Immersion of Augmented Virtual Reality and Its Effect on Empathy

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Abstract

This study investigates how virtual reality can stimulate empathy in college students. Empathy is a link between ourselves and those around us. It helps us understand what others are experiencing. However, social issues such as homelessness, bullying, racism or domestic violence are items that normally don’t go beyond sympathy. We can use virtual reality to increasing accessibility to individuals who wouldn’t otherwise have been able to or want to experience these issues first hand. Our subjects will be placed through two conditions, the first will experience a virtual environment that will simulate homelessness. Our other condition will be given a normal video of an actual homeless individual sharing their insights in their journey. Our independent variable of interest, is the bottom down engagement of our media. Our dependent variables of interest are heart beat as a physiological marker, a survey to measure the immersion of the user during their engagement with the media, and an implicit solicitation of empathy to observe the effectiveness of instilling the emotion within our subject. In both conditions, subjects will have their hear rates measured before they officially begin. Participants in the VR condition will experience a 7-minute-long virtual simulation of homelessness and our other condition will watch a normal video from an individual sharing their experience that is also 7-minutes-long. After each condition finishes watching or experiencing their content, they’ll have their heart rates measured again and be given a survey of immersion. Finally, upon closure of the experiment. Participants will be prompted whether they’d be interested in volunteering for at a homeless shelter provided by Augsburg. Their response will be taken as data only and will be debriefed that it is not a necessary aspect of their participation. IRB approval is obtained, and I plan on gathering data from 60 participants by December 1, 2018. Empathy is a complex emotion, it’s multifarious nature helps us understand the individual differences shaped by our biology and environment. To see the world through the eyes of a hungry child, a production worker who’s been laid off or watch the life of a family who’s built their life together fall apart makes it harder for us not to act, and therefore makes it harder for us not to help.

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Using machines to alter consciousness seems like divine play. By placing ourselves inside environments that are indistinguishable from reality, we can observe more natural behaviors. A 6’ by 6’ room and a up to date desktop computer is all that would be needed. Research has revealed that our brain has an “innate virtual reality generator”, which is experience dependent cognitive process, which generates or predicts models of our world (Hobson, Hong, & Friston, 2014). Neuroimaging of rapid eye movement (REM) “endorses the view that waking consciousness emerges from REM sleep” laying the foundation for our perception and sensation of reality (Hobson, Hong, & Friston, 2014). As an emerging technology, it’s effects are still poorly understood. For example, long periods of virtual reality exposure can often lead to “VR sickness” (Joseph J. LaViola, Jan. 2000 ). VR sickness has been reported to cause “general discomfort, stomach awareness, nausea, vomiting, pallor, apathy, [and] sweating” (Joseph J. LaViola, Jan. 2000 ). VR sickness is caused by visually presented stimulus of self-motion, whereas motion sickness is caused by actual self-movements (Joseph J. LaViola, Jan. 2000 ). We need to keep pushing towards the understanding of individual cognitive processes inside virtual reality, and how they transfer into ours.

All items in virtual environment are directly created by a programmer, meaning everything in the environment experienced by a user has been accounted for. Cognitive mechanisms in perceptual changes and movements within the simulation don’t have a break in immersion (Foreman, 2010). As an emerging technology, much of the definition listed have not been standardized. The definitions taken here have been created by the Faculty of Computing, Engineering and Technology by Staffordshire University in a attempt to standardize their nomenclature. The VR system we’ll use is defined as a fully immersive, the HTC Vive pro is the most up to date and expensive unit on the virtual reality market (Bamodu & Ye, 2013). Its major components are a head mounted display (HDM), tracking devices such as hand input sensor (hand held controller) and sensors to overlay the environment on its designated area (Bamodu & Ye, 2013).

There are two defining features of VR, “imagination” which encompasses the amount of immersion an individual experience while they’re in the program (Bamodu & Ye, 2013). This is related to the quality of stimulus presentation to our five senses. “Interaction” refers to the interface between the person and the untanglable environment they’re in, items like reaction time and human participation (Bamodu & Ye, 2013). We can activate emotions using controlled perceptual cues, such calming music to relax us or heavy genres to help lift more weights. Controlling stimuli to invoke pathological processes help us understand underlying disorders like anxiety or fear significantly. These emotional experiences then have shown to be a direct function of the level of immersion and given the quality of equipment being used, we can observe more natural behaviors. (Diemer, Alphers, Peperkorn, Shiban, & Muhlberger, 2015).

Our perception and sensation of our world depends on expectations of our natural environment. When see light, we observe what’s known as the visible spectrum. With our 4 other senses, we use the stimulus around us to create expectations of our physical world. We all seek to understand, observe, explain, predict and control varying models of our psychology. However, undergraduate researchers often must sacrifice control over their environment, to account for things like cost and time. Virtual environments present us with techniques to stimulate these phenomena, and account for the individual cues that create its effect on our perceptions.

