

# VR to Comprehend a War or Conflict Situation

## Protocol and Implementation

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VR War Render [1]

# Research Goals

We'd like to investigate whether experiencing conflict scenarios in VR vs 2D video leads to greater empathy and understanding for different perspectives.

To do so, we will be evaluating how VR vs 2D presentation impacts emotional responses and perspective-taking in conflict situations by utilising a range of quantitative and qualitative measurements, namely self-report surveys and heart rate.

Our null hypothesis ( $H_0$ ) is "*Testers will not have stronger emotional responses when experiencing a war scenario in a 3D VR video compared to a 2D video.*"

## Measurements/Observations

More specifically, the following Measurements/Observations will be taken:

- Emotional state before and after each scenario (via questionnaires)
- Empathy levels after each scenario (via questionnaires)
- Perspective-taking after each scenario (via questionnaires)
- Immersion/engagement levels (via questionnaires)
- Physiological response (heart rate)
- Preferences and comparative experiences between VR and 2D (final questionnaire)
- Qualitative feedback on impact and experiences (open-ended questions)

## Script

**Greeting:** "Thanks for participating in our study! Today you'll be experiencing scenarios related to armed conflict presented in both 2D video and virtual reality. Our goal is to understand how different presentation methods affect empathy and understanding for others in such situations. Please remember that you can stop the experiment at any time if you ever feel uncomfortable."

**Informed Consent:** "Before we begin, we need your written consent to gather and analyse information regarding your emotional state via questionnaires, as well as information regarding your physical state via a heart rate monitor. All information gathered will remain anonymous and can never be linked back to you."

[Hand participant iPad to fill in Participant Consent Form]

**Pre-Experiment Measurements (Task Prompt 1):** "First, we'll take a baseline measurement of your heart rate. Please sit comfortably and relax for the next two minutes."

*[Measure baseline heart rate]*

**(Task Prompt 2):** "Now, please fill out this pre-experiment questionnaire."

**(Action 1):** *[Have participant complete pre-experiment questionnaire]*

**Experiment Task Instructions:** "You'll now experience two scenarios – one will be in 2D video format, and the other in VR. We will be measuring your heart rate throughout the experiment. After each scenario, you'll fill out a short questionnaire about your experience."

**(Action 2):** *[Show Scenario 1: City War Scene (randomly assign 2D or VR format)]*

**(Task Prompt 3):** "Please fill out this questionnaire about the scenario you just experienced."

**(Action 3):** *[Have participant complete post-condition questionnaire]*

**(Action 4):** *[Show Scenario 2: City War Scene (other format)]*

**(Task Prompt 4):** "Please fill out this questionnaire about the second scenario you just experienced."

**(Action 5):** *[Have participant complete post-condition questionnaire]*

**(Task Prompt 5):** "Thank you for watching those two scenarios. The experiment is now complete. Please fill out this final questionnaire about your overall experience."

**(Action 6):** *[Have participant complete post-experiment questionnaire]*

"Do you have any questions or feedback about the experiment or its goals?"

## When to Administer Questionnaires:

1. Pre-experiment questionnaire - before any scenarios
2. Post-condition questionnaire - immediately after each scenario (2D and VR)
3. Post-experiment questionnaire - after both scenarios are complete

## Data Collection and Analysis:

- Collect questionnaire responses (pre, post-condition x2, post-experiment)
- Record continuous heart rate data throughout experiment
- Analyse emotional state, empathy, and perspective-taking measures using paired t-tests to compare pre vs post and 2D vs VR conditions
- Conduct thematic analysis on open-ended responses
- Compare immersion/engagement ratings between 2D and VR using t-tests
- Analyse overall impact and reflection measures from final questionnaire using descriptive statistics

## References

- [1] Road to VR, "Front Defense VR Review – Room-scale War Will Bring You to Your Knees," [roadtovr.com](https://www.roadtovr.com/front-defense-vr-review-htc-vive/), 2017. [Online]. Available: <https://www.roadtovr.com/front-defense-vr-review-htc-vive/> [Accessed: Sep. 29, 2024]

