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The effects of film narratological devices on the sense of presence in 360-degree video

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Table of contents

Abstract:

This research explores how film narratological effects can be used to affect feelings of presence in 360-degree video. To explore how the sense of 'involvement' can be enhanced this research takes inspiration from film narratology, since there are strong indications that in media such as books and film, it is their narrative abilities that generate feelings of presence. It is done with the expectation that these insights would be potentially useful for enhancing the feeling of presence in virtual reality - a medium that is known to generate high feelings of 'presence' in spatial terms, but not necessarily in terms of 'involvement'. This research focuses in particular on the effects of focalisation and voice-over as narratological devices of choice. 360 video is chosen as an accessible medium, adjacent to virtual reality: 360-degree video. Participants (N=12) viewed three videos with varied focalisation (character focalisation, object focalisation, neutral focalisation) and two videos with varied voice-over (external voice-over, no voice-over). Afterwards, affected feelings of presence between videos of a set were measured with a questionnaire, and with an in-depth interview. Early results indicate that 'object focalisation' reported relatively the highest feelings of presence. The interviews indicated that participants preferred a non-character role in the narrative which nevertheless provided them with a point of attachment in the diegetic space. In future development of narrative virtual reality experiences, this form of focalisation could be seen as a viable option to enhance the viewers overall presence.

Theoretical framework

The phenomenon of feeling completely absorbed into a mediated space that is not the real world has captivated many fields of study over the years. In virtual reality research the phenomenon is described as 'presence' (Slater, 2003) in film as the diegetic effect (Bordwell & Thompson, 1985) and in literature and theatre as 'transportation' (Ryan 2015, Green & Brock 2000). These media differ greatly, especially in terms of technological complexity. It is a common assumption that with greater possibilities for technological complexity, there are consequently greater possibilities for immersion (Murray, 2016). Yet, a base feeling of 'being there' seems to be present in all of them, in greater or lesser terms. The question that this phenomenon evokes is: why is the experience of presence when reading a book, which has a lower technological complexity, comparable to what we experience in for example a virtual reality (VR) environment? This 'paradox' is known as 'the book problem' (Biocca, 2002): why can media with a low technological complexity generate high feelings of presence?

There exists multiple ideas that narrative plays a crucial role in transporting people into the world of a mediated spaces and allowing them to feel present. This is one of the main suggestions by social scientists Schubert and Crusius (2002). Their inter-media comparison of book, film and virtual reality with special regard to the medium specificity of each, allows 'narrativity' to emerge as a crucial element for understanding presence. This connects to the ambition of this thesis, namely to gain more insight in what constitutes feelings of presence in virtual reality, by researching an adjacent medium which is relatively new and therefore underexplored: 360-degree video. Hence, this thesis will look into the following research question:

> *Since narrativity cannot be established in 360-degree video in the same way as in conventional film, I am comparing different variations of the film narratological techniques 'focalisation' and 'voice-over' in 360-degree video to research their effects on presence. This is done to help my reader understand which form(s) of narrativity would be promising to evoke high feelings of presence when creating new Virtual Reality experiences.*

This question will be answered with the help of an experiment. In the upcoming sections I will build a theoretical framework to situate this experiment in. The following theoretical subsections will be addressed: the definition of presence; how presence is established in different media; the role of narrativity in the constitution of presence; the relationship between film, 360-degree video, and virtual reality; focalisation and voice-over in film narratology; virtual reality as a (non)narrative medium.

Presence: definition and medium specificity

There are many media that are concerned with the feeling of being absorbed into a mediated space. The term 'presence' is mostly used in the context of virtual reality research, and terms as 'transportation' and 'the diegetic effect' in other fields of study. Mel Slater, one of the pioneers of VR research, has articulated on multiple occasions (1997, 1999, 2003, 2018) that in this multitude of fields and terms, the two related concepts of immersion and presence should not be confused with one another. He states: "Let's reserve the term 'immersion' to stand simply for what the technology delivers from an objective point of view" (2003, p. 1). Presence, then, should stand for "a human reaction to immersion" (2003, p. 2). To clarify this point he uses an analogy for the scientific principle of colours. Immersion would be the measurable wavelengths of different colours, and the presence would be the subjective perception

of those wavelengths (2003, p. 1). Schubert and Crusius align their definition of presence with that of Slater and other prominent researchers in the field of virtual reality (Slater, Usoh & Steed, 1994) as being: "(…)the subjective sense of being and acting in a virtual environment" (Schubert & Crusius p.1). However, in their research context of studying the book problem, they do make an important note on Slater's split in immersion and presence. Namely that (perhaps involuntarily) the term 'technological' is rather unproductive. "A common assumption in research on the sense of presence is that the better the technical immersion of the user in terms of sensory fidelity, real time field of view, and picture quality, the higher the experienced presence" (p.1). Indeed, when purely in the research context of virtual reality, there seems to be nothing wrong with Slater's statement. What the text of Schubert and Crusius succeeds in doing, is signalling their readers to keep medium specificity in mind when studying presence. Their paper juxtaposes books, film and VR in how they generate feelings of presence. For them, different media evoking similar feelings of presence lies at the stem of the 'book problem': "(…) it always seemed paradoxical that people can also experience presence in narratives presented in books, that is, with a seemingly very low immersion" (p. 1). What they try to make clear is that 'technology' for different media can entail different things.

Schubert and Crusius hint that what underlies the medium specific presence debate is a dichotomy: a spatial side of presence, and a mental side of presence. Each medium has different 'tools; for generating feelings of presence, and often these tools can be placed on a certain side of the presence dichotomy. When it comes to feelings of presence in books (meaning narrative literature) they emphasise the more mental component of presence. Following from 'transportation' researchers Green and Brock, who have suggested that the feeling of presence in books arises when "(…) all of the person's mental systems and capacities become focused on the events occurring in the narrative" (Green & Brock, 2000). Then for film, the fundamental idea on presence (or, the diegetic effect) revolves around the fictional world in film being experienced as an environment (Schubert & Crusius p. 2). However, when Schubert and Crusius juxtapose it with the medium virtual reality, which also makes use of a mediated environment, they point out a substantial difference between the two concerning the position of the viewer. The viewer of the film is positioned as an onlooker, looking from the outside into the environment. The fourth wall is one of the mechanisms to sustain this position. Usually, characters in a film do not look into the camera. This helps to keep the viewer in the position of an invisible observer. The position of the viewer in the mediated environment is one, rather spatial, aspect of presence in film. The other aspect Schubert and Crusius name revolves around mental involvement:

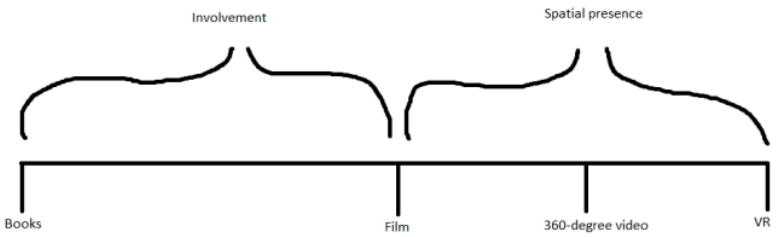
"(…) films use their ability to create a diegetic effect in order to increase identification with certain characters (e.g., by showing the perspective of this character) or to induce certain emotions, among other ends" (p.2). While Schubert and Crusius have briefly and accurately summarised the two main points of diegesis in film, the research field of narratology has sought to specify how these mechanisms work. Film narratology is the angle from which I will be elaborating upon presence and film in the section 'what constitutes narrative in a film'.

From the descriptions above, an overarching notion on this dichotomy of presence should present itself. Schubert and Crusius formulate this idea as: "(…) presence in VR seems most strongly related to a sense of actually being there, while transportation in literature seems most strongly related to an absorption of one's attention by the text. The experience in feature film seems to be in the middle of these two poles" (p. 3). So, in the face of medium specificity, it is not only so that this duality exists, but also that presence differs with regard to the amount of spatial presence and involvement per medium.

Two ideas of Schubert and Crusius have been highlighted so far: the medium specificity of presence, and the dualism of presence represented in both (mental) involvement and spatial presence. Their last addition reflects on the medium books and what 'technology' (to use Slater's terminology) makes them strong on involvement. Their answer is that books can produce presence because they use the power of narration (p. 4). Narration would add meaning to a 'mere space' since it introduces temporality and social understanding of events in that space (p. 5). Yet, when connecting narration back to the other media, Schubert and Crusius follow a line a of thought that I can hardly agree with: "Literature needs narration in order to produce a transportation, and film strongly profits from it, although it can do without (Burch, 1990). VR until now has largely ignored the use of narrative elements (…)" (p. 5). I would argue that the last time film could do without narrative elements was before 1905, right around the time of the one-shot films (Cubitt 2005, Verstraten 2008).

What this statement illustrates for me, is a wider tendency to overlook the importance of narrative in other media than narrative literature. There exists a branch of narratology that specifically reflects on how film is a distinctly narrative medium. As for virtual reality and narrativity, that is somewhat more complicated, as will be elaborated upon in the corresponding section. What counts for both however, is that the tendency stems from the idea that both film and VR are more related to a sense of being there, the spatial presence. This results in the mental side of presence, the involvement side, seemingly being side-lined. And the involvement side is exactly the realm where narrative operates.

With this thesis I aim to stress the importance of narrativity in the media film and VR as well. The illustration below represents Schubert and Crusius's ideas, with my own additions.



To summarise: for them, presence is a dual term consisting of both spatial presence and involvement. Each medium has the potential for both, but some media tend to be stronger on the one than on the other. Additionally, narrativity plays a big role in what makes books strong on involvement. Therefore, books are represented on the far left, VR on the far right, and film in the middle. I have added the line between books and film. They are both strong on the involvement side since they both profit from narratives. Virtual reality and film are strong on the 'spatial presence' side of presence since they give us photorealistic imagery and the ability to place a (virtual) body in a mediated environment. I do not intend to say that books are void of spatial presence, nor that there have never been any feelings of involvement associated with the medium virtual reality. I am merely making a simplified division to show which medium tends to be more strong on what. I have added a medium in this illustration: 360-degree video. This medium will help with the exploration of narrativity in virtual reality for two reason. As Schubert and Crusius have suggested that film somewhat forms the middle ground between books and virtual reality, 360-degree video has the potential qualities to function as the middle ground between film and virtual reality. Every medium is partly shaped by it's predecessors. With the photorealistic imagery of 360-degree video, it stands a little bit closer to the medium film than VR does. Since film is already an established narrative medium, it should be easier to see potential narrative structures for 360-degree video. In other words: which narratological effects can be borrowed and in what way adapted?

What is 360-degree video?