By using virtual reality, we can increase accessibility to students who wouldn’t be able to address these questions in an undergraduate setting. Instruments to develop these environments, such as Unity or Blender are free pieces of program that provide students the ability to create environments from scratch. Providing this large cohort greater power in quantifying and understanding how different affect stimulate cognitive phenomenon allows this area of knowledge to grow even more. Solving issues like cost, time, replicability in the physical world can be solved by using a virtual one, where we can circumvent them completely.

As technology becomes accessible for education, it will bond to also have accessibility for wider economic classes. Groups that don’t have access to equal resources and are treatment resistant have been the main cohorts of interest. Veterans whom suffer from phantom limb where the first to undergo clinical application of virtual reality technology. “90% of amputees experience sensations in their phantom limb” and many patients don’t experience relief from invasive procedures or medication (Ambron, Miller, Kuchenbecken, Buxbaum, & Coslett, 2018). It their first trails, patients were provided low cost VR equipment, and were ran through several trails of simulation treatment. The persons had their lower extremities amputated and were presented with “real-time rendering of two intact legs in a head mounted display while playing a set of custom games” (Ambron, Miller, Kuchenbecken, Buxbaum, & Coslett, 2018). Both patients experienced a significant reduction of pain following their sessions and found pre-session pain levels also decreased (Ambron, Miller, Kuchenbecken, Buxbaum, & Coslett, 2018).. Finding noninvasive, low cost treatments that give greater accessibility are enough to begin investigating more potential therapeutic uses.

This project will assess the effectiveness of immersion on empathy between two types of media, a simulated environment and non-simulated interview. Empathy is the construct of interest, and will be operationally defined as “understanding another person’s experience by imagining oneself in that other person’s situation: One understands the other person’s experience as if it were being experienced by the self, but without the self actually experiencing it” (Hodges & Myers, 2007). Empathy is then our ability to reflect the personal feeling and emotions of another sensation, upon a presentation of stimuli. Immersion is known as a mediator of meaningful emotional experiences, however research has not made their relationships clear (Diemer, Alphers, Peperkorn, Shiban, & Muhlberger, 2015). Background narratives, virtual environments that just simulate, or can also interact have varying and interact or do both enhance emotional engagement of a subject (Diemer, Alphers, Peperkorn, Shiban, & Muhlberger, 2015).

In the first simulation, the environment will have items from which the user can interact with. They’ll have a fully simulated environment that is completely immersive. Meaning, the environment is not prerecorded and actively engages the user with interactable items. The second piece of media is a first-person view of a homeless person being interviewed.

Physiology markers like heart rate are linked to emotional arousal and including this measure in our study can help us identify the immediate effect of our stimuli on our subjects. (Diemer, Alphers, Peperkorn, Shiban, & Muhlberger, 2015). This studies designs expects the subject to encounter content that may cause discomfort which is a function of emotional arousal.

Previous literature investigating the influence of stimulus found that it is strongest when manipulation of a subject’s perspective and multisensory input to the body overrides the natural stimuli’s we passively take in. (Petkova, 2008). Using bottom-up percepts to override top-down processing of our sensation then is a function of a person’s immersion in a virtual environment. (Petkova, 2008) Virtual environments have been known to induce instances of cognitive dissonance, where the user lose the ability to distinguish particular simulated stimuli. Complete immersion of a subject then is expected to produce real time and natural behaviors that would otherwise be difficult to invoke in a laboratory setting.

I hypothesize that subjects who experience a full virtual environment will experience greater immersion, be more empathic and experience greater emotional arousal afterwards than those who are exposed to a piece of 2-Dimensional media.

**Methods**

**Materials**

* The virtual environment was presented using HTC Vive pro HDM, a head mounted display that provides a three-dimensional graphical interface with a cable, as well as a built-in headphone that provide 3D spatial audio.
* The first simulation was provided by Virtual Human Interaction Labs and is a fully interactable experience.
* The second piece of media being presented come from a YouTube channel, and is interviewing a homeless individual on the streets of Detroit.
* Samsung Gear S3 was used to measure the heartbeat of the participants.
  + Alternative mode of assessment is to place two fingers against the subjects wrist and count the pulses for 15 seconds and multiply that by 4.
* Google forms to assess subjects

**Participants**

We recruited participants (n=60) through the Augsburg Moodle participant pool. Which is a sample of ungraduated students taking a psychology course. They need to participate in at least one research project being conducted on campus from either a professor or a student, to receive a credit for their course. Participants must sign up through our schools website, and a posting can be found in a separate webpage.

