THE EFFECTS OF VIRTUAL REALITY (VR) ON THE INTENTION TO DONATE MONEY AND TIME: THE ROLE OF EMPATHY, GUILT, RESPONSIBILITY AND SOCIAL EXCLUSION

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Abstract

Virtual Reality (VR) technology has reached the mainstream market and is in the early stages of being used for charitable purposes. The aim of this research is to investigate and explain the effects of VR on empathy, guilt, responsibility, and donation of time and money in the social marketing context. Supported by the media richness theory (MRT) and the social presence theory (SPT), the results of three experimental studies suggest that VR, when compared to traditional two-dimensional video media (VM), increases empathy, increases responsibility, and encourages higher intention to donate and volunteer towards a social cause. Furthermore, it was shown that VR counteracts the negative effects of social exclusion on prosocial behaviour. In socially excluded participants, VR enhanced the level of guilt and social responsibility, leading to a higher intention to volunteer. Surprisingly, VR was not effective in promoting higher intention of money donation in socially excluded participants.

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My graduate school experience is coming to an end. As I am closing out my thesis with this section, I would like to reflect on my journey.

I must say it has been a very challenging, yet also the most rewarding experience. I not only discovered the importance and beauty of social science, but also learned a lot about myself and the world around me.

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1. Introduction

Virtual Reality (VR) is a communication medium which provides users with a 3-dimentional (3D), 360-degree computer-generated virtual environment. This environment is delivered through a head-mounted headset and headphones. VR first received its name from Jaron Lanier in 1989 (Schroeder, 1993). Since its inception, the medium has intrigued the scientific community due to its unknown, but possibly vast potential. Before its recent mainstream availability, VR has been primarily used for gaming purposes and in specialized applications such as military, engineering, and medical training (Abulrub, Attridge, & Williams, 2011; Burdea, 2002; Janda et al., 2004; Sparrow, Harrison, Oakley, & Keogh, 2015). VR has also been used to help overcome a variety of psychological distresses, phobias, and addictions (Botella et al., 2004; Klinger et al., 2005; Lee et al., 2004). The recent proliferation of VR is linked to the possibility of such 3D video technologies to provide more immersive media content, compared to conventional 2-dimnetional (2D) video content[1] on TVs, computers and other flat-screen devices (Yasakethu, Hewage, Fernando, & Kondoz, 2008). 2D mediums have been around for a long time and remain the primary modes of visual communication and entertainment. However, recent studies suggest that 3D video technologies, which provide the feeling of presence, are superior to their 2D counterparts. Moreover, 3D mediums have been shown to improve the communication quality and trust between geographically dispersed actors present in the virtual environment (Andrew, Collmann, & Borda, 2012).

In the recent years, the cost of VR technology has fallen, making it more accessible to the public. In 2016, Facebook released its highly-anticipated Oculus Rift VR headset, which

[1] In this research referred to as video media, or VM.

noticeably improved the problem of motion sickness that was common in earlier VR systems (Desai, Desai, Ajmera, & Mehta, 2014). VR's accessibility and affordability can be linked to a greater demand and competition among tech companies. Technological titans such as Sony, Google and Samsung joined the race to fulfill consumer demand and expectations (Davis, Nesbitt, & Nalivaiko, 2015). In fact, smartphones can now be used with special holders, such as the Google cardboard, to create a portable VR system (Davis et al., 2015). Many applications, such as Jaunt VR, Within, and Vrse, are freely available to the public, offering users movies, short clips, and advertisements in an immersive 3D environment. As adduced by Palmer Luckey, the Oculus VR founder, "there has been more content created for VR in the last year, than the last 20 years combined" (as cited in Davis et al., 2015, p. 5). The accessibility of VR technology and content has opened VR's scope of application to tourism, communication, education, retail and public relations domains (Barnes, 2016; Griffin et al., 2017; Hasan & Yu, 2015), as well as many other sectors.

Marketers turn to VR to deliver experiential content. For example, Marriott has launched a VR-based advertisement campaign promoting popular travel destinations (as cited in Gorlevskaya, 2016). Through VR's 3D, computer-generated immersive experience, users are now able to virtually travel, study, and generate new experiences, bypassing the constraints of physical and geographical limitations (Cooper, 2009; Ottosson & Holmdahl, 2007; Stainfield, Fisher, Ford, & Solem, 2000).

According to Cody Karutz, the Virtual Human Interaction lab manager at Stanford University, social scientists must investigate the immersive experience of VR and how it affects people's behaviour, as VR applications are becoming more available to the public (Ulrich, 2015). Ulrich (2015) refers to VR as to "a new, complex form of communication" (p. 6); he claims that

VR can influence people and change the way they comprehend the real world. Even though VR can be viewed by many as a new technology that can deliver faster and more accurate graphics, Bowman, Hodges, Allison and Wineman (1999) contend that the main hope for VR is "its useful applications that will benefit people" (p.1).

One such possibly beneficial practical implication relates to the donation behaviour of time (in this research referred to as volunteering) and money. Donors expect charities to deliver close-to-reality messages to accurately represent their social causes (Bendapudi, Singh, & Bendapudi, 1996). Accordingly, social marketers are looking for novel ways to "touch" the donors' hearts, while trying to focus supporters' attention on critical environmental and humanitarian crises. Conventional ways of introducing global issues, be it through raw imagery and visuals, often do not provide potential donors with a rich experience of the social issue. Such methods are effective at delivering statistics and facts, but can often be perceived as disengaging. Compared to a static image, VR can deliver multiple communication cues that people can rely on while interpreting the communicated message. As opposed to traditional 2D video media where one often feels as a spectator, VR, due to its immersive nature, increases realism and presence by allowing the user to become a part of the environment. In addition to verbal, VR increases paraverbal communication cues, such as voice volume and inflection, as well as real time non-verbal indications such as body posture, facial mimics, gestures and attitudes (Fabri, Moore, & Hobbs, 1999). These immediate communication cues facilitate one's interaction in a simulated virtual realm and can assist one's cognitive process.

Charitable and human rights organizations such as United Nations, Global Citizen, and Amnesty International are exploring the potential use of VR in spreading awareness of social issues and promoting social responsibility. Barnes (2016) wrote in his overview paper:

> VR may transform public relations, particularly through revolutionizing the way stories are told via immersive experiences, putting audiences in "other people's shoes", delivering captive and receptive audiences, without distraction, and providing a new medium for effectively pitching to journalists. (p. 26)

Although VR's potential has been widely discussed, there is currently very little scientific knowledge on the merits of VR as a tool for social marketing purposes. This gap in knowledge and VR's potential for influencing people's behavior form the motivation of this study.

The remainder of this thesis is organized as follows: I first present the research question, the goals, and the motivation behind this research. I then introduce the overall research design and methodology, elaborating on the philosophical paradigms that form the approach. Further, I review the literature on empathy, responsibility, guilt, virtual reality, the role of presence, and the effects of social exclusion on prosocial behaviour. Then, based on the tenets of Media Richness Theory (MRT) and Social Presence Theory (SPT), I present a series of hypotheses linking the effects of VR to empathy, guilt, responsibility, and donation of time and money. Next, I test the proposed hypotheses in studies 1, 2, and 3; each study includes a methodology, results, and a discussion section. Finally, I present a general discussion of the findings, research limitations and implications, as well as future research suggestions.

2. Research Question, Goals and Motivation

The overarching research question is *how does VR influence people's intention to donate money and time* [2]*?* This explanatory research question is relevant and persisting. Its relevance is supported by the fact that many social scientists, as mentioned in the introduction, have commented on the potential influence of VR technology on user experience. Furthermore, this relevance is expanding as VR is progressively reaching a wider audience. The persistence of this question stems from the dearth of research in the prosocial applications of VR. As this new medium of communication may have the potential to assist social marketers in spreading awareness of global issues, I set out several goals to understand and explain the phenomenal behaviour under investigation. Specifically, I aim to understand and explain:

1. Whether and how VR (vs. VM) leads to higher level of empathy and social responsibility (Study 1)
2. Whether and how VR (vs. VM) evokes higher willingness to donate money and time towards a social cause (Study 2)
3. Whether and how VR can mitigate the negative impact of social exclusion on the prosocial behavior (in this research money and time donation) and by what means this effect occurs (Study 3)

Keeping in mind the influential nature of VR, the main motivation of this research is to investigate the useful application of this new medium of communication and how it can be utilized in social marketing. I suspect that VR has the potential to assist social marketers in emphasizing and vividly illustrating humanitarian concerns to the society. For example, by

[2] In this research, time donation is referred to volunteering

immersing its users into a 360-degree environment of a refugee camp, VR can play a role of a powerful emotional catalyst, which could spark and spread awareness of social issues and potentially lead to pledging more humanitarian relief.

This research contributes to the field of social marketing. While some scholars have investigated the possibilities of VR towards prosocial and other helping behaviour, (Gillath, McCall, Shaver, & Blascovich, 2008; Rosenberg, Baughman, & Bailenson, 2013; Kristofferson, Daniels, & Morales, 2016), to the best of my knowledge, this is the first comprehensive experimental study that examines the effects of VR on donation of time and money. Additionally, this research initiates a discussion on whether VR can mitigate the emotional disengagement in those who feel socially excluded, and therefore socially uninvolved. This research also contributes to literature on VR and its prosocial applications, allowing social scientists and social marketers to better understand the influential nature of VR within a social marketing context.

