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"I know what it feels like to be lonely": Presence & Engagement in the 360 Video *Henry*

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Brief report

'I know what it feels like to be lonely': Presence and Engagement in the 360 video *Henry*

Background

We recently conducted research looking at adults' experience with 360 video, and asked how things like the platform used and the perspective people see a narrative from influence their engagement with VR. This write-up details one part of that research: interview and survey results related to participants' viewing of the animated short film *Henry* (Oculus Story Studio).

Our interest in these research questions arose because we want to better understand the relative value of VR as a form of media. Though we typically examine VR in educational settings, we were intrigued by both student and general user responses to the empathetic components of *Henry*. This got us thinking about the role of narrative in 360 film, the use of CGI experiences to evoke emotional responses, and the contrasts between different types of 360 films. Our full study involved both *Henry* and *Invasion!* because they represented two different approaches to the idea of 360 video and the role of the viewer.

In this report, we provide summary information about our study, including excerpts of viewer responses, statistical data, and some analysis. Additionally, we have provided all of the participant responses in the attached spreadsheets. In the final section of this report we will address some of the categories of participant responses that we did not end up using for our analyses but which suggest interesting areas for further investigation. It is important to note that in our "screen" condition, we utilized footage that was recorded on the Rift by a member of our film team so that it could be viewed on a flat screen. Some viewers felt that the flat screen footage was stretched or shaky. Though this may pose a confound to a very clear analysis of the two conditions, what we find particularly notable is that even though our "screen" condition was far from perfect, the narrative of *Henry* still held up and was highly rated by viewers.

Some participants were confused about whether or not they were in VR, which seemed remarkable to us since they were watching a screen, but it was evident that not all people have a clear understanding of what VR is. Two participants had exposure to the content prior to this study. We did not remove participants who had seen *Henry* beforehand (whereas, due to the nature of the role of the bunny in *Invasion!*, having seen that content would disqualify them from the study).

Henry

We had 65 adult subjects[1] watch the film *Henry*. The film is about a hedgehog with sharp quills who would like a friend to hug. The story is set inside Henry's house, and shows Henry making a birthday wish and the magical events that ensue. Overall, viewers had a positive response to the film. We had viewers rate how much they felt certain emotions during the experience, and they rated the film particularly high for amusement (average rating: 5.7/7), wonder (5.0), excitement (5.0), and sadness (5.0).

Visuals from Henry. *© 2015 Oculus Story Studio.*

Overview of study subjects

For analysis, a total of 35 headset subjects and 30 screen/phone subjects were used. Subjects ranged from 18 to 64 years old (mean=35.6, sd=12.8). No significant difference in age between the two groups was observed (headset: mean=36.7, screen: mean=34.3).

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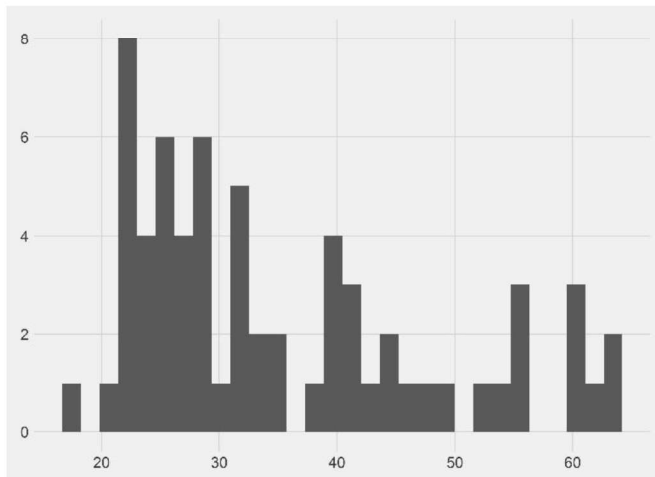
[1] Eighty subjects participated in the study; 15 were excluded for various reasons (issues recording responses, subjects having 'response set' answers, viewing the two films in a different format, outlier scores on measured variables).

The two samples were fairly balanced in terms of gender, education, and race/ethnicity. There was a slightly higher proportion of females in the headset condition than in the screen/phone condition, but this difference was not significant (X^2 = 0.62779, df = 1, p = 0.4282).

		Headset	Screen/phone
Gender	Female	22	15
	Male	12	14
	Gender fluid	1	0
	Prefer not to say	0	1
Education	College graduate	18	16
	Postgraduate degree	7	6
	Some college	5	6
	High school graduate	1	1
	Some high school	1	0
	Trade/technical/vocational training	2	1
	Prefer not to say	1	0
Race/ethnicity	White	24	16
	Asian	6	4
	Black/African American	3	4
	Hispanic/Latino/Spanish origin	0	1
	Other	2	5

The two groups were balanced in terms of personality[2] and tendency to be empathetic[3] - no significant differences between the two groups was observed.

