Motivation to Select Point of View in Cinematic Virtual Reality

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ABSTRACT

This paper examines the effects of participants' preferred point of view of two protagonists, and their motivation for this preference, on two viewings of a cinematic 360-degree video filmed from the first person perspective. Before watching the film, which dramatized gender bias in a STEM workplace, participants were asked to state whether they preferred to view the film from the point of view (POV) of a male protagonist, a female protagonist, or make no selection. They were then asked why they held this preference. Their answers were predictive. Participants' tracked head movements, and the events participants recalled from the film, differed according to their pre-stated preference and motivation.

Index Terms: K.3.1 [Computers and Education]: Computer Uses in Education; J.4. [Computer Applications]: Social and Behavioral Sciences [;]: —

1 INTRODUCTION

Much current work in virtual reality, both computer-generated and filmed in 360-degree video, aims to promote empathy in the viewer by providing them with a new perspective. In early discussion of virtual reality, it was considered to be an "empathy machine" [4] in which participants would be compelled to share the perspective of the protagonist, or the person from whose point of view the scene unfolds. Using immersive virtual reality of 360-degree video to experience "walking in another's shoes" could be a short-cut to greater understanding and fellow-feeling [2]. Often, this sense of empathy through embodiment is designed to change the viewer's attitude about the person portrayed in the film, or their situation.

However, there is another way of considering the experience of being embodied through VR, and that is the common experience of selecting an avatar to represent some aspect of the self [5]. The ability to consciously choose an avatar is also important [3] and an avatar that aligns with some level of the self can aid in increasing identification/presence [1].

It is well-documented that participants can develop a sense of body transfer with avatars that do not resemble them [6]. However, choice of perspective can also be seen as a choice of identity, as in game-based VR systems, where people will choose an avatar to represent themselves, and may choose one that represents, or hides, some aspect of their personality.

In most CVR systems, the choice to select a point of view (POV) in any given video is not an option; the decision to film from a particular POV is a decision made by the filmmaker. However, if users prefer to see events from the perspective of a character that represents them in some way, that might not only affect how content is experienced, it but also *what* content users choose to experience.

Thus, we use a novel cinematic 360-degree video (http://www.uturnvr.com/) filmed from the perspective of two characters to investigate viewers' motivations to select a point of view, and their subsequent behavior.

2 STUDY DESIGN

Participants (N = 119) from two university communities in the United States participated in this study. Twelve participants were eliminated due to missing data, errors in the experimental procedure, or familiarity with the virtual content. This left 107 participants (55 male and one person who did not state their gender) randomly assigned to four conditions. In Condition A, (n = 34, 17 male and one person who preferred not to reveal their gender) participants could freely rotate to view different aspects of the virtual environment. In the other three conditions their movement was constrained in some way. All participants completed informed consent, and were compensated by cash or a gift card. The experiment was approved by the institutional review boards of the two universities.

Before watching the film, participants took a survey which stated, "Shortly, you will watch a film with a leading female and a male character. The female character works as a programmer in a start-up company. The male character works as a CTO in the same company." They were then asked if they would prefer to watch the film from the point of view of the male CTO, or the female programmer, and a second question which asked why they selected this option.

Participants viewed the film using a Samsung Gear VR containing a Samsung Galaxy S6 mobile phone. They wore Bose QuietComfort 35 headphones. Participants head rotational data (pitch and yaw), along with the timestamp, was recorded at approximately 60 times per second. The film, "Uturn" (http://www.uturnvr.com/)is divided into two halves, each showing the first-person point of view of one of the protagonists, including their body and hands. One protagonist is a male CTO and the other is a female programmer. Their stories proceed in parallel and simultaneously–while the viewer watches one perspective, the story continues on both sides. Participants wore a Gear VR headset and swiveled back and forth in an office chair which allowed them to freely move from side to side to follow the two storylines. After filling out the first survey, participants were then asked to watch the film a second time. However, we do not include any data from the second watching.