360-degree videos are shot with an omnidirectional camera, which renders photorealistic footage in the same way a normal film camera does. Multiple independent shots from the cameras are then put together through a process called 'stitching' to form the result of a spherical video. There are two main

differences with conventional film. First: 360-degree video has no offscreen space. In one ‘shot’ the whole spaces is captured. As opposed to the areas behind and beside the camera in conventional film. The second difference is that often cuts and edits are absent. Very briefly stated: different types of shots from different cameras and from different angles edited together is what makes it so that conventional film is able to tell a story. Would these edits and cuts be attempted with the footage of an omnidirectional camera, and the results shown through a virtual reality headset, than the viewer would inevitably get dizzy from all the movement.

The main difference between 360-degree video and virtual reality would be that the images of the former are not computer-generated. As a consequence, they are per definition non-interactive. One cannot walk around in a 360-degree video or make changes to the virtual environment, which is often possible in computer-generated VR environments. The only element of 360-degree video which could be considered interactive is called ‘head-tracking’. 360-degree videos can be viewed on any virtual reality headset. Since the footage is in 360-degrees around the viewer, they cannot see the whole video environment at once. The motion of their head, and sometimes the direction of their gaze, is tracked in order to match the perspective of the virtual video with their perspective. I would argue that this gives the viewer the control to view the video as they wish. As opposed to the specific shots that the director has pre-selected for the viewer in conventional film.

The interest in 360-degree video has been relatively new. It was only in March 2015 that YouTube launched support for publishing and viewing 360-degree videos (Bonnington, 2015). One of the first 360-degree cameras that was on a large scale available to consumers was the Samsung 360 which was released in 2017 (Samsung, n.d.). Its recency might explain why there is not (yet) a lot of research available. At this moment, 360-degree video is most commonly used to show viewers real-life environments in a way they would experience them as if they were there themselves. On YouTube one can find a multitude of (extreme) sports 360-videos or 360-videos of interesting places for tourism and travel. In the circles of art and culture festivals, there can be found experimental 360-videos by artists for a multitude of projects. However, since the viewing on the 360-headset often poses technological difficulties for large audiences, this is not common.

What constitutes narrative in a film?

As I briefly stated in the previous section: different types of shots from different cameras and from different angles edited to together is what makes it so that conventional film is able to tell a story. While

the majority of film (or cinema) as we know it today is certainly narrative, this was not always the case in the early years of the medium. The early years of cinema, up to roughly 1906-1907, have been characterised with the term 'the cinema of attractions' by Tom Gunning (Gunning, 1986). The main difference with the period of film following after 1907 is the set-up of the 'primary spectator relations'. That difference is in the 'exhibitionist nature' of the cinema of attractions, in which the gaze of the performers into the camera, directly towards the spectator, is the norm rather than a taboo as it is in current cinema. What is more, another name of the cinema of attractions is 'one-shot films' (Cubitt 2005, Gaudreault, 2009). For Cubitt, narrative cinema is born with the cut (Cubitt, 2005). Especially because these 'films' are filmed in one shot, without cuts, it is even more obvious that they 'monstrate' instead of tell (Gaudreault, 2009). The movement on the screen, directed towards the non-anonymous viewers who marvel at the exhibition, is what makes it an attraction and not yet narration.

Peter Verstraten analyses what shift takes place in cinema after 1907 for it to be considered narrative in his book *Hanboek Filmnarratologie* (2008). He builds directly onto the existing analyses of narrative in literature, especially those of Mieke Bal (1985). Bal describes that every narrative 'text' distinguishes three levels of storytelling: text, story and fabula. The fabula is a chronological or logical cohesive series of events that is being experienced or caused by actors. So, the events that take place in the storyworld. The level of the story is how these events are presented. The same news event presented by the 8 o'clock news or by children's news could for example be considered the same fabula with a different story.

The level of story is where an important narratological concept comes into play: focalisation. Focalisation is the manifestation of a certain perception on the events in the narrative. Focalisation is the 'vision' from one person/object/body on another: the subject of focalisation and the object of focalisation. The subject of focalisation is often the entity who tells the story. For example there is the external narrator with their external focalisation, or a character narrator with their internal character-bound focalisation. In the classic narrative structure that Bal describes "A tells what B sees what C does", B is the subject of focalisation and C the object of focalisation. Focalisation can be ambiguous or embedded, yet in literature it is often to be clearly seen in the structure of the sentences who focalises. "Joe walks home" is visibly different from "I saw joe walk home" or "Jane saw Joe walk home".

This distinction between text, story and fabula is still applicable to cinema. However, film makes use of images and sound when telling a story, which is necessarily different from the use of text in literature. According to Verstraten there are three main principles that together form the narrativity

of cinema: time, place and causality (Verstraten, 24). They are mainly constituted through specific techniques of editing images and sound. With editing, time can be manipulated, place framed in a multitude of ways, and causal connections revealed (24). Yet, editing has another very important role: setting up the process of identification in film. Specifically: identification of the viewer in the diegetic space. As Verstraten clarifies, the constitution of narrative in films is always an interplay of viewer and filmic narrator (32). The narrator reconstructs the fabula in such a way that it becomes understandable for a viewer, even though that viewer is not explicitly addressed. So, in order for the viewer to feel present in the story, the relation between them and the narrator, and between the narrator and the characters has to become clear to them. The main understanding that need to be gained from this is the understanding of who the subject of focalisation is. Who perceives the elapsing of time? Who feels as if the house is caging them? Who links the jealousy of the husband to the motive for murder? Since focalisation is one of the two main narratological techniques in my research question, I will elaborate some more on how specifically editing in film reveals focalisation and how it constitutes in a narrative. Later, the same will be done for the narrative technique voice-over.

The role of focalisation in film

If we refer again to the to structure in the previous paragraph "A tells what B sees what C does", then Verstraten specifies that in that case A is the narrator on the level of the text, B the one who focalises on the level of the story, and C the actor on the level of the fabula (21). Yet, he also states that focalisation initially always lies with the external narrator, which makes focalisation external (21). This is not a contradiction, especially not when taking into account the notion of the 'filmic narrator' as proposed by Verstraten. The filmic narrator has a different identity than the narrator in literature. The narrator in literature is an agent that performs speech acts through text (16). The filmic narrator both displays (moving) images and produces sound (17). Since image and sound can tell a story separately, Verstraten proposes a separate image narrator and sound narrator, who coexist on the same hierarchical level yet cannot interact. It is the filmic narrator who hierarchically stands above them who has the power to organize which images and which sounds are used to tell the story at that specific time (129). What is necessary to know in order to understand where Verstraten comes from, is an idea that is prominent in narratology research in film, namely that the camera is a thinking unit/agent/actant. Vivian Sobchack aptly phrases it as ''(…) the moving camera is originally perceived by us in experience as an

'other' who is animate, conscious, and experiences and intends towards its own conscious activity as we do'' (Sobchack, 1982).

However, how can an image narrator really 'tell' in the sense that a literary narrator can? Verstraten clarifies this with the following passage comparing the textual way of telling versus the filmic way of telling: "[narrator describes]: she was a young lady with this set of aspects" versus "[the image narrator shows]: the young men who are spying on the young lady saw her as a young lady with this set of aspects" (57). This is where editing gives the different images their narrative power. Because of editing, the identification process in film can be divided into three steps, thus Verstraten. Firstly, the camera (or rather, the image narrator) 'looks' at someone or something. Secondly, the spectator watches the film. Thirdly, there is 'looking' on the diegetic level: every character in the film looks at other characters and things (90). Putting shot A and shot B together through a so-called 'eyeline match', in which the counter-shot B shows the character that is looking, is crucial to the process of narration. The types of shots and corresponding edits that are most important to this process are the over-the-shoulder-shot, the eyeline-match, the point-of-view-shot and subjective shots.

The point-of-view-shot shows the shot as if we were looking through the eyes of the character observing the space. In these shots, the focalisation lies with the character, as opposed to a seemingly 'impersonal' establishing shot, where the focalisation lies with the filmic narrator. However, the viewer can only know whether it is an impersonal shot or a point-of-view-shot, if the character who is looking is also shown in a so-called counter-shot. Point-of-view-shots are usually paired with an eyeline-match: the shot of what is being looked at, matched with the direction from which the character is looking. The more eyeline-matches there are, the more the viewer is able to 'ground' themselves in the position of the character. Besides, it is not always true that a subjective shot needs to be through the exact 'eyes' of the character. Actually, that would have a rather intimidating effect. That is why usually the over-the-shoulder-shot is used to show that a character is looking at something. Usually, the focalisation then still rests with said character.

The role of voice-over in film

The distinction between the image narrator and the sound narrator in film has already been defined. The sound narrator is responsible for internal/external voice-overs, dialogues, voices, music and all other types of noise (129). The voice-over in film can have the identity of an extradiegetic narrator or of an

intradiegetic character narrator. The former may introduce the story with the spoken words “Once-upon a time…”, and the viewer will never see or know whether or not this voice belongs to a character in the story. The intradiegetic character narrator may start as follows “I remember last summer well…”, and then the viewer usually finds out who this ‘I’ is. In both cases, the focalisation on the sound track lies with the narrator. Similar to the image narrator, the sound narrator can lend itself to other characters to make them the subject of focalisation (150). For example, when the sound narrator knows that a gunshot was audible at that moment in the narrative, yet a character that is focalising on the image track is unable to hear it (for example because of earplugs), the sound narrator may choose to match the hearing of the character. Usually, the voice-over aids the narrator on the image track. It can be so that the image track alone fails to properly tell the story, then a voice-over can aid with an explanation. Verstraten describes the case-study of *The Lady in the Lake* (1947) directed by Robert Montgomery (Verstraten, 99). The film consists almost entirely of subjective point-of-view-shots, which proves to be troublesome for the narrative structure in film (A shows, what B sees what C does). Therefore, the voice-over supports the narrative from time to time.

Why is virtual reality not quite a narrative medium yet?

Every medium is at one point still in the infancy of its development. In the infancy of the medium film, there was once merely a camera that recorded images to light-sensitive celluloid. These early one-shot films monstrate: they show but they do not tell. Only by developing itself by paying attention to existing narrative structures in literature, theatre and vaudeville, the dominant media of the time, the narrative abilities of the medium could be developed. First this happened for silent cinema, and then again for sound and later for colour. Cuts, time, place, causality, spectator relations, and how to accumulate these into a narrative were not developed overnight. It takes time. Even though in technical terms the medium might already be mature. Janet Murray (professor of interactive fiction writing at MIT) has a similar stance. As late as 2020 still, she argued that the medium virtual reality is still in its infancy when it comes to narrative “(…) only just beginning to develop media conventions to support sustained immersion” (Murray, 2020). She argued clearly for keeping in mind the medium specificity of virtual reality. It is its own medium, with its own unique abilities. For her “It is not a film to be watched, but a virtual space to be visited and navigated through” (Murray, 2016). In other words, keeping in mind the current status quo of the medium, one should not concluded that virtual reality is similar to film merely because of the moving images. However, she does expect that in the long term VR, and specifically VR

storytelling, will develop itself with the "reliance on legacy media techniques" (2016). A medium has to find its medium-specific structures that are available to it to tell a story. Borrowing and adapting from its predecessors. This is why the medium 360-degree video is the object of research in this thesis rather than virtual reality. As stated earlier, 360-degree video has the potential qualities to function as a middle ground between film and virtual reality. Conventional virtual reality, with its computer-generated images and options to interact with the environment, stands a little further away from film than 360-degree video does. It is arguably more straightforward to see the potential for developing narrative abilities in this medium with its photorealistic images and non-interactive viewer position. What matters, is that both 360-degree video and virtual reality make use of 360-degree spherical images without off-screen space, and that they are both unable to make use of conventional cuts and edits.

