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Master's Thesis  
Academic Year 2022

Virtual Journalist: Measuring and Inducing  
Cultural Empathy by Visualizing Empathic  
Perspectives



Keio University  
Graduate School of Media Design  
Ana Simona Alipass Fernandez

A Master's Thesis  
submitted to Keio University Graduate School of Media Design  
in partial fulfillment of the requirements for the degree of  
Master of Media Design

Ana Simona Alipass Fernandez

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Abstract of Master's Thesis of Academic Year 2022

# Virtual Journalist: Measuring and Inducing Cultural Empathy by Visualizing Empathic Perspectives

Category: Design

## Summary

Cultural empathy refers to the ability to feel for individuals from different cultural backgrounds, and this has been explored across various disciplines. Yet, there has been very little work regarding how immersive experiences can be leveraged to deliver a journalistic experience that promotes cultural empathy. To that end, we propose Virtual Journalist, a virtual reality (VR) system that places the user in the shoes of a journalist while consuming a 360-degree video documentary and providing a camera to capture moments related to cultural empathy. It also combines cognitive and affective components of empathy by mapping physiological data to the photographs of the experience, specifically electrodermal activity (EDA) and heart rate variability (HRV). We found that Virtual Journalist has a different effect depending on the cultural background of the user. Moreover, empathic accuracy could be achieved by combining the photographs taken by the user and the physiological data.

## Keywords:

design thinking, creative society, cultural empathy, immersive journalism, education

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# Chapter 1

## Introduction

### 1.1. Goal

This Study investigates cultural empathy differences and aims to translate cultural empathy levels through a virtual reality (VR) system. Compared to other cultural empathic related research, this research does not solely focus on the reasons behind culturally different empathic reactions. On the one hand, it extends present research by embedding cultural empathy research into an immersive environment. On the other hand, it attempts to overcome cultural empathy gaps through empathic communication. There has been a constant increase of waking hours with information since the beginning of the 21st century. Societies "consume almost 90x more information in terms of bits today than we did in 1940 and 4x more than we did less than twenty years ago" [1]. Sensational Overload due to the increased competition between platforms shapes the way we perceive the situations of other cultures around the world. The umbrella term *Compassion Fatigue* is the initial inspiration for this research. Compassion Fatigue is the phenomena of indifference and dehumanization as a reaction to people that suffer from a different situation than our own [2]. Therefore, it is crucial to develop empathetic inducing systems further, as they can promote social awareness and social action in times of new technological realities. While there has been abundant research regarding the enhancement of empathy levels through immersive technology, there are limitations regarding the cultural implications of empathy in immersive environments. Consequently, this research aims to explore the cultural dimension of empathy or Cultural Empathy. It attempts to answer the question of how Virtual Reality is able to determine and communicate Cultural Empathy Levels across cultures. Cultural Empathy defines the ability to feel and understand the situation of a person from another culture [3]. Researchers cannot agree to which extend affec-

tive or cognitive components influence cultural empathy [4]. This research taps into this controversy developing an empathy inducing system for Virtual Reality: the Virtual Journalist. This system aims to transform the user into a Journalist while consuming cultural content in Virtual Reality. It provokes to reveal a users perspective by capturing its most empathic moments in forms of photographs.

## **1.2. Thesis Structure**

While the first part of this thesis concentrates on empathic concepts and measurement tools, the second part is dedicated to the development and characteristics of the Virtual Journalist. It guides the user through the concept design and a pilot study that pave the ground for the final studies. The final studies intend to test the Virtual Journalist as a tool for Cultural Empathy on three levels: measurement, amplification and communication. After the discussion of the results, the thesis finalizes with conclusions including limitations of the system and future work opportunities.

# Chapter 2

## Literature Review

### 2.1. From Compassion to Empathy

The ability of perspective taking enabled humans to conclude about other human beliefs, values and thoughts [5]. While Compassion and Empathy may be perceived as synonyms to each other they represent two different cognitive phenomena. While Compassion is regarded to the felling for another person, Empathy is regarded to feeling with another person [5].

Empathy related research has been abundant across different academic fields such as Psychology, Medicine, Social Studies and Human Computer Interaction (HCI), however the definition of empathy remains somehow inconsistent. In an attempt to review and summarize existing empathy definitions, Cuff et al. [6] drew overlapping conclusions from different academic interpretations. The following list exhibits the conclusions from this research, drawn from different Empathy definitions:

Summary of Academic Empathy Definitions:

1. Empathy and related concepts such as Sympathy contain functional differences.
2. Cognitive and affective components can be found in Empathy.
3. The target and the observer carry similar but not identical emotions.
4. Stimuli such as imagination are able to induce Empathy.
5. Empathy distinguishes between the self and the other, even if a degree of merging is necessary.

6. Empathy is influenced by trait and state.
7. Behavioural consequences are not a component of empathy itself.
8. Empathy is automatic but also determined by top-down controlled processes.

Dispositional Empathy is regarded as the permanent and stable empathy traits of each individual covering both, affective and cognitive components [7]. However, research revealed that empathetic competences are able to increase [8]. Although the definition of Empathy varies across researchers, two aspects of Empathy appear consistent along most research: *Cognitive* and *Affective Empathy*. Therefore, for the purpose of this research, we will focus on the categories of affective and cognitive components of Cultural Empathy.

### 2.1.1 Affective and Cognitive Empathy

While Cognitive Empathy emphasizes the ability to recognize and identify another persons feelings, Affective Empathy represents one's emotional response to another person's feeling [4]. Early and recent research conclude that despite their different concepts, Cognitive and Affective Empathy are interrelated with each other [6, 9]. The relationship between the two concepts consists in their interactive nature. For instance, researchers argue that cognitive processes are subject to manipulation and hence, these processes are able to influence Affective Empathy [6, 10].

One of the most commonly used tools to measure individual empathy levels is the Interpersonal Reactivity Index from Davis (IRI) [11]. The IRI is a widely used self-report questionnaire to determine empathy levels, based on four different components. As seen in Table 2.1 each of this component represents a different aspect of empathy. Each sub-scale is measured by seven different items included in the questionnaire.

In various cases, Cognitive Empathy and Perspective Taking are regarded as the same construct. However, research reveals additional aspects to consider in order to define processes that influence Cognitive Empathy [6]. Interpreting facial expression, personal emotional experience or the projection of one's own feelings upon another individual's feelings are further elements to consider [6, 12, 13]. The

|                    |  |
|--------------------|--|
| Empathic Concern   | Assesses "other-oriented" feelings of sympathy and concern for unfortunate others.   |
| Perspective Taking | The tendency to spontaneously adopt the psychological point of view of others.   |
| Personal Distress  | Measures "self-oriented" feelings of personal anxiety and unease in tense interpersonal settings.  |
| Fantasy Scale      | Taps respondents' tendencies to transpose themselves imaginatively into the feelings and actions of fictitious characters in books, movies, and plays. |

Table 2.1 The four sub-scales of the IRI (Davis, 1983).

effects of Cognitive Empathy are commonly measured by determining to which extend one individual can infer accurately the emotions of another individual [14]. This construct is referred to as Empathetic Accuracy, which will be covered in the next section.

### 2.1.2 Empathetic Accuracy

There has been debate among researchers whether or not emotional congruence is relevant for empathy [6]. The extend of congruence is influenced by personality, experiences and hence, perspective of each individual. Thus, it is critical to consider the accuracy of emotion and thought recognition between individuals, also known as *Empathic Accuracy* [15]. Empathic Accuracy is a term that describes the extend to which an individual can inference the emotional state of another individual [16]. It represents the most commonly examined index of Cognitive Empathy [14]. Researchers argue along two different streams when considering cultural influence on Empathic Accuracy: Cultural Equivalence and Cultural Advantage Models. Cultural Equivalence states that individuals do not differ in Empathic Accuracy when rating the emotional display from a member of another culture [17]. On the contrary, the Cultural Advantage Model argues that the inference of emotional display within members of the same culture is more accurate [18]. There exists abundant evidence in empirical research sup-



porting both theories [17]. However, the content of these studies lacks real life application scenarios. The ability of immersive environments mimicking real life scenarios could support more accurate findings in relation to Empathic Accuracy in cultural research.

An aspect to consider when measuring Empathic Accuracy is the validity of self reports [19]. In the case of empathetic accuracy experiments, one member is required to self assess his/her own feelings and thoughts in a specific context. Thus, another individual requires to infer these thoughts and feelings. The extent to which that description matches with the description of the target person is called Empathic Accuracy. Consequently, the accuracy can only be determined by the validity of the empathic self reports. The measurement of physiological responses can support the biased implications of self reports and hence, increase validity [17]. Research also reveals a positive correlation between Empathic Accuracy and Personality Predictors such as the dimension of perspective taking included in the Interpersonal Reactivity Index [20].

## 2.2. Cultural Empathy

### 2.2.1 Importance to bridge Cultural Gaps

Cultural Empathy defines the ability to feel and understand the situation of a person from another culture [3]. Initially the term *Cultural Empathy* would be used in the field of counseling, where researchers investigate how therapists are able to utilize information about clients culture as a repository for therapeutic sessions. The ability to utilize that repository for cross-cultural communication is regarded as *Cultural Empathy* [4]. In recent years, due to an increased globalized world, Cultural Empathy became prominent in further research fields such as Management and Education [21,22]. Although researchers agree upon the fact that internalization and expression of empathy varies across cultures, opinions differ whether to emphasize cognitive or affective processes within Cultural Empathy [4]. This fact aligns with the research of Cuff et al. [6] that consider the Affective and Cognitive concepts one of the most discussed aspects of Empathy. As seen in in the previous chapter, researchers proceed to study both, cognitive

and affective components of empathy. Hence, this study will aim to cover both components in regard to Cultural Empathy.

### 2.2.2 Evaluating Cultural Empathy

Due to lack of empirical evidence, the relationship between cultural traits of psychological and social behavior and empathy has not been profoundly examined. Comparing collectivist and individualistic societies and their trait empathy levels resulted in contradictory conclusions. In the case of children and adolescents, two different studies explore differences when comparing Western and Asian Countries [23,24]. In the study of Trommsdorf et al. [23], the empathic response and prosocial behavior of preschool children from two different South-East-Asians countries on the one hand and two Western countries on the other hand were examined. Compared to Children from Western countries, children from South-East-Asian countries show greater personal distress and less pro-social behaviour. This aligns with the research of W. Chung et al. [24] that examined the role of culture on Affective Empathy in adolescents from East-Asian and Western countries. Similarly, while Personal Distress is more prominent in East-Asian participants, Empathic Concern dominates in Western participants based on the Interpersonal Reactivity Index (IRI) from Davis [11,24]. Besides the investigation of empathy among Western and East Asian descendants, Chung et al. [24] found evidence of Affective Empathy levels among bi-cultural individuals. Bicultural individuals scores could be found between Western and East Asian individuals. Nevertheless in the relationship between Affective Empathy and social emotional health results they tend to align with the scores of Western individuals. Atkins [14] extends these findings by focusing on Cultural Differences between emotional and cognitive empathy by measuring empathic responses to physical and social pain. The study demonstrated that while British people show greater emotional empathy compared to Chinese, Chinese participants show greater empathic accuracy.