Narrative Engagement, Empathy, and Presence

After participants watched the film, we had them complete self-report questionnaires reflecting on their narrative engagement[4], empathy[5], and presence[6]. We compared scores on these measures for participants who viewed the headset version and scores for those who viewed the screen version. The results are discussed in turn below (statistics for these comparisons are included in the Appendix).

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[2] Personality was measured using the BFI-10 (Rammstedt & John, 2007), which measures five aspects of personality: openness, conscientiousness, agreeableness, extraversion, and neuroticism.

[3] Empathetic tendency was measured using the Compassion Scale (Pommier & Neff, 2011).

[4] Measured using the Narrative Engagement Questionnaire (Busselle & Bilandzic, 2008).

[5] Measured using the Emotional Engagement subscale of the Narrative Engagement Scale (Busselle & Bilandzic, 2008).

[6] Measured using a modified version of the Presence Questionnaire (Witmer & Singer 1998), and selected subscales of the Temple Presence Inventory (Lombard, Ditton & Weinstein, 2009).

Narrative Engagement

It appears that that viewers of the screen version were just as engaged with the story as viewers of the headset version. Viewers of the headset version of the film did report higher levels of narrative engagement (Total Narrative Engagement in the graph below) than viewers of the screen version, but this difference was relatively small and didn't meet our threshold for significance. Some ratings that factored into overall narrative engagement did show differences across viewing conditions. Participants who viewed the headset version of the film reported higher levels of attentional focus and narrative presence than participants who viewed the screen version. Emotional engagement, our measurement of empathy towards the story's characters, appeared to be high regardless of viewing condition. We ran analyses accounting for empathetic tendencies[7], since individual viewers might vary in how open they were to the emotions in the story. Even taking these individual differences into account, narrative and emotional engagement were not significantly higher for participants who viewed the headset version of the film.


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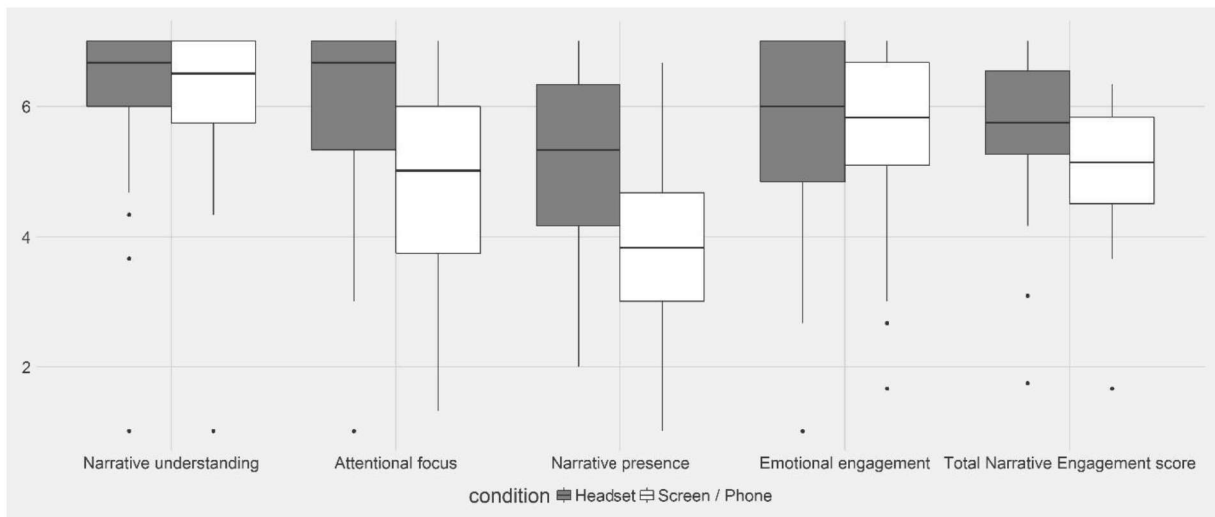
[7] Running regressions of narrative engagement and emotional engagement, with viewing condition and empathetic tendency as independent variables.