The structure concerning the three levels of 'looking' and the role of the subject of focalisation as described in the section on narrative in film cannot be copy-pasted onto any medium that uses spherical video and gaze-turning techniques. It has been established that the filmic narrator can be conceptualized as a conscious other, that experiences events in a similar way a viewer would experience them. Therefore, it is able to make the decision that the image narrator shows the young men spying on the young lady, so that the viewer can grow to understand what type of young lady she is seen as. To repeat: A shows, what B sees what C does. This structure does not hold up when the viewer in 360-video has the power to control the 'frame'. The viewers can turn their heads to look at any given point in the space. This space can not be diegetically 'sealed off' anymore, the distinction between what the filmic narrator wants to show at any given time and what is left outside the frame disappears. On top of that, due to the technical nature of 360-video, editing is very difficult. Classic cuts as we would know them in cinema would make the viewer of a 360-video so dizzy it would be nearly impossible to keep watching. Therefore, the whole structure of focalisation that rests on editing, for example the eyeline-match, is nearly impossible to recreate. So, the act of looking that in classical cinema exists on three layers (the image narrator 'looks', the spectator watches the film, and the characters look at each other) resorts into one ambiguous mess: the viewer mutates into an entity that acts on all levels.

At first glance, voice-over seems to be a useful narratological device in the context of 360-degree video. After all, in film, it is able to support a narrative in case the narrative structure that rests on focalisation on the image track seems to fall short. Although videos with 360-degree sound exist, conventional sound also works with 360-degree video. So, there seem to be no drawbacks to using it to create or support a narrative in 360-degree video. Janet Murray is opposed to this idea (2016). On

creating 360-videos she states: “Please leave out anything that can be heard or seen that is not diegetically part of the virtual space (…) this means no voice-overs, no text overlays, no background music” (n.p). Her statement implies that voice-over will have negative consequences for the viewers’ (spatial) presence. This could very well be the case. However, since spatiality is not the only factor to determine feelings of presence, it could very well be that Verstraten’s claim that voice-over can help support a narrative can aid in increasing feelings of presence. Both sides will be elaborated upon in the ‘expectations’ section.

Back to presence

Similar to the medium film, which in its narrative infancy could not copy the exact narrative structures as used in literature, 360-degree video cannot copy them precisely from film. Yet that does not mean it cannot borrow and adapt. There is research needed to find out which parts of structures can be borrowed, or which adaptions are necessary to make narration work well for the medium 360-degree video. What ‘works’ is too vague a term. When does a film or a book ‘work’? I believe that high feelings of presence could be a very good indication. To be precise: presence as a whole, both its spatial and its involvement side. It has already been established about the medium film that there is one mechanism of diegesis at work that underlies both the defined relation to the diegetic space (the fictional world as an environment) and the feelings of involvement due to of identification: focalisation. If that mechanism for some reason cannot operate optimally, then the voice-over on the sound-track can help support it. Therefore, feelings of presence are arguably the strongest when involvement and spatial presence affect each other in such a way that they strengthen each other. This means even though the research focuses on narrative elements, which operate more on the involvement side, they have to be implemented in such a way that it strengthens the spatial presence that is inherently stronger in 360-degree video. In order to properly experiment with the differences between the film narratological devices implemented in different ways in 360-degree video, the videos were produced specifically for this research.

My videos

All of my videos have the same scenario, with slight variations. What is shown is a part of the story of the fairy tale Red Riding Hood: the part that takes place in Red Riding Hood’s grandmother’s house. In all the videos the following events take place: the grandmother lies sickly in bed, the wolf pretends to be Red Riding Hood so that he can enter the house, the wolf rummages through the house, the wolf eats

the grandmother (although the screen fades to white before right before the wolf attacks). Then, after the fade, the wolf has taken the place of the grandmother in bed, disguised in her clothes. Red Riding Hood appears at the door and asks grandmother if she can come in, she tidies the house, has a conversation with the disguised wolf about his odd looks, and then ducks away right as she gets attacked. Each video is roughly four minutes long. I will now explain what the variations are:

Set 1: Focalisation

Video 1: The character position video (CF)

In this video, the camera is positioned so that the point of view overlaps with the character lying in the bed. Before the fade to white this is the grandmother, after the fade to white this is the wolf. In this video a fake body is created under the covers of the bed with the help of pillows. The sleeves of the coat that grandmother wears are filled to make it look like it is filled with arms. The sleeves disappear behind a ball of yarn with knitting needles that lies on the 'belly' of the body. When the perspective switches to the wolf, it's hands/claws are attached to the sleeves. The camera is relatively low since it is resting on the pillows of the bed. In this video, the viewer is directly being looked at and spoken to as if they are this character (direct address + speaking). For example, Red Riding Hood says: "Grandmother, what big eyes you have!", while looking directly at the camera/viewer. Furthermore, both other characters walk a full circle around the camera/viewer in this video. Lastly, the audio of this video is distinctively different from the audio in the other two videos. The characters have a conversation in the video, a dialogue. However, a camera cannot have a dialogue and nor can the viewer. Therefore I recorded the dialogue of the character in the bed separately, and added it to the video in post-production. This should have the intended effect that it feels as if the sound comes from the viewer's own mouth.

Video 2: The object position video (OF)

In this video, the camera is positioned so that the view overlaps with that of an object in the décor: a fruit bowl (or rather, a piece of fruit in the fruit bowl). The camera is relatively low since it is at the same level as the rest of the fruit in the bowl. However, the bowl itself stands on a cupboard, which is higher than the bed. In this video there are two main variations. The first is that the proportions are unfamiliar, the fruit next to the camera appears to be the same size as the viewer. Secondly, there is a rather intense moment (twice) where a character comes very close and looks at the camera. Due to the

proportions, they appear very large. In the first part of the video the wolf takes a piece of fruit out of the bowl, smells it, then throws it on the ground. Thereafter, Red Riding Hood picks up the piece and rearranges the fruit bowl. Both their hands and their faces are very close to the viewer/camera.

Video 3: The observing position video (NF)

In this video the camera is not meant to be anything other than a view into the room. This position is very similar to conventional film. There is no direct address, so the viewer is neither looked at nor spoken to. The height of the camera is at general eyelevel. It is not attached to any set-piece, nor can the viewer see the stand the camera is on. Therefore the experience is similar to a 'floating gaze'. The camera is positioned equally far from the bed as the camera in the fruit bowl is on an absolute basis, but at the different angle. This camera is closer to the (set piece) front door.

Set 2: Voice-over

Video 4: The voice-over video (VO)

In this video, the characters do not speak. Their dialogue, feelings and actions are narrated by an external narrator. The sounds of the environment (a doorbell, a chair falling, footsteps) are still audible. The voice-over was recorded afterwards and added in post-production. The voice is clearly different and therefore does not belong to any of the characters in the narrative. The camera position in this video is the same as in video 3 (NF).

Video 5: The dialogue video (DIA)

This video is exactly the same as video 3. The characters talk to each other (dialogue).

In appendix 1, there is a map of the set with all the camera positions marked. In appendix 2 one can find screenshots from each point of view. In appendix 4 validation of (artistic) choices on the videos can be found.

Expectations

To repeat, my definition of presence for this research is: the subjective feeling of being in a mediated environment, both mentally on the side of involvement and physically on the side of spatiality. To measure presence, countless of self-report items have already been identified, yet the focus of these

questions differ per medium. When it comes to books or theatre the questions are often on involvement (Green & Brock, 2000), while for virtual reality there are often questions on how realistic the environment looked, or how well the environment responded to the actions of the user (ITC-SOPI, Lessiter et al.). I took inspiration from these existing presence questionnaires and borrowed and adapted or created new self-report items to work with. In appendix 5 it is described what existing presence questionnaires where used and how questions were adapted.

Each video has slight variations, and the expectation is that each variation has some sort of effect on presence. I will not necessarily call these expectations hypotheses, since my research is rather explorative and not many academic researches on this topic exist yet. The first expectation, which I can base on existing theory, is based on Verstraten's research (2008) as set out in the section 'What constitutes narrative in a film?'. Acknowledging the camera/viewer in the diegetic space with the help of direct address (looking and/or speaking to) will heighten feelings of presence in the medium 360-degree video. The taboo of looking into the camera is part of the narrative structure of conventional film. Yet, this does not necessarily mean it has the same effect in 360-degree video. In this medium, where the viewer is already placed inside the diegetic space, I predict it has little merit to ignore the viewer, as one would do when they are in the position of a spectator that is outside of the diegetic space.

Furthermore, I expect that Murray (2016) is right where the effect of voice-over on presence is concerned. Namely that it will lead to diminished feelings of presence since the voice comes from outside of the diegetic space. On the other hand, it is still also possible that the voice-over can help support the narrative, as Verstraten (2008) mentions when talking about *The Lady in the Lake*. In that case, one might then expect that the voice-over can still heighten presence. Whether that effect is to be expected in my videos is difficult to say, since they are short and the story is familiar.

A general expectation is that if participants were to experience dizziness, eyestrain or other discomforts, this would lower presence. This lowered presence is then unlikely to be a direct result of the variations in my videos.

The following expectations all come from my own experience with 360-degree video and film. Often the expectation goes both ways. In the CF video, there are multiple variations that could potentially heighten or lower feelings of presence. Instead of an observing role, a more participating role is constructed for the viewer. To start with, this video has the highest amount of direct address, I expect that this will heighten feelings of presence as explained above. However, since this video has relatively more direct address, it can start to become claustrophobic for the viewer, which can negatively

affect presence. This difference between acknowledging the viewer in the diegetic space or not and how it relates to presence, can be measured with the self-report items ‘participation’ and ‘observing’. Feelings of participation are not commonly included in presence research, yet for my interest in the consequences of direct address it is very suitable. Opposite to feelings of participation stand feelings of observing. This self-report items serves to see whether a structure that is similar to conventional film, one that lacks direct address, could perhaps affect feelings of presence.