3. Research Design, Approach, and Paradigms

The overarching goal of this explanatory research is to elucidate how (if at all) VR enhances people's empathy and social responsibility, as well as their intention to donate and volunteer more. As cited in Blaikie (2009), "explanatory research seeks to account for patterns in observed social phenomena, attitudes, behaviour, social relationships, social processes or social structures" (p.71). Blaikie (2009) further adduces that "explanations are produced by researchers who look at a phenomenon from the 'outside'" (p.72). In this research, I observe the investigated phenomenal behaviour from an objective point of view, by following a deductive research approach. Blaikie (2009) writes, "the aim of the deductive research strategy is to find an

explanation for an association between two concepts by proposing a theory, the relevance of which can be tested" (p. 85). The author further states that the main goal of the deductive approach is "to test theories, eliminate false ones and corroborate the survivor" (p. 84). The deductive approach is appropriate for this research, as it started with a theory that VR, as a rich medium of communication, when compared to VM, has greater capability to deliver messages about social issues. Also, the immediacy of social presence offered by VR, may assist in achieving a positive prosocial outcome, such as donation of time and money. The following research question was formed: *How does VR influence people's intention to donate money and time?* Several supporting hypotheses were born to test this main theory. These research hypotheses were derived from the following theories: the Social Presence Theory (SPT; Short, Williams, & Christie, 1976) and Media Richness Theory (MRT; Daft & Lengel, 1986). These theories are discussed in detail in the following chapter. Robert and Dennis (2005) state that the MRT and the SPT theories are applicable in explaining media effectiveness. It is more important than ever to understand the effectiveness of communicating mediums due to the increasing trend of people communicating via digital devices (Robert & Dennis, 2005). To summarize, digital devices have become the primary mode of contemporary communication. VR, with its freely available content and portable devices (i.e., the Google cardboard), is becoming increasingly available to the public. Thus, VR with its potential prosocial applications (e.g., VR's effects on money and time donation behaviour) is at its apt time to be investigated.

Because this research is concerned with the social order and social responsibility, I adopt the functionalist paradigm. This paradigm seems to be most appropriate for this research, as it is found to be "problem-oriented in approach, concerned to provide practical solutions to practical problems" (Burrel & Morgan, 1988, p.26). In the present research, I am looking for practical

solutions to inform social marketers, nonprofit organizations, as well as social scientists whether VR, as a new medium of communication, has the potential to play a role of a stronger catalyst to spark awareness of social issues and to promote charitable time and money donation, in comparison with traditional video media.

This research is positioned under the philosophical theory of positivism. I acknowledge that for a more comprehensive understanding of the research question, it would be ideal to interrogate it from both, the subjectivist and objectivist perspectives. However, due to the research time constraints and the experimental nature of the project, I followed the objectivist perspective. Additionally, since the nature of the VR medium is such that the presented material is pre-determined by the content's creator and selected by the researcher, the objectivist dimension seemed more suitable.

Ontologically, the positivist paradigm is concerned with the objective perception of the reality which even though initially subjectively perceived and processed, when put together becomes objectively communicated and understood by others. In other words, the reality exists somewhere "out there" and is beyond one's involvement (Burrel & Morgan, 1988). The ontology of the positivists' view is such that the reality has been around prior to one's existence and consciousness (Burrel & Morgan, 1988). VR's content that the research subjects are exposed to is predetermined and outside of their choice. Even though one might argue that "by the 1960s positivism was all but dead and new views of the philosophy of science have ascended" (Miller, 2000, p. 52), according to Ryan (2006) positivism and its place in social sciences have persisted. By following the positivist paradigm, which has been heavily relied upon by the marketing researchers and has been driven by the quantitative approach, I acknowledge that marketing "grew to recognize the importance of situational context, the subjectivity of perception, and the

constructed nature of human reality" (Hirschman, 1986, p. 237-238). However, as mentioned earlier, this research is experimental in nature, and the adoption of the positivist paradigm with its ontological realism seemed to be most applicable.

From an epistemological standpoint, positivism is concerned with either verification or falsification of the hypotheses. According to Burrel and Morgan (1988), both approaches lead to the ideology that knowledge is a cumulative process, which constantly adds to the existing stock of knowledge. The main objective of this approach is that false hypotheses get eliminated. In this research, I found the proposed hypotheses on the existing theories. Additionally, based on the earlier research of VR and its potential, I further investigate this medium's influential nature in the prosocial context. Thus, epistemologically, I am relying on previous research and its findings and gaps to find new insights that can enrich the existing stock of knowledge.

The relationships between humans and society gets developed in a dichotomous way. While accepting that some aspects of the reality are perceived as fixed (e.g., one cannot become a doctor without proper education and a license to practice), I also understand that people are thinking and free-willed creatures (e.g., we make choices to quit a job, go back to school, start a company, etc.). Nevertheless, to stay in alignment with the chosen paradigm, I highlight that the medium of communication (VR and VM) was randomly assigned to each participant. The content of the video was pre-determined and the research participants had no control over its context.

To better understand how VR affects empathy and responsibility, as well as enhances people's willingness to donate money and time from the objectivists' point of view, the nomothetic method was selected. Since this method is concerned with the construction of scientific tests and the use of quantitative techniques for the analysis of data, self-administered

questionnaires were employed during all three experiments. Primary data were gathered and analyzed using IBM SPSS. All three studies were conducted under artificial settings, where phenomenal behaviour under investigation (i.e., effects of VR on the intention of money and time donation) was contrived for experimental purposes. Additionally, in the third study subjects were manipulated to feel either socially excluded or included. Achieving this social manipulation was deemed most practical in a laboratory environment. Blaikie (2009) writes that experiments are most appropriate when a researcher needs "to hold some variables constant while others are manipulated, and then to observe the outcome, is considered to be the only way to explain any social phenomenon conclusively" (p. 167). In the first two studies the independent media type variables VR and VM were kept constant, while testing whether and by what degree the dependent variables (empathy, responsibility, money and time donation behaviour) were influenced by either medium. Immersion and alertness were also measured to test the level of richness in each medium. In the third study, two sets of independent variables: social belonging (social inclusion and social exclusion) and media type (VR and VM) were held constant while testing the effects of the dependent variables (empathy, guilt, responsibility, money and time donation). I also measured immersion, alertness and presence to outline the level of richness in each media type.

4. Literature Review and Theoretical Background

4.1 Why people donate and overview of guilt, empathy and responsibility

Prosocial behaviour is defined as any act with the main goal to benefit another person(s) (Aronson, Wilson, & Akert, 2005). Prosocial behaviour consists of two main subtypes: altruistic and non-altruistic (Eisenberg & Miller, 1987). It takes on many forms and is viewed by some researchers as a selfless act to benefit the other rather than the self. Some scholars state that prosocially inclined people risk their lives to save others, spend money in a form of a donation to benefit the other, or give up their spare time to volunteer to improve somebody else's welfare (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Others believe that prosocial behaviour can be hardly called selfless, as those who are involved in it benefit from their social participation economically (by reducing their taxes), socially (by being publicly recognized), or psychologically (by feeling happier from helping others) (as summarized in Anik, Aknin, Norton, & Dunn, 2009). Some scholars explain that prosocial behaviour among animals and humans is directed towards their own kind and those who can potentially reciprocate. It is also highly dependent on social context and interpersonal relationships with other social actors (Decety, Bartal, Uzefovsky, & Knafo-Noam, 2016).

Prosocial behaviour is encouraged in many cultures and organizations. Money and time donations are amongst the most commonly known ways to help others. While both charitable outcomes are concerned with helping or acting prosocially, at their core, they are fundamentally different. Unlike the non-monetary nature of time donation/volunteering, money donation is concerned with direct financial loss. Furthermore, both behaviours are linked to different

mindsets. While time-ask questions are associated with well-being and personal happiness, money-ask questions activate the economic utility goals and belief about attainment of such goals (Liu & Aaker, 2008). According to Liu and Aaker (2008) "thinking about spending time leads to an emotional mind-set in which giving to charity is seen as a means toward emotional well-being and happiness, whereas thinking about spending money leads to a value-maximizing mind-set in which the link between happiness and giving is less accessible" (p. 546). In a series of experiments authors showed that time-ask questions resulted in higher intention to volunteer when compared to the donation outcome of money-ask questions. Furthermore, the order in which the time-ask and money-ask questions were asked, made a difference. Study findings showed that when time-ask questions were presented first, respondents indicated a higher level of actual contribution when compared to not asking to volunteer at all, or first asking to donate money (Liu & Aaker, 2008). The intention to donate money or volunteer time might be triggered by different factors, such as desire to connect with others, gain job skills, and make a direct impact on one's community (through volunteering), or share one's charity mission (through donating money). Furthermore, sources indicate that people donate time and money to increase their self-esteem, to be recognized for their actions, to feel better about themselves, or to release the feeling of guilt and obligation (as cited in Hibbert & Horne, 1996).

4.1.1. Guilt

Often people's support for a social cause is motivated by guilt. Social marketers have previously used guilt appeals to engage prosocial behaviour (Basil, Ridgway, & Basil, 2006; Huhmann & Brotherton, 1997). Guilt is an emotional state which occurs when one understands that he/she violated a certain societal expectation, moral or ethical norm, or custom (Basil et al.,

2006). The feeling of guilt is a reaction to certain incidents and behaviours, which involves a sense of personal agency and control (Roberts, Strayer, & Denham, 2014). Miceli and Castelfranchi (1998) highlight that guilt can be either induced when one realizes that he/she broke his/her personal moral norms or when one feels responsible for something. As such, guilt is a realization of violations of personal or societal norms.