Presence

Participants felt high levels of presence in both films, but particularly so for the headset versions. All subscales of the Presence Questionnaire except for the Sounds subscale (the sound setup for the headset and screen versions of the film were equivalent) showed significantly higher scores for viewers in the headset condition.
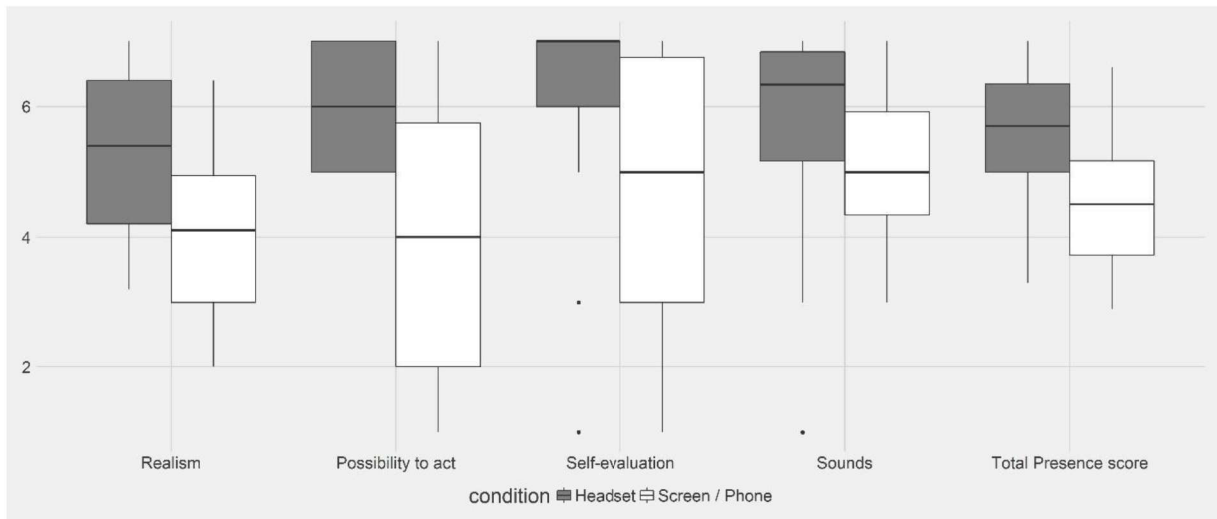
The scales from the Temple Presence Inventory[8] that we used measured slightly different aspects of presence than the Presence Questionnaire. We found significant differences between the headset and screen condition for spatial presence. Headset viewers also reported higher levels of 'Active interpersonal social presence', which reflects how often viewers had physical reactions to the content (making sounds out loud, smiling, and wanting to speak to characters). Mental immersion also was stronger for viewers of the headset version (example item: "How involving was the experience?"). These results were some of the strongest evidence we have that viewing *Henry* in a head-mounted display was a richer experience than viewing the film on a standard computer screen; there were differences in the reactions viewers reported and in their level of sensory immersion. No difference was observed for passive interpersonal presence, which were very high for both viewing conditions (example item: "During the media experience how well were you able to observe the facial expressions of the people you saw/heard?").

condition ▉ Headset ⊟ Screen / Phone

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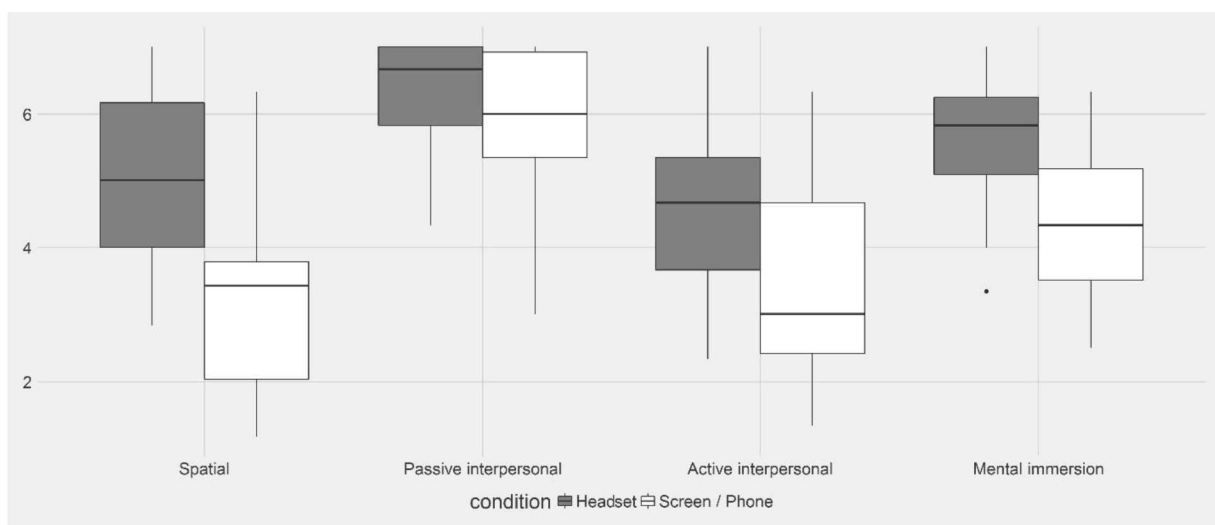
[8] Lombard, Ditton & Weinstein, 2009.