While most research focuses on comparing two cultures at a time, Chopik et al. [7] attempt to fill this gap by broadening the sample and studying cultural differences of trait empathy across 63 countries. It sought to establish a relationship between countries psychological characteristics and prosociality on the one hand and empathy levels on the other hand. People from 63 countries completed two

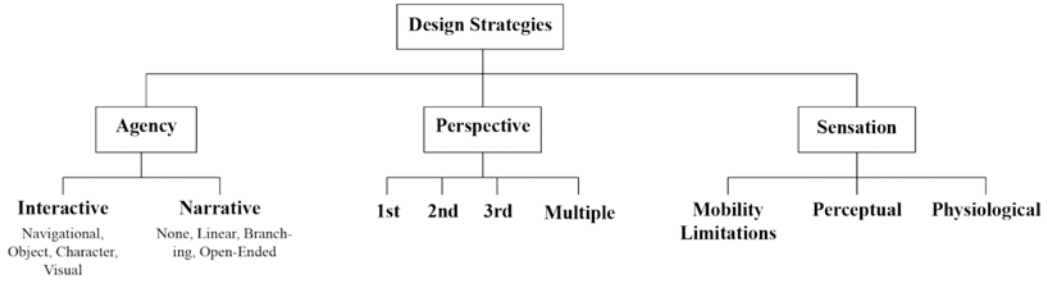
sub-scales from the Interpersonal Reactivity Index [25]. The two sub-scales the IRI are Empathic Concern and Perspective Taking, which cover affective components and cognitive components of an individuals empathy respectively. The results of the IRI were regressed by country-level individualism/collectivism scores. Individualism/Collectivism represent one of the dimensions developed by Hofstede and Minkov [26] which aim to depict country-level differences of social values. Individualistic countries favour the individual as an independent entity whereas collectivist countries prefer interdependence and community over individuality. The results of the study showed that Collectivist Countries showed greater Empathic Concern. Other dimensions of Hofstede were not associated with Empathic Concern, Perspective Taking or Total Empathy scores. These findings contradict previous studies that associate Empathic Concern predominantly with Western countries [14, 24].

## 2.3. Virtual Reality as Empathy Tool

### 2.3.1 Empathy Design Strategies

There have been different approaches to design experiences that aim to measure and induce empathy through HCI. Researchers found three fundamental aspects when designing empathy tools: the extend in which the tool enables agency as well as the perspective and the sensations of the tool [27]. These three components are summarized based on different Virtual Reality experiences that aimed to induce empathy. As seen in Figure 2.1 it offers a design strategy framework for empathy tools.

The works presented in this chapter aim to present empathy inducing tools in HCI research [28, 29]. It will present Virtual Reality as a baseline technology for empathy related investigation and creation. The following examples serve to identify viable applications of Virtual Reality for the exploration of cultural empathy.



(Source: Pratte (2021) [27])

Figure 2.1 Design Strategy Framework: Empathy Tools

### 2.3.2 Agency and Perspective

The research about cultural empathy characteristics in immersive environments has been limited to date. However, previous research has been able to explore empathy in Virtual and Mixed Reality in the context of culture. For instance, Kors et al. [28] designed a multi-sensory game that enables the user to experience a refugees journey through a first-person perspective. In cooperation with Amnesty International, this study aimed to explore the opportunity of interactive media to shift social attitudes and induce social action. By combining real elements through physical feedback and virtual elements through a head-mounted display, this experience represents a Mixed Reality experience. The physical elements serve as an extension of the boundaries of the virtual world. Tactile, vestibule, kinaesthesia and scent elements are used in order to design this multisensory experience. Two aspects of this project are essential to consider for the purpose of the present research: agency and perspective.

Regarding agency, different works within empathy research apply various forms of agency in order to effectuate specific responses [27]. The type of agency for a user to experience is dependent on the extend of freedom during the experience. According to Pratte et al. [27], the influence on agency is based on two different methods: Interaction agency and narrative agency. The case of "A breathtaking journey" reveals the effect of empathetic responses through the design of both - Interaction and Narrative agency [28]. The intentional limitations of navigational and narrative agency as seen in Fig 2.2 serve as an ideal ground for the embodi-

ment of the user. Consequently, the user achieved empathy for a specific moment of embodiment. In contrary to "A breathtaking journey" [28], this research aims to investigate the extend of perspective and empathy levels of different cultures in an immersive environment. Instead of a specific moment of embodiment, it aims to detect cultural specific moments of empathy. Consequently, it is essential to provide natural navigational agency and freedom of narrative agency in order to observe behavioural and perceptive cultural differences among the users. However, the nature of 360° Videos does not allow the user to move freely inside the environment. Freedom of movement is limited to the movement of the head.



(Source: Kors (2016) [28])

Figure 2.2 "A Breathtaking Journey" - An Empathy-Arousing Mixed-Reality Game.

According to Pratte et al. [27] immersive technologies such as Virtual Reality are the most common technology in order to facilitate perspective. Beyond Virtual Reality, other projects created perspective through tangible devices in form of camera glasses or embodied games through kinect applications [30,31]. However, compared to other technological devices, Virtual Reality offers the opportunity to directly channel the perspective within a distant target context. In the case

of this research the context is Culture. Consequently, the content requires to be flexible in order to adapt to each users cultural background and experience. The idea to induce cultural empathy through embodiment is critical at this stage due to the lack of knowledge of how to visualize cultural empathy in immersive environments. Yet, it is a considerable aspect for future work in the exploration of cultural empathy in immersive technology.

An element to consider within the application of perspective is the type of perspective the user is experiencing. The ability of a First-Person perspective through immersive technologies results most commonly in positive feedback from the user regarding the level of immersion [27]. However, researchers found the issue that the experiences ignore the fact of empathy towards another person, as it applies the entire incorporation of the protagonist. This aspect is critical for the exploration of cultural empathy, where the main aspect consists in understanding and feeling *with* another person. Therefore, it will be advantageous to consider applying another type of perspective in this research. This perspective should enable the user to understand and feel *with* a person from another cultural background. It allows to align with the nature of cognitive empathy, which indicates one's ability to perceive and recognize another person's feelings [11].

### 2.3.3 Sensations

The work Aitamurto et al. [29] enables the user to experience gender inequality in the workplace by switching between two different first-person perspectives within the same 360° Video experience(Fig 2.3). Through this intended visual agency in a linear narrative, the authors of the work aimed to provoke a stronger sense of presence and agency through Cinematic Virtual Reality (CVR). The immersion in CVR is facilitated by a controlled space separated from the real world. Factors contributing to immersion are inclusion, extension and illusion of reality [32].

In a "A breathtaking journey" [28] the users sensations were influenced through limitations of movement as well as scent. In order to understand the effects of Alzheimer Kroma and Lachman [33] build a Mixed Reality Experience. This experience embodies the notion of Alzheimer patients by distorting the vision of the user. In this case the limitation of vision create a specific sensation to provoke empathy. Another opportunity to employ sensations is by involving physiological



(Source: Aitamurto (2018) [29])

Figure 2.3 Agency through Perspective-Change in CVR

feedback. Frey et al. [34] visualize and share biofeedback through a wearable device. The wearable device represents the users breathing rate and enables to influence the breathing rate of another user. This mechanism of shared reactions leads to empathy in the form of understanding the feelings of another person. In order to aid the lack of emotional awareness in text messages Hassib et al. [35] visualize the heart rate within text message applications. With the real-time physiological data at a users disposal, it creates the ability to adapt reactions and behaviour accordingly.

## 2.4. Summary

There have been various attempts across research to measure both components of empathy: Affective and Cognitive. Both of these components are interrelated with each other and are relevant to examine as two parts constructing empathy as a whole [6]. Hence, this study will incorporate these aspects in order to create a most accurate representation of an individuals cultural empathy. Further, to date research focused mainly on measuring the extend of each individuals cul-

tural empathy by targeting another individual. However, the opportunities to translate empathy measurement within a Virtual Environment into the context of culture have been limited. We believe that a system of Cultural Empathy in an Immersive Environment will be an opportunity for further exploration of empathy measurement and cultural empathy improvement. As mentioned above, studies explored empathy through immersive technologies. Virtual Reality has proven to be a successful tool when exploring empathy [27]. Cinematic Virtual Reality has been adopted to generate the sense of presence and agency. Therefore this research will adopt Cinematic Virtual Reality to explore Cultural Empathy. Further, this section explored the importance of agency, perspective and sensation when developing empathic systems. As seen in a Breathtaking Journey, this experience attempts to place the user into "another persons shoes" to induce empathy [28]. However, this research attempts to find cultural differences in empathetic responses towards other cultures without placing them in their shoes, which requires a natural form of distance in order to understand and feel with the other person. Natural navigational agency and freedom of narrative through CVR serve as a ground to explore Cultural Empathy. In this project the user follows a linear narrative, where it has no influence or choice over the narrative of the experience [27]. However, the user is able to take something from the experience in form of photographs. These photographs serve as a cultural perspective and choice over the experienced content.



# Chapter 3

## Concept Design

### 3.1. Inspiration

The concept of Compassion Fatigue represents the inspirational source of this research. It reflects the initial point of motivation supporting the research in question. On the one hand it clarifies the adaptation of Compassion Fatigue in the journalistic field. On the other hand it reveals the two core issues this project will attempt to overcome. Subsequently, this section will cover the background of the concept and significance for this research.

Initially Compassion Fatigue was used in the medical sector. It describes the psychological and physical health consequences from emotional exhaustion among social workers [36]. In this context Compassion Fatigue is a form of burn out which translates into negative psychological responses due to traumatizing events [2]. One of the factors that contribute to the development of Compassion Fatigue is the capacity of empathy and engagement. Further research argues, that individuals with higher empathy levels are more vulnerable to Compassion Fatigue than those with lower empathy levels [36]. Research investigating the concept of Compassion Fatigue in the context of culture argues that calculated news coverage motivated by sensationalism promotes Compassion Fatigue [37]. It describes how contemporary journalistic work is able to exhaust the public sensitivity towards crisis. Further research supports that argument by investigating how individuals react to emotional engagement offered by media [38]. In this study, 554 individuals are interviewed regarding their reaction towards pictures of suffering on television news. While half of the respondents (51%) said that they often or quite often do react to the pictures, 23% of participants expressed their indifference. This indifference was brought back to two motivational factors. Firstly, the application

of the „Us-Them“ perspective, regarding to the affected people as distant to ones own culture and applying a concept of dehumanization. Secondly, sensationalism and commercialism of media reporting results in numb and immune reactions of respondents. These two factors are crucial revelations that contribute to the purpose of this research, as it takes compassion to the level of cultural biases. Results also revealed gendered compassion, where women generally react greater than men and show greater identification with the victims.

While the study of Höijer (2004) contributes to investigate the primary reasons of compassion fatigue in media, this research will focus on the the motivations from a cultural perspective. Cultural aspects include on the one hand how people can overcome the emotional distance towards other cultures and on the other hand how to bridge this distance through Cultural Communication.

