the Chapter on interaction) that is expected by attendees of immersive theatre, and it helps the audience members manifest their agency and also creates enthusiasm, suspense and thrill in them. These are also brought about by the participant's hunting attitude (see Alston 2013) and the allure of closeness with a possible stranger in a possible public space, which has undertones related to sexuality and implicit power relations. The spaces where these immersive performances take place serve as public spaces (as they offer spaces for theatrical performances) and also as private ones. This amalgamation of the public and the private can also function as a further disorientating aspect.

AUDIENCE AS PARTICIPANT / 5.8 /

Spectators have not been studied in detail in theatre studies. (Freshwater 2007, Sedgman 2017) Although a very positive attitude towards audience participation is the current trend in theatrical production, this does not mean that theatre researchers are doing enough to take the actual audience feedback into account. Freshwater writes that "audiences are beginning to be trusted by practitioners and by industry. But it seems that theatre scholars have yet to develop this trust." (Freshwater 2007, 76) The audience survey I conducted with the audience members of SIGNA, which I will present in the next chapter, was partly done in order to acquire a better understanding of how they evaluate their sense of immersion and agency. In this section I describe the role of the audience as participant. I consider the role of the audience to be highly important as the active participation of the audience can enable them to experience the somatic effects of the horror genre and encounter the suspense that can be triggered by the illusion of agency.

The participative audience is not a novelty in the arts: already in 2006, Claire Bishop described how in contemporary fine arts the recipients of the artworks have become active agents rather than passive recipients. Freshwater also writes that in the 20th century, theatre directors started to have a rising interest in the audience's role, and "the desire to reconsider the relationship between theatre and its audiences was a recurring theme in experimental theatre practice during the twentieth century and continues to preoccupy many practitioners, and these attempts to reposition the audience have proceeded as much by castigation as they have by celebration." (Freshwater 2007, 2) With the popularity of Jacques Ranciére's article *The Emancipated Spectator*, the active role of the audience started to receive more attention also in theatre studies. In the article, Ranciére states that the real essence of theatre can be achieved if the audience members leave their traditional role and "take on that of the scientist who observes phenomena and seeks their cause." (2007) and he should also be "drawn into the magical power of theatrical action." (Ranciére 2007, 272) According to Carlson (2012, 22) the first idea refers to the audience's attitude, while the second is more about the "dynamics of immersive theatre, where the audience members are more or less engaged into the magical power of theatre". Carlson realizes that SIGNA's performances exemplify Ranciére's concept of emancipated audience better compared to the performances of Punchdrunk, but this emancipation is rather an illusory experience. (Carlson 2012, 24) We can separate the spectator–space and spectator–performer dynamic. The spectator–space

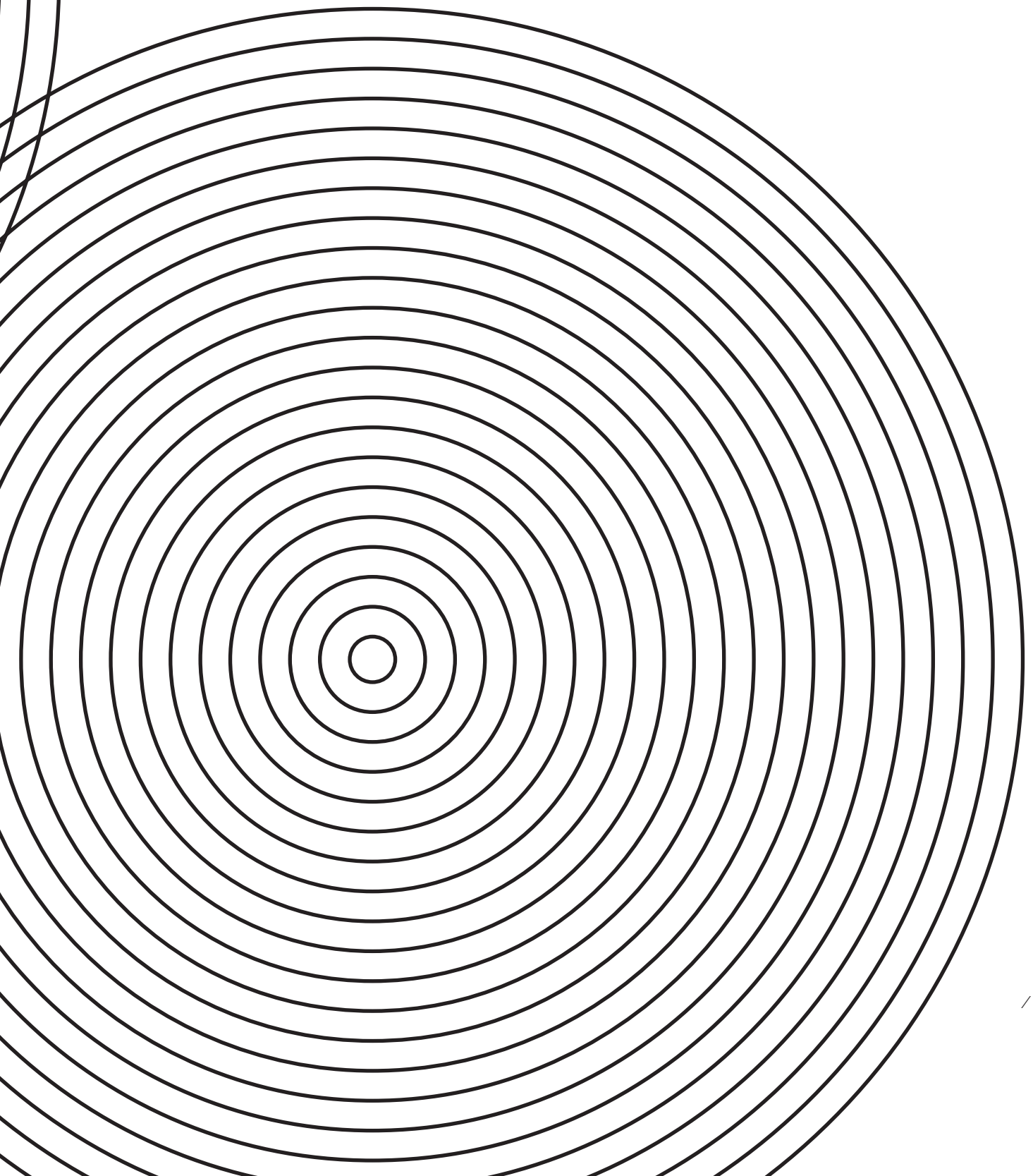
dynamic occurs when the space is designed in such a way that offers freedom for roaming and also enough storyworld related props and details that the spectator can explore. This way, a dynamic between the participant and the space can be established. The spectator–performer dynamic can be unfolded in one–on–one's, between performer and audience members, especially if performances allow the audience members "a much more active role in improvising scenes and actions on their own or in cooperation with the actors" (Carlson 2012, 23) like in SIGNA's performance. In immersive theatre performances, ideally both of these should be present to some extent, but in order to make sure that the audience experiences a feeling of magic, the spectator–performer dynamic should be the dominant one, in order to control the experiencer's trajectory as much as possible. Carlson mentions that the spectator–performer dynamical relationships are more characteristic to SIGNA's performances compared to the performances of Punchdrunk. (ibid.)

The sense of interactivity and agency that the audience members can experience in certain immersive performances, enabled by their feeling of emancipation, has similarities with some magic performances. As Leddington states, (2016, 259) it is important for the performers to have a physical proximity to the audience, just as the physical proximity is important in a magic show for the audience members to fully experience the magic trick. In immersive theatre, the audience members can watch, and experience from close proximity, the continuous improvisation and co–presence of the actors in its pure physicality, which invites the audience for the anticipation of suspense. The apparent freedom of the audience (even if often combined with anonymity) can also result in the risk of embarrassment or awkwardness "for audience members who find themselves uncomfortable, unwilling or otherwise unable to play along." (Biggin, 2017, 24) This risk also constitutes a very big part of their enjoyment in participating. This risk–seeking behaviour is related to what Alston (2013) refers to as the neoliberal hunting attitude (which I discussed earlier), and I would like to suggest that it is also very similar to what audience members experience when experiencing a magic trick, as it involves trying out different possibilities, even though not in a bodily–involved manner, but in a passive, cognitive way. As Ortiz argues, "Magic can only be established by a process of elimination. There is no way that you can directly apprehend that you're witnessing magic. You conclude that it's magic because there is no alternative. Therefore, the primary task in giving someone the experience of witnessing magic is to eliminate every other possible cause". (Ortiz 2006, 37) This elimination of possible causes, which is necessary for experiencing a performance as a magic trick, is very similar to taking risks and trying out the possibilities of an immersive theatre production: you try out various possibilities for interaction, with the anticipation that the interactivity and the immersive characteristic will break down at some point. However, in a successful production, which is participative and immersive enough, this does

not happen, and the audience members can feel that they did not even have the chance to try out all the interactive possibilities.

In this chapter, I provided a brief history of immersive theatre and an account of how the genre evolved, and discussed the main difference between traditional theatre and immersive theatre, arguing that immersive theatre has distinct characteristics that qualify it as a separate genre. In immersive theatre, the participation of the audience in the narrative plays a central role and the audience members are provided with an illusory sense of agency. I discussed how worldbuilding, atmosphere creation and onboarding function in a performance and drew attention to their importance for creating liminal experiences and a level of complexity that disorientates the audience members and enables the sense of losing oneself.

// PART II //
// APPLICATIONS //



ANALYSING AGENCY AND TRAJECTORIES IN ANALOGUE IMMERSIVE PERFORMANCES / 6 /

SIGNA'S DAS HEUVOLK / 6.1 /

In this chapter I will present and analyse SIGNA company's *Das Heuvolk* (Strawpeople), an immersive theatre play, or, as they prefer to call it, a performance installation. I will point out why I consider their work an ideal immersive analogue production. After describing the production, I will briefly present the audience survey that I conducted in cooperation with Mannheim Stadttheater in 2017 and I will discuss how this production can be interpreted with the help of video game studies. At the end of the chapter I will also discuss how the horror aesthetic of the performance affects and structures the immersive experience.

SIGNA's *Das Heuvolk* was presented in June–July 2017 in Mannheim, Germany, in the frame of Schillertage Theater Festival. It took place in the suburbs of Mannheim in Benjamin Franklin Village. While entering the suburb with the bus, one could already see some performers wearing peculiar costumes. When the bus stopped, the audience was welcomed by performers wearing costumes that resembled the solid monochrome dresses of cult members. The performers divided the audience members into several rooms where they received initiation training: they were informed that they were there because Jack, the head of the cult, had died recently and the group was recruiting new members in order to find their missing gods. This was necessary for surviving the end of the world and becoming the "Himmelfahrer" (Ascencioners). The audience was told by the performers that they could encounter various rituals at certain times in different rooms, where they could follow the cult members as they called upon the gods to return. There were also certain house rules that had to be obeyed (e.g. when entering or leaving

a room one had to greet the mythological tricksters with a hand signal). After this, the audience could wander around in a two-level building that contained many thematic rooms where the performers carried out thematic rituals. For example, one could enter a room filled with red, blue, and black carpets, heavy furniture, and drinks with high levels of alcohol. This was the *Peacock's Room* where (in the frame of the ritual) men were fighting each other. The audience, in close proximity, experienced the weight of the punches and kicks, how the fighters were sweating from physical exertion, and how their skin was reddening from being struck. In the *Cowboy Room*, the audience faced a real-life struggle, as they witnessed the "bull" (a performer) suffering from being possessed by a god.

After five hours spent in this house (which is not enough time to visit all of the rooms), the audience was guided into a nearby chapel. Here, everyone was seated near the walls, forming a circle. A ritual started accompanied by songs about gratefulness, where the audience members could finally decide whether they wanted to join the cult or not. There was only one condition: they had to undress in the middle of the circle and join a washing ceremony. Those who chose this option could stay one hour longer (while the rest of the audience was brought back to the city with a bus) and attend a further performance. This final event was a private afterparty with the actors, where the old and new members of the cult sang together and embraced each other. The cult members appeared content, as they were able to recruit more members to help them with their search for the missing gods. If an audience member who joined the cult re-visited the performance, they were greeted at the start as a member.

This immersive performance installation fulfils all the requirements for being an immersive theatrical production which I outlined in Chapter 5. (1) It offers a 360-degree physical environment due to its site-specific character; (2) involves all the senses of the audience members as it includes various olfactory, haptic and gustatory possibilities; (3) has no meta-reference, as the storyline is not an adaptation of an already existing work; (4) the performers integrate in their narrative any happening that influences the unfolding of the performance (e.g. lightning); (5) the performers do not have a fixed storyline but perform the biography of their fictional character in a semi-improvisatory and interactive manner; (6) even though the storyworld of the performance does not allow the audience members to change the narrative path, it allows them to make moral choices in particular situations (e.g. to join the cult); (7) the audience members are presented with and suggested to act according to the rules of the cult; (8) the performance offers many one-on-one situations that can offer a sense of intimacy for the audience members.

THE AUDIENCE SURVEY / 6.2 /

Measuring the level of immersion (or immersivity) is not a simple question: as Matthew Lombard and Theresa Ditton state, it is not easy to quantify immersion by "counting the number of the users' senses that are provided with input and the degree to which inputs from the physical environment [in the SIGNA case, the world outside the performance] are 'shut out'" (Lombard and Ditton, 1997). They emphasize that the level of immersion might be easier to quantify from the point of view of the production – this is much more feasible when it is directly related to the space where the immersive experience is taking place. In my research I gave an attempt to try to measure the level of immersion from both sides: by surveying the audience feedback but also by conducting an interview with the creators of the performance installation. In the following I will present both.

As mentioned above, the audience members were transported to the performance venue and back by a bus. I took advantage of this opportunity and conducted an audience survey in cooperation with the organizers. Altogether 199 audience members answered the questionnaire on their way back right after the performance. The aim of the survey was to map the following:

Measuring audience expectation about the performance: It was important to find out how many of them knew about or have previously participated in this format of immersive theatre and whether they have chosen specifically this performance as they knew what to expect: among those who meaningfully answered this question, which is slightly more than three–fourths of those who took the surveys, approximately half of them knew about the form of
the performance, whereas the other half answered that they wanted to experience something new. It was interesting to see that those who mentioned that they accompanied a friend or they came as a result of someone else's suggestion had a less pleasurable experience than those who knew what to expect.

Measuring the level of immersion from the participant's perspective: the survey mapped how the participants have felt about taking a more active attitude (137 participants marked themselves as an active participant and 128 claimed to have put themselves "totally" into the fictional world of the performers) and how much they could "live" the fictional world of the performance (more than half of the participants marked that they totally let

themselves into the fictional world of the performance). In the survey I also attempted to map and to ask about immersion by using examples from other media, asking, for instance, how would the audience compare this genre with playing video games and/or using VR (in order to understand whether there is any correlation between their media literacy and perception of the performance): some of them (43) found a resemblance with the genre of video game, but only 3 found resemblance with interactive VR productions (among 18 who had experience with VR).