It is important to distinguish between different types of guilt. Literature offers: 1) *Reactive guilt* – occurs when one's personal standards and believes he/she lives by get violated (e.g., use of public transportation without purchasing a ticket); 2) *Anticipatory guilt*- similar to reactive, but occurs when one is going against his/her standards of acceptable behaviour (e.g., lying or misrepresenting facts); and 3) *Existential guilt* - guilt triggered by empathy that occurs when one feels better off than another person (e.g., feeling guilty to live in peace and wealth, while majority of the planet is in poverty) (Hibbert, Smith, Davies, & Ireland, 2007). The latter type is often referred to as social responsibility guilt, which can be triggered by such situations as giving/not giving to a charitable cause (Burnett & Lunsford, 1994). An extensive body of knowledge is concerned with the "right" amount of guilt in advertisements, as too little or too much of it can lead to unsatisfactory and inefficient outcomes (Coulter & Pinto, 1995). Some sources indicate that responsibility positively mediates the relationship between guilt and prosocial behaviour (Basil et al., 2006). Moreover, guilt and empathy relate to each other, as they are perceived to be influenced by similar socialization experiences (Roberts et al., 2014).

4.1.2. Empathy

Many studies have highlighted empathy, as an important contributor to prosocial and other helping behaviour (Baumeister, Brewer, Tice, & Twenge, 2007; Batson, Duncan,

Ackerman, Buckley, & Birch, 1981; Coke, Batson, & McDavis, 1978; Toi & Batson,1982). Through empathy, people selflessly focus on those in need (Silver, 1980). Empathy is defined as "sensitivity to, and understanding of, the mental states of others" (Smith, 2006, p. 3). In other words, empathy relates to the conscious adoption of the subjective perception and understanding of the feelings of another person. In this case, the mental state of another person is viewed or experienced from a complex cognitive perspective (Decety et al., 2016). Many other scholars provided similar definitions of empathy, all referring to the ability of one to experience and understand the emotional state of another (Smith, 2006).

Empathy can be activated in people in many ways and under different circumstances. However, this research does not focus on the entire taxonomy of empathy. It rather focuses on empathy's general function, which is for one to sense and understand the mental state of another.

According to Paiva et al. (2005), modern psychologists distinguish two main mechanisms in empathy: 1) *the mediation of empathy* (facilitated via a situation and emotional expressions), and 2) *the outcome of the empathic process*. In situational mediation of empathy, the observer perceives that the observed person has been mistreated, and as a result, develops a feeling of anger or pain that he/she would experience under the same circumstances. Empathy can also be mediated through emotional expressions. For example, if an observer sees the observed person crying, the observer can then adopt this emotional state. These two modes of empathy mediation represent the empathetic process, which in turn, results in a particular outcome (Paiva et al., 2005). The outcome, typically, is the observer experiencing the emotional state of the other, which leads to the desire to help.

4.1.3. Responsibility

In order to even consider helping, one needs to first feel responsible. As adduced by Basil et al. (2006), personal responsibility "may stem from causing something to occur or from failing to avoid the onset of some occurrence" (p. 3). For example, a realization that personal car use contributes to climate change may cause a person to feel responsible to switch to using public transit. Or, one might feel responsible to donate blood, since not donating might result in someone's demise. Thus, this feeling of responsibility to avert something from happening or mitigate some negative or harmful outcome, might be logically extended to the altruistic motivation to donate or volunteer towards a social cause. Thus, personal responsibility is interconnected with social responsibility, where one thinks outside of his/her inner circle of friends, family, community and nation to help one in need (Pancer & Pratt, 1999, p. 38). Furthermore, "when individuals obtain an accurate empathic perspective about the conditions and needs of others, they are more apt to feel social responsibility and become socially involved" (Segal, 2011, p. 271).

Since prosocial behaviour is endorsed, encouraged and expected, human beings help, lend, vote, share, fundraise, and volunteer to connect with other members of the society. We are a part of the society. Our identity gets developed and shaped within the society. People are biologically predestined to construct and inhabit this world with others (Berger & Luckmann, 1991). Thus, we feel the need to belong, which often manifests itself in fundraising and volunteer activities to reach out and connect with other members of the society, to help and get helped.

Human beings rely on one another physically and emotionally (DeWall & Baumeister, 2006). Throughout life, we make it our goal to build strong relationships with others to feel

accepted, appreciated and loved. However, when this fundamental need is threatened, our physical and emotional well-being gets negatively affected.

To fully consider the impact of VR on the donation behaviour, it is important to consider factors that might weaken the drivers and outcomes (guilt, empathy, responsibility, and money and time donation) of prosocial behaviour. One such factor is social exclusion. Social exclusion or social rejection has shown to negatively affect the overall charitable-donation outcome. Thus, in the next section, I review its potentially damaging effects on the prosocial behaviour.

4.2 Social Exclusion

Social exclusion (SE) is a complex and multidimensional phenomenon that most of us are familiar with at least to some extent. It manifests in an aloof greeting of new classmates in a new school, an avoidant glimpse of a friend at a party, or an uninvolved salutation of a co-worker. We all know that "being ignored, excluded or rejected probably ranks among the most unpleasant and painful of human experiences" (Schaafsma et al., 2015, p. 26). According to Williams (2007), humans learned to recognize whether they are being ostracized to "prevent the inevitable loss of group membership, protection, and reproductive opportunities" (p. 429). How people react to social exclusion depends on many factors. Such factors are: personality traits (extravert/introvert), situations (ostracized by friends, family members or acquaintances), cultural differences (in some cultures people depend on one another more than in other cultures), and the duration of feeling socially excluded (short/long term).

Research on social exclusion primarily identifies negative effects of this phenomenon. A series of seven experimental studies with three different manipulation techniques on social exclusion revealed a statistically significant decline in empathy, and prosocial behaviour in

socially excluded vs. socially included people (Twenge et al., 2007). As adduced by Twenge et al. (2007), children that are rejected by their peers were found to be less prosocially active when compared to their socially included counterparts. Other sources are congruent with these results, indicating lower empathetic response in socially excluded people to other people's plights. Socially excluded people were found to experience more mental and physical issues when compared with those who had strong social connections and felt included within the society (DeWall & Baumeister, 2006). Additionally, social exclusion was found to lead to higher levels of sadness and anger as well as more aggressive and antisocial behaviour (Williams, 2007). Social inclusion (SI), on the other hand, has the opposite effect. For example, married couples volunteer more. Similarly, children from stable and supporting families were found to be more caring and socially involved (Twenge et al., 2007). While acknowledging the complexity of social exclusion, the secondary goal of this research seeks to illuminate how VR, as a rich communication medium, can stimulate money and time donation behaviour towards a social cause despite of the negative effects of social exclusion.

Based on these observations, it seems like societal inclusion is a critical necessity for one to act prosocially. Conversely, social rejection seems to negatively affect our helping behaviour. This dependency can be explained by the socially constructed nature of the reality and its social order (Berger & Luckmann, 1991). Authors adduce that humans are a part of the society. The society, in its turn, becomes a product of humans' activity, and that people are social products of the environment they recreate. Thus, the societal rejection or social exclusion might be viewed as the biggest punishment that can impair us physically and emotionally and can consequently lead to the diminished prosocial tendencies.

While a myriad of literature highlights the negative effects of social exclusion on prosocial behaviour, it is worth noting that some studies indicate that socially excluded people cooperate more and retain social vs. individual information (Pickett, Gardner, & Knowles, 2004; Gardner, Pickett, & Brewer, 2000). However, since much of literature highlights the negative effects of social exclusion on prosocial behaviour (ostracized people were found to volunteer and donate less), in this research I expect social exclusion to lead to emotional numbness towards another person's misfortune and result in a lower desire to donate money and time. This emotional withdrawal, of course, is expected to vary (e.g., short-term and a long-term feeling of ostracism). However, this is outside the scope of this research, as I only look at the short-term ostracism.

In this research, I use the terms social exclusion, ostracism and rejection interchangeably. Many studies have tried to explain the difference between these phenomena, however, no empirical research has shown any distinction (Williams, 2007). In this research, I adopt the definition of social exclusion in its general form proposed by Pereira, Meier, and Elfering (2013): "we define … social exclusion as the general perception of an individual of being excluded, rejected or ignored by another individual … that hinders their ability to establish or maintain positive interpersonal relationships" (p. 241). As shown in a series of experiments by Twenge et al. (2007), social exclusion has the potential to impair people to help others. As put by the authors, this might be due to the primary need to take care of the self rather than another person. Additionally, emotional shutdown might result in distant and indifferent attitude towards the one in need (DeWall & Baumeister, 2006). Moreover, study findings indicate that socially excluded people made fewer donations, volunteered for fewer experiments, helped and cooperated less, reported lesser feelings of belongingness, as well as indicated reduced

empathetic concern for another person's misfortune in comparison with their socially included peers (Twenge et al., 2007). According to the authors, "prosocial behaviour drops off sharply when people think they may be socially excluded" (p. 63). According to Baumeister et al. (2007) "social exclusion causes an immediate reaction of numbness, including a loss of sensitivity to physical pain and a lack of emotion" (p. 514). Because emotional response is one of the key prerequisites of the mediation of empathy, social exclusion might seriously weaken the prosocial behaviour of money and time donation. This might be due to the fact that social exclusion in its definition refers to one's difficulty to establish or maintain positive interpersonal relationships, where people might feel the need to take care of their own emotional state, rather than understanding the emotional state of others. Since social marketers rely on empathetic response, it is essential to understand whether VR, as a rich and more sophisticated medium of communication (Ulrich, 2015), has the capacity to mitigate the emotional disengagement in those, who feel socially excluded.