## **3.2. Measurement Tools**

### **3.2.1 Empathy in Virtual Reality**

According to research, Virtual Reality offers an opportunity for researchers to overcome previous challenges in empathy measurement, such as inconsistency based on observational methods or biased responses in self reports [39]. It allows to imitate real environments and control these environments in Virtual Reality. A large number of studies in different research contexts gathered data in respect to empathetic responses. However, the methodologies vary. To unify data collecting procedures that measure empathetic responses in Virtual Reality, recent research offered a framework for first person data collection of empathy related research in Virtual Reality [39]. This framework can be applied to both - Cognitive and Emotional Empathy. Besides self-reports, momentary self-reports and physiological data, it suggests real-time recording of the Virtual Reality feed as well as recording of the player during the experience. This allows to analyze body language and visual attention patterns. It is further recommended to expose players to the experience at least twice, as multiple exposures lead to higher empathy levels.

### 3.2.2 Interpersonal Reactivity Index (Davis, 1980)

As seen in the work of Atkins (2014), it is essential to assess dispositional empathy in order to interpret cultural empathy accurately. To determine dispositional empathy of each participant, this study will include the widely used Interpersonal Reactivity Index (IRI) from Davis [11]. The four sub-scales Empathic Concern, Perspective Taking, Personal Distress and Fantasy Scale serve to draw a picture of each participants individual empathy traits. By including the results of this questionnaire, the results of the experiment can be compared with the dispositional empathy traits of each participant.

Further research has shown that from the previous mentioned sub-scales Empathic Concern (EC) and Perspective Taking (PT) can be applied to assess Affective and Cognitive Components respectively [11, 25, 40]. There exist divergent opinions among researchers if Perspective Taking alone is sufficient in order to grasp Cognitive Empathy [6]. According to different authors additional aspects such as emotional memory, projection and facial expressions may be taken into consideration when assessing Cognitive Empathy [6].

### 3.2.3 Physiological Data

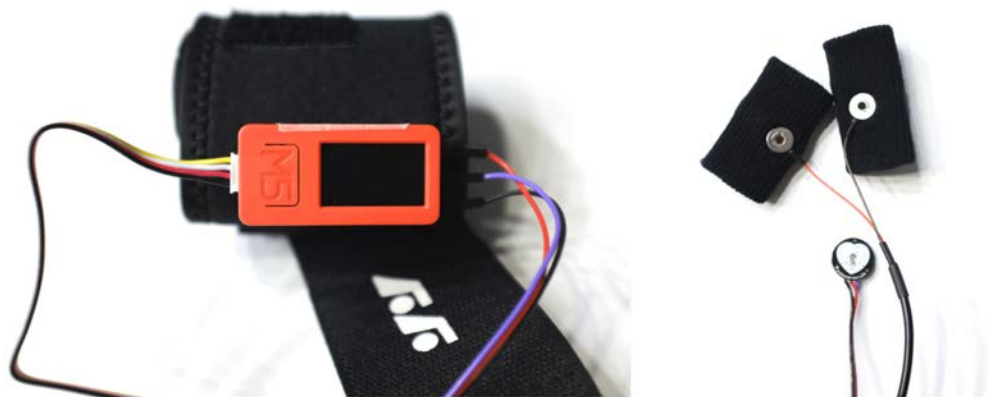


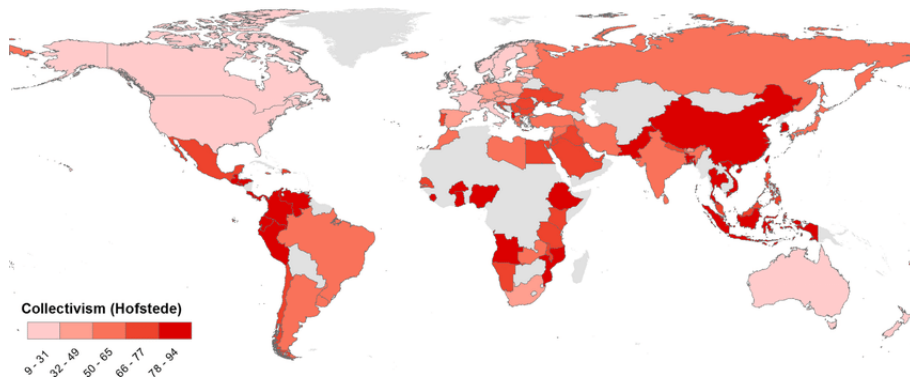
Figure 3.1 Sensing Device

The measurement of empathy through Physiological Data has been adopted adequately by previous research [14]. However, there have been difficulties while assigning empathetic responses to physiological data. Galvanic Skin Response is able to show general trends and specific moments of arousal that do not disclose information about a specific emotion. Notwithstanding, research found evidence that heart rate is a viable method to distinguish between empathic concern and personal distress, two components of affective empathy [14]. While an elevated heart rate indicates personal distress, a decelerated heart rate displays empathic concern. As seen in Fig. 3.1 this study will use a wearable device that records the user's electrodermal activity (EDA) and blood volume pulse (BVP) during the interaction. The physiological data serves to gain an overview of emotional development during the experience through EDA as well as mapping the moments of recorded photographs to emotional responses through BVP. Through this method we expect to collect valuable insights towards the emotional evolution and empathic momenta during the experience.

### 3.2.4 Hofstede's Dimensions

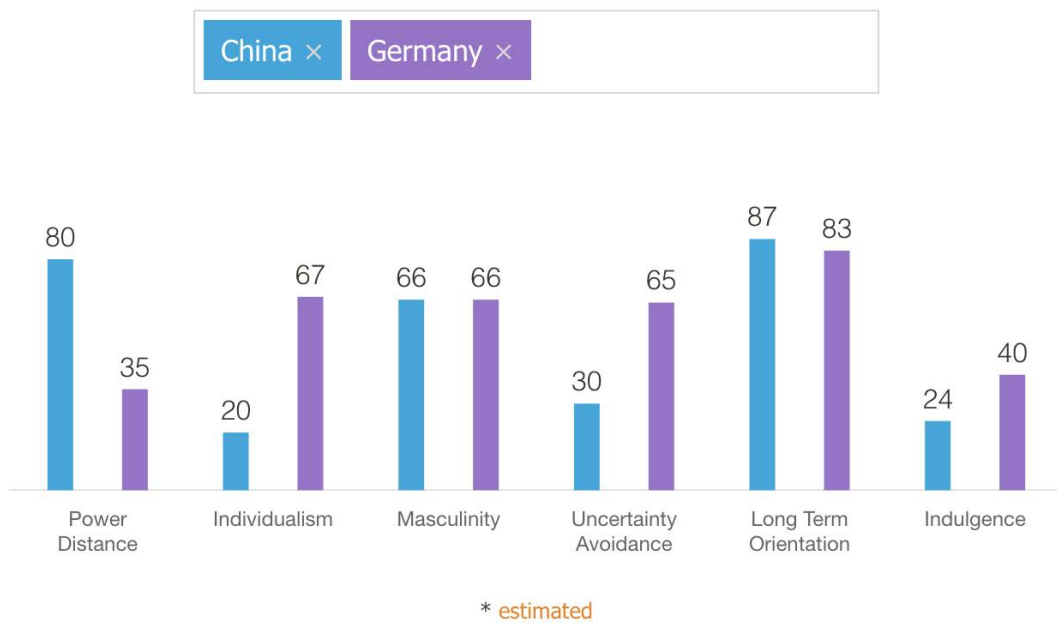
The work of Hofstede and Minkov (2010) proposed a framework of five cultural dimensions that aim to analyze cultural differences in social values [26]. These dimensions reveal cultural traits that allow researchers to compare countries on different levels. Individualism versus Collectivism represents one of these dimensions and describes the "degree to which people in a society are integrated into groups" [41].

People from collectivist countries tend to see the self integrated in the community and prioritize the maintenance of relationships and social harmony. People from individualistic countries tend to prioritize autonomy and independence. As seen in Fig. 3.7, collectivism is mainly prevalent in Asian and South American countries, while individualism is prevalent in North-America and European countries. In cross-cultural research, these two extremes tend to be compared with each other, as they represent different interpretations of the self in the social structure. This tool will be used to assess the gap between the cultures participating in this research. Consequently, this research aims to close the empathetic gap between these cultures respectively.



(Source: Hofstede (2010) [26])

Figure 3.2 Collectivism Map



(Source: Hofstede Insights, 2021 [42])

Figure 3.3 Country Comparison Tool

For the purpose of this study, we will measure the gap between each dyad by using the Online Country Comparison Tool from Hofstede Insights [42]. This tool allows to draw a general picture of the different cultural dimensions of the indicated countries. Fig. 3.3 offers an example of the comparison between China and Germany.

### 3.3. Pilot Study

A pilot study was conducted in order to test the assumption that cultural empathy differs while consuming 360° Video documentaries. Further, it serves to receive feedback regarding the narrative of the content and flow of the experience. It consisted in the exploration of three different scenarios in Virtual Reality by three participants from different cultural backgrounds. Each scenario consists in a different 360° Video documentary about a culture.

#### 3.3.1 Hardware and Content

To create the immersive environment in Virtual Reality we used the Oculus Meta Quest developed by Meta Platforms <sup>1</sup>. This headset offers high quality applications for 360° video content. The application used in this study is the CVR platform *with.in*<sup>2</sup>. From this wide range of high quality 360° documentary videos, we selected three different videos representing different cultures and different narratives. Through this selection we would expect to receive feedback from the participants about the influence of narrative and culture on empathic responses. Fig 3.4 represents the different videos employed in this pre-study.

#### 3.3.2 Participants

One highschool student and two graduate students ranging from 18 to 25 years old ( $M = 1.78$ ,  $SD = 3.09$ ) participated in this study. The participants were selected based on their cultural background and the classification by Hofstede

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1 <https://www.meta.com/jp/en/quest/products/quest-2/>

2 <https://www.with.in/>



Figure 3.4 Selected Videos Pilot Study 1

and Minkov [42] between Individualist versus Collectivist cultures. This allows diversity and hence, culturally balanced results. While the first participant is from Caucasian ethnicity, the second and third participants were from African-American and Chinese ethnicity respectively. No compensation was offered for this study.

### 3.3.3 Measures

*EDA Sensing Device* For purposes of this experiment, we used a wristband equipped with Electro Dermal Activity (EDA) and Blood Volume Pulse (BVP) sensors that would measure using the fingers of the user, the most convenient place to measure EDA.

*Demographic Questionnaire* This questionnaire would serve to obtain basic background information of the participants such as gender, age and for the context of this research cultural experience.

*Emotional Wheel* This tool from psychologist Robert Plutchik [43] enables to detect the core emotions of each participant in a specific moment. It allows to grasp the emotional development of each participant after consuming the content

used in this study. The wheel

*Interpersonal Reactivity Index* This index by Davis [11] would be used to determine dispositional empathy traits of each participants prior to the experience. The dispositional empathy of each participant would serve to gather primary data for comparison as well as allow to interpret empathic responses during the experience.