**Procedures**

* There are two conditions, one which experiences a fully immersive virtual environment, and another will a homeless individual being interviewed about their conditions on camera. Both pieces of media are 7 minutes long.
* Each condition will receive the same measures. Our participants will have their heartbeat measured before they’re administrated their media, and then immediately after once they’re done. Both conditions will be asked to fill out a questionnaire when they’re done. Right before they’re about to leave, they’ll be prompted with whether they’d be willing to volunteer for homeless shelters, a program provided by Augsburg University.

**Results**

A screenshot of a cell phone

Description generated with very high confidence

Figure 1 Dependent variable and their sample size

**A screenshot of a social media post

Description generated with very high confidence**

Figure 2 Group differences are examined between variables of interest

A screenshot of a cell phone

Description generated with very high confidence

Figure 3 Examining standard deviations and means between groups

Due to our sample size, our data will remain inconclusive. The participants were recruited through Augsburg moodles participants pool. We plan on collecting data for the following semester.

**Discussion**

Virtual reality is a novel technology, and it’s potential for undergraduate research or clinical application are newly emerging. Creating environments that simulate other’s individual experiences can shed light into common characteristics across pathologies and the stimulus that define them. They present a safe, replicable and a stronger ecological control over an environment. This project took an existing simulation and investigated a set of variables that contribute to a person’s felt immersion inside. Our topic of interest was empathy, and how a person’s felt presence contributes to their feeling of civic duty towards our targeted group.

**Limitations**

* Creating a full 10-minute simulation would take about 300 hours man hours. Creating a single object would take an estimated 60 hours. To begin development, knowledge of data structures, algorithm design and terminal command use.
* Equipment and collaboration between departments present a problem. In efforts to produce a full simulation. It would require a group of individuals whom have the time and resources to create an original project. Then, years of data collection to evaluate further clinical significance.

**Appendix A**

**Measure 1: Immersion questionnaire**

1. Age \_\_
2. Preferred pronouns
   1. He – Him – His
   2. She – Her – His
   3. We – Us- Our – Ours
   4. You – Your – Yours
   5. They – Them – Their – Theirs
3. What is your Gender?
   1. Female
   2. Male
   3. Prefer not to say
   4. Non-binary/ third gender
4. Please specify your Race and Ethnicity
   1. White
   2. Hispanic or Latino
   3. Black or African American
   4. Native American or American Indian
   5. Other
5. Please answer the following questions if they’re applicable
6. How much were you able to control the events?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Significant |

1. How responsive was the game to actions that you initiated (or performed)?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Very much |

1. How natural did your interactions seem?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely natural |

1. How completely were all your senses engaged?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely |

1. How much did the visual aspects of the media involve you?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Significant |

1. How much did the auditory aspects of the media involve you?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Significant |

1. How naturally could you control movement through the media?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely natural |

1. How aware were you of events occurring in the real world around you?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely aware |

1. How aware were of your game display or controllers?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely aware |

1. How compelling was your sense of objects moving through the space?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Very compelling |

1. How consistent or connected was the information coming from your various senses?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No consistency |  |  |  |  |  | Very consistent |

1. How much did you experience in the game seem consistent with your real-world experiences?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Significant |

1. How well were you able to predict the responsive you would perform in the environment?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | completely |

1. How completely were you able to actively survey or search the game environment using vision?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | completely |

1. How well could you identify sounds?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely |

1. How well could you localize sounds?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely |

1. How well could you actively survey or search the environment using touch?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely |

1. How compelling was your sense of motion and exploration?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Very compelling |

1. How closely were you able to examine objects in the game?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Very closely |

1. How well could you examine game objects from multiple viewpoints?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Extensively |

1. How well could you move or manipulate objects?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Extensively |

1. To what degree did you feel confused or disoriented when you finished?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 |  | 6 | 7 |
| Not at all |  |  |  |  |  |  | Significant |

1. How involved were you in the experience?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely involved |

1. How distracting was the controller?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely distracting |

1. How much delay did you experience between your actions and your virtual actions?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Long delay |

1. How quickly did you adjust to the experience?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Less than one minute |

1. How proficient in moving and interacting within the game did you feel by the end of playing?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Very proficient |

1. How much did the visual display quality interfere or distract you?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Interfered greatly |

1. How much did the controller interfere with playing the game?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Interfered greatly |

1. How well could you concentrate on game play rather than on the controller?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely |

1. Were you so involved in the game that you lost track?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all |  |  |  |  |  | Completely |

**Measure 2: Measure of empathy**

Participants will be asked to sign up for volunteering shifts at the Peace House through the Kitchen campus program at Augsburg University.

The question will be orally presented, such as

*“Thank you for participating for my experiment, before you leave. Would you like to have the opportunity to sign up for volunteering shifts at the homeless shelter provided by Augsburg Kitchen Campus”*

Their answers will only be taken as data, they won’t have to commit to the offer.