Measuring agency: this was done by asking about how would they describe their attitude, how strongly they felt that they were able to control what is happening or able to hack the storyworld of the performance. It was also important to measure with these questions whether the audience felt that they have entered the "magic circle" of the performance that acts as a border between daily life and the performance storyworld. It was also important to find out whether there was anything in the performance that they would have done differently if they were to participate in it again: 134 replied that they would re-visit the performance in order to try out a more active attitude and to visit more rooms.

In the survey, I also asked the participants about specific senses that influenced the phenomenological aspect of the performance. I was aiming to map whether the audience had any specific bodily feelings such as disgust. 115 participants answered that they felt something "in their chest" or nausea or dizziness, which means that their sensorium was very much affected by the detailed set design, and their attention was always kept busy.

The survey was conducted with the aim of measuring the experiences of immersive performance participants by asking questions related to the characteristics of the immersive theatre performances (see the list above). It was important in the survey to understand the spectators' level of literacy in 'immersive performances' and other 'immersive genres'. The level of agency and immersion is also crucial when discussing these performances: this is where it can be measured how successfully these productions can achieve their aim. The responses to the survey show that those members of the audience who were already familiar with the practice of immersive performances were also those who enjoyed the production's ludic immersion (see Ryan 2009, 54). This has parallels with what Klich (2017, 226) observes about ludic immersion in a Punchdrunk performance, that the audience "has agency in terms of their pace and direction, their interaction with the set, and their response to the performers' actions. Some choices are more or less rewarding; a decision to follow a particular character or to stay in a particular room will lead to different encounters. 'In the know' audience members develop strategies to traverse the vast environment and employ tactics to increase their likelihood

of receiving the elusive goal of the one–to–one performance." This self–pacing agency made possible by being presented with a wide spectrum of reward is very similar to what the visitors of an amusement park may feel. Interestingly, one of the creators of SIGNA also referred to some of their visitors as amusement park visitors, those who want to better exploit the variety of bodily and mental states that such performances can offer (Köstler, 2017). As I discussed in Chapter 5 in the context of the cultural–historical background, the aim of this particular spectator attitude is to gather as
many experiences as possible, given that it is up to the subject to curate her own collection of experiences.

The audience survey's aim was to measure the level of immersion in the audience members. The survey was conducted immediately after the performance on the bus that was bringing them back to the city of Mannheim. One important limitation of the survey is that it was never filled in by those participants who took the challenge and undressed in front of the other members and joined the cult, as they had to stay longer rather than going back with the bus. One important finding of the questionnaire, when inquiring about the sense of agency, almost 50% (of the 160 people who answered the relevant question) said that they had some control of what is happening with them while 50% said that they totally went with the flow.

GAME ELEMENTS IN IMMERSIVE PERFORMANCES / TRAJECTORY / 6.3 /

Non–player vs. player characters

The above description of the performance does not focus on the narrative framework, but on how all the characters have a pre–established biography, with a set of characteristics and behaviour. Within the community, everyone talks freely about other cult members, but a constant fear of the future can also be observed, while sometimes secrets are only partly revealed, encouraging the audience to gather further information. As an active audience, the experiencers can also choose which room to visit, with which performer to

interact, how to act themselves, or whether they want to stop a certain act of violence (also see Mühlhoff, 2019) Even though the spectators cannot have a direct influence on how the narrative path develops, they can have an effect on which experiences they gather throughout the evening. They can choose to have more (superficially) joyful moments or to investigate the dark side of this community. In these heavily themed rooms the experiencer engages with other people in various ways: they act together with the performers and other experiencers, and in this way they can encounter various social emotions such as guilt, disgust, embarrassment, or shame. These emotions emerge from the relationships that develop between the experiencers and performers, and they are a result of an amalgam of intertwining and sometimes conflicting roles the audience members may take on, such as being who they are in real life and in the fictional world that they have found themselves in, or whether they should act mainly as guests or try to stop acts of violence.

In the "traditional" game theatre performances (such as the Germany–based Machina Ex, a company the practice of which is based on video game adaptation for the stage) the actors are the non–player characters: they can only perform pre–written tasks and game mechanics on a very narrow spectrum. Meanwhile, the participants are the player characters: they have to figure out the game mechanics and the solutions for how to overcome the challenges in the games. In SIGNA's performances the performers, due their having an established and well–developed autobiography, still cannot step beyond what is allowed to them by their roles, but they can actively influence the way the story arc is perceived by the audience members. Beside this, the actors can also actively pay attention to the variety of the behaviour of the audience members, and help those who are lost or calm down the more aggressive participants (see Köstler 2017).

Being a member of the audience is also very similar to having a temporary avatar. Here, it is useful to borrow the concept of "a representation of a user" from De Zwart and Lindsay. (De Zwart and Lindsay 2012, 82) They define avatars not only as "any online representation of a user" but, going beyond the "online" qualifier, they argue that board game pieces, live–action role playing game personas, MMORPG (massively multiplayer online role–playing games) characters, and social virtual world characters or figures are all avatars. While having this unstable state of mind regarding which avatar to embody, the experiencers seek to find new ways to gain knowledge and experience about this new world.

Spatial Storytelling Character

One peculiar characteristic of immersive theatre performances is their incorporation of some aspects of environmental storytelling, by making preconditions for immersive narrative experiences in four ways (see Hameed and Perkis 2018, 327; Jenkins 2004, 118–130). It is a common feature of immersive theatre performances that they actively make use of spatial storytelling as a tool to keep the spectators' attention engaged. We can follow Jenkins and deconstruct spatial storytelling methods into the following characteristics:

1/ Ability of spatial stories to evoke pre-existing narrative associations;
2/ Providing a backdrop where narrative events unfold;
3/ Embedding narrative information within the mise-en-scene;
4/ Providing resources for emergent narratives.

In *Das Heuvolk*, the carefully arranged, meticulous stage design helps the audience members to figure out the socio-economic and cultural context of the narrative (e.g. in which era the performance takes place); and also such issues like what is the relationship between the performers or in between the performers and their personal objects. The variety of symbolic set design elements also offers an abundance of meaning-making strategies, which also help the performers when improvising background stories for unfolding events.

The real backstory of the performance's venue is merged with the story-world of the performance: real-world facts are mentioned by the performers when talking about the place or the venue, and these can emerge in various formats (in the case of the *Das Heuvolk* performance some questions that the performers often discussed to keep the alternate reality immersion level high were "what happened with this military base?", "how did the cult members occupy it?" and the like.)

As I mentioned above, the performers, could not "act" freely as they had a prescribed biography, but on the other hand, thanks to their highly skilled improvisational skills, they could offer new, emergent narratives to the audience, by answering all kinds of questions that the spectators were asking.

Winning or losing

In *Das Heuvolk*, there are some gestural elements that are required in order to unfold the story (e.g. always greeting the trickster when entering a room, or keeping some "traditions" alive.) The aim of the participant is to visit as many rooms in the building as possible and to talk to as many performers as possible. By this, the participants can assemble a well–curated storyline, which creates for them a sense of comfort and a sense of being at home with the performance. If the participant feels challenged enough and feels open towards the environment, at the end of the performance she can commit to the cult by facing one last challenge, namely to undress in front of the other participants and performers. (And it is also worth mentioning that those who joined the cult and stayed for an extra hour had no organized vehicle to bring them back to the center of Mannheim, so they had to face the additional challenge of a one hour long walk back to the city.) This particular performance of SIGNA offers a reward for the winners, namely the one hour long extra performance, that only the new cult members can attend. Here they can sing together with other members and establish a cosy physical encounter that can raise the endorphin level.

HORROR AS GUIDING ELEMENT / 6.4 /

In her book *The Horror Sensorium*, Angela Ndalianis states that "[t]he spaces of horror media not only fictionalize—in vividly sensory ways—their own sensorium, but they also demand that we cognitively and physiologically respond to their fictions by translating their sensorial enactments across our bodies." (Ndalianis 2012, 3). As I mentioned previously, immersive theatre performances have to directly engage multiple senses of the participants, and through this they can create very striking physical responses. But how the horror genre can create this direct physical effect? Ndalianis explains this by saying that "[a]s a genre, it's capable of intensifying the range of reactions and experiences in which we can become enmeshed when connecting with media texts and, over the last decade in particular, the proliferation of horror texts across media have amplified their focus on sensory encounters." (Ndalianis 2012, 6) And as I have remarked elsewhere, in the case of the cinematic medium, the horror environment constitutes the "aesthetic of disgust. In this performance the participants gain experience through 'carnal elements' such as sweat, saliva mixed with dirt, real time violence, and also taxidermies."

We can say that these "sources of disgust boost the hunting attitude of the audience, and it is this attitude that actually guides the experiencer through the performance space and unfolding story" (Bakk 2019, 217). The continuous disgust that one can encounter in almost every room enhances the expectation of the next shocking element in another room. This expectation is strong, as the feeling of uncertainty can often intensify affective reactions. Bar–Anan et al. conclude in their study that uncertainty intensifies affective reactions to an ongoing positive event, but it can also intensify negative emotions in case of negative events. It is also important to note that the feeling of positive or negative uncertainty depends less on the actual knowledge of the participant, but more on their feelings. (Bar–Anan et al. 2009, 126)

Das Heuvolk is an in–between performance: It uses the mechanisms of unpredictability, and the violence that can be viewed from very close together with the symbols of occultist cults give the audience the feeling that something horroristic might happen. On the other hand, the performance also offers many "happy moments" for the audience members, that intensify the experience together with the rise of the level of intimacy and improvisation that the performers are mastering. As the director of the performance Signa Köstler admits in an interview (Schütz 2019, 55), the environment in this performance was "positively harmless", which is also a reason why some visitors, even though a minority of them, decided to join the cult, as their feeling of uncertainty was intensified but the expectation of something positive will happen was stronger.

ANALYSING AGENCY AND TRAJECTORIES: MIXED-REALITY PERFORMANCES / 7 /

Productions that call themselves immersive performances and use mixed-reality technologies are getting more and more widespread. These productions promise a sense of immersion that is enhanced by the magical characteristics of new technologies. This is not a novelty, as already when the telephone was invented or in the era of Nikola Tesla, the use of electricity was considered similar to forms of magic, as I have mentioned before (also see Carolyn Marvin 1988, 58). Immersive theatre performances using mixed-reality technologies offer a special journey for the participants. By pursuing this experiential pathway, the audience members pass through various experience points that are created to deepen the immersive. These passing points represent the participants' way from digital mediated spaces to analogue spaces and vice versa, while the spatial and narrative unity offers cohesion to the production. According to Chiel Kattenbelt "intermediality is very much about the staging (in the sense of conscious self-presentation to another) of media, for which theatre as a hypermedium provides pre-eminently a stage" (Kattenbelt 2010, 29).

In this chapter, I will discuss mixed-reality performances in the context of their immersivity. I will point out how technologies that employ various types of interfaces and that are merged into one production create a rather fixed trajectory for the audience members. For mapping the experiencer's journey, I will rely on the concept of 'trajectory' that was defined by Benford and Giannachi (2011) and discussed previously in Chapter 3. I will analyse the production *SOMNAI* (2018) created by dotdot and performed in London. I consider it as a unique mixed-reality production where the narrative cohesion reflects the variety of analogue and digital spaces that the audience members have to traverse. Even though trajectories have already been discussed in the literature, this has been done mainly with a focus on the beginning trajectories of a performance (see for example Jaller and Serafin 2020), while I will also mark some crucial moments when the experiencer transitions from having a group experience to a personal or divided group experience and I will also point out how this can be orchestrated and what obstacles the technology can create (also see Jaller and Serafin 2020 for a discussion of related points). I will

show how these transition points are sometimes orchestrated in a rushed way, and how they makes use of the limited time-frame to lure away the audience members' attention, while also raising the level of adrenalin and thrill by making the experiencers run from one location to another. It is interesting to observe how the horror elements of the performance are emphasized by these somaesthetic design strategies.

OVERVIEW OF PREVIOUS THEATRICAL WORK USING VR AS A REFLECTED MEDIUM IN PERFORMATIVE SITUATIONS / 7.1 /

The mixed-reality environment is enabled by the usage of new technology tools that are used to merge the borders of analogue and digital spaces. According to Suh and Prophet (2018) "immersive technology is technology that blurs the boundary between the physical and virtual worlds and enables users to experience a sense of immersion." (Suh and Prophet 2018, 77) If this is taken as a description of immersivity, it is too narrow for the purposes of this thesis (as it excludes analogue immersive experiences that do not involve virtuality understood in the restricted technological sense), but it points at an important aspect of mixed-reality productions. This phenomenon of blurring of the boundaries can already be traced to Paul Milgram and Furnio Kishino's reality-virtuality continuum (1994). On this continuum one can see the scale of classification for different immersive mediums: The taxonomy starts with the real environment and it ends with the virtual environment, in between being the augmented technologies. This means that at the one end of the continuum is the purely virtual and on the other the purely physical environments. In the middle can be found two types of augmented reality: one where physical settings are modified with digital information or visualization, and one where the virtual environment includes physical information.

According to Benford and Giannachi, as stated in their seminal work about mixed-reality performances, the definition of mixed-reality performance is "a new form of interactive experience that integrates digital media

with physical settings and also combines interactivity with live action." (Benford and Giannachi 2011, 22.)

An overall characteristic is hard to define about the nature of mixed–reality immersive performances. They can take place in a public space with a rather undefined special characteristic; various technology tools and interfaces (public or private) can be used to create an overall sense of participation and their length can also vary. The mixed–reality immersive performance *SOMNAI*, designed by the company dotdot, does not entirely correspond to the above mentioned characteristics of immersive performances, as due to the technical limitations the agency and the spontaneity by which the audience members could explore the space are totally missing. Instead, the audience is guided by the performers/orchestrators, and the technologies that they use in their performance can be also intimate and public interfaces as well.

Bendford and Giannachi state that "different points of view can be occupied, so the subject's way of experiencing this new mixed–reality is always already based on the convergence, divergence, and reconvergence of multiple embedded and emergent trajectories." (Benford and Giannachi 2011, 4). Their framework is based on the consideration that mixed–reality theatre is a juxtaposition of digital and physical environment, where the members of the audience are "transformed into being interacting participants or players, and subsequently into being performers in their own right." (ibid., 5)

DOTDOT'S SOMNAI / 7.2 /

The fundamentals of worldbuilding require that the members of the audience are immediately situated in the narrative framework of the space. In case of *SOMNAI*, the audience members are patients of a sleep clinic, where they can experience lucid dreaming. The creators use many tools and layers which we can consider to be necessary for a perfect immersive state. I have attended a performance of *SOMNAI* in July 2018 in London, which I describe below.

Upon arrival, the spectators step into a building which appears to be a plain warehouse. The audience is greeted by an actor dressed in white, who immediately offers us some non–alcoholic cocktails and some bonbons. After completing the necessary administrative and logistics procedures (presenting the ticket, giving our belongings and phones to the cloakroom, taking off our shoes) we are invited into a changing room, where those who

wish can take on a bath gown. The audience members are separated into groups of six. We step into a room that radiates the atmosphere of a New Age cult: Silent music, scents from various candles, and a very welcoming woman initiating a conversation with us, asking about different types of dream and telling us about how we can acquire the skill of lucid dreaming. She also tells the story of a little boy: He is unsettled by a worry that he might not be a good boy and does anything to fulfil his mother's (imagined) expectation of having a good son. But he has lost his white handkerchief (and the woman, as she tells this part of the story, discreetly puts the handkerchief into the pocket of a participant's bath gown). From here starts the audience's rushed experience of going through various physical or digital immersive spaces, which leaves only blurred memories of the experiences of the performance due to an overwhelming amount of impressions. The performance is taking place in a two-storey venue, where the audience is navigated by the actors. The dramaturgical rhythm of the actions is not unified: There are moments of waiting and contemplation, especially when the audience encounters screens and projections in various ways, or when they are putting on HMDs.