Retelling and Story Inferences

As part of the study, we asked all participants to retell the story in their own words. Initially we wanted to look for trends in terms of language usage in the retelling (there is some research that suggests that how viewers reference avatars and characters in digital media can indicate a degree of connection to the story/characters). We did not, upon an initial pass through the data, find any compelling information about language usage and thus did not pursue this line of analysis further.

However, a few interesting anecdotal themes emerged. By looking at the retellings we were able to get a strong sense of which aspects of the story really stood out to participants. Participants clearly understood that Henry was lonely, across both conditions. They also often clued into elements of his home; one participant even described it as "well appointed." This suggests that the setting was appealing to participants and added to their enjoyment of the experience.

As they retold the story, participants regularly noted moments such as Henry's cake getting splattered everywhere. In fact, that moment seemed to really be upsetting to viewers as one noted, "He falls on the cake which is the worst possible way a birthday can end." Additionally, the balloon animal scene was consistently referenced by participants. Some found it magical and many found it disturbing and used fairly strong language to describe their interpretation of the scene:

> *"It was a hedgehog that got these whiskers that be killing everybody."*

> *"Henry accidentally murders one of his new friends."*

> *"But then he accidentally destroys? Kills? One of the balloon animals, and the other balloon animals understandably freak out."*

> *"As a hedgehog, Henry is also saddled with the unfortunate desire to hug things, like people, or animals."*

> *"By some force it turned his animals real, or just alive, which is also kind of horrifying...and then he fell into his cake and gave up on his life."*

Most participants reference Henry making a friend at the end which the majority found pleasing. Interestingly, their responses about the tortoise, aside from being a helpful pal for Henry in the story, aren't particularly strong. Other characters, such as the ladybug or balloon animals, were more apt to evoke stronger sentiment. For instance, the ladybug elicited some strong words from participants who felt it was a "jerk" for abandoning Henry.

We also found it fascinating how deeply participants thought about the storyline. One of our initial concerns when designing the study was that adult participants might not have strong reactions to CGI content. These concerns were quickly dispelled. A few participants even wished they had more of a backstory to the narrative. Others made up their own backstories or scenarios, for instance:

> *"What was curious for me is where are the other porcupines? Cause, you know, they all have the same issues and they would have learned how to be friends."*

> *"I felt Henry was a little self-indulgent, and was, well it's not all about him. He has to think of other ways that he could reach out to people instead of just like hugging them..."*

> *"It wasn't clear if he had any family or like a girlfriend or parents or anything."*

Several participants also strongly related the story to their own lives, which was unexpected. People openly referenced feeling lonely in their own lives, being alone on their birthdays, knowing other people who are lonely, or noting that being lonely is a "common feeling nowadays." One adult male noted, "Dude, I was so touched, I was actually about to cry." Adult participants personified Henry in many ways, which we have seen when children or adolescents experience the content, but we were impressed with its ability to elicit these types of emotional and personal responses from adults. Often when people talk about VR content eliciting empathy and emotion, they are referring to cinematic content with real people. We feel that CGI and animated content can also be strong choices when considering elicitation of emotional reactions from users.

The largest point of confusion for participants was whether or not they were actually supposed to be in the experience. Though Henry looking at the viewer at the beginning was noted by the majority of participants, there was confusion about how that should be interpreted. Responses to how participants viewed their presence to various characters can be seen in columns G, H and I of the data set. Those questions asked participants to address whether Henry, the balloon animals or the tortoise knew the viewer was there and how they knew. Though we did not use all this data for our presentation, we think there may be some interesting elements in their responses that perhaps highlight how viewers feel they are either included, or not included, in an immersive narrative experience.