### 3.3.4 Procedure



Figure 3.5 Pilot Study Set-Up

Prior to this study all participants were asked to answer the Demographic Questionnaire as well as the Interpersonal Reactivity Index. After, the subjects were familiarized with the content. Three sessions of approximately ten minutes were conducted after each other, the order of the sessions correspond to the order of one to three seen in Fig 3.4. In each session the subjects wear the Oculus Quest 2 Headset and watch the respective 360° documentary video. The physiological data was recorded during each session. Participants chose their non dominant hand to wear the sensing device to avoid noise in the data. After each session the participants were to report their emotional state via the emotional wheel and given a five minute break where they were recommended to relax and balance their



emotional state. The study would end with an interview about the comparison of the experiences.

### 3.3.5 Results

*Physiological Data Comparison* The physiological data revealed that the content and narrative of the videos is essential to alter the extend of emotional feedback. While the first video about North Korea contains a rather objective narrative without an individual protagonist, the second and third video represent stories of individuals. This influenced the emotional response of the users while watching the videos. As seen in Fig 3.5 the users showed less arousal fluctuation and arousal peaks than in the other two videos. Hence, we assume that the empathic response is depended on the narrative style of an individual. This aligns with emotional self report (Fig 3.6) and interview responses after the experiences. Participants reported less engagement with the culture in the first video.

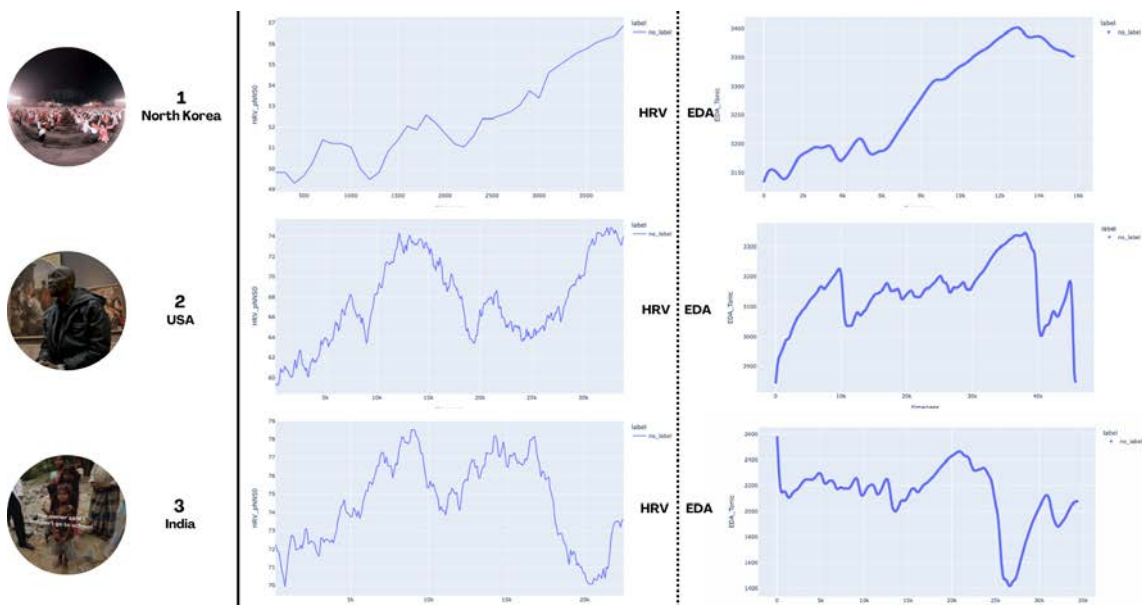


Figure 3.6 Pilot Study 1: User 3 Physiological Data

#### *Emotional Self Report Comparison*

As seen in Fig 3.6 participants develop increasingly negative emotions with each

video. While all participants reported happiness before commencing with the experience, no one reports happiness after watching all the videos. On the one hand it supports the assumption that the chosen videos trigger specific emotional responses. On the other hand it aligns with the results of the physiological data that reports increasing arousal with the second and third video.

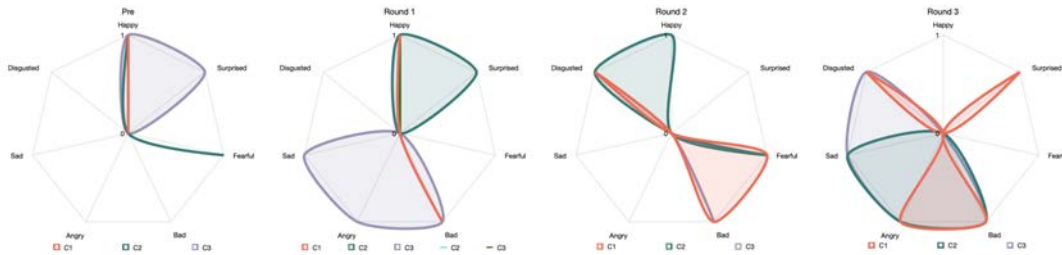


Figure 3.7 Pilot Study 1: Emotional Self Report Comparison

*Content Feedback* Participants agreed upon two points in respect to the influence of the content on their self reported empathy levels. Firstly, the narrative structure of the content is essential in order to allow comparison. While the first video merely presented the countries environment, the second and third video presented an individual story. Participants agreed that the second and third video were emotionally more engaging than the first video regardless of the depicted culture. The choice of words for the second and third video were "personal" and "relatable". Secondly, feedback included a crucial aspect for the validity of the Virtual Journalist. Participants concluded that the difficulty to develop empathy for the protagonist is linked to the disability to engage with the experience. Reportedly, a form of interaction would enhance the ability to bundle empathy towards the protagonists.

#### *Interpersonal Reactivity Index*

The results of the Index support the assumption that people with higher scores of dispositional empathy reveal higher levels of arousal. However, the adaptation of the index does not disclose sufficient information about cultural empathy. Exposing the user to the questionnaire a second time after consuming all the videos could have supported the idea that the videos of this cultural context influence

empathy levels. Furthermore, the Index does merely disclose dispositional empathy. To analyze content specific responses, the questionnaire should be adapted to measure empathy in relation to each content. Further, in order to discover cultural characteristics about empathic responses in a cultural context, the analysis requires a representative sample size.

## 3.4. Virtual Journalist

### 3.4.1 Final Concept Design

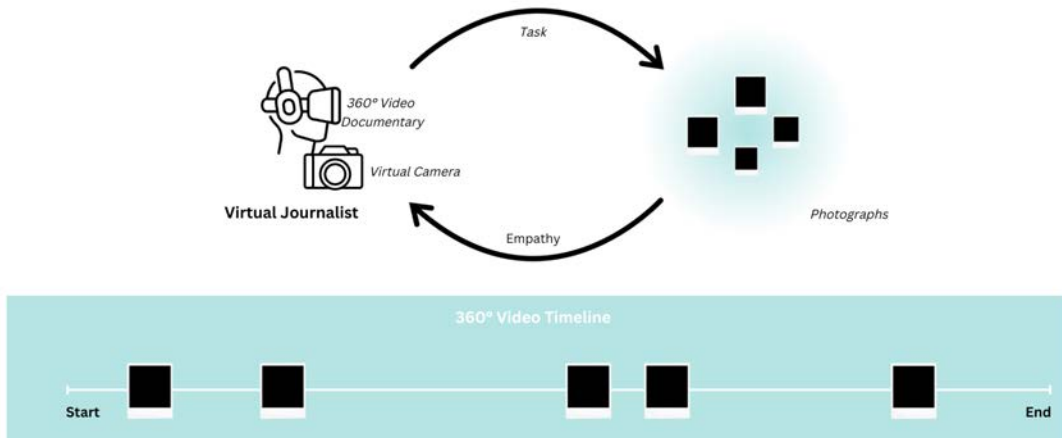


Figure 3.8 Virtual Journalist Concept

Based on the feedback of the participants and insights of the pilot study we developed the *Virtual Journalist*, a system that aims to measure and induce Cultural Empathy within an immersive and interactive environment. Previous research found evidence, that carrying out simulated physical acts can induce empathy or influence emotional states [39]. With reference to empathy both components, affective and cognitive, will be addressed. As previous research proved that perspective represents a crucial component of cognitive empathy, this system aims to visualize the users perspective through photographs [27]. The user will be

able to take photographs while watching a 360° Documentary in Virtual Reality. These photographs will be mapped to an emotional response visualized through physiological data, which serves to include affective components in the moments of perspective. The self reports, physiological data and recorded perspective will serve to measure empathic responses. Further, the ability to visualize the perspective and transform the user from a mere viewer to a participant leads to the assumption that the Virtual Journalist is able to induce cultural empathy. In this sense, the Virtual Journalist serves as an empathy inducing and measuring system at the same time. In conclusion, while the dependent variable is the dispositional empathy of a user, the independent variable is the Virtual Journalist. This research will analyze how the Virtual Journalist is able to alter empathic responses and hence, the dispositional empathy of a user.

### 3.4.2 Components of the Virtual Journalist

#### Virtual Reality

This research will use Virtual Reality as a tool to approximate and visualize empathetic responses accurately. This aligns with conclusions of Pratte et al. [27] in which Virtual Reality represents a popular tool for empathy measurement as it provides the opportunity of perspective, a characteristic component of cognitive empathy. In contrary to the embodiment of a First-Person, this research emphasizes the empathy towards a Third-Person within a distant cultural context. Cinematic Virtual Reality will allow the user to be fully immersed and at the same time obtain a Second-Person perspective. Research found evidence that the limitation of vision in a Mixed Reality Experience creates sensations that induce empathy [33]. However, this system will employ Virtual Reality. This is due to the nature of the context. To build an experience in a cultural context, targeting people from different cultural backgrounds requires to introduce the user to different cultural contexts. Depending on the location as well as the cultural experience of the user, this context has to be created from scratch which results challenging to apply to a Mixed Reality application. This argument contributes to the decision of Virtual Reality as a tool for this experience.

### **Affective and Cognitive Components**

Affective and cognitive empathy will be explored based on an empathy designed Virtual Reality system. This system enables the user to visualize empathic responses while consuming cultural content and hence, allows comparative analysis of perspective. These empathic responses represent the cognitive process and will be further assessed based on affective components. It aims to overcome previous issues of Empathic Accuracy measurement procedures. Through the immersive environment and physiological data, this research expects to draw conclusions closer to real life scenarios. Users are able to integrate themselves into a cultural content while exposing their empathic responses visually. This exposure will result in the form of photographs that represent the users most empathetic moments. Further, the integration of self reports and physiological data will provide validity to explore cognitive and affective components. The physiological data will assist the empathetic moments from the self-report to achieve most accurate interpretation of the results. Second, the user will be able to share his own empathic response with a second user in order to learn from another cultures empathy levels. Studies found evidence that empathic competences are able to increase [8]. The study expects to increase the users empathic competences in a cultural context through this system. The form of sensation created in this experience is the lens the user has to operate while watching the 360 degree video. Therefore, for the purpose of exploring cognitive components of cultural empathy, this research will employ Virtual Reality as a resource and tool to employ the cognitive component of cultural empathy.