Another variation is that in this video (CF) the viewer is presented with a fake body in the diegetic space. This can help anchor them in the space, therefore I expect it will affect presence positively. On the other hand, the body cannot move and looks quite fake, which might feel unnatural or uncanny. In addition, the impression of a surrogate body can cause dissonance with the viewer’s own body. This could instead lead to less presence. This can be measured with the self-report item ‘awareness of body’. Questions on awareness of body are used more often in presence research, yet it is especially important for 360-degree video. While wearing a virtual reality headset, the body is left in the real world while the viewer is situated in the mediated space. Whether the use of the surrogate body in the mediated space works positively towards feelings of presence is related to both involvement and spatiality.

The NF video was designed to resemble watching a conventional film as much as possible. There is no direct address, the viewer is merely an observing entity. Since I anticipate that the medium 360-degree video does not work well for this spectator relation, I expect the absence of direct address to lower feelings of presence significantly. Alternatively, it needs to be taken into account that people usually prefer what is comfortable or familiar to them. This is the most familiar position and the least intense. Perhaps this could heighten presence for this select group of people.

The OF video was designed as a sort of middle ground between the NF and the CF video. I expect that the position of being an object in the narrative is less intense than being a character in the narrative, but more interesting than being an unseen observer. The viewer is an entity in the world and they are being ‘used’ by the characters, yet the characters do not perceive them as alive or as being able to interact. In this video there is direct address, yet it is only looking at and not speaking. This moment is a lot shorter than in the CF video, yet more intense since the characters come closer. Additionally, in this video the camera is very low, to replicate the focalisation of the fruit. To the viewer, all other fruits appear as roughly the same size as themselves, and the characters appear to be very large when they come close. The combination of all this could prove to be too intense for the viewer and as a result

lower feelings of presence. However, I expect that in my videos the experience will be closer to a positive than to a negative one. This can be measured with the self-report item 'intensity'. If a variation is perceived as too intense for 360-degree video, this could lower feelings of presence. However, if the intensity is too low, then it is possible that the position or a variation within that position is not optimal for 360-degree video.

Lastly, it might be possible that it is too much to ask from the viewer to identify themselves with the focalising position of an inanimate object. This difficulty may lower feelings of presence. This can be measured with the self-report item 'subject position'. The variations in the 360-degree videos were designed so that a distinct focalising position would be experienced by the viewer. Yet perhaps the intended experience and the actual experience differ, with the necessary consequences for presence. This is true for all three different subject positions (CF, OF, NF).

Lastly, between the different videos, I expect there to be overall differences related to involvement and spatial presence respectively. To measure this, the more broad self-report items 'engagement' and 'being internalised' can be used. Engagement concerns the feeling of being interested in, empathising with or otherwise being involved with the narrative, and often specifically its. Being internalised relates directly to feelings of spatial presence- it is valuable to ask in how far the participant has a feeling that they feel as if they are in the diegetic space.

I do not want to give the impression that these seven self-report items accumulate into some sort of formula that reads out a definitive value related to feelings of presence. From the combination of all these self-report items, both in the questionnaire and in the interviews I hope to explore which variations work better for the participants and which do not. From my own experience with 360-degree videos, I expect it to be a close call between the CF video and the OF video which will indicate the highest feelings of presence.

Method/design/procedure

My experiment can be shortly summarised as follows: there are two sets 360-degree videos, one on focalisation consisting of three videos, one on voice-over consisting of two videos. Each video has certain variations that are unique to that video. After watching these videos on a virtual reality headset, participants will answer a questionnaire and participate in an interview.

To be able to gain the most insight on the feelings of presence of the participants, I have opted for the mixed methods of both a quantitative and a qualitative analysis. The questionnaire gives quantitative insights, and the answers to the interview questions qualitative insights. The paired statical analysis shows whether there are statistically significant effects visible between my videos. The descriptive statistics shine a light on whether those effects can be said to be positive or negative. The interviews serve as a look into why these feelings arose, which I deem to be the most important. Additionally, with the combination of mixed methods, it becomes more likely to find new observations on notions that are importation to presence, which perhaps previously remained unconsidered.

Properly researching the effects of focalisation and voice-over in 360-degree videos requires narrative 360-degree videos that employ these narratological effects in such a clear and understandable manner that they are properly discernible and comparable. I opted to produce these myself since I would then have the most control over the contents. The production value is not quite high, but they are effective in a research context.

Experiment set-up

The four circa 4-minute videos, as I have describe above, are the materials shown to the participants. The participants (12) were all Dutch-speaking, since the contents of the videos are also in Dutch. With a short introductory talk, the participants were informed of the procedure. They were told that they were to watch two sets of 360-degree videos. The first set consisting of 3 videos and taking up circa 12 minutes in total, and the second set consisting of 2 videos and taking up circa 8 minutes in total. They were told that they were seeing a version of Red Riding Hood. After each set they were expected to fill in a questionnaire, and at the end they were to participate in an interview. Their answers would remain anonymous and they were asked for their permission to record audio of their answers to the interview questions. They were able to read the rest of the information in the information sheet/ informed consent form, for example that they were to remain seated and that they could remove the virtual reality headset any time they felt it was needed.

Room-setup

The participants took part individually, and only the participant and I were present in the room when viewing the videos in VR. The participant was seated in a rotating desk chair and was to remain seated during the whole experience, yet they were free to turn in whichever direction they wished. I

would adjust the VR-headset so that it was (as far as possible) comfortable for the participant to wear. The view of the VR headset (Oculus Quest 2) was streamed to a smartphone, so that the I would know if anything unplanned happens in the VR (notifications, accidental button presses etc).

Video-viewing

The experience consisted of two sets. For each participant, the videos within the set were in a different order. Yet they always viewed set 1 (focalisation) first and set 2 (voice-over) last. I selected the pre-edited video with the correct order before putting the headset on the participant. Between the videos in a single set, a title screen with a 1, 2 or 3 is visible. For the participants this is always the same and in chronological order. I knew the specific order for each participant and noted it in their survey.

Quantitative questions

The questions for the quantitative questionnaire were based on the seven self-report items (as identified in the 'expectations' section) that best represent presence in the context of this research and its theoretical framework: engagement, participation, observing, intensity, being internalised, awareness of body, and subject position. The quantitative questionnaire was filled in online by the participant after each set of videos, so two times in total, on a provided laptop. The answers were given anonymously. The first three questions were demographic questions on age and gender, and a question on self-rated experience with VR. Thereafter, all questions could be answered with a slider on a 0-100 scale. With 0 indicating 'not at all' and 100 indicating 'very much'. In the left column of table 1, the questions are listed in Dutch, exactly as they were presented to the participants. In the right column, the corresponding self-report items are noted.

	Part 1: Focalisation	**Corresponding self-report item**
Q4	Ik voelde me betrokken bij de gebeurtenissen in de video	Engagement (most concerned with involvement)
Q5	Ik voelde me alsof ik kon participeren in de video	Participation. The keyword here is 'as if'. The videos are non-interactive and the participants know this. However certain focalisation positions might trigger the illusion of possibility more than others.
Q6	Ik voelde me een observerende entiteit	Observing
Q7	Mijn ervaring was intens	Intensity
Q8	Ik voelde me geïnternaliseerd in de video	Being internalised (most concerned with spatial presence)
Q9	Ik was me bewust van mijn eigen lichaam (zittend in de stoel in het kantoor)	Awareness of body
Q10	Ik voelde me duizelig en/of misselijk	-
Q11	Ik had pijn aan mijn ogen en/of hoofdpijn	-
Q12	Ik had het gevoel dat ik de wolf/oma was toen de camera in het bed gepositioneerd stond.	Subject position

Q13	Ik had het gevoel dat ik fruit was toen de camera in het fruit gepositioneerd stond.	Subject position
Q14	Ik had het gevoel dat ik een observerende positie had toen de camera in de kamer gepositioneerd stond.	Subject position
	Part 2: Voice-over	
Q15	Ik voelde me betrokken bij de gebeurtenissen in de video	Engagement
Q16	Ik voelde me een observerende entiteit	Observing
Q17	Ik voelde me geïnternaliseerd in de video	Being Internalised
Q18	Ik voelde me duizelig en/of misselijk	-
Q19	Ik had pijn aan mijn ogen en/of hoofdpijn	-
Q20	Ik had het gevoel dat de externe voice-over me de gebeurtenissen in het verhaal makkelijker liet begrijpen	-
Q21	Ik had het gevoel dat de dialoog mijn ervaring van de omgeving in 'grootmoeders huis' meer concreet maakte.	-
Q22	Ik voelde me afgeleid van de omgeving in 'grootmoeders huis' door de externe voice-over.	-

Table 1: Self report items presence questionnaire

Questions ten and eleven are not self-report items that are directly related to presence. These relate to known drawbacks of the virtual reality headset. If people were uncomfortable during the experience, that could have influenced their presence in way that were unrelated to my variations. However, I did opt to ask the question for each video, to check if there were any focalising position that perhaps evoked more negative feelings than others.

There are fewer question for part two, the part on voice-over, than for part one. Voice-over as an auditive narratological effect is necessary different from focalisation, which is mainly visual. Since the camera position did not change between the two videos of the second set, I expected that feelings of participation, intensity and body where unlikely to change. Additionally, instead of questions on position, I added three questions that are linked to my expectations based on the literature. Question twenty asks whether the voice-over enabled the participants to have a better understanding of the events in the narrative, which Verstraten proposes to be the case in the film *The Lady in the Lake*. Question 21 ask the viewer whether the dialogue makes the diegetic space (grandmother's house) more concrete, which is in line with Janet Murray's idea of only including intradiegetic sounds in the virtual space. Lastly question twenty-two asks the viewer whether the voice-over distracts them from the environment, which by association could be reason for diminished presence as proposed by Murray (2016).

Qualitative questions

Before the start of the interview, I explained to each participant the definition of presence for this research and that they can expect the term in the questions. They were asked whether they understood 'presence' or if they needed more explanation, which would thereupon be provided. They were

encouraged to relate and compare between the videos in their answers. The way they describe their own subjective experience is of interest in this part.

For the sake of readability, the questions (original Dutch) and their corresponding self-report items can be found in appendix 3. The first five questions have a similar structure, consisting of a main question and underneath in bullet points sub-questions. The sub-questions were only used when participants were short in their answers or strayed from the topic, in order to help guide them towards more complete answers. The questions were created with a twofold goal. Again, they intend to explore the impact of the narratological effects in detail. I wanted to know which ideas the participants had on their feelings while watching the videos, and what terms they themselves used to describe them, since subjectivity is a keyword in the definition of presence.

From the sixth to the eighth question, the structure of the main- and sub-question as it was for the first five questions is not applicable anymore. They each refer to one specific video (CF, OF, NF), and have multiple questions about that video. The questions were based on the assumptions made in the expectations section. For example, for the OF video I asked the participants whether they had trouble identifying with/conceptualizing themselves as an object. For the CF video, I asked whether their head-turning felt unnatural in that position since the character's head is on a pillow. For the NF video, I asked about familiarity since I assumed it resembled conventional film more.