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## PARTICIPANT INFORMATION SHEET

Project title: VR to Comprehend a War or Conflict Situation

Name of Principal Investigator (PI): Dr. Danielle Lottridge

Name of Co-investigator (Co-Inv): Dr. Gerald Weber

Name of Student Researcher(s): Dan Chae, Daniel Eir, Vinayak Joshi, Troy Murdoch, Jason Perng, Jeremy Ting, Ben Zhou

### Researcher introduction

We are Group 2 and we are students in the University of Auckland Computer Science / Software Engineering course "Advanced Topics in Human Computer Interaction", completing a Software Engineering degree.

### Project description and invitation

Our research goal is to investigate whether VR can help people empathize with each other by showing different perspectives. As someone who is familiar with VR technology, we would like to invite you to participate in the research we will be undertaking.

Your participation is entirely voluntary and it is at your discretion whether or not you would like to take part.

### Project Procedures

A questionnaire and physical readings are the methods of data collection. The expected time commitment from you will be 30 minutes, and the interview may be carried out on University of Auckland campus. As part of this interview, you will be asked to perform the following tasks:

- Provide written consent for data collection

- Undergo a baseline heart rate
- Complete a pre-experiment questionnaire
- Experience two scenarios related to military conflict:
  - One presented in a 2D video format
  - One presented in virtual reality (VR)
- Complete two post-scenario questionnaires (one after each scenario)
- Fill out a final post-experiment questionnaire about your overall experience

### **Data storage/retention/destruction/future use**

Storage: We will store the interview, task data and questionnaire data on password-protected computers and we will store hardcopy data in a secure locked cabinet.

Retention: Because this is coursework research data, it only needs to be kept for the duration of the course, which is until November 1 2024.

Future use: Collected data will be used for the purpose of my assigned course project. Summaries of data will be included in course reports.

Confidentiality: will use coding schemes to keep participants' identities confidential, and will analyse study data separate from any identifying personal information.

### **Right to Withdraw from Participation**

You are free to withdraw from the session at any time without giving reason.

### **CONTACT DETAILS AND APPROVAL WORDING**

Researcher Name and contact details	Supervisor name and contact details	Head of School name and contact details
Dan Chae dcha762@aucklanduni.ac.nz	Dr. Danielle Lottridge d.lottridge@auckland.ac.nz	Dr. Giovanni Russello g.russello@auckland.ac.nz
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Jeremy Ting ctin678@aucklanduni.ac.nz		

Ben Zhou bzho257@aucklanduni.ac.nz		
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For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 extn. 83711. Email: [ro-ethics@auckland.ac.nz](mailto:ro-ethics@auckland.ac.nz)

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON 17-Jul-2019 FOR 3 YEARS REFERENCE NUMBER 023373

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19/09/2024

### CONSENT FORM

**This form will be kept until November 1 2024.**

Project title: VR to Comprehend a War or Conflict Situation

Name of Principal Investigator (PI): Dr. Danielle Lottridge

Name of Co-investigator (Co-Inv): Dr. Gerald Weber

Name of Student Researcher(s): Dan Chae, Daniel Eir, Vinayak Joshi, Troy Murdoch, Jason Perng, Jeremy Ting, Ben Zhou

I have read the Participant Information Sheet, have understood the nature of the research and why I have been selected. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I agree to take part in this research.
- I understand that I am free to stop the interview at any time, and to withdraw any data traceable to me up to two weeks following the interview.
- I understand that any personal data recorded during this interview will be kept confidential by the researcher and destroyed at the end of this research project.
- I understand that any such data will be kept securely and separate from the Consent form.
- I understand that I can request to receive a summary of findings from the researchers using the contact information in the Participant Information Sheet.