4.3 VR and Effects of Presence

To understand whether VR can facilitate the empathetic process, increase responsibility towards a social cause and lessen the feeling of social exclusion while diminishing its consequences, I reviewed the concepts of presence and immersion, which VR provides. Terms presence and telepresence have been used by many scholars interchangeably (Heeter, 1992; Held & Durlach, 1992; Loomis, 1992; Sheridan, 1992; Steuer, 1992); in this research, I follow this approach.

According to Slater and Wilbur (1997), immersion is concerned with technology, and its capability to deliver inclusive, extensive surroundings and vividness of reality to users. Presence,

on the other hand, is concerned with a state of consciousness – one's psychological awareness in a virtual world. Kim and Biocca (1997) state that media richness and user control are necessary components to create a sense of presence strong enough to affect consumer attitudes.

Many academics have extensively studied the notion of presence since the early nineties (Heeter, 1992; Held & Durlach, 1992; Loomis, 1992; Sheridan, 1992; Steuer, 1992). As summarized by Waterworth et al. (2003):

> Presence arises when we mostly attend to the currently present external environment. An implication of this is that a person has to perceive the environment that presently surrounds her, through her senses rather than in imagination, whether it is a virtual environment or physical reality. By this account, presence is primarily determined by the balance between processing internal (imaginal or conceptual) information and external (perceptual or sensory) information, and it can be experienced in response to both the physical (external real) and a virtual (externally modelled) environment. (p. 191)

Steuer (1992) posits that presence is achieved through two components of the technology that are responsible for the richness of the medium. These components are *vividness* and *interactivity*. He describes vividness as "the representational richness of a mediated environment as defined by its formal features, that is, the way in which an environment presents information to the senses." (p. 11). According to Steuer (1992), *vividness* is expressed through sensory breadth and depth. Sensory breadth is concerned with the sensory channels, such as aural, olfactory, and visual. Therefore, media with more sensory channels will provide a higher sense of immersion within the mediated environment when compared to other forms of media (Lombard & Ditton, 1997). Sensory depth is defined by Steuer (1992) as "the resolution within

each of the perceptual channel." (p. 11). Sensory depth also refers to the quality of each channel and the quality of information delivered.

Since these concepts can be extended to the domain of virtual reality, I argue that VR is a rich medium of communication due to its 3D, 360-degree computer-generated visual capacity and integrated sound. VR provides its users with the sensory breadth by incorporating audio, visual, and haptic channels, and depth by communicating them at a high-quality level. It is also an interactive media channel. Even in the simplest versions of VR, the user is able to look around, gaining a perception of the 360-degree environment. In more advanced variants, users can interact with other characters and objects. This enhances media richness (see Daft & Lengel, 1986) as VR is able to transport users to an alternate, virtual environment. Such environments are known to result in sensory immersion and have been shown to stimulate consumer behaviour through presence (Klein, 2003).

Nevertheless, it is important to note that the feeling of presence does not directly cause a response; it rather enriches the media characteristics that consequently influence consumer response (Klein, 2003). Slater and Wilbur (1997) state that when perceiving information from a 2D media (e.g., TV, computer) it is the same as "looking through the glass" (p. 2). The events that unfold seem to be distant in space and time. However, in virtual, computer-generated environments, there is a feeling of "stepping through the glass" (p. 2). Thus, VR is an engaging medium that can display a virtual environment where users comprehend it as places visited rather than images seen. Due to its engaging capacity, VR allows its users to become active participants of the reality, rather than spectators. This gives me reason to believe that through this active participation and the temporal and spacial feeling of "now-and-here", VR users might closely relate to the social issues that are at stake. Additionally, I hypothesize that VR, due to its

richness, might provide its users with an augmented visual and emotional overview of a social issue, while potentially leading to more humanitarian relief.

By keeping in mind the immersive and interactive nature of VR, my experimental hypotheses were borne from the following theoretical frameworks: the *Social Presence Theory* (SPT; Short et al., 1976) and the *Media Richness Theory* (MRT; Daft & Lengel, 1986). These two theories provide a basis for my arguments, and thus I elaborate on them in the subsequent section. Robert and Dennis (2005) state that the MRT and the SPT theories are applicable in explaining media effectiveness. Authors further note that it is more important than ever to understand media effectiveness due to the increasing trend of people communicating via digital devices.

4.4 Media Richness Theory (MRT)

The MRT theory, also known as the information richness theory (IRT) (Daft & Lengel, l986), posits that understanding of the delivered message depends on the form of media. The theory argues that richer mediums of communication lead to a better understanding of messages and tasks with greater ambiguity. For example, a face-to-face interaction is considered to be the highest medium of communication, as opposed to email which is considered to be low. This is because physical presence is the richest medium; you can see, hear, feel, and interact with the subject and the surroundings. In contrast, an email medium only has text. Since VR, is a rich medium that combines 360-degree visual and audio dimensions, as well as the ability to interact within the environment (e.g., look around, or interact with objects in more advanced VR versions), and transfer multiple communication cues, this suggests VR is a richer medium relative to other traditional media. To further support this point, Schroeder (2002) writes about

shared virtual technologies, or shared virtual environments, which are defined as VR systems where VR users experience other participants as real social actors. The author highlights the richness of such environments offered through VR by stating:

> Shared VEs are a rich medium in the sense that they allow people to interact via several senses. … they allow people to interact via audio/text and via a 3D visual environment. This sets shared VEs apart from telephony, video conferencing, and other media of communication. (Schroeder, 2002, p. 4)

It should be noted, however, that some researchers find the MRT theory outdated and call for new communication models to emerge (Ngwenyama & Lee, 1997). This proposed update suggests considering individuals' differences that may affect the choice of the medium and social context (Minsky & Marin, 1999). In light of such suggestion, I acknowledge that subjective perception of each participant would differ, that is, to a certain extent the richness of the medium would be defined and evaluated at an individual level. This difference in perception and richness of the communication experience can be only understood by directly interviewing the participants. However, this is outside the scope and design of this research. This research is experimental in nature and I want to highlight that the research participants had no choice over a medium of communication and its content. During all three experimental studies, subjects were randomly assigned to either 3D-VR content (viewed through the VR Oculus Rift headset), or 2D-VM content (watched on a flat laptop screen). In this research, I am looking at the media effectiveness (VR vs. VM) on the prosocial behaviour (i.e., money and time donation). Thus, I argue that the MRT and the SPT theories are applicable to lay the foundation for the later proposed hypotheses.

4.5 Social Presence Theory (SPT)

The SPT theory (Short et al., 1976) posits that existence of other social actors in the moment of communication is important in the choice of the communication medium. For example, telephone or videoconferencing provides users with more prominent social presence when compared to email. The presence of others was found to enhance the sense of responsibility to behave prosocially (Basil et al., 2006). The SPT theory suggests that communication between social actors would be more successful if the communication medium provides an appropriate social presence required for a task. The main task of VR is to communicate a message. Therefore, it is important to understand the level of social presence of the communicating actors within the virtual environment. As outlined in the literature review section, VR provides enhanced social presence through its immersive environment where the viewer perceives virtual social actors as real (Lee, 2004). Additionally, as pointed out by Barnes (2016), socialness, which is defined as "the extent to which users perceive social cues within a virtual environment considered as a social entity" (p. 8) is a missing and not very often mentioned component of VR (Barnes, 2016). According to the author, many contributory factors that VR provides have the potential to influence the feeling of belonging to a virtually close, and not-so-distant community.

According to Barnes (2016), the SPT theory has been applied in the studies of virtual worlds and virtual reality. As further outlined by the author, Biocca, Harms, and Gregg (2011) distinguish between multilevel social presence available through VR environments:

- *co-presence*, which relates to the feeling of being together with other social actors in the moment of virtual communication
- *psychological involvement*, which is concerned with the perception of the emotional state of another person within the VR environment (for example feeling what mood the person

you are interacting with is in)

- *behavioural engagement,* which is concerned with the impact of the actions of the participant and other social actors within the VR environment.

As further adduced by Barnes (2016), social presence available through VR can lead to emotional, mental, and behavioural effects in people. Since VR is considered to be a rich medium of communication with its immersive, 3D, 360-degree capacity, I suspect that social presence of other social actors can be perceived on a multidimensional level, allowing VR users to get involved with another person's plight emotionally, mentally, and behaviourally.

To further reinforce the applicability of the chosen theories, Ellis, Gibbs, and Rein (1988), and DeSanctis and Gallupe (1987) highlight the importance of spatial and temporal dimensions. They posit that mediums that allow interactions in the same time and space are considered to be higher in social presence and media richness. It is important to note that VR provides same-time and same-virtual-space communication through its 3D and immersive platform, allowing people from different geographical locations to meet, share stories and create new virtual experiences.

5. Hypotheses Development

Lee (2004) terms presence within VR as "a psychological state in which virtual (para-authentic or artificial) objects are experienced as actual objects in either sensory or non-sensory ways." (p. 27). The author distinguishes three types of presence: *physical, self, and social*. *Physical presence* is the "psychological state in which virtual (para-authentic or artificial) physical objects are experienced as actual physical objects in either sensory or non-sensory ways" (p. 44). *Self-presence* is the "psychological state in which virtual (para-authentic or artificial) self/selves are experienced as actual physical self/selves in either sensory or non-sensory ways" (p. 46). *Social presence* is the "psychological state in which virtual (para-authentic or artificial) social actors are experienced as actual social actors in either sensory or non-sensory ways" (Lee, 2004, p. 45). Since VR is widely perceived as a rich medium of commination, I believe VR can facilitate physical, self, and social presence. Physical presence can be experienced through a realistic 3D depiction of physical objects. Self-presence can be realized because the user is immersed into a 360-degree visual and integrated audio environment. Just like in the physical world the user can look around and hear sounds coming from different directions. Moreover, in more advanced versions of VR, the user can interact with objects. Finally, social presence can be facilitated by enabling the user to communicate with the virtual social actors as if they were real.