Results

All participants that took part in the study both filled in the questionnaire and participated in the interview. My sample size is 12 participants (3F, 9M) aged between 18-35. This resulted in 12 fully completed questionnaires (22 questions) which were all valid. Each interview lasted for approximately 30 minutes, which accumulates to 6 hours of interview materials. The audio recordings of the interviews were subsequently transcribed and translated from Dutch into English. How far the answers given in the interviews reflect the results from the survey will be incorporated in the discussion. The paired statical analysis shows whether there were statistically significant effects visible between my videos, the descriptive statistics shine a light on whether those effects can be said to be positive or negative, and the interviews serve as a look into why these feelings arose, which I deem to be the most important.

In this section the results of the statistical analysis of the quantitative questions will be discussed. For the sake of readability, the results will be discussed per variable. On all questions where a student's paired t-test was performed, the Shapiro-Wilk test for normality was also performed. The

results of the questions Q10, Q11 and Q18, Q19 on dizziness and eyestrain are omitted from the results section. The overall reports were close to naught, so these could not have affected feelings of presence. As indicated earlier, the scale for the quantitative questions used to be 0-100 in steps of 5, the program that I used converted this to a scale of 1-21. If the reader would like to recalculate the original score, they can do so by subtracting 1 and multiplying by 5.

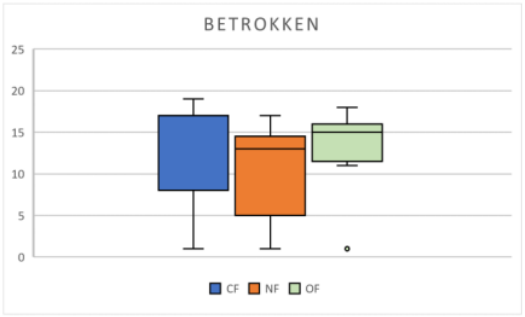
On feelings of engagement ('betrokkenheid')

Three paired sample t-tests were conducted to evaluate the difference in feelings of engagement on all three videos. Between only one pair of videos, NF and OF, there was a statistically significant difference as can be seen in figure 1. The boxplots show that the median of OF is above the upper quartile of that of NF. Furthermore, it can be noticed that on all videos the median is 13 or above, which means overall the reports of engagement are relatively high.

Betrokken

			t	p	W	p
CF	-	NF	2.115	0.058	0.930	0.379
CF	-	OF	0.878	0.399	0.899	0.153
NF	-	OF	-2.611	0.024	0.915	0.246

Figure 1



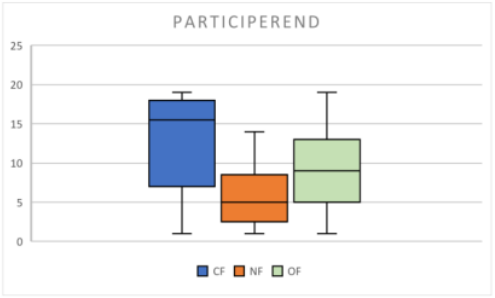
On feelings of participation ('participerend')

Three paired sample t-tests were conducted to evaluate the difference in feelings of participation on all three videos. Between all pairs of videos there were statistically significant differences as can be seen in figure 2. The boxplots show that the median of CF is above both of the upper quartiles of the other positions. The median of OF is again above the upper quartile of NF. This means that there is a clearly discernible order from most to least feelings of participation in different videos respectively: character, object, observe.

Participerend

			t	p	W	p
CF	-	NF	4.712	< .001	0.950	0.635
CF	-	OF	4.072	0.002	0.885	0.102
NF	-	OF	-2.774	0.018	0.966	0.859

Figure 2



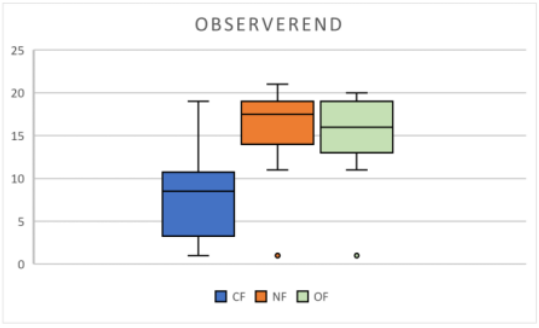
On feelings of observing (observerend)

Three paired sample t-tests were conducted to evaluate the difference in feelings of observing on all three videos, as can be seen in figure 3. Between two pairs of videos there were statically significant differences: CF-NF as one pair, and the CF- OF as the other pair. There was no significant difference reported for OF-NF. The boxplots show that the medians of both NF and OF are above the upper quartile of CF. The medians for both are 16 or above, which I deem very high.

Observerend

			t	p	W	p
CF	-	NF	-4.497	< .001	0.955	0.715
CF	-	OF	-5.253	< .001	0.963	0.824
NF	-	OF	0.845	0.416	0.922	0.303

Figure 3



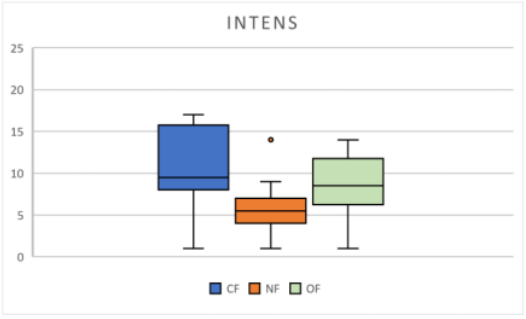
On feelings of intensity (intens)

Three paired sample t-tests were conducted to evaluate the difference in feelings of participation on all three videos. Between all pairs of videos there were statistically significant differences as can be seen in figure 4. The boxplots show that both the medians of OF and the CF are above the upper quartile of NF. The median of OF is a little under the median of CF.

Intens

			t	p	W	p
CF	-	NF	4.231	0.001	0.926	0.336
CF	-	OF	3.742	0.003	0.963	0.821
NF	-	OF	-3.191	0.009	0.915	0.246

Figure 4



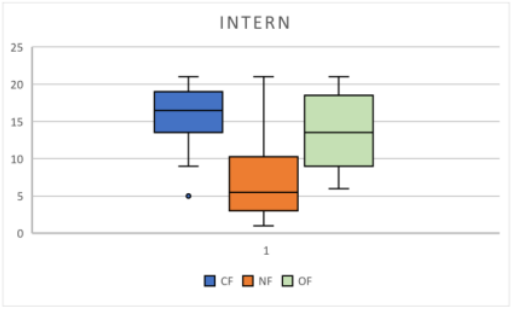
On feelings of being internalised (geïnternaliseerd)

Three paired sample t-tests were conducted to evaluate the difference in feelings of being internalised on all three videos, as can be seen in figure 5. Between two pairs of videos there were statically significant differences: CF-NF as one pair, and NF-OF as the other pair. There was no significant difference reported for CF-OF. The boxplots show that the medians of both CF and the OF are above the upper quartile of the observer video.

Intern

			t	p	W	p
CF	-	NF	6.264	< .001	0.952	0.673
CF	-	OF	2.077	0.062	0.969	0.895
NF	-	OF	-3.966	0.002	0.968	0.885

Figure 5



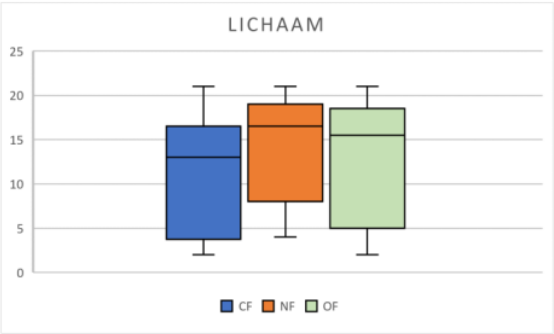
On feelings of being aware of one's body (lichaam)

Three paired sample t-tests were conducted to evaluate the difference in feelings of being of one's body on all three videos, as can be seen in figure 6. The only significant difference was found between the CF-NF video. However, it is not certain this result can be trusted, since the Shapiro Wilk test showed a deviation from normality. The boxplots show that the medians of all videos are 13 or above which is on the high side.

Lichaam

			t	p	W	p
CF	-	NF	-2.233	0.047	0.712	0.001
CF	-	OF	-2.110	0.059	0.854	0.042
NF	-	OF	1.483	0.166	0.495	< .001

Figure 6



On feelings of subject position (subject positie)

The next three questions can be regarded as a set and as somewhat different from the other questions. The participant got three statements related to their position in the video and were asked how much they

would agree with them on a scale from 0-100. For this question, no paired sample t-tests were conducted since the question was not the same for all videos.

As can be seen in figure 7, with the lowest variance and a median of 17, participants had little doubt that they felt as if they were an observing entity in the NF video. CF shows a median of, which is also on the high side of the scale. People arguably felt as if they were the character of the grandmother/wolf, yet there is a higher variance as compared with NF. With a median of 8 on OF, it seems people were not inclined to feel as if they were a piece of fruit in the fruit bowl.

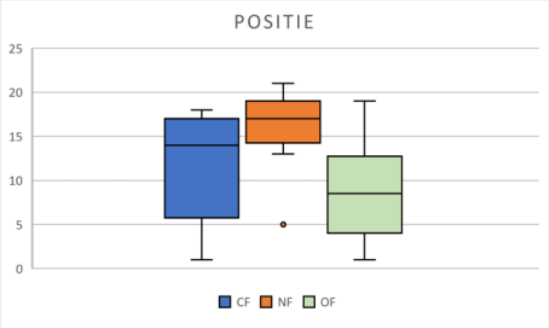


Figure 7

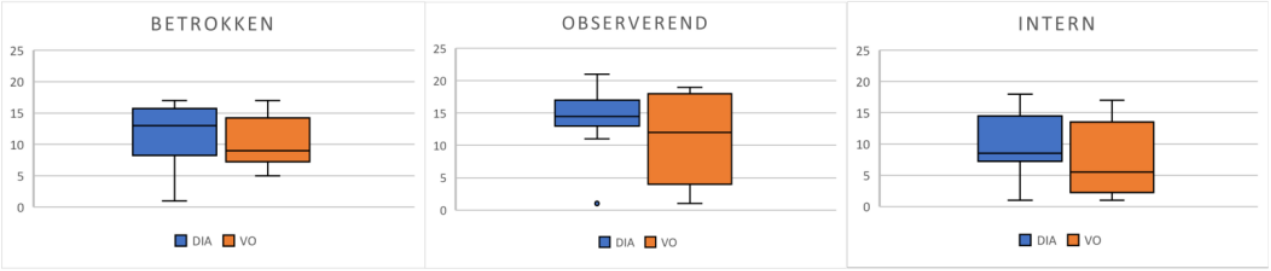
Voice-over: on feelings of engagement, observing and being internalised

Three paired sample t-tests were conducted to evaluate the difference in feelings of engagement, feelings of observing, and feelings of being internalised. Between none of these pairs any statistically significant differences were found, as can be seen in figure 8.