However, even though in a gradual and punctuated way, the creators succeed in initiating their audience into the 'planned' subconscious state achieved by lucid dreaming: First the audience is brought into a small, round-shaped place where one can lie down. After lying down, a projection screen covers this round shaped-room and around 120 centimeters above the audience, there is a mesmerizing projection. In this first passage, the performance seeks to familiarize the members with the hypnagogic state. Immediately after this scene, an actor rushes the audience to another room where they can try out the feeling of flying: We are helped to move onto a swing and to put on an HMD so we can experience the feeling of the flight of the birds. The animation experienced in this context is supported by a narration that describes the symmetry in birds' flight. In this experience, however time-based, with the help of the swings we can also encounter the feeling of balance and lightness. After a session of running through the hallways connecting the rooms, the audience again puts on the VR helmets. Here one can walk on mountains and also try out the sense of balance by crossing a very edgy bridge. In the same scene, we later arrive at a field of flowers and mushrooms. Meanwhile, the participants are surrounded by helpers (or orchestrators) who guide the audience in passing through different trajectories. This guidance is important also because there are mushrooms or frogs not only on the virtual field, but also in the physical space there are touchable version of these shapes made out of silk or plush. (In my experience, the HMD was not accurately situated on my head and due to some programming issue the image was not synchronized.) Here, the participants' paths fork. During this walk, two of the six participants (and I was one of these two) are guided by one of the orchestrators to follow him silently while the other participants stay in the virtual space. By running

through the hallways and the carefully designed room, the performer presents himself as a young boy (just as in the beginning) and tries to show the two participants various magic tricks in a children's room with automated toys (swinging ponies and scary rabbits). All the spaces that the audience passed through in a rush have a design from the 70s–80s, which evoke the design of the New Horror movies. The orchestrator later brings us into a dilapidated cellar, where the audience can watch, through a screen, what is going on in the next room. Even though the screen does not clearly display what is happening, the use of poor image aesthetics of web cameras enhances the feeling of being scared and chased. Due to this discrepancy between the high definition animation images of the VR and the black–and–white screen, the thrill of expectation is continuously rising. The room is also reminiscent of the raw aesthetics of a cellar where villainous characters keep their hostages before killing them. Figures painted in red, a rusty sink, dim light and an inoperable door all represent the setting of a horror movie. After the hyperrealistically designed rooms, the rush stops for a while in this space, where immersion is established with few tools, mainly with the atmosphere. After the other four participants save the two persons locked in the cellar room (even though this does not require much agency on their side), comes the final part of the performance: The atmosphere of a sanatorium is again omnipresent, and the participants are asked to lie down on hospital beds after a short technical introduction by two orchestrators who look like nurses. Everyone puts on their helmets and experiences a state of free fall, which is accompanied by the movement/vibration of the bed. In the last scene, the nurses frame this experience by explaining to us that all our lucid dreams that we had during this experience will be used by machines (even though what this amounts to is not well explained), but the dreams have to be brave in order to push the boundaries of the humans: we can become very strong humans by practicing the art of lucid dreaming, and obtain happiness and professional excellency, though with possible side effects. After getting up from the bed the audience members arrive to a physical bar scene, where one can order cocktails in order to wake up from the whole lucid dream experience.

The selection of technological tools in the performance help enhance the immersive experience. They help the adrenaline level rise, as they depict a world where we are threatened with feelings like vertigo or a loss of balance when we are facing danger. These elements remind us of the beginnings of cinema. These direct sensorial experiences bring to mind Rebecca Rouse's concept of the 'media of attraction' and the seamed character of these media, which I discussed in Chapter 2. However, this seamed characteristic also means that immersion might be broken or interrupted many times, and it gives us more reasons to try out new formats and design strategies for creating new content in order to render a more seamless immersion.

This seamed characteristic can be observed in the experiencer's journey: whenever the participant is entering a situation, she encounters a transition because of the mediated space with a varying interface ecology. In the following, I will point out how these transitions create the participant's journey, and how the creators of *SOMNAI* inject a stronger sensation of shivering by indulging the participants into fast movements. By generating situations where the participant is chased or has to arrive somewhere quickly, the set design enhances the atmosphere of the horror movie environments. This combination creates a unified participant trajectory which does not offer any agency to the audience members but aims at compensating them with immersive sensorial inputs.

MERGING ANALOGUE AND VIRTUAL REALITY WITH TRAJECTORIES / 7.3 /

In this section, I will analyse the structure of *SOMNAI* with the help of the concept of a trajectory, and I will point out how there are limited possibilities for the audience members to diverge from the "canonical trajectory". All the members of the audience leave the production *SOMNAI* with a collection of experiences, which is curated by themselves. Adam Alston interprets this as follows: "Audiences are likely to find themselves functioning as something more than an audience, either as a character cast within a given world, or as some kind of hyper–self, even a pastiche of oneself once confronted with a range of participatory demands pining towards some kind of revelation". In regular immersive theatre performances, the experiences are divided unevenly in the performance and the audience members feel an urge to find as much as possible. In the case of *SOMNAI* the audience members have a prescripted path and therefore they have no agency to discover new personalized experiences, but instead they can have a multisensorial trajectory that allows them to experience the transitions between various spaces. Even though the performance and its framing promises that in *SOMNAI*'s world "anything is possible" and the participant is helped here to master his or her "subconscious mind", the participant has almost no possibility for interaction, due to the technological overload that offers the feeling of a rollercoaster or amusement park. This creates a special sense of tension in the participants' bodies, which emerges from the ongoing transitions between various technologically mediated spaces.

In the next section, I will analyse in more detail some specific transitions within the performance, such as the beginning, the space, the hybrid ecology of interfaces, and also the somaesthetic design aspects of the transitions.

The Beginning

In a recent paper, Jaller and Serafin (2020) expand on Benford and Giannachi's concept of a trajectory and focus on the beginnings of the productions, which are crucial as these are the first steps, the initiation period, towards the epistemic type of immersion (see Ryan, 2009). In *SOMNAI*, the audience members enter a magic circle where various rules should be followed (however, later the audience can recognize that these rules do not matter so much as they have very little chances for interaction). As Katie Salen and Eric Zimmerman also remark, "only when a player has entered into the magic circle of a game do game rules imbue game actions with meaning and consequence." (2004, 573)

When entering the warehouse building where *SOMNAI* takes place, the audience members are greeted by a performer. The performer immediately welcomes the audience members as if they would be the guests of a sanatorium. After handing over the ticket and the coats to the cloakroom, audience members can step into the first room in groups of six people. Here the performer introduces the situation and also creates an interactive situation where the audience members can introduce themselves. The performer offers the handkerchief to one of the audience members, this way assigning him or her a later role in the performance. When I attended the performance, I was assigned the role of a participant, but I was aware of the fact that I will have a special mission later. As audience members, we also found out that the sanatorium where we arrived has the mission of helping those who are interested in learning the special skills of lucid dreaming.

The production's plot is built around the concept of lucid dreaming, which might be considered as a tailor-made subject for VR. Kitson and Riecke argue that lucid dreaming "is the ultimate virtual reality" and they ask whether one can research self-transcendent experiences in lucid dreaming with the VR experience and designers could use the outcomes in designing virtual reality experiences, given the similarity between the two phenomena. (Kitson and Riecke 2018) The creators of *SOMNAI* use the concept of lucid dreaming to offer an argument for the audience members that is rooted in a narrative, which makes the transition between the physical space and the virtual space (that is reached by putting on the HMD) an immersive phase instead of an abrupt one.

Space

In case of *SOMNAI*, the performance's stage is unmappable for the participants, due its labyrinthine character. The plethora of interfaces also create a chaotic usage of space, which makes the audience members feel that they can get lost immediately. The performance space is extended by spatial structures, with interfaces such as virtual reality, recording cameras, projection screens and other sensory–aimed props, and also with tools such as swings or vibrating beds. The role of the latter is to extend the sensorial effects of VR. Even though the designers and orchestrators have placed a lot of emphasis on creating the experience of transition between virtual and physical spaces, in the performance that I took part in the performers were often rushing or chasing the audience in such a manner that created more distraction than adrenalin.

The space of the performance is also constructed in such a way that some rooms/spaces are designated for encounters with other media, while some other rooms are fully decorated with sets (e.g. the childrens' room from the 80s). There are two rooms that combined the digital medium with the physical setting. In one of them, the participants put on the headset, and with the effects of the new technology tool Magic Leap, they can also see various plants and mushrooms around them. As mentioned before, the virtual plants are not only shining in the virtual space, but they are also tangible objects in the physical space (the VR system rendered and tracked these for a full–sensorium experience). The final scene takes place in a hospital room, where the audience members can lie down. The orchestrators/nurses put on the headsets for the audience members. The beds are responsive to the current VR visual representations, and when the audience members are seeing pictures of themselves descending or ascending the beds are vibrating in different ways, enhancing the physical sensations of flying and falling. The performance intends to create adjacent realities, as the narrative emphasizes how lucid dreaming can be an acquired skill. While in the beginning it seems like an unachievable or alien state (as the audience can watch only 2D visualizations in this phase) at the end the total sensorial input reflects that virtual reality experiences can be interpreted as lucid dream experiences. This skill is achieved (or gained) by going through the hybrid spaces, that emerge "out of the relationship between perceived, conceived, lived physical and digital spaces." (Benford and Giannachi 2011, 44) Even though new technology tools are used often in the performance, they offer a certain discontinuity for the audience members: The participants are frequently kept busy with trying to comprehend various media experiences, especially VR. They also have to go through fast meaning–making procedures while they are urged to rush from one room to another.

INTERFACES
/ 7.4 /

The concept of an interface is important to fully understand trajectories. Koleva et al. (2000) introduce the term "traversable interface". According to them, "[these] interfaces provide a mechanism for people to dynamically relocate themselves along this continuum of Milgram", the continuum from purely physical to purely virtual reality, with augmented reality in the middle. This way the participants can traverse between the primary real or virtual environments, so they can reposition themselves on the continuum, according to their interests, and structure their way along the trajectories. Koleva et al. state that the "illusion of entering a remote environment (has) to include appearing to leave one's current environment." (Koleva et al. 2000, 240). In *SOMNAI* one can notice the large projection screens that serve as a warm–up for the audience for the immersive media experiences that lie ahead (as they are placed very close to the body of the audience members when they are lying down). The interactions in *SOMNAI* that are enabled by various types of virtual reality experiences (via HMD interfaces) can be grouped into two different groups/moments:

1/ In the first interaction type, the audience can kneel down onto a swinging chair when putting on the HDM. The performers promise new skills to the audience members: they will learn to fly and this experience can offer them a glimpse into how it might feel to fly. The experience is not only presented with animated visualization but also in a sensory way with the help of the moving chairs. Similar to this, in the last sequence the audience members are asked to lie down on hospital beds where they can exercise lucid dreaming. Here the VR animation displays visuals that help one feel as if one is falling or flying. This experience is accompanied by sensorial elements, as the beds are vibrating and slightly ascending or descending, thus providing a fully sensorial experience.

2/ In the second type of interaction with virtual reality experiences, the participants are guided into a space where they are helped by the orchestrators to put on the HDM and other tools that help track the participants' movements. Equipped with these, the participants have to traverse an animated virtual bridge in order to arrive at the magic field with various plants and mushrooms. Here one has the agency to roam in the space (and also to follow the other participants who wear the HMD) and touch the exact physical copies of virtual plants. For me, this was a very unstable and nauseating experience: the visualization could not be rendered in a synchronous way with the analogue shapes. In an ideal situation (where programming is done properly) the virtual plants can be touched, as in the physical environment the exact copies in size were placed there for the audience to see. This experience ended abruptly, as some of the experiencers were "taken" by the performers, with no explanation of why the VR experience ended.

Eva Hornecker and Jacob Buur argue that the tangible interfaces have to be designed with both their physical and digital aspects in mind, and also with their interrelations "within hybrid ensembles" (Hornecker and Buur 2006, 437). According to Hornecker and Buur, the following categories help us define the various interface types better, as these specify the "trajectory of interaction":

- Tangible Manipulation: "refers to the material representations with distinct tactile qualities, which are typically physically manipulated in tangible interaction" (Hornecker and Buur 2006);

- Spatial Interaction: tangible interaction that occurs through movement that is embedded in physical space;

- Embodied Facilitation: "how the configuration of material objects and space affects and directs emerging group behavior";

- Expressive Representation: "focuses on the material and digital representations employed by tangible interaction systems, their expressiveness and legibility" (ibid., 438)

In *SOMNAI*, we can observe mainly the embodied facilitation type of interfaces: the audience members' trajectory is defined as moving from one type of space to another one where their possibility of interaction with the interfaces is limited to a single modality in each case. Within the various new technology tools used in the performance, the VR sequences are there to immerse their users, although they are not based on photorealism.

SOMAESTHETIC INTERPRETATIONS / 7.5 /

The performance aims at being multi-sensory, and this sensory bombardment makes our sense of direction stop functioning as we are moved around in the two-storey, 20.000 square feet warehouse. In her book *Designing with the Body*, Kristina Höök bases her research on two baseline theories: the first is the primacy of the movement (taking cues from Maxine Sheets-Johnstone's work) (Höök 2018, 30), and the second is Richard Shusterman's (2008) concept that combines soma and aesthetics. According to Shusterman, soma refers to bodily subjectivity, cognition and perception, which are strongly connected, and if we can develop our senses through close attention to our experiences

we can also train our aesthetic ability, and we can also appreciate our experiences in a more meaningful way.

While analysing the heavily orchestrated trajectory, by applying Höök's somaesthetic design approach one can point out that significant design elements can influence our perception of the performers. For the various situations where the audience encounters or steps into an interaction with the devices, the designers created a multisensorial space, where the audience members' body is situated in a specific situation that correlates with the type of visualized content and the device.

Peculiar body positions also affect our perceptions: when watching a projection from very close the audience members are lying down, which creates the atmosphere of a bedroom. The VR experiences are accompanied with other sensory inputs: Either the furniture that supports the user is offering a swinging movement, or the participants accompany each other and they try not to bump into a real 3D object that stands in the way of their virtual journey. According to Höök, VR as a "supple interface" (a key term in Höök's book) works beyond the cognitive/rational level of the standard graphical user interface, both because of the use contexts it operates in (potentially emotionally charged, social and leisure situations) and the input modalities it may make use of (such as gestures, facial expressions and biosensor data). "A supple interface is one that enables and possibly enhances these subtle social signals. In a sense, a supple system is doing a sort of social/emotional 'dance' with the end user." (Höök 2018, 136).