As mentioned in the literature review section, empathy can be mediated via a situation or an emotional expression. By investigating empathy in the age of virtual communication, Fuchs (2014) outlines three modes of empathy: *primary, extended, and fictional*. *Primary* (or intercorporal) empathy occurs when people directly interact with one another and are able to

experience each other's emotional state directly. *Extended* empathy, which is concerned with the imaginative representation of the other, is evoked through one's imagination of a "what if" scenario, or when we try to imagine what it would feel like to be in an observed person's shoes. *Fictional* empathy relates to the fictitious persons or objects (e.g., characters in novels, robots, avatars, etc.). Fuchs (2014) claims that it is important to distinguish between the primary (implicit or bodily empathy), and the extended (explicit or imaginative) empathy. He concludes that the closer one is in bodily contact with another, the more active one's primary empathy becomes. On the contrary, when the bodily communication becomes distant, the virtual or imaginative characteristics of empathy become more important. For this reason, conventional videos often include inner monologues, emotional music, and other techniques to evoke feelings from the observer. While acknowledging different types of empathy in the age of virtual communication, in this research I investigate the overall empathy, in its sense to feel and perceive the emotional state of another. Thus, I argue that VR can augment all three types of empathy in the same manner as the overall empathy because of its rich and immersive nature that results in a sense of presence.

Since VR's richness can enhance all three dimensions of presence proposed by Lee (2004), I believe that VR can further lead to enhanced primary, extended and fictitious empathy. The sense of physical, self, and social presence can affect primary empathy, making the user feel more bodily closer with virtual social actors. For example, Janda et al. (2004) identified that dental students who were trained through a virtual environment and talked to a virtual patient, showed more empathy for their patients in real life, when compared with those who were not trained on a virtual patient. As for the extended and fictitious empathy, I suspect that physical

and self-presence can augment the users' ability to take on feelings and emotional states, as VR has been hypothesized to lead to higher emotions and feelings (Waterworth et al., 2003).

According to Ulrich (2015), even though visual delivery of information, also known as visual rhetoric, can influence people by evoking emotions through powerful images, VR could go beyond the visual rhetoric to elicit a stronger emotional response. The author adduces that "the more vivid a virtual world is, the more it feels like actual experience, and the more directly it influences emotions." (p. 8). According to Roussou (2002), VR technology has noticeably improved in the past several years, "providing more natural and obvious modes of interaction and motivational elements." (p. 93). Due to its rich and immersive nature, which leads to physical, self, and social presence, VR can provide users with a more direct/first-person narrative experience when compared to 2D mediums (e.g., TV, laptop) and facilitate multiple modes of empathy. Thus, I theorize that VR increases empathy:

H1$_a$. *People in the VR condition (vs. VM) will report higher level of empathy towards a social cause.*

Empathy, at its core, encourages people to act towards social change. When people receive accurate empathetic perspectives about someone in need, they feel more socially responsible and typically act prosocially to make a difference (Segal, 2011). Thus, by offering an immersive and interactive involvement into a social issue, VR might deepen one's understanding of the importance and urgency of the matter. Moreover, social presence, which has been found to increase responsibility (Basil et al., 2006) and lead to prosocial behaviour, can be perceived in VR at a deeper level, by projecting virtual social actors as real. Thus, I hypothesize that VR, due to its media richness and increased social presence has the potential to lead to higher level of responsibility towards a social cause when compared to VM.

H1$_b$. *People in the VR condition (vs. VM) will report higher level of responsibility about a social cause.*

I expect that VR can lead to a higher level of empathy and responsibility. This is to say that due to its richness which leads to increased social presence, VR is expected to increase emotional and cognitive response to a social issue. Once an emotion (i.e., empathy) is triggered at a higher level, one is more likely to feel responsible and is more likely to act upon this feeling. This is because the motivation to take action (e.g., responsibility) is an outcome of the empathetic process proposed by Paiva et al. (2005). Keeping in mind this mediating effect of empathy on prosocial behaviour, I suspect that empathy is the grounding point towards responsibility. Thus, I hypothesize the following:

H1$_c$. *Empathy positively mediates the relationship between VR and responsibility.*

Lee and Chang (2007) outline that donating one's time and money are the two main forms of charitable giving. The authors state that when, how, and how much money and time people are willing to contribute towards a cause depend on many demographic and socioeconomic factors. Bryant, Jeon-Slaughter, Kang and Tax (2003) adduce that people's decision whether to engage into philanthropic activity or not depends on the resources that they have. These resources can be economic, such as time, income and wealth; or sociological, such as human, cultural and social. Furthermore, solicitation of a response to an issue can be affected by many variables, such as the donor's mood, media exposure, and attention of the donor to the communicated message (Bendapudi et al., 1996).

While recognizing the complexity of the charitable-donation motivation, in this research I concentrate on measuring the intention of one to donate and volunteer towards a social cause in

VR vs. VM. It is important to acknowledge that there is a difference between the intention and action to donate or volunteer. Nevertheless, an indicated intention is more likely to lead to an actual action. This argument is based on the theory of construct activation and accessibility. As summarized by Liu and Aaker (208), "when a concept is activated, associated constructs are also activated. Thus, one outcome of asking questions is activating and increasing the accessibility of related concepts, thereby augmenting the probability that they will be used in a subsequent judgment or behavior." (p. 545). An extensive body of literature shows that "asking people questions about their intentions for an action can dramatically change the likelihood that people will later perform the action" (Liu & Aaker, 2008). Furthermore, an empirical observation indicates that those who were first asked about their intention to behave in a certain way, were more likely to engage in that behaviour than those, who were not asked about their intention (Levav & Fitzsimons, 2006). Based on the foregoing, it seems like the intention-based questions are directly related to one's most probable action outcome.

As indicated in the literature review section, time-ask questions vs. money-ask questions differ, as they are associated with two different mind-sets. While time donation is linked to the emotional outcome and projection of one's personal well-being and happiness, money-ask questions were found to suppress these emotional goals, in contrast evoking value-maximizing goals (Liu & Aaker, 2008). However, in this research I suspect that VR due to its richness and the sense of presence has the potential to increase one's emotional goals for both, money and time donation intention. The MRT theory posits that richer communication mediums help in understanding complex situations, I suspect that the richness and immersion of VR can be more effective in bringing donors' attention to the communicated message. This should result in an increased response towards the communicated message, which in a charitable case, should

manifest in higher time and money donation. Furthermore, it has been shown that higher empathetic disposition leads to generosity (Bendapudi et al.,1996). Thus, I theorize that participants in the VR condition, who experience higher level of responsibility, which is hypothesized to be mediated by empathy (in $H1_c$), would indicate higher desire to contribute more volunteer hours and donate more money towards a cause vs. those in the VM condition.

$H2_a$. *People viewing a video of a social cause via VR (vs. VM) will report higher desire to volunteer*

$H2_b$. *People viewing a video of a social cause via VR (vs. VM) will report higher desire to donate money.*

In addition to empathy and responsibility, I added the effect of guilt to the focus of the experiments. As discussed in section 4.1.1., guilt materializes through the empathetic process, and can be triggered when one's personal norms are violated or when one feels responsible for something. Furthermore, Basil et al. (2006) found that responsibility mediates the relationship between guilt and prosocial behaviour. Therefore, it seems like empathy, guilt and responsibility have an implicit association with one another. Guilt and empathy are emotions, which trigger one's cognitive process to help the other through feeling responsible, and as a result act upon this feeling.

Social belonging (social inclusion – SI, and social exclusion – SE) was added as an important factor that can potentially affect prosocial behaviour. As summarized in section 4.2., an extensive body of empirical studies indicates that SE leads to emotional withdrawal and reduction in the empathetic response towards those who need help. Since guilt and empathy are emotions, I suspect that emotional withdrawal, caused by social exclusion, will lead to minimal or non-existing level of guilt and empathy towards a social cause. Moreover, by diminishing the

empathetic response, SE might lead to lower or non-existing level of responsibility. For example, when people are not emotionally engaged with an issue, generally they do not feel responsible to do anything about it.

Overall it has been shown that SE negatively affects the outcome of the prosocial behaviour; socially excluded people donate and volunteer less than those who feel socially included (Twenge et al., 2007). Baumeister et al. (2007) adduce that SE causes emotional distress, which in-turn diminishes the prosocial behaviour. By applying the same logic, where people do not feel empathetic, guilty and responsible towards a social cause, they do not feel like acting upon it. Thus, I expect that in congruence with the diminished empathy, guilt and responsibility, socially excluded participants will indicate lower time and money donation. I expect this effect of exclusion to occur independent of media type.

All in all, based on the foregoing and in alignment with prior literature, I expect that SE will negatively affect the money and time donation outcome, while reducing empathy, guilt, and responsibility towards a social cause.