### **Content**

As this research attempts to enhance and measure Cultural Empathy in immersive environments, it will establish culture through cultural content. To address both, culture and immersion, this research will employ 360° Video documentaries that represent a cultural context. The study of Atkins (2014) compared empathic responses to physical and social pain of British and Chinese descendants. The responses were measured upon video consumption of content that portrays physical and social pain. Results indicated an in-group advantage for British participants due to the content choice [14]. The main protagonists in the video were from

Caucasian descendant which may have resulted in greater identification for the British participants. To avoid a biased response, this study will aim to adapt the content according to the participants cultural background. To aim for objectivity, the chosen content in question will represent protagonists from a culture distant to each participants own culture. For instance, if the participant is from Caucasian descent, the content will portray Asian or African culture to expose the participant to another cultures situation. Pratte et al. [27] suggest to emphasise similarities between users and the reference population in order to evoke affective empathy. However, this study aims to tap into the differences between cultures towards a third reference culture. Therefore it is essential to confront the users from different cultural groups with a culture distant from their own to explore the extend and type of references of each user. In order to design a comparative with-in study the confronted cultures have to respond to a third culture, distant to both participating cultures.

### **Interaction**

While the cultural context will be granted through the content, the empathy levels will be visualized and induced through an interaction. The interaction is the ability to take photos within the experience based on an indicated task. The task consists in the temporary transformation of the user into a Journalist to allow narrative and agency as suggested by Pratte et al. [27]. The journalist is asked to capture the most impactful moments of the experience, while these should be interpreted as equivalent to the moments of strongest empathy towards the target culture. Hence, the photographs will visualize self reported empathetic moments of the user through their own photography. These photographs can later be compared to the physiological data and further self reports to allow a deeper analysis of empathic responses during the experience. It also serves to identify different cultural perspectives on the same cultural content by comparing the photographs from users that belong to different cultures. Lastly, the physiological data can support the empathic accuracy of self reported empathic moments.

## Prototyping

*The platform* the prototype was build using the game developing software Unity Technologies<sup>3</sup>. This software allows to build Virtual Environments for the Oculus Meta Quest 2 and the Oculus Integration Module. The employed videos were build in a Skybox mapped to a respective Render Texture and played through a Videoplayer. The Camera Component was created through an asset in the Unity asset store library named "Next-gen Camera" developed by Vertex Studio<sup>4</sup>. Through the OVRPlayer Controller prefab of the Oculus Integration we mapped the camera to the right-hand device of the Headset. The viewfinder of the camera was mapped to a render texture. This render texture inherited a default that was modified to the dimensions of the video. This allowed the viewfinder to display the same render texture as the environment and hence, the perspective of where the camera was pointing at. Unity does not provide the opportunity to command the qualitative screenshot capture in Virtual Reality. Due to this inhibition we decided to use the integrated screen capture option of the Oculus Meta Quest 2 headset. By pressing two joystick buttons seen in Fig 3.9, the user is able to take a screen capture which will be saved in the library of the headset.

*The content* is based on journalistic 360° videos that narrate the stories of people and their situations. As seen in the Pilot Study, users inherit stronger empathic reactions and references to content with clear protagonists. Journalistic 360° videos can be widely found online distributed across multiple platforms. However, most of the platforms use the Videoplayer from Youtube. This platform transforms every uploaded 360° video into their own Equi-angular cubemap format. When downloaded, Unity Technologies does not offer a respective cubemap to display the video accurately. Due to this format incompatibility, the amount of open source videos available decreased drastically. To measure the physiological data the Virtual Journalist is going to adopt the physiological data recording used in the Pilot Study.

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<sup>3</sup> <https://unity.com/>

<sup>4</sup> <https://assetstore.unity.com/packages/3d/props/electronics/next-gen-camera-37365>



Figure 3.9 Photo Capture: Joystick Buttons



# Chapter 4

## Proof of Concept

### 4.1. Goal

The current study was conducted to address the limitations of previous research to induce and communicate cultural empathy in order to overcome cultural empathy gaps. The following three aims will be considered: 1) examine to which extend cultural empathy differences can be determined in an immersive environment, 2) test the opportunities of the Virtual Journalist to induce Cultural Empathy and 3) investigate if cultural empathy gaps can be overcome through cross-cultural exchange of empathetic responses. While the first study addresses the first two points in question, the second study will focus on the last point.

### 4.2. Participants

Eighteen participants, one researcher and seventeen graduate students, ranging from 22 to 38 years old ( $M = 27.61$ ,  $SD = 4.36$ ) participated in this study. 50% of participants identified as male, 44.4% as female and 5.4% prefer not to disclose their gender. Same as in the Pilot Study, participants were selected based on their cultural background and the classification by Hofstede and Minkov [42] to represent empathy levels among people with distant cultural background. Each session included a cross-cultural dyad where participant A will belong to a culture distant from participant B and vice versa. We recruited nine East Asian subjects, six Caucasian subjects, one African American subject and two bi-cultural subjects. The bi-cultural subjects identify both as Caucasian/ East Asian. However, both were primarily raised and educated in Western cultures. Therefore we assigned nine participant to the collectivist culture group and nine participants to

the individualist culture group to enable analytical balance. For the simplification of this study we will call these groups Collective subjects and Individualist subjects respectively. All of the subjects have experience working or studying abroad. One participant speaks one language, two participants two languages and 10 participants speak three languages. The two remaining participants speak four and five languages respectively. While East Asians speak an average of 2.8 languages, the remaining participants speak 2.6 languages. Consequently, the two groups represent similar language abilities. The intercultural experience<sup>1</sup> of East-Asian participants ( $E = 3$ ) score slightly lower than their Caucasian and Bi-Cultural counterparts ( $E = 3.51$ ). 33.3% of participants never used Virtual Reality, 44.4% rarely use it and 22.2% sometimes use it.

### 4.3. Procedure

The study procedure will be two folded by conducting firstly a comparative with-in study and secondly a follow-up study. The first study allows to compare the baseline with the adoption of the Virtual Journalist. The follow-up study addresses each participants extension of empathic response based on a Cultural Empathy Exchange workshop. A cross-cultural dyad (Fig.4.6: U1, U2) participated in each session to represent the two different cultural perspectives on the same content. Each session was initiated by completing a demographic questionnaire that determines each participants age, gender, nationality, ethnicity as well as intercultural experience. This questionnaire was followed by the Interpersonal Reactivity Index (IRI) from Davis in order to determine each participants dispositional empathy levels [11]. Next, the participants will be acquainted with the Virtual Reality headset, the upcoming content and the study procedure.

#### Study 1

In the first study the subjects experienced two rounds of 360° videos. In the baseline round the subjects were asked to merely watch the video without any

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<sup>1</sup> Based on the number of countries resided, the number of foreign friends and the extend of traveling.



Figure 4.1 Baseline Round

further interaction (Fig 4.1). During the other round the subjects watched the video while becoming the Virtual Journalist and asked to take photos that represent their most empathetic moments (Fig. 4.2). Subjects were offered a seating or standing position to their liking. There was no limitation for the amount of photographs they could take. For counterbalancing, the rounds alternated in their order.



Figure 4.2 Photcapture at a same moment vs. at a different point in time

After each round subjects were asked to fill out an experience questionnaire that inquires about the users empathy towards the protagonist in the experience. This

allows the researchers to compare the empathic relationship to the protagonist with and without the Virtual Journalist. The questionnaire was composed of modifying the IRI from Davis [25] with the help of methods from Haegerich and Bottoms [44] as well as the Scale of Ethnocultural Empathy from Wang et al. [45]. The content of this questionnaire can be seen in Fig. 4.3.

| Nr. | Type          | Question   |
|-----|---------------|--|
| 1   | Affective     | <i>I feel empathy for the protagonist in the experience.</i>   |
| 2   | Cognitive     | <i>I can really imagine the thoughts running through the protagonist's head.</i>   |
| 3   | Affective     | <i>I can really feel what the protagonist must have been feeling in his/her situation.</i>   |
| 4   | Affective     | <i>I can experience the same feelings that the protagonist(s) experienced.</i>   |
| 5   | Cognitive     | <i>I can take the perspective of the protagonist and understand why he/she is in the situation.</i>  |
| 6   | Cognitive     | <i>I can really see myself in the protagonist's shoes.</i>   |
| 7   | Cognitive     | <i>I feel like I can easily take the perspective of the protagonist.</i>   |
| 8   | Affective     | <i>I know what it would be like to be the protagonist.</i>   |
| 9   | Ethnocultural | <i>It is easy for me to understand what it would feel like to be a person of another racial or ethnic background other than my own.</i>                  |
| 10  | Ethnocultural | <i>It is difficult for me to relate to stories in which people talk about racial or ethnic discrimination they experience in their day to day lives.</i> |
| 11  | Ethnocultural | <i>It is difficult for me to put myself in the shoes of someone who is racially and/or ethnically different from me.</i>                                 |
| 12  | Ethnocultural | <i>I know what it feels like to be the only person of a certain race or ethnicity in a group of people.</i>  |
| 13  | Ethnocultural | <i>I can relate to the frustration that some people feel about having fewer opportunities due to their racial or ethnic backgrounds.</i>                 |
| 14  | Ethnocultural | <i>I feel uncomfortable when I am around a significant number of people who are racially/ethnically different than me.</i>                               |
| 15  | Ethnocultural | <i>I don't know a lot of information about important social and political events of racial and ethnic groups other than my own.</i>                      |

Figure 4.3 Content of the Experience Questionnaire

## Follow-Up Study

In the follow-up study participants took part in a cultural empathy workshop (Fig. 4.4). From all the pictures taken in the first Study, they were asked to choose three to five pictures. While the first photograph should represent the big picture of the story, the second one should represent the main protagonist from their perspective and the third a detail that represents part of the story. Subjects were given one



Figure 4.4 Perspective Exchange Workshop

minute to decide on the pictures. After the initial selection participants were asked to exchange their photographs with each other and explain their motivations, thoughts and feelings behind each picture. One researcher would facilitate the session in order to provide a stable discussion. After the workshop, participants were asked to watch a third 360° video while using the Virtual Journalist. After the experience the subjects were asked to fill out two final questionnaires before going into the final interview. The two questionnaires in question are the experience questionnaire from Study 1 and the IRI from Davis [25] completed in the beginning of the study. This allows the researchers to compare the results to results from Study 1 and evaluate a development from before and after the two studies were held.