Name \_\_\_\_\_ Signature \_\_\_\_\_

Date \_\_\_\_\_

## **Control Questionnaire (Pre-experiment):**

***NOTE: For those questions which have duplicates (to ensure intra-rater reliability and validity,) we will also shuffle in our Google Form Questionnaire to ensure that we do not inadvertently reduce our questionnaire's ecological validity. Note that the labels will NOT be given in the Google Form – they are here for you, the marker, to have an easier time reading them.***

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### Demographics

1. Age:
  2. Gender:
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Have you ever participated in a VR experiment before?

- Yes/No
- 

On a scale of 1-7, how comfortable are you with technology (computers, phones, tablets, VR)?

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Typical Emotional State (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

4. I am normally a calm person.
  5. I am normally an anxious person.
  6. I am normally in a positive mood.
  7. I am normally an empathetic person.
- 

Current Emotional State (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

5. I feel anxious at the moment.
  - 5a. At this moment, I'm feeling uneasy or worried
  - 5b. I am feeling peaceful
6. I am experiencing a sense of calm right now
  - 6a. My mood at present can be described as upbeat
  - 6b. I am feeling cheerful
7. I feel empathetic towards others today.

7a. Right now I am understanding of others' feelings

7b. I am feeling sympathetic

8. My current mood is positive

8a. I'm experiencing a sense of anger right now

8b. I am feeling afraid

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Views on Conflict (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

9. Armed conflicts can be justified under certain circumstances.

9a. In some situations, the use of military force can be warranted.

9b. There are times when armed intervention is a necessary course of action.

10. I believe most conflicts could be resolved peacefully.

10a. Most disagreements between groups or nations could be settled without resorting to violence.

10b. Peaceful negotiations are usually sufficient to resolve the majority of conflicts.

11. It's easy for me to understand different sides in a conflict.

11a. I find it straightforward to see multiple perspectives in a dispute.

11b. When there's a conflict, I can easily grasp the viewpoints of different parties involved.

12. Media portrayal of conflicts is generally balanced and fair.

12a. News coverage of conflicts typically presents a balanced view of all sides.

12b. The media generally provides fair and unbiased reporting on disputes and wars.

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## **Post-Condition Questionnaire (after each 2D/VR presentation):**

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How long did the scenario feel?

- Rather short
  - Neither short nor long
  - Long
  - Very long
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Emotional Response (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

1. The scenario made me feel anxious.
    - 1a. The scenario left me feeling distressed or down.
    - 1b. Watching the scenario induced a sense of nervousness in me.
  2. I felt emotionally moved by what I witnessed.
    - 2a. The scenarios I saw were emotionally powerful.
    - 2b. The events I witnessed evoked a strong emotional reaction.
  3. The experience made me feel angry.
    - 3a. I felt a sense of frustration or irritation while watching.
    - 3b. I experienced feelings of resentment during the scenario.
  4. I felt helpless while viewing the scenario.
    - 4a. The events I observed stirred strong emotions in me.
    - 4b. I felt a lack of control while observing the situation unfold.
  5. The experience made me feel sad.
    - 5a. I experienced a sense of unease or worry during the scenario.
    - 5b. The experience left me feeling depressed.
- 

Empathy Measures (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

6. I could understand the feelings of the people in the attacked city.
  - 6a. I was able to relate to the emotions of those affected in the city under attack.
  - 6b. The sentiments of the individuals in the besieged city were clear to me.
7. I felt sympathy for the victims of the attack.
  - 7a. I experienced compassion towards those impacted by the assault.