H3: *Independent of media type, socially excluded people, when compared against socially included people, will report:*

a) *lower level of empathy*
b) *lower level of guilt*
c) *lower level of responsibility*
d) *lower level of money donation*
e) *lower level of time donation*

Following the logic presented in the development of hypotheses $H1_{a,b}$ and $H2_{a,b,}$ and to reconfirm the findings of the first two studies, I expect that VR will lead to higher empathy,

responsibility, time and money donation. Since guilt is closely associated with empathy and responsibility, I also expect it to increase in the VR condition (vs. VM).

Keeping in mind the counter-effective influences of VR and SE on prosocial behaviour, it seemed appropriate to explore their interconnection. Here I argue that VR will elevate empathy, guilt, responsibility and money and time donation in both SI and SE, but that this effect would be most important in the SE condition. This assertion is based on the argument that socially included people are emotionally engaged and as a result are already more enabled to empathize, feel guilty and responsible, and to donate time and money more generously than socially excluded people, as outlined in literature. VR then boosts all these traits beyond their base condition by delivering charitable content in a richer form. Socially excluded people, on the other hand, are expected to be withdrawn and to be at a much lower emotional and donation potential (due to being emotionally and socially disengaged). In other words, while socially included people do not need to regain social acceptance, socially excluded and emotionally disengaged people first need to feel accepted and emotionally involved to even consider acting prosocially.

I argue that for socially excluded people, VR's ability to enhance social presence will first counteract the negative SE effect in the SE participants. While I do not have an empirical basis for this conjecture, theoretically, I link this proposed outcome to the social construction of reality. As outlined by Gamson, Croteau, Hoynes, and Sasson (1992), media and its images play an important role in how we perceive the reality. Authors state, "We walk around with media-generated images of the world, using them to construct meaning about political and social issues. The lens through which we receive these images is not neutral, but evinces the power and point of view of the political and economic elites who operate and focus it. And the special genius of

this system is to make the whole process seem so normal and natural that the very art of social construction is invisible." (p. 374). While this thought is specific to political and economic "images" of the reality, I make a logical parallel that prosocial images affect our construction of reality as much. I suspect that VR, with its enhanced social presence, will assist socially excluded people in decoding the reality. Gamson et al. (1992) state that "we are active processors and however encoded our received reality, we may decode it in different ways." (p. 384). Thus, after being excluded one might perceive him/herself as non-existent for others. However, this perception is expected to change through the enhanced social presence of others, which VR provides. In the case of VR, the reality will be decoded in a different way by realizing that due to the virtual communication with other social actors, one might feel accepted and included into the society. Thus, even though the experience of a socially excluded person was initially framed in a way he/she felt rejected by others, VR through its augmented social presence might have the capability to reframe the experience of social exclusion into a positive/included way.

I further conjecture that after making socially excluded people feel socially included, and therefore emotionally engaged, VR will boost their empathy, guilt, responsibility and money and time donation through VR's richness. Thus, it is the magnitude of the mitigation that VR will provide to socially excluded people should be higher. I theorize that VR will have a stronger positive effect on prosocial behaviour in the SE vs. the SI condition:

H4: *There will be an interaction between the effects of media type (VR/VM) and social belonging (SI/SE), such that in the SE condition VR is expected to be more effective in increasing:*

a) the level of empathy

b) *the level of guilt*

c) *the level of responsibility*

d) *the level of money donation*

e) *the level of time donation*

As mentioned in the literature review section, different studies found empathy, guilt, and responsibility to be important factors and mediators in the process of influencing prosocial behaviour (Basil et al., 2006; Hibbert et al., 2007; Decety et al., 2016). Since there is no established agreed-on model that describes how these mediators are interrelated, I plan to iteratively investigate their interdependence. This will be done by testing multiple mediation models using IBM SPSS PROCESS macro by (Hayes, 2009). "The goal of mediation analysis is to establish the extent to which some putative causal variable X influences some outcome Y through one or more mediator variables." (Hayes, 2012, p. 1). According to the author, as research matures, the main goal of the researcher is no longer to show the effect, but rather understand the mechanism behind the effect, while trying to answer the "how" and the "when" questions. Mediation is concerned with answering the "how" question, which lays at the core of this explanatory research. The multiple mediation analysis should yield an understanding of the effects of VR on money and time donation in socially excluded people at a level well beyond what will be determined from the hypotheses tests.

6. Study 1

6.1 Design and Procedures

I began this research by investigating whether VR, as a rich medium of communication, leads to higher levels of empathy and responsibility and whether empathy mediates the relationship between VR and responsibility.

Participants were informed about the study through the SONA[3] website and recruited via a university-sanctioned participant pool in exchange for a partial course credit. There were no restrictions on gender, level of education, or age. Eighty-five undergraduate students (Mean age = 20.56; 57.6% females. $N_{VR} = 44$, $N_{VM} = 41$) took part in this study. The study was a one-factor between-subjects design. Upon entering the experiment space, the participants were randomly assigned into one of two conditions: VR or VM.

In the VR condition, the participants were asked to watch a video through an Oculus Rift VR headset, connected to a VR-ready desktop computer. Oculus Rift allows people to experience 3D, 360-degree videos. This is achieved through the device's motion tracking system, which allows its users to look around, as they naturally would in a real world. The participant's head movement and direction is constantly analyzed by this head tracking system, and the video is changed accordingly to simulate a real-life-like experience. This allows for a "completely natural way to observe the world, which is a major factor in immersion." (Desai et al., 2014, p.

[3] SONA – the electronic system used at Ryerson University to recruit and manage students from the student behavioral participant pool

177). Instead of watching a video as an observer in 2D, the VR participant is immersed into a 3D, 360-degree virtual environment (see pictures in Appendix E).

For this study, I chose a video created by RYOT titled the "Global Citizen". The video was downloaded through an app called Jaunt VR[4]. The length of the video was 3.17 minutes. Global Citizen is a social action platform for a worldwide community that aims to stimulate collective actions to bring about social changes. RYOT is an immersive media company founded by Bryn Mooser, David Darg and Martha Rogers, who act not only as filmmakers, but also as humanitarian aid workers. Through their innovative 360-degree experiential videos they bring attention to the world's main global and social issues (Sawers, 2016). For this video, RYOT traveled across the globe to capture social and climate issues. As the United Nations lays out its plan to eradicate extreme poverty by 2030, it is critical to understand the scale of "what we are trying to solve, and whom it is we are trying to help" (jauntvr.com). The main objective of this video was to introduce the viewer to the global issues and summon everyone to take action.

Under the VM condition, research subjects were exposed to the same video content via a 14-inch screen laptop. Even though the video had a 360-degree navigation option, the participants were not allowed to touch the laptop (except for the volume control), thus, they watched the video as they normally would on a laptop screen. After watching the video, the participants were asked to complete a questionnaire related to the video.

In this study, I examined three dependent variables: empathy, responsibility, and guilt. I also measured alertness and immersion within both VR and VM. I conducted independent t-tests to make inferences about the differences between two means of VR and VM on each dependent variable. All five assumptions of the independent sample t test were met. The two populations

[4] Jaunt VR is a privately-owned virtual reality company, which is known for its storytelling through cinematic virtual reality

were presumed to be normally distributed and to have the same variance. These assumptions are supported by the fact that the *t* statistic is robust and the sample size (N = 85) is large enough to assume that the sampling distribution of the sample mean is a normal distribution based on the Central Limit Theorem (Glenberg, 1988). The scores in the two samples are independent of one another; each of the samples is obtained using independent random sampling from its population. The scores were measured on an interval scale.

I acknowledge that one might disagree on the use of *t*-tests in combination with the ordinal Likert-scale measure. However, in this research I assume that Likert categories, ranging from 1-7 (strongly disagree to strongly agree) become an interval-level measure. This assumption is based on the following: numbers assigned to each category are assumed to be the same distance apart. For example, the interval between 1 and 4 (strongly disagree to neither agree/ disagree) is the same as the distance between 4 and 7 (neither agree/ disagree to strongly agree). As adduced by Blaikie (2003), "Likert categories … are not necessarily evenly spaced along this level of agreement continuum, although researchers frequently assume that they are. When this assumption is introduced, an ordinal-level measure becomes an interval-level measure with discrete categories." (Levels of Measurement Section, Ordinal-level measurement subsection, para. 3). Blaikie (2003) further writes:

> It is a common practice to use ordinal-level measure and regard them as being interval. For example, many scales are created from responses to a number of statements or items in which the response categories form only ordinal-level measurement. Commonly used categories are 'Strongly agree', 'Agree', 'Neither agree nor disagree', 'Disagree', and 'Strongly disagree'. If these categories are assigned numbers, say from 1 to 5, it is only possible to sum the responses to a set of statements if the intervals between these

> categories are assumed to be equal, that is, as constituting interval-level measurement. While this assumption is not strictly correct, its adoption is quite general and few attitudes scales have been constructed without it. (Scales and Indexes section, para. 4)

I adapted the empathy scale from Escalas and Stern (2003) – 5 items, the responsibility scale from Basil et al. (2006) – 3 items, the guilt scale from Cotte, Coulter, and Moore (2005) – 4 items. The authors, partially recreated this guilt scale from previous research of Bozinoff and Ghingold (1983) and Pinto and Priest (1991).