Horror atmosphere elements can be considered as an example for a somaesthetic design element. By putting the audience members in bodily uncomfortable situations or by creating chase situations for the participants, and also by enhancing this chase with verbal actions, the excitement level of the audience is raised, evoking a peculiar feeling of uncertainty as the audience does not know why they are chased and as they have to make quick decisions regarding their expectations about what will follow. As the overall environment presents a rather horroristic atmosphere in *SOMNAI*, the audience members' also develop a tendency to expect negative events. (A psychological phenomenon pointed out by Bar-Anan Yoav et al. 2009).

According to Angela Ndalianis, "[t]he spaces of horror media not only fictionalize—in vividly sensory ways—their own sensorium, but they also demand that we cognitively and physiologically respond to their fictions by translating their sensorial enactments across our bodies." She also states that horror is perhaps more intensely somatic than any other genre that has an extensive media history (due to the various remediation of media conventions) (Ndalianis 2012, 63). "Contemporary horror is marked by an excess of self-referentiality

and remediation that's as multifarious as the conglomerate structure that produces it." (Ndalianis 2012, 63.) In *SOMNAI* the digital animations and VR experiences add to the horror atmosphere that is continuously maintained by the overall dim light of the spaces. Although the audience members do not have the chance to create a personalized trajectory of the performance, they can have experiences similar to dark rides or other amusement park experiences, where being startled is a key element of "having fun".

The dreamlike characteristic of the production also adds to the feeling of a 'dark ride'. As mentioned before, we can consider lucid dreaming as a suitable topic for virtual reality productions, as lucid dreaming resembles the dream-like characteristics of the medium and a narrative based on the topic of lucid dreaming helps the sense of being in a virtual reality production extend to the parts of the performance where no VR technology is used. On the other hand, virtual reality itself reflects its characteristic on the whole production and it explains the feeling of illusion that the audience members have even when they are not facing anything illusory. Also, the rushed way the audience members perform the transitions between the analogue and digital spaces which resemble the fast pace and abrupt transitions in a dream, the lack of agency, the overloaded sensorial effects, and the horroristic atmosphere that mirrors the state of anxiety common in dreams help magnify the dream-like feeling and therefore the feeling of illusoriness throughout the performance.

Oliver Grau describes immersion in virtual reality as follows: "In virtual reality, a panoramic view is joined by sensorimotor exploration of an image space that gives the impression of a "living" environment." (Grau 2004, 7) He states that in virtual spaces the parameters of time and space can be modified, and while accessing virtual reality spaces, "images of the natural world are merged with artificial images in "mixed realities," where it is often impossible to distinguish between original and simulacrum." (Grau ibid.). This merging of images is what helps us to create the sensation of discrepancy in the audience and what enhances the intermedial characteristic of many contemporary performances. The process of distinguishing reality from the virtual in *SOMNAI* is actually the process of passing through the various transition points. In such a responsive environment, this causes stress and disorientation in the viewer, especially if the atmosphere is horroristic. The juxtaposed layers of media and reality also contribute to this disorientation, which is a liminal experience. The viewers' immersive experience is caused precisely by this disorientative phase of being lost in between the media. As this is a passive state, the participant only has to follow the trajectory, which gives a new sense to mixed-reality performances, meaning that a single canonical trajectory overloaded with the above-mentioned characteristics can constitute a new type of intermediality.

IMMERSIVE THEATRE MERGING WITH VR: CASE STUDIES / 8 /

Since 2020, COVID–19 lockdowns created new challenges but also new and imaginative mediated theatrical possibilities for performance makers. Audiences had the chance to experience theatrical events that involved liveness and co–presence in many forms, especially in video conferencing and other web–based forms. But all these present very limited possibilities for creating the sense of co–presence, due to their 2D characteristic and minimal interaction possibilities, not to mention video conferencing fatigue. Meanwhile, new and affordable stand–alone VR headsets appeared on the market. The long–awaited Oculus Quest 2 headset launched in autumn 2020 brought the stand–alone experience for users at a more affordable price (promising for the whole industry the expected wide outreach of the idea of VR) but it also faced criticism as it had a new requirement to log in with the user's Facebook account in order to log in to the headset and the Oculus services.

Another problem VR industry is facing is that there is not enough VR content besides games. (Roose 2020) It takes a long time to develop complex games for the headset that would offer an experience that is not disappointing, such as *Half–Life Alyx* developed by the VR headset developer company Valve, which shows how much effort is needed to create medium–reflexive content and to fulfil the desires of the VR gamers.

Yet another issue of VR is the emotional dangers it poses: a study by Lavoie et al. (2021) has shown that "VR games are capable of intensifying negative emotions elicited during gameplay and that these emotions persist beyond the gameplay experience". Meanwhile, there have appeared platforms that make possible the creation of live events and meeting points where actors and orchestrators can make sure that the participants are handling negative emotions properly; these are social VR platforms, especially VRChat. Like other similar platforms, this online virtual world platform allows users to interact and create their own personalized 3D avatars, and player modes are capable of eye tracking and audio lip sync, which can create a heightened sense of presence. If the user wants personalized spaces, then she can have the possibility to create a special room in the VRChat world and invite others there (without extensive knowledge of coding). This flexibility also attracts

theatre makers to further experiment with the application and try out new forms of co-presence of the performers and the audience members and new forms of liveness and embodiment (Fischer-Lichte 2008, 67).

In this chapter, I will overview various design suggestions for contemporary theatrical VR productions and I will present three immersive VR theatre productions as case studies, namely *Tempest* by Tender Claws, *Finding Pandora X* by Double Eye Studio and *Welcome to Respite!* by CoAct Productions and Ferryman Collective. I will try to show that this type of performances, which has the capacity to bring remote audiences together, can offer new possibilities for co-presence and interaction in virtuality, with the help of particular mechanics that are used in video games as well as elements of immersive theatre such as onboarding or LARP, even though these productions are still fighting the barriers of technology. I will conclude with pointing out the limitations of virtual immersive theatre compared to analogue immersive theatre performances, and I will make some suggestions regarding how to overcome these limitations.

Virtuality and Theatre

As proposed by Antonin Artaud (1958), theatre can be considered as a space for virtuality. In 1980s and early 90s performing artists began to focus on virtual reality and many of them started to experiment with the virtual reality system. One of the pioneers is Mark Reaney, who did numerous experiments with the technology at the Institute for the Exploration of Virtual Realities at the University of Kansas. He also shares the view that theatre is a form of virtual reality:

"Theatre is the original virtual reality machine. Accessing it audiences can visit imaginary worlds which are interactive and immersive. Traditional theatre [...] offered experiences which were indeed immersive and interactive, and made possible by the technological means available at the time. The theatre as a 'machine' ... [is] composed of animate and inanimate parts that make it possible to transport audiences to other worlds." (Reaney quoted in Allen 1999, 242)

Artaud's and Reaney's statements might seem to be conflicting with what I have claimed before, that immersive theatre should be considered a separate genre and not all theatre that has some immersive elements is "immersive theatre"; however, they rightly point out the scalar nature of immersivity and the basic elements of virtuality and immersion that can

be found in earliest forms of theatre, as in most other artforms – which, as mentioned before, is an outcome of fantasy.

There are other discussions of the connection between virtual reality and theatre from the earlier times of VR technology. Rheingold, another VR enthusiast, suggests in his 1991 book that Artistotle's dramatic notions such as mimesis and empathy are the basic characters of VR technology, and he adds that "properly done, a virtual reality experience will have a greater sense of mimesis and of participation in the events" (Dixon 2007, 364). Here, Rheingold is forecasting how the crossroads of virtual reality headsets, virtual spaces and theatre can create new ways for understanding the power of performing arts.

Virtual Reality

Before discussing the Virtual Reality productions created by performing arts companies, it is important to define the difference between 360–degree movie and VR–experience. In the everyday language, VR–movie can designate 360–degree videos as well as the computer generated VR–experience with live rendering. 360–degree videos are situating the spectator in the place of the camera, which is a passive position similar to that of the film viewers. The immersive characteristic of this genre is that the environment can be explored in 360–degree by head movements, but staying in a fixed position. The 360–degree videos (unless they are interactive) therefore have a fixed storyline and timeline, this way they have a predefined viewing time and the narrative is controlled by the creators. In contrast, computer–generated VR environments present the viewers an experience that leads to a more participative attitude. These are environments that can be explored by the viewer; they are game–based environments where the players are the protagonists and they are making the choices, as long as it is enabled by the design. One reason why the two genres are considered "virtual reality" in everyday language is because for a better viewing experience both of them should be watched with the use of goggles or head–mounted displays, even though what is provided by the 360–degree videos is only a diminished type of virtuality, as it does not provide interactivity.

As the two production types (that can also be considered as two different genres) are both labelled "virtual reality", it is important to point out that only the VR–experiences enable in themselves interactivity for the participants. Therefore, we can state that even though both of these main types of productions can be experienced in their full by using the headset, the 360–degree videos are more related to the medium of the film, while the VR

experiences, that give more opportunities for the user to get into interactive relations with the immersive space, are based more on video game mechanics. For the design of video game mechanics, game designers have to anticipate player strategies. Game designers are using clues, sounds, and dramatic actions to guide the players. Such game mechanics can be used in theatrical performances that combine VR and the bodily co-presence of the audience with the performers, and in this case, they can create various emotions, and can also highlight the "ecstasies of things" discussed in Chapter 5. The objects that can be used in such productions where real time events are combined with VR-experiences do have this "ecstatic" character as they receive more layers of possible interpretations.

Early theatrical VR productions and their characteristics

Since the 1990s, various theatre labs and creators have been experimenting with the relationship of the medium of VR and theatre, although in the earlier times these VR experiences were only suitable for one experiencer. One of the most prominent early pioneers in this field is Brenda Laurel, the author of the book *Computers as Theatre*. In her 1994 site-specific VR installation *Placeholder*, Laurel puts her ideas about VR in practice by reinventing "the sacred spaces where we collaborate with reality" in order "to transform it and ourselves". (Laurel 2013, 197) In her VR performance, the experiencer arrives at a place and puts on the HMD and sensors with the help of an assistant, and enters a space where she embodies various characters (Crow, Snake, Spider and Fish) and inside the production she is guided by the Goddess – a live-performed character usually played by Laurel herself. This offers a highly personalized experience with a clear specification about the role of the experiencer.

Another VR immersive production that provides a strong sense of embodiment (that is, where the environment is in strong interactive relationship with the experiencer's body) is Osmose by Char Davies. This 1994 production is a single user experience, where the breathing of the "immersants" (as Davies calls the participants) is monitored and the environment changes in response to their breathing.

Today there are several theatre companies using 360-degree video technology. The technology that is most commonly used is the 360-degree live streaming, which began with Broadway productions such as *The Lion King* (2015). Many performance companies are now using 360-degree video to engage their viewers, by promising them a new perspective of being on the stage and the excitement of liveness. Dance and even circus companies are

creating their VR–movies, partly with advertisement goals. In 2016 the Dutch National Ballet created *Night Fall,* the first virtual reality ballet in the world. The performance takes place in a rehearsal room where we can also see renowned dancers like Anna Tsygankova. The spectators have the feeling that they are sitting in the middle of the room and the dancer and the violinist are moving around them. Cirque du Soleil also created several 360–degree movies, based on their already famous performances such *KÀ* (2016) and *Dreams of 'O'* (2017) and their production company has also released a separate mobile phone app for these 360–degree movies.

In many of these performances, the viewers have the feeling of being part of what is happening on the stage, but they cannot influence it, because of the lack of an interactive aspect. Also, these productions are ephemeral. They are live streamed, and their fame is spread usually via social networks, and because their attractiveness for the audiences depends on the novelty of the technology, many of these productions enjoy just a short period of fame and do not get established as classics.

However, there have also been production companies which integrate the use of VR head–mounted displays into their practice by enhancing it with various aspects of performance, such as Punchdrunk or Bombina Bombast. In their production *Believe Your Eyes*, shown only for 500 people at Miami Art Week in 2016, Puchdrunk synchronized in an uncanny way the rendered image screened inside the head–mounted display with live actions and presence. The audience was ushered by an actress into an isolated spot and asked to wear a helmet which incorporated a head–mounted VR display. The 4D visual presentation featured the same actress, moving around the room. Based on the reports about the performance, the actress was present in the room, she was speaking to the participants, letting them feel her breath or touching them, the actress and the audience remaining incredibly "close" throughout the performance (Graver 2016).

In 2017, CyberRäuber created a performance called *Der Geisterseher* (The Ghost–Seer) that premiered in Mannheim at Schillertage Festival. It was based on a lesser known novel of the same name by Friedrich Schiller, a first person narration by a prince named O. The story, which takes place at the time of Venice Carnival, had elements of gothic novels, and also spiritualism, necromancy and unfulfilled love. However, in CyberRäuber's theatrical show, this fragmented narration was not constructed from a single syuzhet, rather, a series of elements came together in this 360–degree production and brought it closer to the realm of VR. The physical setting for the audience to step into this world was a motion–tracked space, where one could put on the head–mounted display and watch the 360–degree animation, made with a programme called Unity. The production was pre–scripted, there was

no possibility for interaction, but the participant could move freely in a small space, as the motion track camera enabled it. The production was directed by a theatre director. The protagonist, the prince, talked directly to the viewer in the beginning, but after this the viewer became only the witness of various private discussions. The set design was constructed to resemble the interiors of a gothic cathedral, where the viewer had the ability to move only through a limited space, offered by the motion–tracking system. Characters in the virtual space, animated via the movements of physical actors, surrounded the viewers, sometimes even going through their bodies. Sometimes, the characters seemed to vibrate, with the graphics often deconstructing themselves, uncovering the technological construction of the representation. The 360–degree video's length was 17 minutes, with a fixed line of sequences.

In the production of the Swedish theatre group Bombina Bombast and creative technologists from the company Makropol, titled *The Shared Individual* (2016), the spectators can experience a unique interaction between viewers and the medium of VR by playing along with the visual isolation of the head–mounted display. In their performances, they ask each member of the audience to put on a headset, then one of the members of the group sits in front of them with the same headset, and on the performer's headset there are several mounted cameras that livestream the audience's current actions. In their virtual space, the participants see themselves via the camera that is installed on the performer's headset. First, they verbally perform a meditative embodiment exercise: they ask the audience to synchronize physically with the performer and to mimic the performer's movements, and then also to synchronize "with her soul". The series of acts end with a joke that reflects on this ritual–like exercise with some irony. In the virtual space, suddenly an empty row of seats appear, replacing the participants' own image, which are the participants' seats filmed prior to the show and sequenced into the performance using the technique of montage. Then the participants start to create interactive situations, which involve a self–identifying feedback–loop (seeing themselves and their movements on the stage.) Through this process they are trying to bridge the gap, the gap in their reception of their spatial positions and identity that is caused by the rapid montage. With this performance, the creators question the location of the stage during a VR performance.

If we compare these productions to those that were made in the last two years, mainly during the pandemic, it is clear that the latter can offer a different sense of immersion by bringing audience members together in a virtual space and offering them a sense of intimacy with the help of the improvisational skills of the actors. While the installation–based VR performances heighten the sense of embodiment, the VR productions that take place in an online space shift our attention away from the embodied experiences and they direct it towards the illusion of agency. When comparing these two

types of productions, one important point to note is that performances on various social VR platforms can allow us to experience the performances from a distance, while the earlier ones required the viewer to visit a physical setting. The performances experienced via the Internet can create a new sense of community and togetherness by providing a sense of telepresence, where the audience has a central role.