Voice-over – Geen Voice-over

				t	p	W	p
Betrokken	DIA	-	VO	0.832	0.423	0.842	0.029
Observerend	DIA	-	VO	1.334	0.209	0.886	0.105
Intern	DIA	-	VO	1.212	0.251	0.969	0.902

Figure 8



On mental consequences of voice-over

Also the next three questions can be regarded as a set. Three statements were made and the participants were asked how much they would agree with them on a scale from 0-100. For this question, no paired sample t-tests were conducted since the question was not the same for all videos.

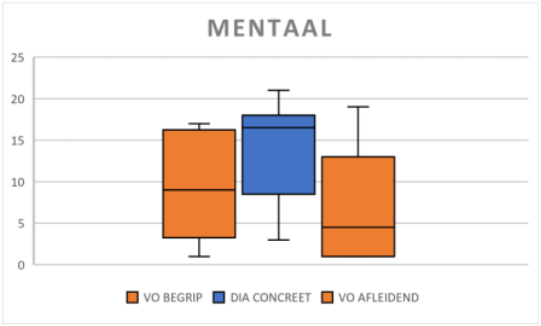


Figure 9

With a median of 9, participants where somewhat less inclined to say the voice-over helped them understand the events in the narrative better. With a median of 17, participants seemed inclined to agree that the video with dialogue made grandmother's house feel more concrete to them. Lastly, with a median of 3, participants surely did not agree with the notion that the voice-over was distracting. Yet, all of these conclusions are not very decisive, since all boxplots show a high variance.

Discussion

In this sections the answers given in the interviews will be reflected upon in light of the results from the survey.

Engagement

The results from the survey (*fig 1*) reported that the engagement in OF is significantly higher than in NF. This is in line with the results from the interviews. Participants mentioned that they preferred elements in OF such as being addressed, having a position with good overview, being given a 'role' in the narrative. One participant commented: *"There (OF) I had the best overview, and because of that I felt the opportunity to be more engaged in story, since I was not concerned with the question where to*

look". Another said: *"It felt very interactive that the wolf takes a piece of fruit from the place where you are, and then later Red Riding Hood picking it up again. That makes you feel engaged in the scenario"*. One can juxtapose this with a reaction on NF from another participant: *"Being an observer (…) it felt very – okay. I guess I am witnessing from a distance now- there were really no additional feelings"*.

Participation

The results from the survey *(fig 2)* reported that feelings of participation gradually increased respectively from videos NF-OF-CF. This is also reflected in the interviews. A majority of participants gave consistent answers that being a character in the narrative felt to them most as if they could participate. As important factors, participants mentioned being looked at, being talked to (direct address) and the indication of having a body in the narrative. For example:

> *"In CF you felt the most as if the characters interact with you. For example when the Wolf enters for the first time, and later Red Riding Hood when she talks to you, that provides you with the best connection to the story"*.

Or: *"Since you can see the bed and you can see the arms lying in front of you, it gives you more of an idea that you are actually there"*. However, there were other participants who reflected that higher participation in the manner of being a character did not necessarily add to heightened presence. Their reasons related to not being able to move one's body or not being able to respond. A participant remarked: *"I did not really feel connected to the grandmother or the wolf from their point of view, that I am being spoken to does not really feel like it is directed to me personally"*. Or another: *"And that you cannot move except for looking around… It just felt slightly uncomfortable"*.

Observing

The findings from the survey (*fig 3*), that in NF the feelings of being an observing entity were the highest, were also reflected in the interviews. For example: *"It could have been the image of a security camera. It was not like I was really present, it felt more distant"*. High feelings of observing relate in my hypothesis negatively on feelings of being present. Participants reported feeling as an observer as equivalent to being "*ignored*", being "*outside of the space*" and also "*fairly boring*". For example:

> *"It certainly had a negative effect on my feelings of presence that I was being ignored. The position did not even feel voyeuristic at all. In the fruit bowl I did have this feeling of being*

somewhere secretly and making sure that you are not found out, that increases feelings of actually being there in the space".

However, from the interviews it also became clear that for a minority of people, being in an observing position worked positively on feelings of presence. Two participants reported that they preferred their media to be uncomplicated and therefore preferred this position:

"I could concentrate best during (NF) because I could simply look around and not pay any special attention to anything else. I did not have to process which character or object I was this time around. You could say it had the least mental burden".

Another said: *"It (NF) felt like watching a movie, that is what you are used to".* So, the comfort that being in a familiar position brings with it can work positively towards feelings of presence. However, since only a minority of participants reported this, I do not find it very promising to look into keeping the same anonymous viewer position as in film. A last remark on the survey results, was that it was unexpected that there was no statistically significant difference between OF and NF. I would have excpected that the change of focalisation and the moment of interaction would be enough to make them distinct. While the medians were high on both videos, it could be for a different reason. Namely, as mentioned earlier, that OF was named to have the best overview position.

Intensity

The findings from the survey (*fig 4*), that both CF and OF were perceived as high on feelings of intensity, was also reflected in the interviews. However, the reasons for why CF and OF were perceived as intense seem to differ. I hypothesised that high reports of intensity can go both ways regarding feelings of presence. It could work positively since people have real bodily reactions to intensity, that can make an experience more real. On the other hand, too much intensity might work backwards since people might want to shut themselves off from it, especially those who prefer more calm experiences. What had become clear from the interviews, is that the high intensity of the OF has been experienced positively, also with a positive reflection on presence. Only one participant reported that all sorts of direct address to be a negative experience. For the others the experience where the wolf takes the fruit and comes really close to the camera could be described as a positive mix of intriguing and exciting: *"Yes, when the wolf came over I really had the feeling he was going to grab ME personally".* Another: *"You really have the idea that you have to hold your breath because else he might spot you".* As for the CF video, the intensity seems to lean more toward negativity. For example one participant remarked:

> *"I would say it (CF) is rather overwhelming, because you are permanently like -mimics frantically turning head and looking around- which meant I was preoccupied with turning and where to look instead of being able to focus on the story".*

Another said on the CF: *"It is quite ironic that Red Riding Hood is standing in front of you like a giant and that you are really small. I would describe that as overwhelming".* A new hypothesis could be that a short moment of intensity, while there is in general a position with a good overview, works positive for presence, while more extended moments of intensity in a position where the viewer has trouble with keeping overview and with the position in general, could reflect negatively on presence.

Internalised

The findings from the survey (*fig 5*), that in NF the feelings of being internalised were quite low compared to the other two videos was also reflected in the interviews. It is valuable to know that feelings of being internalised are given such low scores in the observing position. When reflecting on presence, a participant said: *"I was merely a thingy on a stick. I did not necessarily have the feeling I was standing there. That was mainly because I could not see my own body when looking down".* As seen before in the paragraph on feelings of participation, the fake body inside the narrative worked positively towards feelings of presence for many participants. That could be a good reason why the CF video has the highest median score. From the interviews, it became clear that something similar was going on in the OF video, yet that participants were in general more confused about it. For the CF video, there is little doubt about what the fake body represents, it is the body of the grandmother/wolf. However, for OF, participants seemed to experience some sort of physical anchoring point in the diegetic space, yet what represented that point exactly varied much between participants. For example, one participant reported: *"Because I was attached to a piece of furniture, a set piece in grandmother's house, that made the space feel more 'physical' for me".* They do not say that they felt as if they were either a piece of fruit or the fruit bowl, they mention the piece of furniture. This and other answers participations gave regarding the position of the OF video will be discussed in the section regarding position.

Body

The survey results (*fig* 6) reported no significant difference in feelings of being aware of one's own body (the one in the real world). The medians for all videos were on the higher half of the scale. This could be due to low production quality, yet there were close to none reports of dizziness or eyestrain.

In all videos there were some remarks on the camera position and how the participants unnaturally related their body to it, being unable to move yet turn their head 360 degrees in the CF, the *"thingy on a stick"* in NF or the odd proportions of the fruit and the characters in OF. It seems like either the different positions had no effect on the perception of one's body, or they all had distinctive assets that individually made the feelings of being aware of one's own body so high. From these results, one is unable to conclude which position would work best to make people unaware of their own body in the real world, and therefore spatially as well as mentally more present in the diegetic space.

Position

The question of position was asked in the questionnaire to check whether my intended positions were indeed understood as intended. If participants would have difficulty understanding in what position they were in a video (a character a piece of fruit, a floating gaze), the reported effects on presence might be a consequence of an inability to properly convey the position altogether. The answers given in the interviews were in line with those of the survey (*fig 7*). In most of the previous sections, it has already been indicated that the participants understood their position in the NF video. They felt like an observing entity, as was intended, and as a consequence, they felt more outside of the diegetic space. The participants understood the position and indeed felt like an observing entity and more as an outsider. With the CF video, there was more variance if and why the participant did or did not feel like they were in the position of the grandmother/wolf in the character video. There was more variance in if and why participants did or did not feel like the grandmother/wolf in the character video. Based on the interviews, we can learn that there was a discrepancy between understanding what the position was supposed to convey, and 'the willing suspension of disbelief' in order to really feel as if they were that character themselves. A participant who did not encounter the discrepancy remarked: *"I was ready to accept. I am now simply the grandmother/wolf"*. Another person who felt the discrepancy more said:

> *"No, I did not have trouble identifying with the role of grandmother/wolf, I mean you can immediately see the hands. However if I could really put myself in their shoes… somewhat I guess"*.

A participant with a stronger conviction on this suggests: *"Here too I felt like an observer, a glimpse into someone's life. I did not have direct link with this person"*. Then, when considering the survey results from OF, I had expected that people's reports of feeling as if they were fruit would have been higher. The answers from the interviews present an unexpected range of conceptualised subject

positions. For example: *"piece of furniture", "insect", "little gnome", "little mouse"*. I find the inclination to conceptualise themselves as something with eyes to perceive and a consciousness to understand what they are perceiving fascinating. This might also explain why for the OF video the scores on engagement and feelings of being internalised were relatively high, while reports of feeling like fruit were relatively low. One participant, who was familiar with the term presence prior to this research, remarked:

> *"I conceptualised myself more as an insect in the fruit bowl, since an insect has eyes and can actively look. In the questionnaire, I did give low scores on the question whether I felt like a piece of fruit, but I think that for your goal, it comes down to the same thing"*.