Based on literature, the feeling of guilt is often enhanced in advertisements by the marketers. It has been suggested that guilt appeals might evoke some sort of action (i.e., volunteering) after viewers watch an advertisement that employs guilt. Alertness and Immersion scales were created for the purpose of this study – 3 items each. All scales used for this study are presented in the appendix (Appendix A). The empathy and responsibility scales were in a Likert-scale format (ranging from 1-7, strongly disagree-strongly agree). The alertness and immersion scales on a 3-item, 7-point bi-polar scale: not alert/alert, not attentive/attentive, not focused/focused, and not engaged/engaged, not immersed/immersed, not integrated/integrated, respectively. Since the Cronbach's α measures were acceptable for both scales (Alertness Cronbach's α = .89, Immersion Cronbach's α = .95), I proceeded to use both scales. As stated by Hakan and Seval (2011), a reliability coefficient of .70 or higher is considered "acceptable" in Social Science research situations. However, in a post-hoc factor analysis test I identified and would like to acknowledge the following shortcoming. Factor analysis of the immersion scale revealed that all three scale items correlated too highly and resulted in multicollinearity. The alertness scale was found to be adequate: all three scale items correlated within the norm (under the cut-off of .80) and loaded on one factor. The guilt scale was used on a 4-item, 7-point bi-

polar scale (not guilty/guilty, irresponsible/responsible, not accountable/accountable, not ashamed/ashamed). Other variables such as age and gender were included in the survey for possible later use.

6.2 Study 1 Results

The collected data were analyzed using IBM SPSS. A reliability test for empathy and responsibility was satisfactory. Cronbach's α for the empathy scale was .90, Cronbach's α for the responsibility scale was .74, Cronbach's α for the guilt scale was .73. Regarding empathy and responsibility, the independent t-test results showed a significant difference between VR and VM. The results of the guilt construct, however, did not come out to be significant: $M_{VR} = 4.5$ (SD = 1.06) vs. $M_{VM} = 4.18$, (SD = 1.11), $t = 1.37$, p = n. s. Regarding empathy, the results revealed: $M_{VR} = 4.80$ (SD=1.18) vs. $M_{VM} = 3.38$ (SD=1.64), $t = 4.56$, $p < .01$, Cohen's $d = 0.99$.

Based on these results, people under the VR condition experienced higher empathy towards the advertised cause, compared to those who were in the VM condition. These findings are in alignment with $H1_a$ and are graphically illustrated in Figure 6.2. 1. Regarding

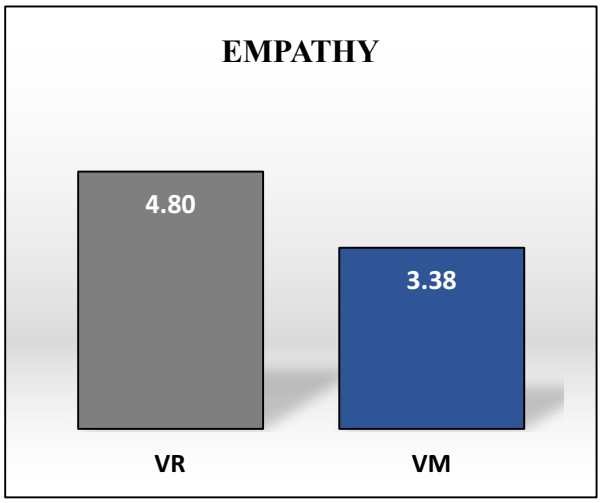

Figure 6.1: *Average Level of Empathy by Media Type*

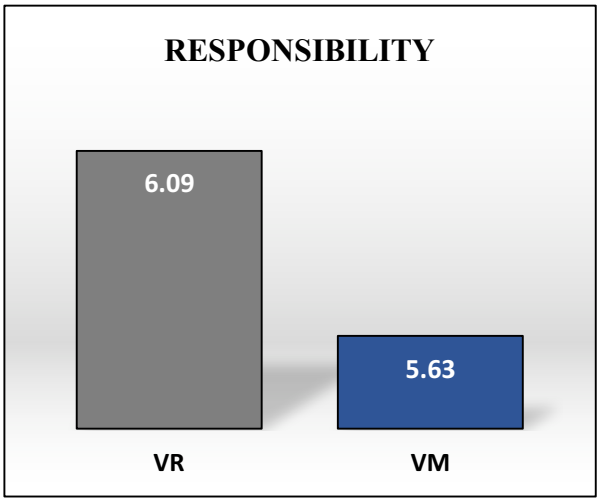

Figure 6.2: *Average Level of Responsibility by Media Type*

responsibility, the results revealed: M_{VR} = 6.09 (SD = 0.97) vs. M_{VM} = 5.63 (SD=1.07), t = 2.06, p < .05, Cohen's *d* = 0.45. Based on this result, participants in the VR condition reported more responsibility towards the social cause, compared to those in the VM condition. This result supports $H1_b$. Figure 6.2 graphically illustrates the results.

To test for $H1_c$, I examined whether empathy mediates the relationship between VR and responsibility. Initially, I used Baron and Kenny's (1986) multi-step mediation analysis to elucidate the mediating effect of empathy on the relationship between VR and responsibility.[5] To reinforce the results from Baron and Kenny's (1986) mediation analysis, the Sobel (1982) test was conducted to determine whether the reduction of the effect in the independent variable (VR) occurred after the mediator (empathy) was added into the model and whether the reduction is significant or not.[6] To further confirm the mediation effect, I used a more contemporary method – SPSS PROCESS macro, proposed by Hayes (Hayes, 2009). This new way of moderation/mediation analysis has been lately used by many researchers as a substitute to the Baron and Kenny multi-step mediation method. As opposed to the causal steps approach proposed by Baron and Kenny (1986), the SPSS PROCESS offers the output for the indirect effect (a*b), including confidence intervals and effect sizes. It also allows for bootstrapping to overcome Sobel's test limitations (e.g., dependence on a normal sampling distribution) (Hayes, 2009).

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[5] Step 1 – I examined the relationship between the independent variable - VR and the dependent variable - Responsibility. Regression results revealed that VR is positively associated with responsibility: (Standardized) β = .22, t = 2.06, p < .05. Step 2 – I investigated the relationship between the independent variable – VR and Empathy (mediator). The results revealed a positive relationship between the two variables: (Standardized) β = .45, t = 4.61, p < .01. Step 3 – I looked at the relationship between the empathy (mediator) and the responsibility (DV). Regression results show that the connection is significant: (Standardized) β = .38, t = 3.77, p < .01. Step 4 – I examined all three variables to see whether the inclusion of the mediator reduces the effects of the IV to DV: (Standardized) β = .06, t = .53, p > .05. When Empathy was introduced into the model, the relationship between independent and dependent variables became non-significant.

[6] Sobel test reinforces the mediation: t = 2.82, p < .01.

SPSS PROCESS macro, Model 4 (Hayes, 2012) was used to test a simple mediation process between the independent variable Media Type and the dependent variable responsibility, using bootstrapping methods (5,000 bootstrap samples). This mediation was hypothesized to occur through empathy.

The mediation model is proposed in Figure 6.3, with the mediation metrics described in Table 6.1. The results consist of the effect of media type (VR/VM) on responsibility without the mediating effect of empathy (path c), the effect of media type on empathy (path a), the effect of empathy on responsibility (path b), and the direct effect of media type on responsibility with the concurrent effect of media type affecting responsibility via empathy (path c'). Results shown in Figure 6.3 and Table 6.1 indicate that paths c, a, and b were all significant. Path c' was not significant, indicating that empathy is a strong mediator. A Sobel test was conducted and found full mediation in the model ($z = 2.54$, $p < .05$). It was found that Empathy fully mediated the relationship between the media type and responsibility. A measure for the indirect effect (path a*b) of the media type on responsibility (via empathy) was also presented after the regression models. In this case the effect size was .3320 (lays between the Lower Limit of the Confidence Interval (LLCI) - .1208 and the Upper Limit of the Confidence Interval (ULCI) - .6802, with a 95% confidence interval which did not include zero; that is to say the effect was significantly greater than zero at $\alpha = .05$. These findings indicate that the mediation analysis fully supported the mediating role of empathy in the relation between the media type and responsibility towards a social cause. These results directly support $H1_c$.

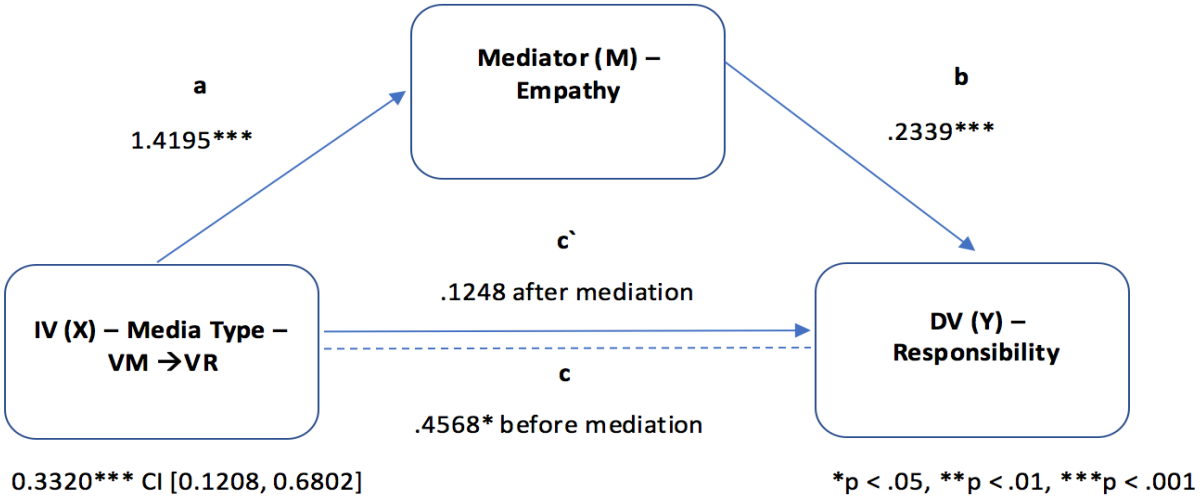


Figure 6.3: *Mediating role of Empathy and Responsibility on Media Type – SPSS PROCESS – Model 4*

Table 6.1: *Mediation Analysis Flow/Path*

	Coefficient	S. E.	t	p
1. c – before mediation	.4568	.2216	2.0615	.0424
2. a	1.4195	.3078	4.6111	.000
3. b	.2339	.0752	3.1110	.0026
4. c` - after mediation	.1248	.2363	.5282	.5988

In addition to the results of media type effects on empathy and responsibility, immersion and alertness were also measured and interpreted. Interestingly, participants in the VR condition reported greater levels of alertness: $M_{VR} = 6.39$ (SD = .69) vs. $M_{VM} = 5.63$ (SD = 1.24), $t = 3.36$, $p < .01$, Cohen's d = 0.75. Intuitively, immersion was found at a higher level in the VR condition: $M_{VR} = 5.75$ (SD = 1.24) vs. $M_{VM} = 4.41$ (SD = 1.67), $t = 4.07$, $p < .01$, Cohen's *d* = 0.91. These results are illustrated in Figures 6.2.4 and 6.2.5.