People openly commented on their confusion about their role in the story:

> *"It would have been better if I had been more certain about my role."*

> *"In real life, I'd want to intervene and do something about this…"*

> *"If Henry really knew I was there, he would have hugged me."*

Other data

In column F, we asked participants to talk about emotions they felt in the experience. We did not code and analyze the open-ended responses. In viewing the data, similar trends and themes are seen in both the headset and screen conditions with regard to viewer emotion.

Column U asked participants what they liked least about the experience and column V asked what they would change about the experience. Some of those comments had to do with our flat screen version. Others commented on the pacing at the beginning of the story when the viewer is first in Henry's house. Interestingly, there was also a subset of people that wanted the experience to involve interaction, even though it was a film. A few other comments had to do with perspective and distance while in the headset. Others referenced specific story elements (e.g, "I would not have had him fall into the cake."), other characters they would have introduced (another hedgehog), or issues with the Oculus headset (e.g., lenses fogging up).

We initially wondered if there may be a difference in the perception of time passing (previous research has shown that when people are immersed it may impact their sense of the passage of time) and that is

why there is data in column W. When we analyzed the data, we did not find any significant differences between the headset and screen conditions.

What we've learned

In short, it appears that viewing Henry in a headset does contribute positively to the viewer's experience. Though the story was powerful to viewers in both conditions (even in the flat screen version), it does appear that there is something more to the immersive experience for participants. People were excited to be "present" in Henry's house, and participants in the headset condition referenced liking the ability to look around his house, though this did cause them some concern, at times, that they might be missing some of the action. Those types of comments were less frequent in the flat screen condition, although some participants said that they wished they could have looked around. Additionally, there were notable differences in the headset condition such as:

> *"It was more intense than watching TV, because you felt like you were in the room with them."*

> *"Well, it's just like a regular TV show, but I felt like I was in the room with them...kind of a different experience."*

> *"I really did love the house, being able to see in every little room, having time to look around the whole house. And then the same with the balloon animals being able to go into all the different spaces. That was pretty amazing, I saw them go in front of me and behind me."*

> *"...when he fell from the ladder and splattered the cake, there was a part of me that was like, oh, I should get out of the way, because it's going to splatter one me. And because of that, I felt it was almost a real life experience."*

The headset comments, generally speaking, noted more things about the almost visceral experience of immersion, whereas the screen comments, while often positive about the story, have a qualitatively different feel. Though we did not code and statistically analyze the results for differences, an examination of column T (What did you like best about this experience) will give a sense of the variations between the two conditions.

There are not necessarily clear differences in terms of the level of empathy in the VR experience, yet we do think there are intriguing elements that participants were noticing in the VR version. It would be interesting to explore what other types of qualitatively different components of the VR film experience resonate with viewers. Does the immersive component add to the compelling nature of the story? How does the acknowledgement (or lack thereof) of characters in the narrative, with the viewer, add to or detract from their viewing experience? In CGI film experiences in VR, are viewers expecting some kind of way to interact and does that cause frustration?

Appendix

We conducted multiple t-tests to compare scores across viewing conditions. With correction for multiple comparisons, p-values <.0036 are significant (highlighted in table).

Scale	Subscale	Headset		Screen/phone			
		mean	*sd*	*mean*	*sd*	*t* value	*p* value
Narrative Engagement Scale	Narrative understanding	6.27	1.25	6.17	1.20	0.3276	0.7443
	Attentional focus	5.98	1.41	4.77	1.64	3.1682	0.002454
	Narrative presence	5.09	1.43	3.78	1.27	-3.9052	0.0002323
	Emotional engagement	5.58	1.65	5.48	1.37	-0.27464	0.7845
	Total Score	5.73	1.13	5.05	0.99	-2.5876	0.01199
Presence Questionnaire	Realism	5.27	1.08	4.03	1.20	4.3529	5.435e-05
	Possibility to act[9]	6.14	.88	3.80	2.11	5.68	1.62e-06
	Self-evaluation of performance	6.20	1.30	4.67	2.20	3.3453	0.001655
	Sounds	5.84	1.33	5.10	1.10	2.4467	0.01722
	Total Score	5.62	0.91	4.39	0.94	5.3281	1.521e-06
Temple Presence Inventory	Spatial Presence	5.03	1.23	3.21	1.30	5.7977	2.647e-07
	Social Presence, passive interpersonal	6.34	0.79	5.88	1.06	1.9753	0.05343
	Social Presence, active interpersonal	4.61	1.19	3.48	1.42	3.4403	0.001096
	Engagement (mental immersion)	5.66	0.90	4.34	1.06	5.3907	1.38e-06

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[9] Limited to 1 item about vision, since these was the only interaction available to viewers in the film.