### 4.3.1 Experimental Set-Up

With reference to Carey et al. [39], we employed the experimental set-up as seen in Fig.4.5. In the pilot study, the wheel of emotions did not represent the ability to display the users momentary emotional responses. We decided to not include the

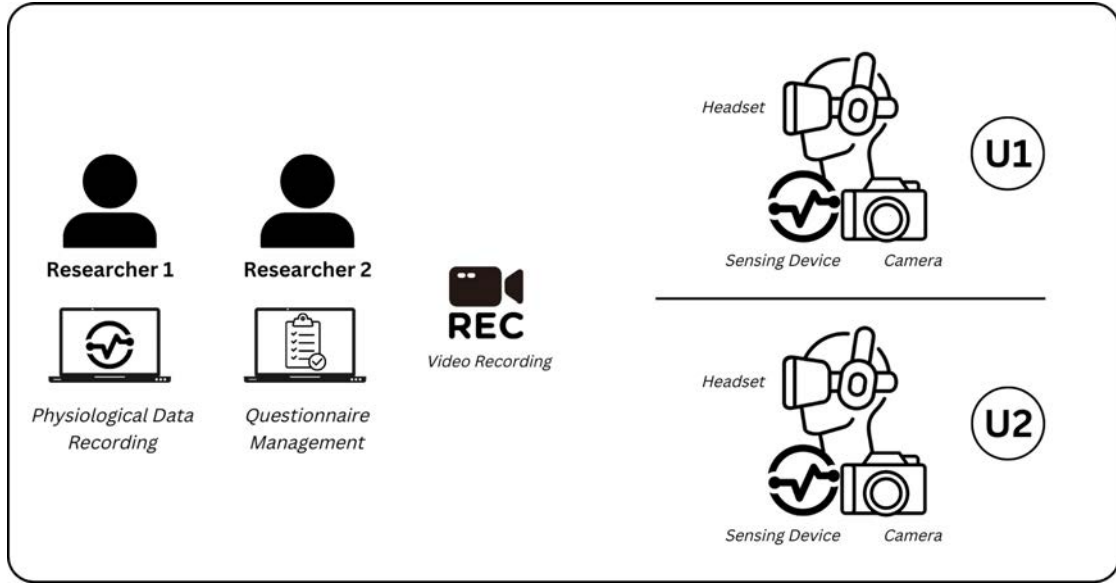


Figure 4.5 Experimental Set-Up

emotional wheel and to employ a self report questionnaire that refers to the emotional state of the user in relation to the protagonist in the experience. Further, research suggests to incorporate questions from the observer about the players identity and feelings towards the protagonist [39]. Therefore we would held interviews about the relationship between the user and the protagonists after each experience round.

### 4.3.2 Content

Similar to the pilot study, we selected three different videos, two videos for the first study and a third video for the follow-up study. The pilot study revealed deeper emotional involvement with narratives where users are able to identify with a protagonist. Consequently, this study aimed to incorporate this type of narrative across all the selected videos. To allow comparison, the selected videos represent the same cultural topic of *refugees*. Within this topic, the videos focus on the middle east. The employment of this region is based on the assumption that the cultural background of all participants has to be distant to the target culture. Fig. 4.6 represents the different videos employed in this study.



Figure 4.6 Selected Videos

## 4.4. Results

### 4.4.1 Study 1

#### Experience Questionnaire

The experience questionnaire gives information about the momentary empathic development towards the content. Conclusions are drawn upon separating the questions into affective, cognitive and ethnocultural categories and calculating the average score of both cultural groups based on these categories. From this pattern information about affective and cognitive components as well as ethnocultural adjustment can be derived.

In Fig 4.7 Round I represents the baseline and Round II represents the integration of the Virtual Journalist for the first time. In general, the East Asian group displays higher empathy levels for both, cognitive and affective components throughout the rounds. While East Asian participants develop higher scores of affective and cognitive empathy with each round, Caucasian participants demonstrate a slight increase in cognitive empathy and a decrease in affective empathy after the second round. The ethnocultural scale shows a decrease of 0.09 points for East Asian subjects and an increase of 0.08 points for Caucasian subjects.

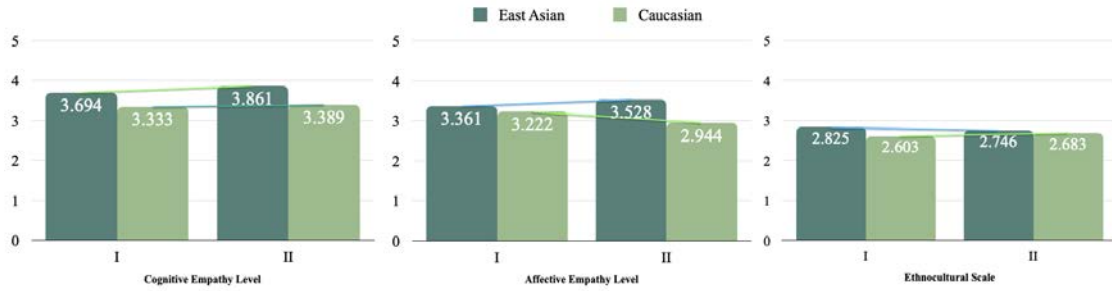


Figure 4.7 I: Baseline Session, II: Virtual Journalist.

## Photographs

While individualistic subjects took 44 photographs or 5.5 photographs per person during the experience, collectivist subjects people took 57 photographs or 1.62 photographs more than their counterparts during the experience. This implies that collective participants had the general urge to capture more empathetic moments than individualistic participants. As seen in Fig 4.8 the photographs of collectivist subjects are more scattered through the experience, while the photographs of individualistic subjects are more concentrated at specific points in time. Comparing the photography, collective subjects tend to portray details and surrounding aspects that contribute to the narrative more than their individualistic counterparts.

Furthermore, the timeline as seen in Fig 4.8 shows that both cultural groups tend to take photographs at identical moments. One of these moments portray protagonists in moments of distress to be seen in Fig 4.9. Other photographs of identical moments tend to be framed differently by both cultural groups. On the one hand, collective participants tend to capture details rather than the whole picture (4.10). On the other hand, participants of both groups capture a different angle of the same moment as seen in Fig 4.11. While especially Chinese participants capture a detail of the children's face, West- and Central European participants capture the authoritarian person (administrators) of the situation.



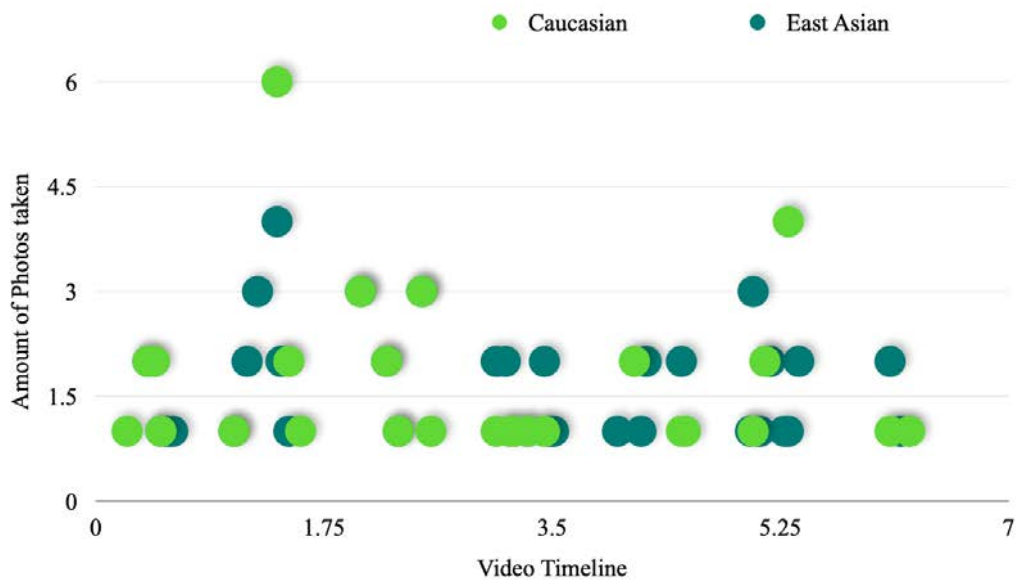


Figure 4.8 The amount of photographs taken during the experience.



Figure 4.9 Identical photographs of protagonists taken by both cultural groups.



**Caucasian**



**East Asian**

Figure 4.10 Same moment but different focus.



**Caucasian**



**East Asian**

Figure 4.11 Same moment but different angle.

## Physiological Data

The physiological data recordings assist the self reports in order to determine affective responses of the participants on the cultural content as well as the validity of the photographs as a mirror of this empathic response and hence, Empathic Accuracy. However, due to noise in the data two out of eighteen participants could not be included in this analysis. These two data sets belong two collectivist participants. Noise in the eda-data and its limitations of interpretation regarding

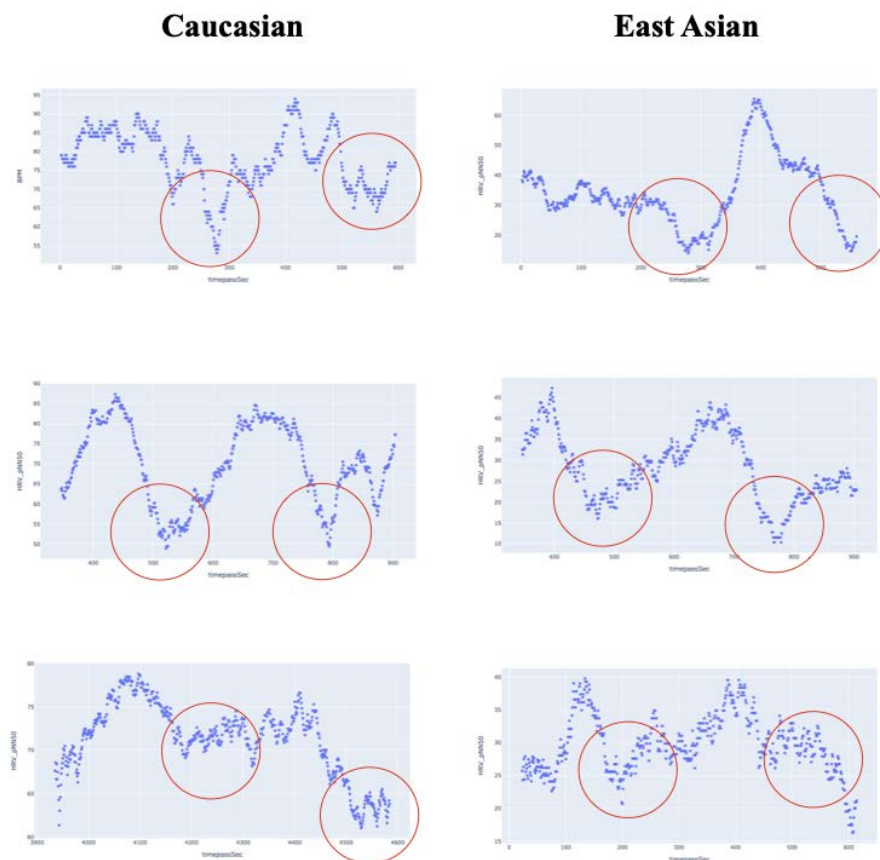


Figure 4.12 Physiological Data Comparison Baseline

empathy levels contribute to the decision to focus on Heartrate Variability (HRV) for the analysis of the physiological data. Due to the different content for each session, the comparison of the physiological data between the baseline and the

session with the Virtual Journalist is limited. Merely the data for each session on its own will deliver valuable results. The baseline round does reveal similar HRV development among both cultural groups.