Social aspects of virtual co-presence

The social aspects are dealt with to a lesser degree when defining telepresence or virtual presence. Lombard and Ditton's widely quoted study (1997) is an exceptional case where the social element of presence is discussed along with others. Two of the six elements that they define as key elements for presence in a virtual environment is related to social aspects: one is about how the user can be a social actor within the medium, and this is defined by the user's ability to control or interact with his or her environment; the second is about the medium itself being a social actor, defined as the digital environment's providing to its user the sense that it interacts with him or her. However, defining these aspects still do not bring us closer to the question of how the sense of togetherness or community in a multiplayer-like VR chat platform can strengthen immersion. In a 2016 study, Samur compares stage presence to presence in VR; and he states that "Open world environments, found in *Second Life* [...] create the promise of an experience that is unique to them, reinforcing the feeling of presence as the narratives the users create are tailored to their choices. Interactivity can heighten an audience's sense of fictional presence as they realize what they are currently experiencing is the result of past choices made." This approach can shed some light on the above-mentioned question, and it is especially important as immersive theatre productions aim to offer unique and original experiences to their audience members and this is what the audience members are also hunting (Alston 2016b, 134). In the same study, Samur (2016) also addresses the question of how theatrical formats could enhance the sense of presence and he briefly mentions the open world productions, even though the performances in VR that can accommodate multiple audience members surfaced mainly in the last 2 years – after Samur's study. Nevertheless, he brings up the point regarding how interaction can heighten the sense of presence (and immersion).

In Chapter 3, I introduced the taxonomy of interaction in digital theatrical formats offered by Dixon (2007): (1) navigation; (2) participation; (3) conversation; and (4) collaboration; where he defines interactive collaboration as a type of collaboration that comes about when "the interactor becomes a major author or coauthor of the artwork, experience, performance or narrative."

(ibid., 595.) This type of collaboration that Dixon defines is an important innovation and characteristic of the theatrical VR productions that I will analyse here (even when the collaboration–based agency is only illusory.) Combined with new types of interaction taxonomies (that are defined specifically for VR theatrical performances), reflecting on this new type of co–presence can help us find new ways of discussing these performances.

An overview of design suggestions for contemporary theatrical VR productions

Jason Ferguson suggests that "virtual reality has a storytelling problem and theatre will save it", and he takes it that this problem is due to the first–person delivery mode, making it harder for the audience to perceive the story as a story when they are themselves involved in it. (Ferguson 2016) Although this cannot be denied, here I will suggest that VR theatre performances organized in multiplayer settings can enhance the storytelling effect with the illusion of agency and interaction. I have already discussed how early VR works could be considered as theatrical, due to their installation–like characteristic and also because of the strong sense of embodiment that their users experience. But theatrical VR performances, especially since the new technological advancements, make it possible to bring audiences into the same space, often allowing them to interact with the environment, with each other, and also with the performers. Sita Popat states about VR environments that "[t]hese environments allow us to ask questions about embodiment and humanity through the experiences of our individual bodies in a way that has never been possible before." (Popat 2016, 359) Creators of performances that rely on the Internet also have a very long history with experimenting in novel ways on how the audience members can have new self–reflective experiences via telepresence. These are "telematic" performances, to use an older term for performances that rely on telecommunication networks as their medium. The sense of telepresence allows the creators to produce a new type of telematic performance which exploits the specificities of VR that other telecommunication networks often lack. According to Sermon et al. "[t]elematic artworks emphasize facial and body language, and in certain ways can offer more than physical encounters permit. The presence and observation of their *own* body in the third space as well as 'the other(s)' provides the participant with an opportunity to make coinciding subjective and objective observations. Since on screen their self is also the other, they are able to reflect on the interactions and performances occurring in front of them while seeing themselves as being directly responsible for it." [Italics in original] (Sermon et al. 2021) While presence in the 'real world' is effortless, virtual reality can offer

a special sense, a more complicated one, that shows how multi-faceted is our process of perceiving presence can be.

Recent research also discusses theatrical VR performances and offer design suggestions for this genre. Gupta et al. state that "we operate under the premise that the central pleasures that interactive drama should serve are those of playing along according to the expectations set by the system and communicated to the player directly. This contrasts with the dominant rhetoric of interactive narrative and story–based games, which emphasize the freedom to choose as a central poetic of the form." (Gupta et al. 2020, 10) They emphasize that many productions that are tagged as theatrical VR do not specify the role of the audience. The authors offer several design suggestions for creators such as managing the audience's expectation by offering to them explicit roles. Interestingly, the authors do not describe how this is possible on the narrative level, but they focus on embodiment. They suggest that in the onboarding process the audience members should be faced – in the VR application – with a mirror, so they can have more awareness about their avatar's body. They also suggest that the audience members should have the chance to get familiarized with the system so they should have "situated rehearsals" (Tanenbaum and Tanenbaum 2010) where they can try out the interactive situation in a low–risk environment – this could also be a helpful way to build up the onboarding. Another important suggestion is that the creators have to "invest time in 'high–yield' interactional and visual details that support the *illusion* of a social reality for the player within the scope of the *specific desired interactions called for by the script*". (Italics in original.) (Gupta et al. 2020, 9)

Based on their own experiments, Gochfeld at al. (2019) voice some doubts about the importance of the participants' identification with their avatar. They suggest that "for performance, embodiment is not as important as the ability of the actors to convey the characters' behaviours and emotional states: the actors don't need to feel that the avatar is their own body in order to be able to perform as if it is." (Gochfeld et al. ibid.) If true, this means that creators can freely make design decisions about the avatar. The authors suggest that actors' performing in VR is similar to operating a puppet, where the performer must master the control system to be able to project their expression through the avatar. (Gochfeld et al. 20219, 4) It is also important to note that actors with more realistic avatars tend to feel more in a rigid context then the less realistic avatars, while on the audience's side the more realistic avatar creates higher expectations towards the performers. (Gochfeld et al. ibid.)

As mentioned before, Yan et al. (2021), offer a specific taxonomy for interactions in VR theatrical settings: (1) individual–based interaction (IBI) includes mainly linguistic interaction and physical contact; (2) scenario–based interaction (SBI) "enables audience to play directly with virtual stage props un-

der the guidance of the performer" (Yan et al. 2021, 3) and (3) narrative-based interaction (NBI), which occurs if there are possibilities to make meaningful choices that influence the story, which is possible when multiple storylines are allowed in the production. The authors also stress the importance of identification and roleplay for the players. Taking the affordances of the medium of VR into consideration, the authors suggest that the freedom for the audience members to move and explore the VR space is very important. They suggest that the creators should offer a "rich sensual experience as far as possible to let the audience feel that they are focused by the performer all the time". (Yan et al. 2021, 5) These three strategical advices about onboarding, the audience's role and the specificities of their interactions can serve as an important starting point for analysing VR theatrical performances.

CASE STUDIES

In this section I will present three theatrical VR productions that create performance-based situations, focusing on the onboarding process that leads to the audience's role definition, and taking into consideration the suggestions by Gupta et al., I will analyse how these theatrical VR performances define their audience's role, and how the participants immediately understand their responsibility and the rules of the performance. I will also make use of the interaction taxonomy presented by Yan et al. Based on this analysis, I will conclude by offering design suggestions for this kind of theatrical performances.

THE TEMPEST
/ 8 / 1 /

The Tempest by Tender Claws (2020) takes place on a bespoke application, on The Tender Claws' immersive theatre platform The Under Presents. It is a live, prescripted participatory VR performance, where a small number of audience members are guided through the linear story of Shakespeare's play, *The Tempest*, and where they have local agency. The audience members can pre-purchase the ticket at a ticket counter in the app. Showing up at the chosen time indicated on the ticket, the audience members find themselves in a theatre lobby, where they can explore the space and where there are various assets (such as glowing bottles) with interesting functions. The audience cannot talk (they are on mute automatically) and everyone's avatar looks exactly the same, they can only produce some signs by clapping or snapping their fingers, or taking off their helmet. Because of this, body language is very important for the audience members, and also for the guiding actor who is helping the audience to go through all the scenes and offers the narrative background for the scenes. Together with the actor, the audience land on Hollywood Hills around a fireplace, where the actor talks about the virus situation and how many of his performances were cancelled, and offers a space to interact with various objects (e.g. a flashlight, with which the members can lighten the back of this scene, where there is a house.) The fireplace is also used as a ritual space, where – if everyone tries to follow the actor's guidance in the same time – magic can happen (a vessel appears). The actor is talking sometimes as Ariel and sometimes as Prospero, and later they are transitioned to Prospero's lair which is a three-dimensional memory palace, and here the

audience members can interact with the actor by bringing to him various assets that trigger various anecdotes, which help the audience to figure out why Prospero and his daughter Miranda ended up there. As the performance takes up a more jokey tone, the audience is briefly brought back to the initial fireplace scene where the guiding actor pretends to take a toilet break. After this, everyone is teleported to the island where Prospero and Miranda are exiled and the audience members find themselves on a feasting table when a harpy shows up from above. The feasting table's assets are interactive; the audience can throw food at the harpy or show him a long sword. In the last scene the guiding actor directs a mute LARP scene with the audience members: two of them will get Miranda and Ferdinand's costume and they have to get married, while the other audience members are spirits who have to act joyfully. In the last act everyone is teleported back to the fireplace where the actor is encouraging the audience to dance around the fireplace, and after several light and sound effects the audience is teleported back to the theatre lobby, where the audience members can have a solitary offboarding.

In this performance the audience members can manifest their agency in two ways:

- Sounds (snapping fingers with the controllers);
- Physical interactions (moving in the space and interacting with various assets (holding, throwing, etc.) and purely somatic interaction with the performer.)

Both of these interaction types are individual–based and scenario–based interactions. None of them are necessary to unfold the narrative of the performance, but offer the illusion of agency and of active contribution. These are not interactions to nurture collaboration within the audience members, but rather to have a sense of presence and body awareness in the world of the performance.

The audience members are onboarded as in the traditional theatrical format: they are spawned into the lobby of a theatre and from here they automatically arrive at the sight where the guiding actor awaits them. She (or he, depending on which actor is in charge of the role) helps the audience to understand that they are active viewers, and she also tells them each time what acts they should perform (e.g. make light with the torch or perform a wedding).

FINDING PANDORA X / 8 / II /

Finding Pandora X (2020), created by Double Eye Studio and directed by Kiira Benzing takes place on the VRChat platform and offers the audience members a higher level of interactivity, in the sense that they can also verbally interact or go independently to explore the space of the performance, while being a member of an ancient Greek choir. After a short technical onboarding that helps them to understand how to move in VRChat (a procedure presented by Hermes) and change their avatars, the audience members find themselves on Mount Olympus with the aim of helping Zeus and Hera retrieve the box of hope from Pandora. The players split into two groups: one group follows Hera in a utopian–looking future city and tries to help her find the box by solving easy gamified tasks (such as figuring out a word); the other group follows Zeus into the base of Mount Olympus where the players can have some drinks with the god, and also smash various objects. In both cases they enter these spaces via a portal that heightens the magical effect of the performance. The performance ends in a party, where the performers are presented and the audience members can interact with them (by having "drinks") as an offboarding.

At the beginning of the performance, the audience members are spawned into an "antechamber" where the creators can facilitate and properly organize the onboarding process. Here the audience members can learn about how VRChat functions, what are the movements that one can perform, how to handle technological problems (such as how to change their avatars and how to go through a portal) so that they can smoothly contribute to unfolding the narrative.

The audience can perform the following:

- Various physical actions (such as jumping and running);
- Simple interactions with objects (such as picking up objects, smashing objects, looking for the box);
- Joint interactions (such as solving puzzle elements in the futuristic city scene, which can be done only with another audience member);
- Verbal interaction with the performers (dialogue).

Even though the audience members have several types of interaction (mainly individual–based and scenario–based ones), although all of them involve only local agency. In this performance the audience members have to

rely on collaborative type of interactions as well, especially when solving puzzles. They understand that in order to find Pandora they have to do everything that the performers encourage them to do. This is a big challenge especially for the performers as they have to rely heavily on improvisational skills. They have to engage in one–to–one conversations in order to help and to guide the audience members, and this also creates a certain type of intimacy. The joint mission is what helps the audience members to clearly identify their role and also to have a sense of temporary audience community as everyone's aim is the same, as scripted in the performance.

WELCOME TO RESPITE! / 8 / III /

Theatrical VR performance *Welcome to Respite!* premiered in 2021 and it was developed by CoAct Productions and Ferryman Collective. This production also takes place on the VRChat platform. It is the first part of a four–chapter long production and deals with representing mental disorders such as dissociative identity disorder. The audience members, when stepping into VRChat, are greeted in a space filled with childhood memory objects most of which are oversized – compared to the size of the avatar. The actor who greets the audience offers a long onboarding: the audience members can interact with the actor, can sing songs together and also receive a technical onboarding. The actor here is engaging in one–to–one conversations with the participants and she creates a sense of trust and intimacy that will be needed throughout the performance. Here the audience members get separated, as one member will be the protagonist of the performance and the other participants will receive extra technical guidance. The rest of the participants become invisible and they can navigate in the space in a very fast pace (creating nausea in many audience members).

The invisible audience members arrive to the terrace of a house, where they meet Alex, the protagonist (played by the audience member who was separated), who is a young boy waiting for his parents. The mother and later the father also arrive home. While there is no narrative arc (the family is cooking dinner, the father and the son have some fun in the attic and then the parents bring their son to sleep) the elements of the background story, e.g. small comments about the father's drinking habits, and the son's possible mental health issues, create suspense. There are also two interactive moments when the invisible audience members can also manifest their agency:

in both moments the interactors have to try to save Alex (by pushing the controller's buttons) from amorphous evil forces. These are represented as colourful abstract forms in order not to attach any concrete meaning to these representations. After the performance, the audience members can have an offboarding in another VRChat room, where there is further information about this mental disorder as well as about the production.

The invisible audience members have very limited interaction possibilities, mainly individual– and scenario–based ones. But the participant who is playing the role of the protagonist has the chance to interact with the performers as well and also to decide on the narrative–based interactions, which means that she can interact with the other protagonist, but in a way that the performers try to keep the improvisation within the borders of the scripted narrative, and can have the illusion of agency, the illusion that it is possible to change the narrative path of the performance.

The interaction possibilities in this performance are:

- Interaction with the performers (verbally and in a somatic way, when playing the protagonist);
- Interaction with other audience members (when playing the invisible audience members, providing the illusion of agency in their group actions meant to save the boy from his psychosis);
- Interaction with the system by solving various puzzles (here the puzzles are mainly based on simultaneously pushing the buttons on the controller in order to save the protagonist.)

This performance relies on live action role–play mechanisms on the side of the audience member invited to perform the role of the protagonist and requires a highly concentrated improvisational method on behalf of the performers to remain in the narrative pathway. On the other hand, this can create a sense of great intimacy that also the audience members (who are invisible in the performance and whose participation is more voyeur–like) can enjoy, and this also encourages them to pursue the joint mission: to save the protagonist.