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3 Hypotheses and Research Questions

Our first hypothesis was as follows: *H1. Participants' self reported reasons for selecting a point of view can be categorized as "perspective taking" or "identification."*

Next, we asked if participants' motivation to choose their preferred perspective then recalled different types of content. For example, participants who select a point-of-view based on the desire to take perspective might be more likely to recall details of the plot or moral themes. In contrast, participants who were motivated by their own identity might be more sensitive to, and recall more, concrete details. *Research Question 1. Will participants motivation for selecting a point of view affect what they report recalling after watching the movie?*

Finally, we also explored how participants' motives for selecting a POV might affect how they look around the virtual environment. This led to the following *Research Question 2. Will participants who state a motivation of perspective taking move differently in the environment than participants who state a motivation of identifying with the protagonist?*

4 Results and Discussion

4.1 Preference and Motivation

Thirteen participants preferred to watch from the perspective of the male CTO, 42 participants preferred to watch from the perspective of the female programmer, and 52 participants had no preference.

Participants also wrote a brief free-response stating their reasons for their preferred POV. These reasons were categorized by two raters blind to condition. Responses that were not agreed on were discussed by both raters until consensus was reached. Responses could be assigned to more than one category. Four categories emerged:

Perspective: "I like to experience things from a perspective less known to me."

Identity: "I wish to see how the female programmer goes about her day to day activities in her work space, since I being a working woman myself I think I will identify myself more if I watch the film from her POV."

Content: "I am interested in the content/story rather than the gender/position of the protagonists."

Bias: "I don't want any bias. Selected a gender initially may influence that."

Nine participants did not provide a reason for their preference. 16 participants reported concern about bias; 17 participants were primarily concerned with content, 25 participants mentioned identity, and 62 participants mentioned perspective. Twenty-two of the participants reported mixed motivations, for example, both a desire to take perspective as well as concern about bias.

We note that the category of bias might be folded into the perspective category, as both groups of participants discussed the idea that seeing events from a particular POV might affect their attitudes or opinions. However, given that all of the participants who mentioned bias as a motivation also declined to select a POV, we propose that these groups may differ in important ways, and we analyze them separately for the purposes of this paper.

4.2 Recall

After watching the film, participants were asked to "List the 5 things that you remember the best from the film." We predicted that some of these responses would be coded as *Concrete Details*, or specific comments on the sensory qualities of the environment; for example. On an initial coding, the following categories emerged.

Concrete Details: "The food was delicious."

Plot: "They were pitching their company called "Wag the Dog"

Moral themes: "The comments during dinner were misogynistic"

Technology: "The constant need to switch from scene to scene"

Narrative: "The story was interesting"

Of the responses at Time 1, 45 participants reported at least one concrete detail, 57 reported recalling at least one moral theme, 94 recalled basic plot elements, 2 participants commented on narrative and 7 participants mentioned the technology.

We found a difference between participants' pre-stated motivation categories on the number of concrete details recalled by participants, such that participants who were motivated by concern over Bias recalled more concrete details than participants who gave motivations of Identity, Perspective or Content ($\beta = 2.76$, $p = 0.008$). Participants who wished to avoid bias were also marginally more likely to recall plot details ($\beta = 1.74$, $p = 0.085$). There were no significant differences between motivation categories on moral themes.

4.3 Movement

We next assessed participants' movements in the virtual environment. We used only the "free-switching" condition in this analysis, as it was the only one that allowed participants to move freely between the two POVs. In this condition, when the participants watched the film for the first time, the movement data of three participants did not record completely, leaving a smaller data set of 31 participants (11 women).

Nevertheless, we conducted a limited analysis, asking whether participants self-reported preference would affect which POV they chose to watch from. Indeed, when examining the percentage of time that participants spent watching the female programmer POV at Time 1, we found a effect of preference, such that participants spent a significantly smaller percentage of time viewing content from the female POV when they previously stated they preferred a male POV ($n = 5$, $M = 34\%$, $SD = 14\%$, $p < 0.001$), or preferred to take no POV ($n = 15$ $M = 53\%$, $SD = 15\%$, $p = .048$). Participants who stated that they preferred the female POV, $n = 11$, followed through on this preference, viewing the film from this perspective an average of 64% ($SD = 13\%$).

5 Limitations and Future Work

This analysis was part of a larger experiment examining the effects of different viewing conditions in CVR. In our exploratory study, we found evidence that participants' preferences for POV and their reasons for their preference influenced how they viewed and recalled content. While the ability to give the viewer the first person perspective of a character in the film is valuable, viewers bring their own motivations and preferences to this experience. These motivations may change what they remember about the content they consume, or even whether they choose to view some aspects of the content at all.

We note that this study was exploratory, and our sample of participants, especially those with usable movement data, was small. Our future work will extend and replicate these findings.

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