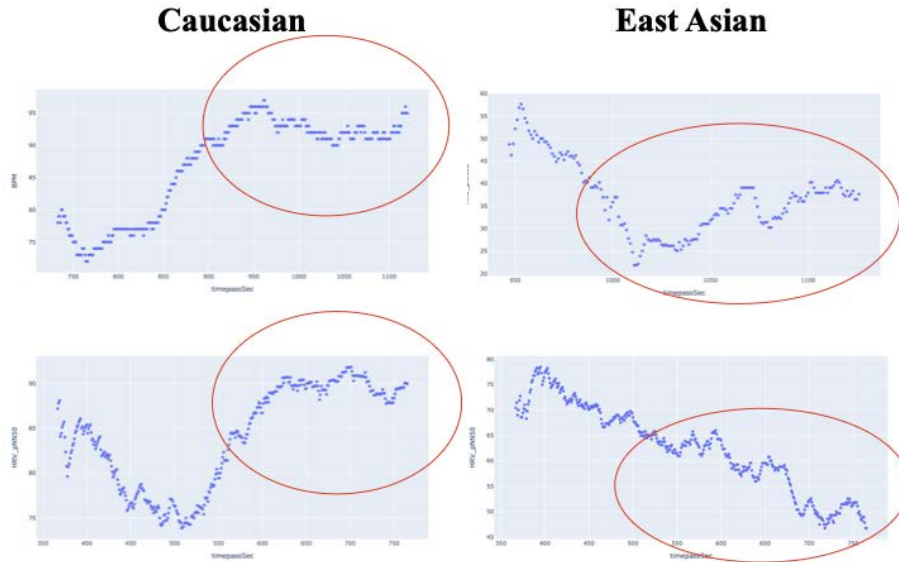


Figure 4.13 Physiological Data Comparison Virtual Journalist

As a sample from both groups, Fig. 4.12 displays the HRV for the baseline session. We can observe a general trend of two main peak phases of distress in the experience. These phases do not differ strongly between the two cultures. The session with the Virtual Journalist on the contrary, reveal less similarities among all participants. Further, we observe a stronger tendency of Collective participants to maintain longer in phases of distress compared to their Individualistic counterparts.

The session adopting the Virtual Journalist allows to analyze the physiological data in relationship to the photographs, the empathic perspective of each participant. Mapping the physiological data and the photographs on one timeline of the experience discloses some information about the relationship of these two components. In general, participants with a volatile HRV tend to take more pictures than participants without a volatile HRV. Further, as seen in Fig. 4.14 the

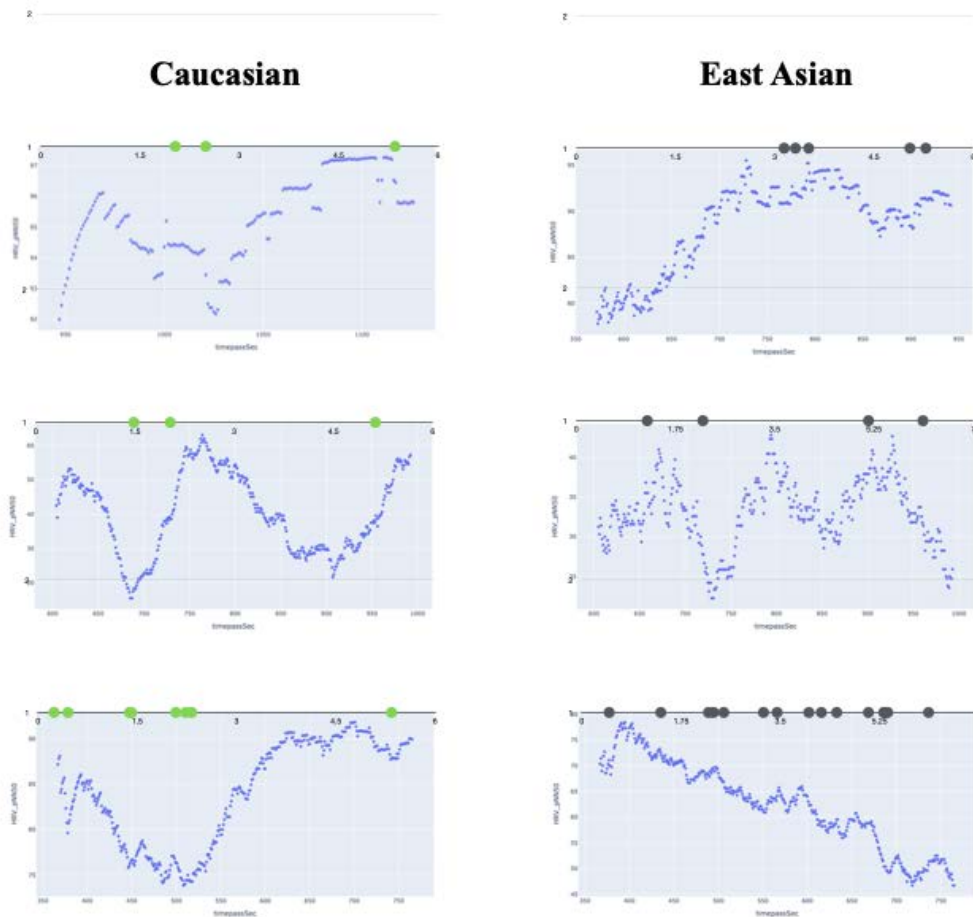


Figure 4.14 Photographs and Physiological Data

physiological data supports the moments when participants tend to capture pictures. Pictures can be predominantly found in moments of physiological distress which inhibits the fact that the data complements each other. In cases where the photography does not align with the physiological data, we may reconsider the empathic accuracy of the participant.

#### **4.4.2 Follow-Up Study**

##### **Experience Questionnaire**

As an extension to the first study, in this study Round III represents the integration of the Virtual Journalist after the Cultural Empathy workshop 4.15. Results display a similar trend to Round II for the empathy levels of the East Asian group. Both, affective and cognitive levels continue to increase after the third round. From the first to the last round, cognitive empathy levels increased by 7.52% and affective empathy levels increased by 14.87%. The Caucasians on the contrary, display fluctuation in their scores. While cognitive empathy increased after the second round, it decreased by 0.02 points after the third round. As for affective empathy scores, the scores of Caucasian subjects decreased by 0.274 points after the second round and increase again close to initial levels after the third round. The ethnocultural scale demonstrates identical results for East Asian subjects comparing the first and the third round. The score of Caucasian subjects continue to rise in the third round, raising by 4.25% from the first to the last round.

##### **Observations from the Workshop Discussion**

After a short break following the First Study, participants held a Cultural Empathy workshop. Each dyad exchanged the most empathic photographs. A general observation was the tendency of East Asian participants to infer and discuss the possible feelings of the protagonists. Meanwhile, Caucasian participants tend to rationalize the situation by describing the situation. Furthermore, compared to their Caucasian counterparts, East Asian participants would mention positive empathic moments or positive elements in moments of distress. While one East Asian subject mentions "I think that this is a good moment for them, that they are not

alone” another one mentions ”I wanted to show this picture because people are helping”. Moreover, while both cultural groups choose similar pictures for their protagonist, the big picture and detail picture tend to differ. While Caucasian subjects choose people inside the categories of big picture and detail picture, East Asian subjects choose empty scenery or materialistic details that portray the narrative.

### **Dispositional Empathy Comparison**

The results of the Interpersonal Reactivity Index before and after the studies support the hypothesis that the Virtual Journalist is to some extent empathy inducing. Not only did the scores for some empathy components increase, they also demonstrate a cross-cultural alignment between the two participating cultures after the study. The scores deliver information about the different adjustments of dispositional empathy among both cultures. From the dispositional empathy we can also derive the adjustments regarding the affective and cognitive empathy components accordingly.

*Cognitive and Affective Development* Cognitive and affective components of the dispositional empathy developed differently among both cultural groups. As seen in Fig. 4.15, cognitive and affective empathy increased among East Asian participants, while Caucasians demonstrate an increase merely on the cognitive empathy scale.

*Empathic Concern* The Empathic Concern scale demonstrates an increase among both cultures. With a 0.25 point increase, East Asians developed slightly more Empathic Concern than their Caucasian counterparts that show a 0.17 point increase.

*Perspective Taking* The Perspective Taking Scale reveals slightly different results than the Empathic Concern scale. While Caucasians report higher scores after the study, East-Asians report a minimal decrease of 0.01 points. This scale provides insights on two levels. On the one hand it represents the highest increase for Caucasian participants among all the scales. On the other hand, the scores reveal an alignment of both cultures in their scores. Before the experience, the gap between the two cultures was 0.31 points. After the experience, the gap fell to 0.04 points.



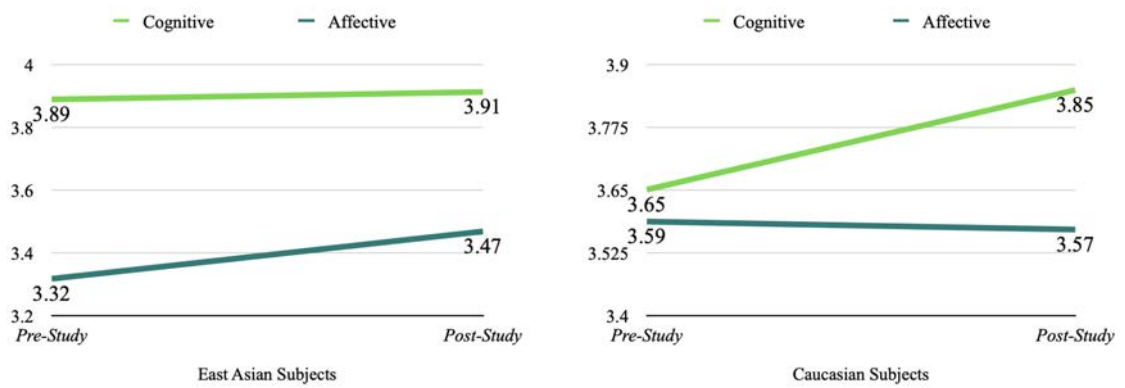


Figure 4.15 Cognitive and Affective Development

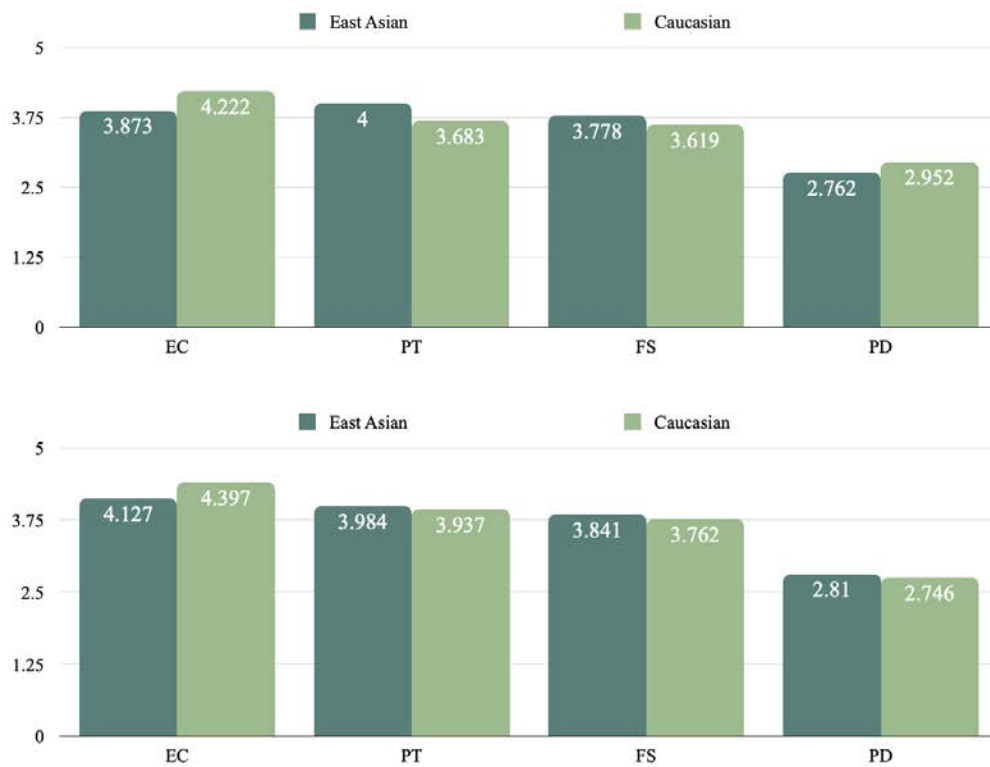


Figure 4.16 Interpersonal Reactivity Index: Before vs. After Study



*Fantasy Scale* The Fantasy Scale points towards the tendency of people to transpose themselves into the feelings of a fictitious character through imagination [25]. Both cultures report higher scores after the study. However, Caucasian participants report a slightly higher increase than their East-Asian Counterparts. Similarly to the Perspective Taking Scale, the scores show greater alignment after the experience across participants from both cultures.