This is a valuable remark. Even though the particular participant who quoted this gave low scores on the question in the questionnaire since they did not exactly conceptualised themselves as a piece of fruit, the feeling of conceptualising themselves as a non-character entity that exists in the storyworld was there. Furthermore, there were overall a lot of positive remarks on feelings of presence for this video. The main reason seemed to be because the position is less defined. Participants reported to have more freedom for their own interpretations. This may seem vague, but the participants who reported this could explain it eloquently in their answers.

> *"During the OF I did not feel like an object. I liked the 'image' and I did feel as if I were a part of the story since there was an interaction with me. (…). I was not a character in the story so I did not have an assigned role, but there was an interaction with me. Which really made me feel I personally was in the story"*.

Another said:

> *"I would not identify with fruit no. The position is nice though, since there is some form of participation, but the characters in the scene do not perceive you as something or someone that is present. All the while you still participate in a way"*.

I would agree that even though participants were not overall inclined to feel like fruit, the goal with this position to differentiate between the character position and the observing position was still accomplished

Voice-over

In the second part of the survey, none of the variables (engagement, internalised and observing) showed significant differences between the voice-over video (VO) and the dialogue video (DIA) From the interviews, however, there seemed to be some noteworthy remarks on the differences between the

videos regarding feelings of presence. These will be mentioned briefly, with the side-note that it cannot be said with certainty that the answers are representative, yet they can still be meaningful. For example, nine out of twelve participants reported to prefer the DIA video. Most of them felt that it was more natural that you could hear the voices coming from the characters themselves, and that hearing their voices made the feelings of being in the same room as them stronger. *"In [DIA] you can hear the voices coming from the multiple characters, you can hear them from the source and not from someone else"*. Another mentioned a heightened engagement: *"I am asked to really empathise with the characters by listening to their voices"*. Out of the three participants who instead preferred the voice-over, two gave a similar reason. Namely that they identified with the narrator: they felt as if they were the person telling the story. One says: *"When I heard that voice, something immediately clicked. As if I were the one telling the story and the characters approximately do as I say"*. Furthermore, there were multiple people who expressed that a combination between voice-over and dialogue would have been their preferable mode. This was not a question, so several people mentioning it unprovoked makes it remarkable. In general, I think that a research focused solely on feelings of presence created by narrative techniques that have to do with sound would have given more definite answers. It has to be remarked that the videos of part two were always shown after part one. So, the participants had seen the same scenario three times already, then took off the VR goggles for a while, and then went back to see the same scenario another two times. Several participants mentioned that their reported feelings of presence could have been lowered due to repetition. On the extra questions on the mental consequences of the voice-over, there was no remarkable difference or addition in the interviews that was not already mentioned above.

Additional findings

There were several surprising remarks and views in the answers in the interviews that did not relate to my previous expectations. An example that I already briefly touched upon was that of how a good overview position relates positively to presence. This is surprising, since the distance from the main point in the scene was exactly evenly far for both the NF position and the OF position, yet participants did not mention this perk for the NF video. Therefore, it does not seem to be about the distance. Apart from the angle being different, the camera was closer to the door of grandmother's house in the NF video. In the OF video, one can see that the characters are moving towards you already very early. In the NF video, when the door opens, the wolf already quite close. So, viewer might be unsettled that

they cannot always see the characters coming, and that there is still an option something else might come through the door. A position with good overview seems to work positively towards feelings of presence, since the viewer cannot be easily surprised in a negative way.

Additionally, it seemed that the audio in the CF video indeed had a slightly positive effect: more than half of the participants reported that it felt as if the speaking voice of the character came from their own mouths.

> *"It felt like the sound came from me. I did really experience it like that. As for consequences for presence, I felt like it sat between narration and spectator. Because you hear 'yourself' speak, it is as if you hear your thoughts out loud".*

Another participant remarks on the naturalness of the voice:

> *"I had trouble understanding your question just now because I did not really feel as if the audio in that video was different. I would say that is a positive sign and a positive effect, it felt natural".*

Furthermore, it was remarkable that participants who reported to feel powerless sometimes- for example, because they could not move the body in the virtual world or affect the story- did identify better with the characters or positions in the videos that were also more powerless. Earlier, a participant was already quoted who said to identify more with the grandmother since she is bedridden. Another participant felt that there was a discrepancy between the viewer and the wolf in the CF video, since the wolf is a powerful character that is about to attack and the viewer cannot even move. On the OF video the same participant adds: *"I did feel less powerless as a piece of fruit compared to being the wolf. A piece of fruit can do nothing except lie there anyway, that is its function"*. This seems to hint towards a certain harmony between position the viewer finds themselves in when subjecting themselves to the experience of watching a 360-degree video, and what the object befalls in the narrative.

Overall conclusion

When reviewing the results of the survey and the answers given in the interviews, my conclusion would be that 'object' focalisation is the form that would result in the highest presence. Often, it was remarked to be 'the best of both worlds' when compared to the NF and the CF. What was not expected beforehand was that the position of overview would be so important for the participants. What was somewhat expected was that that the ability of the object position to anchor the viewer physically in the diegetic

space as well as mentally in the narrative worked positively towards presence. Mostly these feelings could be attributed to the short moment of intensity during the direct address. The main expected drawback was also present from many participants: namely that identifying with the focalisation of an inanimate object is difficult for them. However, the position left more room the viewer's imagination, and the viewers acted on that more actively than expected. Since many actively chose to conceptualise themselves as something they felt was fitting, like a mouse or an insect, this indicates that participants had more room to put something of themselves in the experience. This interpretive freedom can result in the feeling that they themselves, not as the subject but as their own person, are also interacting with the contents of the 360-degree video. It seems to boils down to the notion that the OF video provided the right balance. Just enough feelings of observing to be comfortable, yet just enough participation to feel called upon. Just enough intensity to spark interest, yet not too much to make it overwhelming.

I hope that these preliminary findings will be of use to groups of people working with and experimenting with narrative in both 360-degree video in all sorts of contexts. If a 360-degree video is for teaching and training purposes in a social context, do not be disillusioned that the experience will successfully teach, simply because the viewer is put in a situation. The spatial side of 'being there' is not the only basis of the medium. A certain awareness of the narrative side is in order. Active, conscious choices need to be made in the creative process to match the goal of the experience.

One of the ambitions of this thesis is to gain insight in what constitutes feelings of presence in not only 360-degree video, but also to extrapolate these findings to virtual reality. In the way the narratological techniques focalisation and voice-over were adapted for 360-degree video, they can be used for all sorts of spherical content. In my distinction, VR is still a different medium. The images are computer generated and often there are options for interaction with the virtual environment. While presence research than tends to focus on interactivity, sensory fidelity, believable avatars and picture quality, the point made above remains the same. Merely being in the diegetic space is not the only basis of the experience. Beneath all the possibilities that these more technologically complex options brings with them, the question on the subject position remains the same. The question what voice-over can do in addition to the images and sound of the environment remains the same. Creators need to question what they want to achieve with their experiences and find fitting narrative techniques such as focalisation and voice-over to reach that purpose. Only then, the spatial feeling of being, 'in the space' will be properly strengthened by the narrative structures and subject relations put in place.

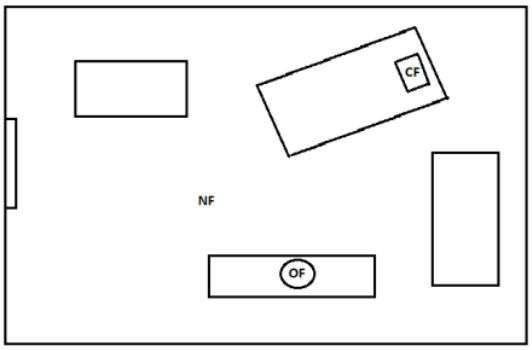
Future research

Since these conclusions only originate from one particular scene in one particular narrative, a feasible follow-up research would be to change only the content of the videos in order to see whether the observations stay the same. Incidentally, this new content should be of a higher production value, as to remove the uncertainty that this might have affected the observations. My suggested choices for content would for example be: another fairy tale, yet without an antagonist as scary as the wolf; a completely original story that is unfamiliar to the viewer. Then, if follow-up research would have a similar structure to this research, I would instead advise to make it an inter-person study with a large number of participants. This means each participant would only see one video. Now, the reports of repetition and boredom could have influenced the results.

Lastly, it could be interesting to see whether solving the main drawbacks that the participants mentioned per video would influence which video then would be the strongest on feelings of presence. For example, if the viewer could see a moving fake body in the CF video, would this make the difference that the CF position elicits the highest feelings of presence?

These suggestions are only the top of the iceberg. Narratives in 360-degree video is still a largely unexplored academic topic. Therefore, I hope that this exploratory research has provided new starting points for future research.

Appendix 1: Map of set with each camera position indicated



Appendix 2: Screenshots

Note: the proportions are not representative, since the 360-degree images are flattened and zoomed-out.

CF 1: Grandmother

CF 2: Wolf

OF 1: Downward looking view of fruitbowl

OF 2: Straight-ahead view

NF 1: Straight-ahead view

NF 2: Right-side view

Appendix 3: Qualitative interview questions

Q1: Kun je me vertellen in wat voor positie je je voelde in de verschillende video's? **(Subject position)**

- Voelde je je echt een karakter/een object / observerend.
- Zat er verschil per video in jouw gevoelens van 'presence' die te maken hadden met deze positie?

Q2: Kun je me vertellen in welke video je het gevoel had het meest fysiek aanwezig te zijn in het huis van oma en waarom? **(Being internalised)**

- Waren er bepaalde posities waarin het veel meer of minder geloofwaardig was dat jij op deze plek was?
- Waren er bepaalde posities dat je je veel bewuster was dat het maar een afbeelding was, en niet fysieke ruimte om je heen?

Q3: Kun je me vertellen in welke video je het gevoel had het meest mentaal betrokken te zijn bij het verhaal van Roodkapje? **(Engagement)**

- Waren er bepaalde posities waardoor je makkelijker afgeleid werd van de video?
- Waren er bepaalde posities dat je er heel erg mee bezig was dat je een 360 video aan het kijken was, in plaats van met de gebeurtenissen in de video's zelf?

Q4: Kun je me vertellen in bij welke video's je het meest het gevoel had alsof je echt een rol had in de gebeurtenissen in de video? **(Participation)**

- Werkte dat positief op gevoelens van presence? Of juist negatief? Vond je het wellicht ongeloofwaardig?

Q5: Kun je me vertellen hoe je je voelde wanneer de karakters dichtbij komen en je 'bekijken'? **(Intensity)**

- Is dit nog anders wanneer je ook aangesproken wordt?
- Zou je zeggen dat het intimiderend was.
- Werkt dit positief of negatief op je gevoelens van presence?

Q6: Ik wil je wat vragen over de positie op het bed en je gevoelens van presence:

- Kun je me vertellen of het 360-graden rondkijken onnatuurlijk voelde in de positie op het bed? **(Awareness of body)**
- Had je moeite met het identificeren met de rol als oma/wolf? **(Subject position)**
- Had de verandering in audio effect of je gevoelens van presence?