Towards an immersive virtual theatre

The three performances all offer onboarding procedures, to eschew as many technical barriers as possible that the audience members may encounter with their devices. They also serve as role-identification procedures for the audience members, raising their willingness to interact and to unfold the story. The collaboration-based interaction among the performers cannot always be high-intensity. While in *Finding Pandora X* the audience members have to collaborate to solve a puzzle and to unfold the story and therefore the production offers an increased sense of collaboration, in *Welcome to Respite!* the collaboration seems to be something more formal. This is done so that the audience members cannot observe the consequences of their actions: no one knows when pushing the controller's button does actually effectuate a movement.

All three performances use elements from community rituals, such as onboarding procedures found in immersive theatre and in LARP, that are applied to define the audience roles in the performance. The interaction types are usually individual and scenario-based but they can be used to nurture the collaboration between the audience members. It is important to mention here that the sense of co-location and co-presence in the virtual space is also enhanced by VR's three-dimensional rendering and also by stereoscopic vision. According to Tilo Hartmann (2008), the avatars being co-located can mean imminent threat but also opportunity, and have an impact on the embodied self. This is why in VR co-located avatars are approached with greater care (than, for example, in video games). These performances cannot allow narrative-based interactions as there are no possibilities to change the script of the performance. *Finding Pandora X* is an exception, as the script bifurcates, and this requires human resources (that is, more actors) and a storyline designed that way. The performances have a fixed and mainly linear narrative that either follows the drama or the natural cause-reaction chain of the events. The narratives are prescripted, which means that the audience behaviour is very limited; this is the reason why the available interactions are individual and scenario-based. On the other hand, the audience's attention is guided away from these limitations as all the performers rely on their improvisational skills. These skills are necessary for the participants to feel the liveness of the event, and the interaction types together with the intimate atmosphere also enhance the live aspect of these productions.

It is important to mention that *The Tempest* has an important element that distinguishes it from the other two and which, to some extent, works against the sense of immersion: as it is an adaptation of William Shakespeare's well-known play, the narrative that unfolds holds no big surprises for the audience members and one can even forecast what will happen in the

next scene. This way, the sense of illusory agency as well as the uncertainty is decreased in this production, and the environment is perceived as fictional because of the meta-reference. This might seem to go against what I have said when discussing the survey with the SIGNA audience, that those who knew what to expect enjoyed the performance more; but those who knew about the SIGNA performance did not necessarily know about the storyline, they knew about the general features of the genre and were more open to this type of experience.

The virtual immersive theatre produced in VR is a specific type of immersive performance very similar to those performances taking place in an analogue setting. For now, the immersive performances in VR cannot be very long (partly due to the uncomfortable setting of the HMDs) and because of this there is less time to build up the storyworld; therefore, these performances need to be prescripted. In order to offer a sense of liveness in VR, what is necessary is a more complex acting style where the actor is ready for improvisational situations and for guiding the audience where it is required. While immersive theatre offers to the audience an original story, physical possibilities to manifest agency, and unique experiences (Alston 2016b, 2), in VR immersive performances these unique experiences are harder to achieve due to technological obstacles such as limited possibility for multiplayer participation and limitations regarding navigation in space and interaction with objects. These obstacles can be concealed for a while by creating spatial open-world structures and by attention guiding cues (borrowed from the science of magic), but curious audience members can find out the limitations after a while. On long term, the creators of such experiences could experiment with the possibilities of creating more unique experiences with the help of the actors, a more layered storyworld and interaction possibilities.

I would like to conclude with a note on avatars and their relation to the narrative. I have briefly discussed avatars in the context of the sense of embodiment, but the function of avatars is not necessarily limited to providing a virtual physical body which the user can identify with. In some cases, the avatar is a character with which the user is supposed to identify herself. Although in this thesis I did not discuss the role of narrative in VR in detail, I would still like to make a related suggestion in passing. Slater et al. (2014) argue that one strategy for temporarily expanding the subjective experience of the personal self can be identifying with the characters in the story. Although the authors discuss mainly the narratives offered by printed medium or films, their ideas can be expanded to VR theatrical performances. They argue that "the accustomed boundaries of personal and social self are expanded to accommodate the realities, characters, and assumptions in the narrative. Identification with story characters and transportation into a story world provides, imaginatively and transiently, expanded agency." (Slater et al.

2014, 443). What makes many entertainment forms attractive are the emotions they offer, including negative ones (Vorderer, Klimmt, and Ritterfeld, 2004) that arise from the narrative and identification with characters, and this way, VR theatrical performances can serve as a break from one's daily self. In VR, the identification process should happen during the onboarding (as I discussed before) where the audience members can acquire the personality traits that are given (and can try out other personification possibilities as well). This identification can start with the design of the avatar, and can be improved by involving other live participants (audience members) and the possibility to interact with them as well as with the performers. In the case of non-interactive media, it has been shown that characters that are superficially dissimilar from the character of the recipient of the narrative can lead to a higher level of immersion (Slater et al. 2014, 450), so experimenting with similar design strategies in VR can also prove to be fruitful.

Theatrical VR performances through the lens of the science of magic

In this section, I will talk about how we can interpret VR performances through the lens of magic. Writing about immersive theatre performances, Garreth White states that "the feeling that there is more to see in the next room, and that there is always a danger of missing something, propels this movement. The moment-to-moment 'what happens next?' of conventional narratives is replaced by the 'where is he going?' and 'what's in the next room?'" (White 2012, 225) This is what we can call the "the hunting attitude" and it is a distinctive feature of immersive theatre productions and immersive performance installation. Still, the VR theatrical performances presented above contain an aspect of suspense or uncertainty. I previously discussed the nature of uncertainty in immersive theatre and also how the sense of suspense (that is similar to uncertainty) is "managed" by magicians. But this sense of uncertainty and suspense is very much present in VR theatrical performances as well, and it is brought about by a proper onboarding of the audience and their attention being guided in the right kind of way. To understand these processes better, we should look at the possibilities that VR theatrical productions are offered by immersive theatre performances and by theatrical magic shows as well.

There is a large body of critical literature on the notion of uncertainty in the fields of economics, philosophy and sociology, and the phenomenon has become an important feature of our everyday life. (see Bauman 2007; Wolff 2008) It is also an important aspect of video games, interactive art and immersive theatre. As previously discussed, uncertainty raises the level of

risk-taking attitude, and makes the audience members rely on various, basic risk assessment strategies in order to manage anxiety, and the risk-taking attitude also put its fingerprint on performance studies. I will argue below that the immersive feature of the above analysed performances also inspires their audience to welcome the uncertainty, as in video games and interactive art. As VR theatrical performances operate with mechanics of interactive art as well as video games, they also rely very much on uncertainty. But many of these mechanics have been deployed before in séances and magic shows, so offering an interpretation of such mechanics used in VR via a comparison to magic can expand our theoretical view and point to new ways of enhancing the immersivity of new productions.

Several authors have emphasized the importance of uncertainty in video games. Caillois (2001) makes a distinction between game and play: while games have rules, play is a rather freeform activity which is an essential element of human life; and he mentions that uncertainty should be at the core of the activity of playing. In a discussion of the relation between uncertainty and challenge, Malone (1982) argues that challenges have to have an uncertain outcome. Costikyan (2013) offers a taxonomy of eleven sources of uncertainty. Not all of these may be applicable to interactive art or immersive performances, but I would like to suggest that the following seven can be: performative uncertainty (which is connected to the player's feeling of uncertainty that is associated with the physical performance); solver's uncertainty (which is related to the solution of game puzzles); player unpredictability (uncertainty related to other players); randomness (of game elements); analytic complexity (the player's feeling of uncertainty when faced with the problem of grasping a complex system); hidden information (uncertain information that hidden elements can emanate); narrative anticipation (uncertainty regarding the path of the events). As Power et al. state, players usually sense uncertainty in various interaction forms but especially in information seeking.

As I discussed in Chapter 4, VR productions can also be compared to the séances of the 19th century as well as to certain types of magic tricks, those which do not come with the claim of conjuring but emphasize the skills of the magician. I will draw a parallel between the mechanics of these VR theatrical performances on the one hand and tricks used in séances and magic shows on the other, in order to offer a new interpretation of the experience of VR theatrical immersive performances. The onboarding mechanics as well as strategies that nudge the participants to achieve something together rely on séance-like magic gatherings. This link between immersive theatre and séances is partly due to both séance and theatre having roots in rituals. It is important to mention that in immersive theatre (and in the VR theatrical productions discussed above) onboarding is very important as it sets a common ground for the participants. During the onboarding, the audience/participant's

attention is manipulated in a way that she pays attention to the details and happenings that are framed by the performers. In the above analysed productions, the onboarding part (or in the case of VR productions the technical onboarding) also functions as an attention guiding element.

The actors of all three performances have a role similar to the role of a ritual leader or even a magician: they are responsible for the participant's personal experience. They help the audience members to onboard – they support the audience in getting familiar with the technologically defined context and they help them to identify their role in the overall narrative of the performance. This is done by a special onboarding procedure where the audience members get acquainted with the VR platform environment (especially with the possibilities of VRChat in the case of *Finding Pandora X* and *Welcome to Respite!*), and get an idea about the interaction possibilities, and learn about such things as how to "dress" into the avatar which is required in order to enter the performance's world. The narrative onboarding can take place at the same time (and some hints are given before, e.g. via e–mail) or at a later stage.

At any moment during the performance some technological problems can occur (Lyons, 2022), and one of the magician–like characteristics of the performers is that they guide the audience's attention away from technological problems, by diverting it on some specific characteristics of the VR performance or explaining it via the storyworld's internal rules. (For instance, during the performance of *Finding Pandora X* that I attended, a portal that was supposed to transport the audience from one chat room to another one did not function and they had to transport the members manually, explaining it by the powers of the gods in the storyworld.) This guided experience is very similar to the process of experiencing a magic trick: when seeing a magic trick, audience members entertain various scenarios about how the trick was done, but a successful magic trick denies all of these scenarios (see Chapter 4 on magic). Some audience members enjoy seeing 'behind the scenes', an opportunity that can be provided with these technical breakdowns, as it once happened in *Welcome to Respite!* where the main protagonist disappeared and meanwhile the invisible audience members could explore the space in more detail, but such cases are rare, and they happen likely because of VR theatrical performances being in an early stage.

The orchestrators often use the forced choice technique or a similar technique used in magic. As previously mentioned, these techniques are used when encouraging the audience members to make a choice especially for elements in the play that have similarities with video game mechanics. Such a moment can be found in *Finding Pandora X* when the audience members are presented with the choice regarding which side scene to be transported

(underground or utopian city views), while in reality it is decided beforehand. Solving these video game–like mechanics also provides the audience members with a feeling of success, although the genre is still in its early phases when it comes to making use of these mechanics. The performers/orchestrators also guide the audience in a way that they can find Pandora's box; while in *The Tempest* they encourage the audience to try out various assets in various scenes and let them discover the interaction possibilities with the actors' avatars, also giving verbal feedback.

Due to the unfamiliarity and the fragility of the digital environment, the audience members are in continuous suspense and in constant anticipation of uncertainty, framing the audience in a way that they feel that anything can happen anytime. The digital, and therefore unfamiliar character of liveness and the presence increases the suspense and uncertainty, and therefore offers a new type of liveness that shares characteristics with magic performances, manifested through mediated presence (telepresence). I have argued before that uncertainty itself is an element that enhances immersivity, and now we can see that there is a mutual reinforcing relation between these two elements.

As the medium of VR is still in its beginning, there is space for further development. We can still consider it as a 'seamed medium' – the characteristic of the media itself are not fully transparent; and the VR–productions reveal the importance of the guiding mechanisms that helps the participants to step into and participate in the immediate immersive world's narrative as they navigate through various types of technological features that are not transparent, which is similar to the attention guiding mechanisms in magic shows. One of the biggest challenges in VR theatrical productions (those that require the contribution of live actions behind the avatars) is the solution of technological problems that have to be delivered immediately as they surface in a production in order to maintain the flawless experience of the audience members.

The audience members, in the cases when they are enabled to do, are ready to push the boundaries of the roles of the avatars (in order to find out how flexible the performers are or how much the borders of the performance can be expanded): they want to see how scripted or algorithmic are the avatars, how the performer/orchestrator "behind" the avatars ready is to face challenges and how they can be moved out from this avatar role. The spectators also make attempts to challenge the sense of uncertainty of the performance. On the other hand, this uncertainty means that the participant's experience depends on the in–character improvisation on the side of the orchestrators and they are uncertain about the reality of that avatar. This is the reason why the audience members want to experience the liveness (as a category opposite to the algorithmic) with the performing

avatars. A reversed 'uncanny valley' can be observed, where the audience member recognizes that while the other person is performing live, she as an audience member can bother her or try to bring her away from her track, with almost no risk of being ashamed, as the virtuality of the performance allows him some security. I suggest that this is a peculiar type of behaviour that can show us why the attitude of the participants can be compared to the attendees of séances from the 19th century.

Attending a theatrical VR production is similar to attending a magic show, where the audiences have an appetite for, and seek pleasure in, "falling in with the tricks of the prestidigitator", or discovering how they are "liable to deception", or admiring "the performer who executes the sleights of hands" ; whereas in the magic shows the uncertainty is brought about by the apparent physical impossibility of the tricks (and the anticipation of failure in the trick's performance), in VR the uncertainty is brought about by the virtuality of the space (and the unpredictability of it, including the possibility of technical bugs). The actors are in the role of a medium and a magician as well, and the audience members might feel the tension to break the framework of the performance and to perform acts of misbehaviour. Misbehaviours can take various forms: not listening to the performer's guidance, not letting the performer fulfil a certain act (e.g. by back-chatting), trying to modify the environmental design of the virtual world (also with the aim of disorientating the performers), or spoiling the experiences for others if the audience member has foreknowledge of what's coming up in the production. This tension in virtual reality is due to the environment's being not so suitable for make-believe actions. The overlayered digital images (such as the environment, the avatars, etc.) do not present any reality and it is hard to create the possibility for make-believe actions, as the participants are in a virtual environment that is similar to an escapist imagery that requires the Active Creation of Belief (see Murray 2016, 93) and their attention is preoccupied with understanding the setting (and fight through the possible technological challenges). All the responsibility falls on the performers who have to guide the attention of the participants. Perhaps this means that there is a growing need for a new theatre etiquette and for new roles in creating theatre performances. Such directions are already framed in the *futureStage Manifesto* by metaLab Harvard (2021) that articulates the need for thinking about theatre and new technologies in a more holistic way, as well as presenting the variety of new roles that theatre creators should be aware of when thinking of the novel formats of digital theatre. These shifting roles will also enable the participants to have more immersive experiences by also remaining engaged with the live characteristic of the theatre.