**Measure 3: Physiological measure of heartbeat**

Participants will have their heartbeat measured before and after they go through the simulation.

**Example**

**A screenshot of a cell phone

Description generated with very high confidenceDa**

**Appendix D**

**Subject Consent Form**

Immersion of Augmented Virtual Reality and Its Effect on Empathy

IRB # 2018-06-04

You are invited to participate in a research study on immersion in virtual reality and how it affects empathy. You were selected as a possible subject because you meet the requirement of the participant pool at Augsburg University. Please read this form and ask any questions you may have before agreeing to participate in the study.

This study is being conducted by Alexis Delgado, as part of my research project in PSY495 Clinical Research and Lab at Augsburg University. My advisor is Stacy Freiheit, Ph. D. L.P., an Associate professor in the Psychology department.

**Background information:**

The aim of the study is to examine how effective empathy is transferred into someone based on whether they’re presented a virtual simulation, or a 2-Dimensional piece of media.

**Procedures**

If you agree to be in this study, you will be placed in either two groups. One will experience a simulation, and the second will be shown a video. Both pieces of content relate to homelessness.

* Both conditions will have their heartbeat measured before and after their experience.
* One condition will be placed in a 7 minute long and will be completely seated.
* The other condition will be shown of a video that is also 7 minutes long
* After each experience, each condition will be given a questionnaire that will ask for a subjective judgement regarding their experience of immersion.
* The total amount of time for participating is 20 minutes.

**Monetary compensation:**

Subject will receive credit as compensation for participating in the study. There will be no monetary compensation rewarded for this study.

**Risks and benefits of participating in the study:**

**Benefits:** The indirect benefit of participating in the study is increased understanding about the research process of psychology. This study may also contribute to our understanding about the impact of virtual reality technology on empathy. A direct benefit of completing the study is a 1 research credit if you’re in the participant pool.

**Risks:** Although unlikely to occur, Virtual Reality has been reported to cause instances of motion sickness, general discomfort, headache, stomach awareness, nausea, vomiting pallor, sweating, fatigue, drowsiness, disorientation and apathy.

**Confidentiality:**

The records of this study will be kept confidential, unless required by law. All data will be assessible to the researcher and Dr. Freiheit. The results will be disseminated in the final paper and presented to the students in PSY 945 Clinical Research and lab. The results may also be presented at Zyzzogeton at Augsburg University. In any form of dissemination, I will not include any information that will make it possible to identify you.

**Voluntary Nature of the Study:**

Your decision about whether or not to participate in this study will not affect your current or future relations with Augsburg University, the researcher. If you decide to participate, you are free to skip questions in the interview or withdraw at any time without affecting those relationships. Due to the nature of the content and the study, if you feel that you should discontinue the simulation, you’re free to do so anytime during the experiment.

**Contacts or Questions:**

You can ask any questions before the experiment, or if you have any concerns thereafter, you may contact me, Alexis Delgado at 612-222-0860 or [delgadoa@augsburg.edu](mailto:delgadoa@augsburg.edu). You may also contact my advisor, Stacy Freihiet Ph. D., L.P., at [freiheit@augsburg.edu](mailto:freiheit@augsburg.edu) or 612-333-1200. If you’d like to know more about your rights as a participant or have any concerns/issues during the process, please Contact [IRB@augsburg.edu](mailto:IRB@augsburg.edu). You will be given a copy of this form to keep.

**Statement of consent:**

I have read the above information or have had it read to me. I have received answers to questions asked. I consent to participate in the study.

Subject Printed Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Subject Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_

Investigator Printed Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Investigator Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_

**Appendix E: Recruitment posting**

**Credit: 1 credit for 25 min. of participation**

**Restrictions: There are no restriction for this listing**

**Experiment status**: Recruiting participants­-

**Description:** If you agree to be in this study, you will shown media relating to homelessness. There are two group, one will be placed inside simulation replicating homelessness. And the second group will be presented a 2D video interview of a real person being interviewed.

**Time commitment: 20 minutes**

**Possible Risks Associated with Participation:**Although unlikely to occur, Virtual Reality has been reported to cause instances of motion sickness, general discomfort, headache, stomach awareness, nausea, vomiting pallor, sweating, fatigue, drowsiness, disorientation and apathy.

**Possible Benefits Associated with Participation:**The indirect benefit of participating in the study is increased understanding about the research process of psychology. This study may also contribute to our understanding about the impact of virtual reality technology on empathy. A direct benefit of completing the study is a 1 research credit if you’re in the participant pool.

**Experimenter: Alexis Delgado, Delgadoa@augsburg.edu**

**Advisor: Stacy Freiheit, freiheit@augsburg.edu**

**Location: Third Floor of Hagsfor Center, room 363**

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