Q7:Ik wil je wat vragen over de positie als fruit en je gevoelens van presence:

- Had je moeite met het identificeren met die rol? **(Subject position)**
- Wat voor effect had lagere camerapositie waardoor je omhoog moest kijken? **(Awareness of body)**

Q8: Kun je me vertellen of de positie in het midden van de kamer effect had op je gevoelens van presence?

- Had je het gevoel dat deze positie bekender voelde dan de andere? **(Intensity)**
- Wat voor effect had het dat je niet werd aangekeken of aangesproken? **(Observing)**
- Wat voor effect had de hoogte van de camera? **(Awareness of body)**

Q9: Kun je me vertellen welke positie je de fijnste ervaring vond en waarom?

—----------

Q10: Kun je me vertellen welk verschil je hebt gemerkt tussen deze twee video's?

Q11: Kun je me vertellen in hoeverre je in de verschillende video's het gevoel had mentaal aanwezig te zijn? **(Engagement)**

- Waren er bepaalde audio aspecten waardoor je makkelijker afgeleid werd van de video?
- Maakte de voice-over je dieper verbonden met het verhaal of juist minder?

Q12: Kun je me vertellen hoe geïnternaliseerd je je voelde in de verschillende video's: **(being internalised)**

- Waren er bepaalde audio aspecten die je het gevoel gaven dat hoewel je de gebeurtenissen meekreeg van binnenin het verhaal, je toch daar niet hoorde?
- Wat had dat voor effect op jouw gevoelens van presence?

Q13: Ik ga je nu vragen de video met dialoog en met externe voice-over te vergelijken. Over de video met de dialoog:

- Welke bracht het je dichterbij de omgeving?
- Koste het bij één van de twee het meer mentale moeite om de gebeurtenissen in het verhaal te volgen/in je op te nemen?
- Bij welke van de twee werd je perceptie van oma's huis een meer een fysieke omgeving?

Q14: Welke variatie vond je het fijnst om te beleven?

Appendix 4: Validation of (artistic) choices

I chose the subject matter of Red Riding Hood based on familiarity. I assed it to be the most recognizable and understandable story that had a low cognitive threshold to 'get into'. This to ensure as much as possible that any effects on presence are because of the applied narratological effects, and not due to the fabula itself.

The choice of having two scenes per video (a part before the 'fade to white' and after) was to ensure that the participant is given enough time to be absorbed into the narrative. The videos should not be longer than that, since there is the risk of them becoming too long, boring and repetitive. Additionally, wearing a VR-headset for longer amounts of time is simply not comfortable.

Furthermore, in all of the videos the camera is steady: it does not move from its spot. This is different from conventional narrative film since the medium hardly allows movement. Viewing a 360-degree video in virtual reality with a moving camera can cause heavy motion sickness. This took extra consideration for the character video. Often, characters move in a scene. Therefore I have chosen two bedridden characters for the character position video.

As described in the section on focalisation, the three-way division of viewer, (conscious) camera and character is for a large part caused by the gaze into the camera that is seen as a taboo. Since this three-way division cannot hold-up in a similar way in 360-degree film, I hypothesised that it is worth overturning this taboo. Therefore, in the character position video the viewer is being acknowledged: they are looked at and spoken to as if they are the character. For the object position I made it so that the viewer was only looked at, not spoken to. If an object is 'used' in a scene and the viewer feels as if they were that object, it is arguable that the viewer feels as if they were participating in the scene even though they are not 'alive' as a character would be. Additionally, adding direct address to the object position creates a starker contrast with the 'neutral focalisation' condition. If there can be said to be a fourth wall, it is definitely broken in the object position, whereas in the observing position it is not.

For the voice-over video I chose to not have any dialogue from the characters, since the difference with the 'dialogue video' would be starker and the comparison clearer. For the voice-over video I chose the 'observing' camera position, since out of the three it is the most neutral.

Appendix 5: Adaptations from existing presence questionnaires

Existing presence questionnaires were used for inspiration and adapted for my purpose. Q4 is common is presence questionnaires and can therefore be found in both the Green and Brock (2000) questionnaire and the ITC-SOPI (Lessiter et al, 2001) questionnaire. Q7 and Q8 can also both be found in the ITC-SOPI questionnaire. The latter, however has a slightly different wording. Instead of 'I has a sense of being in the scenes displayed' I opted to used the slightly more technical term 'internalised', for it is a bit more precise. The notion to add questions on negative effects was also adapted from the ITC-SOPI questionnaire. While they name four negative effects independently, I found it sufficient to combine dizzy/nauseous and eyestrain/headache into two separate questions, which provides me with enough information to have a general indication whether it could have affected feelings of presence. Q9 was adapted from the Green and Brock (2000) questionnaire. In their study participants read a narrative text, therefore their question was: "While I was reading the narrative, activity going on in the room around me was on my mind" (p. 705). I adapted the question for 360-degree video. The participant cannot see nor hear the room around them with a VR-headset on, yet they can be very aware of their own body that was still in their chair in the office. Q5, Q6, Q12, Q13, Q14 were not adapted from any questionnaire, they are original questions. I could not have used an existing questionnaire in its totally, there were too many questions or categories that did not in any way reflect on my videos. For example, the ITC-SOPI questionnaire has a section on 'ecological validity'. Both the narrative and the environment where artificially created and the overall results is of a low production quality, which renders questions in that direction nonsensical.

Bibliography

Bal, M. (1985). *Narratology: Introduction to the Theory of Narrative*. University of Toronto Press.

Biocca, F. (2002). *Presence working group research targets*. Presentation at the "Presence Info Day" of the European Commission, January 10, 2002, Brussels.

Bonnington, C. (2015, March 13). *You Can Now Watch and Upload 360-Degree Videos on YouTube*. Wired. Retrieved November 26, 2021, from https://www.wired.com/2015/03/youtube-360-degree-video/

Bordwell, D., Staiger, J., & Thompson, K. (1985). *The classical Hollywood cinema: Film style & mode of production to 1960*. Columbia University Press.

Cubitt, S. (2005). *The Cinema Effect*. Mit Press.

Gaudreault, A. (2009). *From Plato to Lumière: narration and monstration in literature and cinema*. University of Toronto Press.

Grau, O. (2003). *Virtual Art: From Illusion to Immersion (Leonardo Books)*. The MIT Press.

Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of personality and social psychology*, *79*(5), 701-721.

Gunning, T. (1986). *The cinema of attractions: Early film, its spectator and the avant-garde* (pp. 381-388). na.

Herrera, F., Bailenson, J., Weisz, E., Ogle, E., & Zaki, J. (2018). Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective-taking. *PLOS ONE*, *13*(10). https://doi.org/10.1371/journal.pone.0204494

Lessiter, J., Freeman, J., Keogh, E., et al. (2001). Acrossmedia presence questionnaire: the ITC Sense of Presence Inventory. *Presence: Teleoperators, and Virtual Environments* 10:282–297.

Minsky, M. (1980, June). *TELEPRESENCE*. MIT. Retrieved November 25, 2021, from https://web.media.mit.edu/%7Eminsky/papers/Telepresence.html

Murray, J. H. (2016, October 6). Not a Film and Not an Empathy Machine- How necessary failures will help VR designers invent new storyforms. *Immerse*. Retrieved November 25, 2021, from https://immerse.news/not-a-film-and-not-an-empathy-machine-48b63b0eda93

Murray, J. H. (2017). *Hamlet on the Holodeck, updated edition: The Future of Narrative in Cyberspace (The MIT Press)* (Updated ed.). The MIT Press. (Original work published 1997).

Murray, J. H. (2020). Virtual/reality: how to tell the difference. *Journal of Visual Culture*, *19*(1), 11–27. https://doi.org/10.1177/1470412920906253

Pendlebury, T. (2018, September 30). *Making the holodeck a virtual reality*. CNET. Retrieved November 25, 2021, from https://www.cnet.com/tech/gaming/making-the-holodeck-a-virtual-reality/

Ramirez, E. (2018, October 26). *It's dangerous to think virtual reality is an empathy machine*. Aeon. Retrieved November 25, 2021, from https://aeon.co/ideas/its-dangerous-to-think-virtual-reality-is-an-empathy-machine

Riva, G., et al. (2007). Affective interactions using virtual reality: the link between presence and emotions. *Cyberpsychology & behavior*, *10*(1), 45-56.

Ryan, M.-L. (2015). *Narrative as Virtual Reality 2: Revisiting Immersion and Interactivity in Literature and Electronic Media*. Johns Hopkins University Press.

Samsung. (n.d.). *Samsung Gear 360 (2017)*. The Official Samsung Galaxy Site. Retrieved November 26, 2021, from https://www.samsung.com/global/galaxy/gear-360/

Schubert, T., & Crusius, J. (2002, October). Five theses on the book problem: Presence in books, film and VR. In *PRESENCE 2002-Proceedings of the fifth international workshop on Presence*. Porto, Portugal: Universidad Fernando Pessoa.

Sobchack, V. (1982). Toward Inhabited Space: The Semiotic Structure of Camera Movement in the Cinema. *Semiotica* 41 (1-4): 317-335.

Slater, M., Usoh, M., Steed, A. (1994). Depth of Presence in Virtual Environments. *Presence: Teleoperators and Virtual Environments, 3,* 130–144.

Slater, M., & Wilbur, S. (1997). A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments. *Presence: Teleoperators and Virtual Environments*, *6*(6), 603–616. https://doi.org/10.1162/pres.1997.6.6.603

Slater, M. (1999). Measuring Presence: A Response to the Witmer and Singer Presence Questionnaire. Presence : Teleoperators and Virtual Environment, 8(5), 560–565. https://doi.org/10.1162/105474699566477

Slater, M. (2003). A note on presence terminology. *Presence Connect*, *3*(3), 1–5. Retrieved November 25, 2021, from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.800.3452&rep=rep1&type=pdf

Slater, M. (2018). Immersion and the illusion of presence in virtual reality. *British Journal of Psychology*, *109*(3), 431–433. https://doi.org/10.1111/bjop.12305

TED. (2015, April 22). *Chris Milk: How virtual reality can create the ultimate empathy machine* [Video]. YouTube. https://www.youtube.com/watch?v=iXHil1TPxvA

Verstraten, P. (2008). *Handboek Filmnarratologie*. Nijmegen: Vantilt,

Wirth, W., Hartmann, T., Böcking, S., Vorderer, P., Klimmt, C., Schramm, H., Saari, T., Laarni, J., Ravaja, N., Gouveia, F. R., Biocca, F., Sacau, A., Jäncke, L., Baumgartner, T., & Jäncke, P. (2007). A Process Model of the Formation of Spatial Presence Experiences. *Media Psychology*, *9*(3), 493–525. https://doi.org/10.1080/15213260701283079

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