- 7b. I felt bad for the victims of the attack
8. I tried to imagine how I would feel in their situation.
- 8a. I made an effort to put myself in the shoes of those affected.
- 8b. I attempted to envision my own emotional response if I were in their position.
9. What I saw did not impact me much.
- 9a. The scenario left me relatively unaffected emotionally.
- 9b. I remained largely unmoved by the events I witnessed.
10. I felt as though the victims of this scenario deserved what they got.
- 10a. In my view, the individuals affected in this situation brought it upon themselves.
- 10b. I believed the victims' circumstances were a result of their own actions.
- 

**Perspective-Taking (7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]):**

11. I could understand why the attacking side might have taken such actions.
- 11a. I was able to comprehend the motivations behind the attackers' decisions.
- 11b. The rationale for the aggressors' actions became somewhat clear to me.
12. I found myself considering the conflict from multiple perspectives.
- 12a. I was able to view the situation from various angles.
- 12b. The scenario prompted me to think about different sides of the conflict.
13. The scenario helped me see the complexity of the conflict.
- 13a. I gained a deeper understanding of the intricacies involved in the situation.
- 13b. The experience revealed the multifaceted nature of the conflict to me.
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**Immersion/Engagement (7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]):**

14. I felt like I was really there in the scenario.
- 14a. I experienced a strong sense of presence within the depicted environment.
- 14b. The scenario made me feel as though I was physically present in the situation.
15. The experience felt realistic to me.
- 15a. The scenario appeared authentic and true-to-life.
- 15b. I found the depiction to be a credible representation of reality.
16. I was fully engaged throughout the experience.

16a. The scenario held my complete attention from start to finish.

16b. I remained thoroughly absorbed in the experience for its entire duration.

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Open-ended:

17. What aspect of the scenario impacted you the most and why?

## **Post-Experiment Questionnaire:**

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Which format did you prefer?

- 2D, VR, No Preference
- 

Comparative Experience (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

1. The VR experience was more impactful than the 2D video.
    - 1a. I found the VR scenario to be more emotionally affecting than the 2D version.
    - 1b. The immersive nature of VR made the experience more powerful compared to 2D.
  2. I felt more empathy during the VR scenario compared to the 2D video.
    - 2a. The VR experience connected me more deeply with the situation than the 2D video.
    - 2b. I found it easier to relate to the people involved when using VR versus watching 2D.
  3. The VR video allowed me to process the information more clearly than the 2D video.
    - 3a. I felt I had a better understanding of the scenario details in VR compared to 2D.
    - 3b. The VR experience provided a clearer context for the events than the 2D video.
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Overall Impact (**7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]**):

4. This experience has changed how I view armed conflicts.
    - 4a. My perspective on armed conflicts has shifted as a result of this experience.
    - 4b. This experience has altered my understanding of warfare and its impacts.
  5. I feel more empathetic towards victims of war after this experience.
    - 5a. I now have a stronger sense of compassion for those affected by war.
    - 5b. This experience has increased my ability to empathise with war victims.
  6. The scenarios made the reality of war feel more personal to me.
    - 6a. The scenarios made the consequences of war feel more tangible and real to me.
    - 6b. I now feel a more personal connection to the realities of armed conflict.
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**Reflection (7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]):**

7. I'm now more likely to seek multiple perspectives on conflicts.
  - 7a. I'm now more inclined to consider various viewpoints in conflict situations.
  - 7b. I am now more likely to explore different sides of a dispute before forming an opinion.
  8. This experience will influence how I think about international conflicts in the future.
  - 8a. My thoughts on international conflicts have been shaped by the experience
  - 8b. This experience will impact how I interpret global disputes going forward.
  9. I feel motivated to learn more about ongoing global conflicts.
  - 9a. I now have a greater desire to educate myself about current conflicts
  - 9b. This has sparked my interest in learning more about ongoing global disputes & tensions
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**Ethics and Media (7-point Likert scale from Strongly Disagree [1] to Strongly Agree [7]):**

10. Using VR/2D to depict war scenarios is ethically acceptable for educational purposes.
  11. Media should use more immersive technologies to report on conflicts.
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Open-ended - Describe further for each:

12. How has this experience affected your understanding of armed conflicts?
13. What differences did you notice between the VR and 2D presentations in terms of their emotional impact?
14. Do you have any additional thoughts or feelings about the experience you'd like to share?
15. Did you experience any discomfort during the VR experience?