CONCLUSION / 9 /

DIRECTIONS FOR FURTHER RESEARCH / 9.1 /

The discussions about the "new grammar for VR" will probably continue for a longer time, as long as interactive VR experiences are in the stage of "media of attraction". Even though this discussion still has a long way to go, meanwhile it would be worthwhile to look beyond the cinematic medium and look at other design fields and strategies, that might not seem necessarily relevant at first sight, but might eventually offer valuable insights for creating media-specific content for immersive experiences. In this thesis, I presented magic and the empirical work that has been done on the presentation and perception of magic tricks as one such field that carries this potential, and I offered various strategies for designing VR experiences distilled from the learnings from this field and other more familiar fields such as theatre studies. Before I summarize these strategies, I will briefly talk about the limitations of the current work and further avenues for research.

There are many fields that might be relevant for designing immersivity which I have not delved into in this thesis or that I have only briefly touched upon. Video game studies surely present more insights relevant to the current topic than what is presented in this thesis. I did not address the question of physiological modes of how VR can create a sense of illusion. (Gonzalez-Franco and Lanier address this question in detail in an article from 2017, explaining some of the 'tricks' that VR causes from the cognitive perspective.) Other fields of research on the history, sociology, psychology and neuroscience of various phenomena that might also present interesting findings for immersion studies include fields that deal with religious or esoteric ceremonies and trances (but also secular rituals), hallucinogenic substances, hypnosis, lucid dreaming, and potentially immersive forms of art beyond the theatrical and the visual, such as music and auditory art. Philosophical inquiry into the sense of embodiment, agency and selfhood (Metzinger 2003) and the epistemology of virtual reality (Chalmers 2017) may also offer interesting discussions that could expand the theoretical inventory of immersion studies.

I have not dealt with the issue of the ethical aspects of immersion. Even though immersive experiences are designed for artistic pleasures and entertainment, it is a reality that they have their negative aspects and some experiences can leave an undesired mark on some of the experiencers in various ways. Not everyone might be ready to have social interactions in interactive immersive environments or storyworlds where a strange but highly vivid new reality is presented to them and where ordinary socials rules no longer apply. This is the case especially for virtual environments. As the digital avatars expand behavioural freedoms and possibilities for the constructions of various identities, and the nature of some VR spaces is such that one is hidden behind anonymity and can apparently leave with no physical consequences, it is likely that users come across aggressive or irresponsive behaviour in such environments. This is not only an issue for immersive productions but also platforms that are used for work, leisure, or socialization. As with the proliferation of VR headsets, and the rise of the number of productions suitable for VR and social VR platforms, observing the online behaviour of people who use these technologies and the tensions that arise between them will be a priority, along with observing the psychological effects VR have on individuals. Issues related to the live co-presence started to receive more attention from researchers recently (see Maloney and Freeman 2020 and Maloney, Freeman, and Robb 2021), although it focuses mainly on how young people use the VRChat platform. A deeper study of users and audiences is needed in order to explore the possibilities (and dangers) of stimuli that lead to systematic trends in the behaviour of users. The question of false memories that VR can induce is another newly emerging topic (see Segovia and Bailenson 2009; Hartmann 2021) that will soon require more attention. Beyond all these issues, there is also the question of whether a proliferation of highly interactive artworks will diminish the kind of abilities like listening and observing that we gain through more passive forms of experiencing art and what would be the societal effects of this loss. In short, designers of immersive environments now face the ethical issue of how to create immersive experiences that do not pose harm to their users, and will soon have to explore more ways of doing this properly.

SUMMARY OF THE MAIN STRATEGIES FOR DESIGNING IMMERSIVE EXPERIENCES / 9.2 /

Rose Biggin states that "immersive experience can exist in that movement between passive and active engagement: between freedom and following rules; making choices within given pre-designed constraints. When considering immersion and interactivity within the walls of an immersive theatre production, what matters is less how interactive a production actually is at any given moment, and more the question of how it manipulates various modes of interactivity to allow for the experience(s) of its audience." (Biggin 2017, 94)

In this thesis, I attempted to show what these modes of interactivity are and how they can be manipulated; and the most crucial point we can add to Biggin is that the question is rather how an analogue, mixed-reality, or VR theatrical performance manipulates the modes of interactivity in order to offer a sense of impossibility.

Marie-Laure Ryan suggests that "VR is not so much a medium in itself, as a technology for the synthesis of all media toward a total experience" (1999, 112), and suggests that the VR interface is so transparent that in fact "the 'virtual reality effect' is the denial of the role of signs (bits, pixels, and binary codes) in the production of what the user experiences as unmediated presence" (Ryan 1999, 112). However, I hope I was able to show that ever since Ryan wrote these words, VR still couldn't fulfil its promise of total transparency and total immersion, and this is not only due to the limitations of technology: immersion is a phenomenon that requires a great deal of narrative, theatrical, and psychological strategies, many of which I discussed in this thesis, and which I will summarize in what follows.

Via my analysis of SIGNA's performance *Das Heuvolk*, I tried to show that there are already successful examples of immersive performances in the field of analogue theatre. Immersion is a phenomenon that comes in degrees in the sense that it is not an all-or-nothing phenomenon; even traditional theatre, or a short story, or a painting can be said to be immersive to some extent, satisfying some of the criteria for immersion without satisfying all. However, I have argued that this graded nature of immersivity should not prevent us

from identifying the genre of immersive theatre as a separate genre: works in this genre are not theatre performances that just happen to have some degree of immersivity, but those that attempt to include characteristics that are building blocks of a complex immersive experience. I identified these characteristics as

1/ a 360–degree physical environment;
2/ involvement of as many senses as possible;
3/ having no meta–reference;
4/ integration of coincidental events into the storyworld;
5/ character–based improvisatory and interactive performance;
6/ a (false) sense of agency on the side of the participants;
7/ abandonment of everyday social rules; and
8/ intimacy.

It is the successful deployment of these characteristics that enable a sense of immersion as I defined it in this thesis: a sense of being bodily present in an impossible world or situation brought on by the impression of a liminal transportation.

The first strategy for designing such a sense of immersion concerns the world in which the experiencer will be immersed. Designers should make sure that the storyworld and the environment provide the right kind of rich and explorable details and a captivating atmosphere, one which preferably triggers the right kind of cognitive and behavioural responses on the side of the participant. But another design element concerns how the experiencer will enter this constructed world: the experiencer should be provided with a carefully designed onboarding procedure that scripts the participant and frames her experience as a liminal one, an experience of leaving the ordinary world and entering an unordinary world, which is an unreal world and perceived as such, but which nevertheless looks and feels real.

A crucial element in this transportation is the sense of embodiment, which helps the participant to feel herself present in the storyworld; tactile sensations, emotions with somatic aspects and bodily engagement further heighten emotional responses to the events unfolding in this environment, and, in case of VR, helps the participant to identify herself with her avatar in the virtual world. Therefore, in order to strengthen the sense of embodiment, it is also important to include elements in a production that have these somatic responses, such as horroristic elements, intimate situations, and an overall environment, atmosphere and narrative that induces curiosity and uncertainty.

Given that an important aspect of immersion is the participant's feeling oneself present in the storyworld, strategies that offer higher possibilities for engagement, participation and interaction lead to a stronger experience of immersion. These include interactions with the actors, with the other participants, and with inanimate objects. Presenting the participants with situations where they are required to make a choice, take part in improvisatory dialogues, use objects, solve puzzles and roam the environment all increase the effect of immersion.

Many of these interactions also heighten the participant's sense of agency, of being involved in the storyworld as an agent that can influence what is going on in that world, sharing performative responsibilities with other participants and actors in shaping the narrative. However, for an immersive environment to function as a coherent and well-structured production or artwork, most of the real agency that is offered to the participant has to be limited, so that the narrative and the overall flow of the experience is structured in the way that the creators of the immersive work want them to be. Therefore, a crucial element for the design of immersive environments is not only to offer agency to the participants, but also to find ways to make most of this agency as illusory as possible and to guide the participants in the desired trajectory. In this respect there is a lot that VR can learn from the already available strategies deployed in analogue and mixed-media immersive theatre productions, as I have tried to show with the help of the literature on these works and my own analysis of several productions; and all these fields have a lot to learn from séances and magic shows where various tricks to induce a false feeling of agency and to guide attention, along with atmosphere building strategies, have been used for more than a century. Video games, and the literature that deals with this field of entertainment, may also provide many clues for shaping the participant's behaviour in the desired way.

Many technological shortcomings and the participants' unfamiliarity with the available technology present challenges for creating and maintaining a sense of immersion in VR and mixed-reality works. Particularly, the transition points in mixed-reality productions are moments when the immersion can break down. However, with the right kind of orchestration, these difficulties can be transformed into possibilities, where these transitions enhance the liminal character of the production and the feelings of unfamiliarity, uncertainty, discrepancy and disorientation that these transitions bring about, when supported by other elements that magnify these feelings and the right kind of attention-guiding mechanisms, can make the experiencers feel like they are lost in, and immersed by, an unreal world.

But transitions are not the only points where there is a danger that the immersion can break down. Any interactive production where the participants have some degree of exploratory and improvisational behaviour should be designed in a way that the environment, the technological system (if any) and the actors are ready for accommodating this behaviour: the fictional world should be ready to answer these behaviours without disrupting the participants' feeling of being present in that world. Some participants will be actively pushing the limits of possibilities, not because they want to spoil the show, but to feel a sense of wonder by finding out that the level of immersivity is high enough to answer all challenges, like the viewers of a magic performance who really want to find out how a magic trick is done while at the same time delighting in the fact that the magician eliminates each and every possible explanation. To achieve a similar sense of wonder, an immersive production should offer as many such possibilities as possible where the participants can experiment with the system, while successfully answering each challenge.

I want to conclude by re-emphasizing the importance of the fact that immersion is an experience of impossibility. Being immersed in a fictional world is a state of mind with an internal contradiction. It is not a state where we are fooled into believing that a virtual or theatrical world is real; this would be delusion, not immersion. Immersion is a state where we feel that we are present in a world while being aware that this world is not real. Aficionados of immersive artworks or performances, movie-goers, theatre-goers, readers of captivating literature, magic enthusiasts, or those who are lured to visit spiritual mediums' séances despite their unbelievability, all seek out an experience of impossibility. Current technologies and sciences of the human mind, together with insights from the history of various kinds of immersive art and entertainment, might be bringing us closer to delivering full immersion; and creators who believe that full immersion is a real possibility should keep in mind that the desire for immersion is a desire towards an unbelievable impossibility.

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CURRICULUM VITAE

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Researchgate: https://www.researchgate.net/profile/Agnes-Bakk
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EMPLOYMENT HISTORY

Researcher in immersive media
at Moholy-Nagy University of Art and Design
www.mome.hu
March, 2020 —

Mapping Social Behaviour in Social VR Spaces That Simulate Metaverse-like Environments — lead researcher
Zenctuary // Prototyping natural environment representation in VR and measuring its relaxation effects — lead researcher
Research Excellence Work Group — program leader

Board member and STSM coordinator
at INDCOR — Interactive Digital Narratives for Complexity Representation COST Action (no. 18230)
www.indcor.eu
December, 2019 —

Co-founder and co-curator
at VEKTOR VR section (together with András Szabó)
March 2019 —

International editor
at Játéktér journal
www.jatekter.ro
January, 2019 —

Junior researcher
at Sapientia Hungarian University of Transylvania in the research project; "Rethinking Intermediality in Contemporary Cinema: Changing Forms of In-Betweenness", Code: PN-III-ID-PCE-2016-0418, funded by the UEFISCDI (Executive Unit for Financing Higher Education, Research, Development and Innovation). Research led by: Dr. Pethő Ágnes.
September, 2017 — December, 2019

Co-founder
at Random Error Studio, Budapest
https://randomerror.studio
December, 2018 —

Founder
at ZIP-SCENE Conference and Magazine. The ZIP-SCENE conference is a yearly conference on immersive storytelling organized in Budapest since 2018.
Magazine: http://zip-scene.com; Conference: https://zip-scene.mome.hu
June, 2016 —

Creative producer
at Rita Góbi Dance Company, Budapest
www.gobirita.hu
January, 2013 — October, 2019

Journalist and editor
at Hungarian National Film Archive
www.mandarchiv.hu; www.filmarchiv.hu
January, 2012 — November, 2019

International manager
at Jurányi Art Incubator House / FÜGE (Függetlenül Egymással Association)
www.juranyihaz.hu
January, 2012 — October, 2014

STUDIES / QUALIFICATIONS

PhD in Design Culture Studies
at Moholy–Nagy University of Art and Design, Budapest
Research field: performing arts, new technologies, interactivity, co–creation
http://doktori.mome.hu/author/bakkagnes/?lang=en)
September, 2016 — August, 2020

MA in Theatre Studies
at Károli Gáspár University, Budapest, Hungary
September, 2008 — June, 2010

MA in Theatre Studies
at Babes–Bolyai University, Cluj–Napoca, Romania
2005 October — 2008 July

BA in Hungarian and Finnish Studies
at Babes–Bolyai University, Cluj–Napoca, Romania
September, 2004 — July, 2008

BA in Buddhist and Religion Studies
at The Dharma Gate Buddhist College, Budapest
September, 2009 — June, 2012

Professional Memberships/Accreditations
ARDIN – Association for Research in Digital Interactive Narratives
IETM – Informal European Theatre Meeting

Fellowships
National Excellency Program Fellowship (ÚNKP), 2018
National Excellency Program Fellowship (ÚNKP), 2019

INTERNATIONAL CONFERENCE PRESENTATIONS (SELECTED LIST)

Panel discussion about the future of New Visual Narratives.
New Visual Narratives Conference
2022.07.01—03. Lodz, Poland

Archival Material in Environmental Storytelling: Representing 1980's Hungarian Society Through a Walking Simulator. (together with Bendegúz Szatmári)
12 March, 2022. Solingen Museum, Play! Conference

Magic in Theatre and Video games – presentation at
Future Media Theatres cooperation project,
online, Skövde University, 2021.12.16

The Ethics of Virtual Reality Interactive Digital Narratives in Digital Heritage (together with Jonathan Barbara and Hartmut Koenitz) – ICIDS– International Conference of Interactive Digital Storytelling. Conference poster presentation, 2021.12.08—10.

Would you denounce your neighbour? Representing 1980's Hungarian Society through Walking Simulator (together with Bendegúz Szatmári)
GLOW Conference, Lusofona University,
22 October, 2021. Lisbon, Portugal

VR theatrical forms
Theatre&Technology Conference by ELTE
25 September, 2021. Budapest, Hungary

Kara Agora project presentation
Rector VRso online festival,
14 April, 2021. Laval Virtual Space

The Machine Stops
Pitching at 5th Wall Forum
8 March 2021. Online.

Video games in museum
Presentation at Petőfi Literature Museum
3 March, 2021.Budapest, Hungary.

Panel discussion about women's role in technology
TECH Conference Europe
8 March, 2021. online

Types of Immersion
Play in Life conference organized by the University of Public Service
25 February 2021

Immersion and The Science of Magic
Conference organized by the Committee of Academy of Science Cluj
25 January, 2021.online

VR For Environmental Change — keynote speaker
Environmental Sciences Department, Central European University
16 December, 2020. Budapest, Hungary.

Is There Magic in VR? — keynote speaker
DokNeuland – DOK LEIPZIG,
29 October, 2020. online

ComplexityJam — Case study (with Hartmut Koenitz)
ICGJ Conference on Games Jams
25 August 2020. Online

Opening debate presentation about *ComplexityJam*
INDIECADE International Game Jam
29 July, 2020. online

Digital Intimacy and Societal Change
Performimmersion Conference,
29—30 January, 2020.Berlin, Germany.