*Personal Distress* The development of Personal Distress shows an opposing trend between the two participating cultures. Before the experience, Caucasian subjects report greater Personal Distress than their East-Asian counterparts. After the experience, these scores developed into an opposing direction until almost aligned, with 2.81 points as average among East Asians and 2.74 points for Caucasians respectively.

### 4.4.3 Discussion

This study partially proves that the Virtual Journalist reveals cultural empathy differences, adjusts cultural empathy on different levels and reveals tendencies to overcome cultural empathy gaps. The following discussion covers all three hypothesis and attempts to align the different data points obtained through the Study. These data points include the dispositional empathy questionnaire, the experience questionnaire, the photographs as well as the physiological data.

#### Cultural Empathy Differences

As previously mentioned, research has shown that the sub-scales Empathic Concern (EC) and Perspective Taking (PT) from the IRI can be applied to assess Affective and Cognitive Components respectively [11] [25] [40]. The increment of cognitive empathy was higher for Caucasian participants than for East Asian participants, while the affective empathy components incremented solely among East Asians. We assume that this could represent a crucial difference in cultural empathy. Another crucial difference is the attitude towards the interaction itself. In the post-study interview three of nine Caucasian subjects mention their distress by taken photographs of people suffering. One Caucasian subject describes it as a "voyeuristic" and the act of taking pictures of this kind "unethical". This con-

trasts with the statements of two subjects of the East Asian group that evaluate the interaction as a form of empowerment. According to one East Asian subject taking pictures represents a tool for helping people.

In general, the East Asian group scored higher among all empathy components. The physiological data of the session adopting the Virtual Journalist supports that East Asian participants display more moments of distress [14]. The higher amount of photographs as well as more moments of lower HRV contribute to this conclusion. Different results in empathy among both groups have to take one aspect into consideration: the unbalanced gender specific distribution in this study. While there were five females among East Asian subjects, only three belonged to the Caucasian group. Research reveals that females tend to be more empathetic than males [46]. This may influence the fact that East Asian subjects display higher scores in empathy on average. Previous research states that cognitive and affective components are interrelated [6, 9]. However, cultural components of the relationship between affective and cognitive components have not been explored sufficiently to date. As seen in Fig4.15, an assumption based on the results could be that East Asians affective empathy increases with the increase of cognitive empathy. On the contrary, Caucasians affective empathy decreases with the rise of cognitive empathy. If applied to the classification of cultures by Hofstede [26], a general assumption could arise that collectivist cultures tend to increase both affective and cognitive empathy at the same time, while individualist cultures decrease their affective empathy when cognitive empathy is enhanced. This could be attributed to the fact that individualist cultures see the self more independent from a social group which allows them to regulate their affection through cognition. People from collectivist cultures see the self as part of a social group. Hence, affective components are bounded to a group and not easily adjusted through individual cognition. However, the data requires a detailed interpretation in order to draw accurate conclusions. Although the summary of the affective empathy score reveals lower affective empathy for Caucasians this is due to the Personal Distress-Subscale. As seen in Fig4.16 results imply that participants from both cultures developed other-oriented empathy during this study. Other-oriented, as defined by Davis [25], can be interpreted as an enhancement of sympathy and concern towards people less fortunate than us. This aligns with statements of participants

in the post-study interview. As a counterpart to Empathic Concern, Personal Distress is another type of Affective Empathy. It describes the "self-oriented" type of empathy. This includes feelings of anxiety and tension in interpersonal experiences [25]. Caucasians developed lower levels of Personal Distress and scored closer to their East Asian counterparts while adjusting their Empathic Concern to higher scores. Consequently, this results in a different evaluation regarding the quality of the empathy. It aligns with the data from the photographs taken during the experience, followed by the Cultural Empathy workshop. East Asians tend to point at positive aspects of the experience, while Caucasians focus solely on the problem. Caucasians reported greater attention to detail and a shift in perspective after learning from the perspective of their East Asian counterparts, which aligns with lower Personal Distress levels.

### **Perspective through Photographs**

The ability to take photographs allowed to gain information about culture specific perspectives. Considering that perspective is a predominant component of cognitive empathy, this contributes to conclusions regarding cognitive components of Cultural Empathy [27]. Physiological data supports the self reports that the Virtual Journalist can be used as an empathy inducing tool. The session with the Virtual Journalist reveal longer and more repetitive moments of distress in the HRV, especially among East Asian participants. This also aligns with statements of the post-study interviews where participants repetitively mention "focus" and "engagement" associated with the perspective the Virtual Journalist offered. Further statements of the interviews allow a deeper understanding and personal justification of the photographs. While Caucasians predominantly focus on moments of distress, East Asian subjects intended to capture also content moments. According to the interview, moments of contentment are related to social interactions. An example can be found in Fig4.17 While a Caucasian subject and East Asian subject capture the same picture, their justification differs between distress and contentment. This aligns with Hofstede and Minkov [26] who attribute maintenance of relationship and social harmony to collectivist cultures.

East Asians also tended to photograph moments with stronger personal associations compared to Caucasians. Two East Asian subjects related to specific



Figure 4.17 Example of Distress vs. Contentment

moments in the experience. One East Asian subject relates to the fact of waiting and the dependence on other for the own well being. This complements the idea of previous research that East Asians, as a collectivist culture, tend to see themselves as a part of a group and not as an independent subject [26]. It also contributes to the fact that personal emotional experience influences cognitive empathy [6].

### Empathy through Virtual Journalism

The study provides information of cultural empathy adjustments across both participating groups. Research stated that empathic competences are able to increase [8]. Hence, we can derive information that justifies if the Virtual Journalist system inherits the ability of inducing empathy. After evaluating the results and comparing them with interview responses and physiological data we assume that the Virtual Journalist is able to induce empathy. However, the stimulation between cognitive and affective components differ. Sixteen out of eighteen participants report stronger cognitive involvement by using the Virtual Journalist. For instance, one participant addresses that "it causes you to be more attentive towards what's going on". Another participant mention the quality of focus and

memory: "Sometimes I have a hard time focusing, but Virtual Journalist helped me to slow [...] and helped to get bookmarks from moments in content, it increased my memory". However, twelve participants report a form of emotional distance through the cognitive load the Virtual Journalist causes. One participant describes it as a "form of control of emotion". The different stimulation of cognitive and affective empathy is represented in the results. While East Asians reported higher affective and cognitive empathy levels with each round, Caucasians display a more fluctuating and moderate scores. These scores are also mirrored in the dispositional empathy trait adjustments before and after the study and the physiological data. While the cognitive empathy levels increase among Caucasian participants, affective empathy levels decrease.

### **Overcoming Cultural Empathy Gaps**

Further, the comparison of the IRI before and after the study supports the assumption that the Virtual Journalist has the ability to overcome cultural empathy gaps. Calculating the average scores for both cultures respectively and comparing them to the average scores after the study reveal that the score gap for each component diminishes. For instance, the participating cultures were 0.19 points apart from each other on the Personal Distress Scale before the experience. After the experience, this score decreased to 0.04 points (Fig4.16). Similarly, the Perspective Taking sub-scale reveals a convergence in scores after the study. Davis describes Perspective Taking as "the tendency to spontaneously adopt the psychological point of view of others." [25]. These alignments are mirrored in the post-study interview responses of some participants. One participant mentions that especially after the workshop he intended to "capture the photographs from a different perspective".

# Chapter 5

## Conclusions

This thesis introduces a system that enables cultural empathy measurement and amplification. It serves to tap into the current challenges of Compassion Fatigue through media, which describes the loss of empathy towards the circumstances to people in cultures distant from our own. It also provides to measure cultural empathy by visualizing culture specific perspectives through photography in Virtual Reality. The visualization paired with physiological data and emotional self reports serve to tap into the empathic responses of the user. It aims to target the controversy of previous research whether to emphasize cognitive or affective components of cultural empathy. The results of this study suggest an active relationship between cognitive and affective components of cultural empathy. However, results also indicate that cultures may differ to which extend one component affects the other. Through the implementation of the Virtual Journalist, East Asian subjects tend to increase affective and cognitive components of empathy simultaneously. Caucasian subjects demonstrate an increasing gap between affective and cognitive components of empathy when using the Virtual Journalist. This study also confirms the assumption that the the Virtual Journalist has the potential to overcome Cultural Empathy gaps through cross-cultural perspective sharing. However, to confirm a real influence of perspective from one individual to an individual of another culture, we suggest to perform a long term study to obtain greater validity. Furthermore, all participants reported intercultural experience. Based on the demographic questionnaire, eighteen of eighteen participants indicated to have studied or worked abroad, twelve participants speak over three languages and fourteen participants lived in three different countries or more. Hence, this affects the data. Participants with less intercultural experience may show more diverse reactions, greater differences of cultural perception and behaviour.

There are two aspects of hardware to consider for future work. Participants mention difficulty of movement due to the physiological sensing wristband as well as the point of view inside the experience. Regarding the wristband one participant mentions to feel "handicapped" as the wristband is connected to a power source and the participants could feel the limitation of movement. Consequently, this technological limitation should be adjusted for an enhanced way of physiological data recording. Ideally, this includes a remote wristband with a seamless integration in the users experience. Twelve of eighteen participants also mention the desire to explore the space through body movement such as walking. Hence, recreating a realistic 3D space for Virtual Reality could represent a next step of development for the Virtual Journalist. Research found evidence that the experience level of Virtual Reality can influence the players emotional state [39] and hence, manipulate emotional responses towards the content. Although all users were given time to familiarize themselves with the functionalities of the Virtual Journalist, a few users experienced difficulties in adopting the system. Although the chosen cultures intended to be culturally distant to both participating groups, Caucasian participants showed previous empathic experience with the content. This is due to the European media that portrayed this topic intensely since the refugee crisis 2015. Consequently, this may have affected the perspective on the content as it might have led to an in-group advantage that was previously observed in other research [14]. After all, it is recommended to contact production companies of 360° video productions directly as online open sources resulted in limitations of content. Due to the Equi-angular format of Youtube, it is not able to display the video accurately in the Unity software.

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