Thrill or Magic in VR
Zip–Scene Conference
10—12 November, 2019.Budapest, Hungary

Design Framework for VR – Using the Science of Magic
The Picturesque: Visual Pleasure and Intermediality
Conference at Sapientia – The Hungarian University of Transylvania
25 October, 2019. Cluj/Kolozsvár, Romania

Let's Get Scared. Magic in VR
CILECT Conference
6—12 October, 2019. Moscow, Russia.

Look Around. It's All VR. International
ELIA Academy
25—27 September, 2019. Stuttgart, Germany

VR and Embodied Experience Via The Horror Sensorium
NECS Conference
14 June, 2019, Gdansk, Poland.

Performing the Anthropocene – Towards a New Intimacy
Conference on Theatre and New Materiality by University of Montreal, Canada
28 May, 2019., Montreal, Canada,

SOMNAI – Horror Sensorium in VR–performance
Theater und Technik Konferenz,
8—10 November, 2018, Düsseldorf, Germany.

Embedded Liminal Experiences: VR–Experiences Framed by Performance Art.
Intermediality Now: Remapping In–Betweenness
Conference at Sapientia– The Hungarian University of Transylvania
18—20 October, 2018. Cluj/Kolozsvár, Romania

Hunting Guilt, Shame and Embarrassment. How Immersive Theatre Uses Video Game Mechanics In Order to Create Social Emotions.
Central and Eastern European Game Studies Conference at FAMU
11—13 October, 2018., Prague, Czech Republic

Video Application as an Intertwining Agent for Different Media.
Symbiotic Cinema: Confluences between Film and Other Media co–organized by SERCIA Linnaeus University
Conference organized in collaboration with SERCIA
6—8 September, 2018, Växjö, Sweden,

Analogue and Digital Immersive Experiences. What should Digital Creators Learn from Live Theatre Makers?
EVA London 2018: Electronic Visualisation and the Arts,
9—13 July, 2018. London, UK.

Total Immersion with Human Interface: Hypermediacies of VR Productions
NECS Conference: Media Tactics and Engagement
27—29 June, 2018. Amsterdam, The Netherlands

How Deep Is Your Immersion?
Presentation at the The Power of Immersion. Theatre – Affect – Politics workshop
Freie Universität
9—13 April, 2018. Berlin, Germany

How Interactivity Is Changing in Immersive Performances – An Approach to Understanding the Use of Interactive Technologies in Performance Art.
International Conference of Interactive Digital Storytelling. ICIDS
14—17 November, 2017. Funchal, Madeira, Portugal.

Narrative Environments Using Game Design Mechanism in Performance Installations & VR.
Clash of Realities 2017 Conference on Art, Technology and Theory of Games.
5—7 November, 2017. Cologne, Germany.

Vegetal Mediations
Plant Agency Conference (organized by Translocal Institute)
at Central European University
5 May, 2017. Budapest, Hungary.

Digital Theatrical Formats and Their Comparision
Play The City! Conference NIEUW
20—21 April, 2017. Rotterdam, The Netherlands

Potential of Independent Sector in Theatre
Theatre Conference of Tehran at Centre for Dramatic Arts
5—7 March, 2017. Tehran, Iran

Is There an Online Theatre with its Online Community? – Online Theatre Strategies for Creating New Communities
Open Fields Conference – RIXC Festival
27—29 September, 2016. Riga, Latvia

Interactive Digital Theatre
Media Archeology Conference, Organized by the University of Film, Television and Theatre
23—25 October, 2015. Beograd, Serbia.

New Technologies for New Audience.
Redefining Theatre Communities. Gozo University & New Tides Platform
15—18 September, 2015, Gozo, Malta

PUBLICATIONS

See List of Publications

AS EDITOR, REGULAR CONTRIBUTOR AND REVIEWER

Upcoming edited volume
"Immersion in Analogue and Digital Environments: Enchantment as a Laboratory for Transdisciplinary Thinking and Practice"
(together with Péter Kristóf Makai)
under discussion with Palgrave Macmillan – Basingstoke, UK

Regular article contribution
to the journals Helikon and Játéktér
helikon.ro and jatekter.ro

Conducting and publishing interviews
on zip–scene.com

Guest editor
at Designo special issue on Film and Design
January, 2022

Guest editor
for Frontiers In Virtual Reality special issue
(together with Rebecca Rouse, Joshua A. Fisher and Maria Cecília Reyes)
2023

Regular reviewer
for International Conference for Interactive Digital Storytelling

COURSES TAUGHT

Immersive Storytelling / Transmedia Storytelling
Escape room design
VR narratives
Future Forecasting and Complexity

INTERACTIVE DIGITAL NARRATIVES AND VIDEO GAMES IN WHICH SHE COLLABORATED AS MANAGER AND NARRATIVE DESIGNER

Budapest–New York
Point–and–click game
https://instituthongrois.itch.io/budapest–new–york
2020

1986
3D historical detective game about the Kádár–era in Hungary
PC game
https://89.edupro.osaarchivum.org/#szabadulj
2021

Follow the Crown
A historical game about the US–Hungarian diplomatic relationships
PC game
supported by the US Embassy in Budapest
Expected release: September 2022 on Steam

Petőfi 200
mobile point–and–click game for Petőfi Literature Museum of Budapest.
commissioned by PIM
Expected release: September, 2022

Don't You Dare, Houdini!
Theatrical VR experience for Oculus Quest 2.
Expected release: May, 2023

LANGUAGES SPOKEN

Hungarian (native)
English (near–native)
Romanian (near–native)
German (advanced)
Finnish (advanced)

LIST OF PUBLICATIONS extracted from MTMT

at 2022.07.13. 15:23

/ 1 / Immerzívszínház analóg terekben — görbe tükrökkel

Theatron: Színháztudományi Perodika 16 : 1 pp. 44–54. , 11 p. (2022)
Szakcikk (Folyóiratcikk) | Tudományos
[32925066] [Nyilvános]

/ 2 / Holodeck a színpadon — Transzrealizmus_01

Tranzitblog.hu : 1 p. 1 (2021)
Publicisztika (Folyóiratcikk) | Tudományos
[32927239] [Nyilvános]

/ 3 / Kiáltvány a jövő színházáért: Az előadás emberi jog. A harvardi metaLAB futureStage kutatási csapatának manifesztója

Bakk, Ágnes Karolina (Fordító)
Játéktér 10. évf. : 4 pp. 12-19. , 8 p. (2021)
Nem besorolt (Folyóiratcikk) | Tudományos
[32925602] [Nyilvános]

/ 4 / "Miningfor Lies" Enacting the Player Style through Performing Strategies in Archival Narrative

In: Denizel, Deniz; Eyüce Sansal, Deniz; Tetik, Tuna (szerk.) Multidisciplinary Perspectives on Narrative Aesthetics in Video Games
Bern, Svájc : Peter Lang (2021) p. 137
Esszé (Könyvrészlet) | Tudományos
[32922836] [Nyilvános]

/ 5 / Curate It Yourself! Game Mechanics and Personalized Experience in the Immersive Performance Installation Strawpeople (*Das Heuvolk*) by Signa

Well Played. A Journal on Video Games, Value and Meaning. 10 : 2 p. 116 (2021)
Szakcikk (Folyóiratcikk) | Tudományos
[32922821] [Nyilvános]

/ 6 / "Mining for Lies": Enacting the Player Style through Performing Strategies in archival Narratives

In: Denizel, Deniz; Eyüce Sansal, Deniz; Tetik, Tuna (szerk.)
Multidisciplinary Perspectives on Narrative Aesthetics in Video Games
Bern, Svájc : Peter Lang (2021) pp. 137-150. , 386 p.
Esszé (Könyvrészlet) | Tudományos
[32921990] [Nyilvános]

/ 7 / Körkérdés a karanténszínházról

Adorjáni, Panna; Deres, Kornélia; Hegyi, Réka; Herczog, Noémi;
Imre, Zoltán; Kiss, Krisztina; Köllő, Kata; Kricsfalusi, Beatrix;
Péter, Beáta; Ungvári, Zrínyi Ildikó et al.
Játéktér IX. évf : 2 pp. 3-36. , 34 p. (2020)
Sokszerzős vagy csoportos szerzőségű szakcikk (Folyóiratcikk) | Tudományos
[32925781] [Nyilvános]

/ 8 / Minden szerelmi kapcsolat kezdete egy thriller

Helikon (Kolozsvár) XXXI. évf. : 23 (805) pp. 19-19. , 1 p. (2020)
Műkritika (Folyóiratcikk) | Tudományos
[32925982] [Nyilvános]

/ 9 / New Technologies for a New Audience? Using Transmedia Storytelling towards a New Experience Design Form.

In: Marco, Galea; Szabolcs, Musca (szerk.) Redefining Theatre Communities. International Perspectives on Community-Conscious Theatre-Making.
Bristol, Egyesült Királyság / Anglia : Intellect Books (2020) pp. 206-219. , 14 p.
Szaktanulmány (Könyvrészlet) | Tudományos
[32925528] [Nyilvános]

/ 10 / Színház és transmedia storytelling: Szenzóriumok és a narrációs űr

Játéktér 9 : 1. pp. 51-55. , 5 p. (2020)
Szakcikk (Folyóiratcikk) | Tudományos
[32868478] [Nyilvános]

/ 11 / a néző̋i test „félreérzékelése"

Játéktér IX : 1 pp. 56-58. , 3 p. (2020)
Recenzió/kritika (Folyóiratcikk) | Tudományos
[32925634] [Nyilvános]

/ 12 / "We are making cyber–history." Az online színház nem ma született

Jatekter.ro IX : tavasz pp. 37-41. , 5 p. (2020)
Szakcikk (Folyóiratcikk) | Tudományos
[32925376] [Nyilvános]

/ 13 / Az érzékelés technológiái. Az érzékelés kibővítése az immerzivitás korában

Chris, Salter; Bakk, Ágnes (Fordító)
Játéktér IX : 1 pp. 39-50. , 12 p. (2020)
Szakcikk (Folyóiratcikk) | Tudományos
[32925825] [Nyilvános]

/ 14 / Epiphany Through Kinaesthetics. Unfolding Storyworlds in Immersive Analog Spaces

In: Maughan, Curtis L.; Debus, Michael S.; Alvarez Igarzábal, Federico (szerk.)
Violence | Perception | Video Games : New Directions in Game Research
Bielefeld, Germany : Transcript Verlag (2019) pp. 213-224. , 12 p.
DOI Egyéb URL
Szaktanulmány (Könyvrészlet) | Tudományos
[32922808] [Nyilvános]

/ 15 / VR as a Narcissistic Medium. Interview with Rebecca Rouse

Acta Universitas Sapientiae Film and Media studies 17 : 17 pp. 157-167. , 11 p. (2019)
Szakcikk (Folyóiratcikk) | Tudományos
[32922798] [Nyilvános]

/ 16 / Sending Shivers Down The Spine

Acta Universitas Sapientiae Film and Media studies 17 : 17 pp. 143-156. , 14 p. (2019)
Szakcikk (Folyóiratcikk) | Tudományos
[32922796] [Nyilvános]

/ 17 / Performativity and Worldmaking. Interview with Chiel M. Kattenbelt

Acta Universitas Sapientiae Film and Media studies 17 : 17 pp. 169-178. , 10p. (2019)
Szakcikk (Folyóiratcikk) | Tudományos
[32922772] [Nyilvános]

/ 18 / Analóg bolyongás virtuális világokban

Játéktér VII : 2 pp. 53-58. , 6 p. (2018)
Nem besorolt (Folyóiratcikk) | Tudományos
[32925690] [Nyilvános]

/ 19 / Thirtythree, a New Horizon of Photography at Moholy–Nagy University of Art and Design Budapest

Máté, Gábor; Kudász, Gábor Arion; Kopeczky, Róna; Szalontai, Ábel; Bakk, Ágnes (szerk.); Vargha, Balázs
Berlin, Németország : Hatje Cantz Verlag (2018)
ISBN: 9783775744522
Katalógus (Könyv) | Tudományos
[32236377] [Nyilvános]

/ 20 / How Interactivity Is Changing in Immersive Performances

In: Nuno, Nunes; Dr. Ian, Oakley; Valentina, Nisi (szerk.) Interactive Storytelling. ICIDS 2017.
(2017) pp. 343-346. , 4 p.
Konferenciaközlemény (Egyéb konferenciaközlemény) | Tudományos
[32924970] [Nyilvános]

/ 21 / Kulcstalan kávéház — a New York

www.mandarchiv.hu MaNDA p. 1 (2014)
Publicisztika (Folyóiratcikk) | Ismeretterjesztő
[32926827] [Nyilvános]
Nyilvános idéző összesen: 1, Független: 1, Függő: 0, Nem jelölt: 0

/ 22 / Budapesti Negyed, akkor és most

http://mandarchiv.hu/cikk/356/Budapesti_Negyed_akkor_es_most, (2012)
Nem besorolt (Egyéb) | Ismeretterjesztő
[30393027] [Nyilvános]

/ 23 / Színikritika ma és holnap

Erdélyi társadalom: Szociológiai szakfolyóirat: a Kolozsvári Babes-Bolyai Tudományegyetem Szociológia Tanszéke Magyar Tagozatának Folyóirata 17-18 : 1-2 pp. 115-116. , 2 p. (2011)
Esszé (Folyóiratcikk) | Tudományos
[32925065] [Nyilvános]

/ 24 / Terepkönyv

Nyelv- és Irodalomtudományi Közlemények LII. évf. : 2 pp. 89-90. , 2 p. (2008)
Ismertetés (Folyóiratcikk) | Tudományos
[32927245] [Nyilvános]

/ 25 / Hiába a nyelv... (Láthatatlan Kollégium)

Korunk (Kolozsvár) III. : 5 p. 117 (2007)
Esszé (Folyóiratcikk) | Tudományos
[32922851] [Nyilvános]

Grafikai tervezés: Vándor Rita
Betűtípus: BC Novatica CYR és Mokoko
Nyomda: Digitalpress Digitális Nyomda Kft.

EREDETISÉGI NYILATKOZAT

Alulírott Bakk Ágnes Karolina (szül. hely, idő: Lugos, 1986.04.08,
anyja neve: Schwertner Ágnes Vilhelmina, szem. ig. szám: 789200KE),
a Moholy–Nagy Művészeti Egyetem Doktori Iskola doktorjelöltje
kijelentem, hogy a

HUNTING THE IMPOSSIBLE: The Science of Magic and the Experience of Immersion in Analogue and VR Theatre

című doktori értekezésem saját művem, abban a megadott forrásokat használtam fel. Minen olyan részt, amely szó szerint vagy azonos tartalommal, de átfogalmazva más forrásból átvettem, egyértelműen, a forrás megadásával megjelöltem.

Kijelentem továbbá, hogy a disszertációt saját szellemi alkotásomként, kizárólag a fenti egyetemhez nyújtom be.

Kelt: Budapest, 2022. április 18.

aláírás

MOHOLY-NAGY
művészeti egyetem
university of art and
design budapest