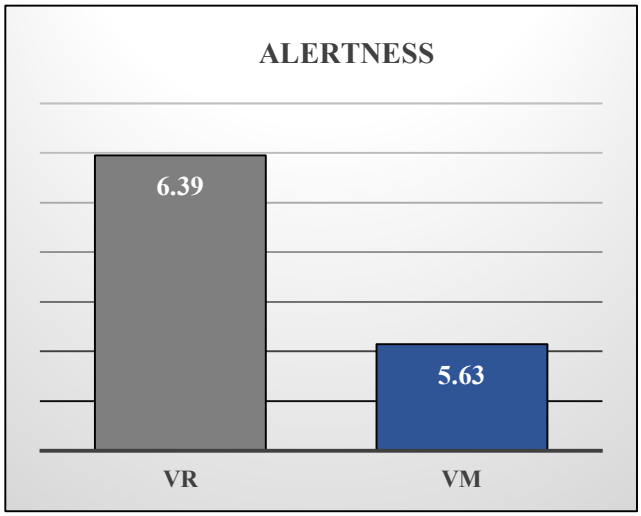


Figure 6.4: *Average Level of Alertness by Media Type*

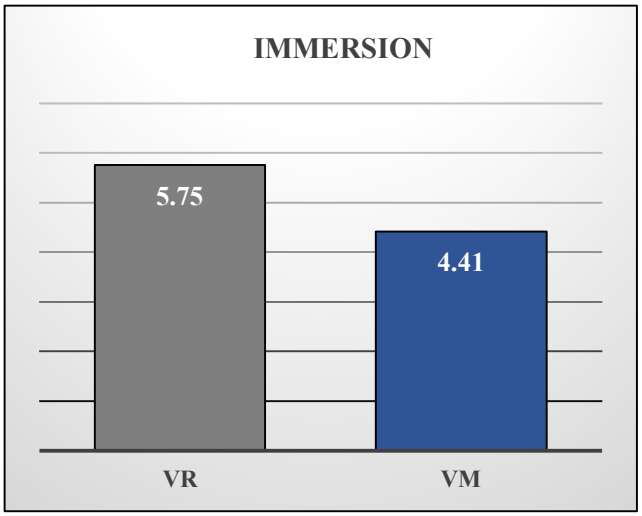


Figure 6.5: *Average Level of Immersion by Media Type*

6.3 Study 1 Discussion

Study 1 demonstrated that empathy and responsibility were triggered at a higher level in the VR condition (vs. VM) (Figure 6.1 and 6.2). Additionally, findings of this study revealed that empathy mediates the relationship between VR and responsibility (Figure 6.3).

Previous studies have stressed the importance of responsibility and its mediated effect on the relationship of guilt and money and time donation (Basil et al., 2006). This is an interesting finding, as during this study guilt did not turn out to be significant. However, the sense of responsibility, which was hypothesized to lead to higher charitable donations and more proactive social responsibility was found to be significant. Responsibility, however, did not play a role of a mediator here; empathy took its place. The findings of this study show that VR with its richness evokes empathy to a higher degree and leads to a higher level of responsibility towards a social cause when compared to VM. These results give me reason to expect a higher money and time donation outcome.

As suggested by Basil et al. (2006), higher level of responsibility, which was induced by guilt in the case of their study, leads to higher levels of charitable-donation activity. Since I was able to identify that VR leads to a higher responsibility level towards a social cause, the aim of study 2 was to investigate the effects of VR on money and time donation. Similar to Study 1, Study 2 was a one-factor between-subjects with media type as the independent variable (VR/VM) and donation of time (DT) and donation of money (DM) as the dependent variables. Study 2 tests the second hypothesis that VR increases people's donation of time and money toward social causes.

7. Study 2

7.1 Design and Procedures

In this study, 53 undergraduate students (Mean age = 20.64; 56.6% females. N_{VR} = 26, N_{VM} = 27) participated via a university-sanctioned participant pool for a partial course credit. Upon entering the experiment space, the participants were assigned into one of two conditions: VR or VM. Similar to Study 1, under the VR condition, the participants were asked to watch a video through the Oculus Rift. Under the VM condition, the participants were asked to watch the same video through a 14-inch laptop.

For this study, participants watched "A Journey to the Arctic" video created by Greenpeace. Greenpeace is a non-governmental organization that is concerned with global issues such as climate change, deforestation, overfishing, anti-nuclear and many other environmental problems. The video was downloaded through an app called "Jaunt VR". The length of the video was about 3.5 minutes. In the video, the narrator welcomes the participants to "The Artic Sunrise" Greenpeace ship, which sails through the sea ice to the high Arctic. The narrator states that polar bears live there and that their home is under threat because of global warming. The narrator encourages the viewer to protect the Arctic.

To test for $H2_a$ and $H2_b$, after watching the video the participants were asked to record their willingness to donate time and money to the cause. The following questions were asked: 1) If you were going to donate for this cause (i.e., protection of the Arctic due to the climate change consequences), how much would you be willing to donate ($1 min, $100 max)? and 2) How many hours would you be willing to volunteer for the cause (1 hour min, 24 hours max)?

In the second set of questions, similar to Study 1, we also measured variables such as alertness (3-item, 7-point bi-polar scale: not alert/alert, not attentive/attentive, not focused/focused), and immersion (3-item, 7-point bipolar scale: not engaged/engaged, not immersed/immersed, not integrated/integrated). Other variables such as age and gender were included for possible later use.

7.2 Study 2 Results

A reliability test for alertness and level of immersion both revealed a Cronbach's α of .95. The independent sample *t* tests were used to compare two hypothetical populations and their means: those in the VR and VM conditions. T-test is an appropriate hypothesis test for this study as the sample size is quite small (N=53). T-test is the only hypothesis test that deals with smaller samples, while still being robust (Glenberg, 1988). Regarding donation of money and time, independent *t*-test results showed a significant difference between the VR and VM with respect to money donation: M_{VR} = 38.12 (SD=35.48) vs. M_{VM} =15.67 (SD=18.94), $t = 2.86$, $p < .01$ Cohen's d = .78. and time donation: M_{VR} = 12.96 (SD=8.32) vs. M_{VM} = 8.41 (SD=8.40), $t = 1.98$, $p = .05$ - significant, Cohen's d = .54.

In alignment with study 1, participants in the VR condition reported greater levels of alertness: M_{VR} = 6.56 (SD = .62) vs. M_{VM} = 5.02 (SD=1.81), $t = 4.17$, $p < .01$, Cohen's d = 1.13 and greater levels of immersion: M_{VR} = 6.35 (SD = .95) vs. M_{VM} = 4.41 (SD=1.73), $t = 5.08$, $p < .01$, Cohen's d = 1.39. There were no notable gender and age effects on the dependent variables.

Based on the results, people under the VR condition indicated higher willingness to donate and volunteer towards the cause, compared to those in the VM condition. Figures 7.1 and 7.2 graphically illustrate the results. These findings confirm $H2_a$ and $H2_b$.

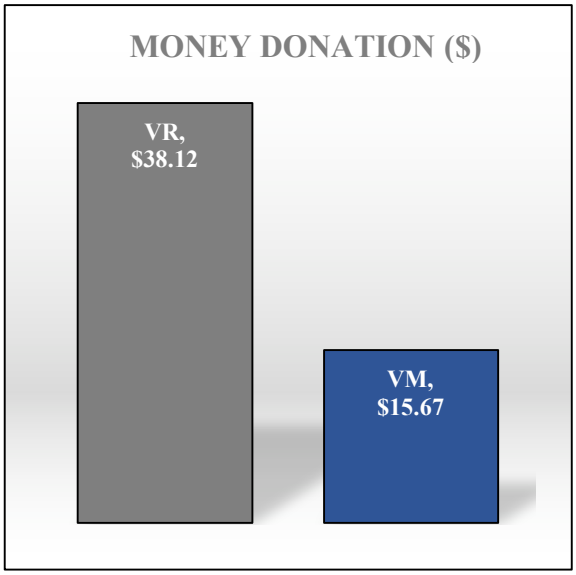


Figure 7.1: *Average Level of Money Donation ($) by Media Type*

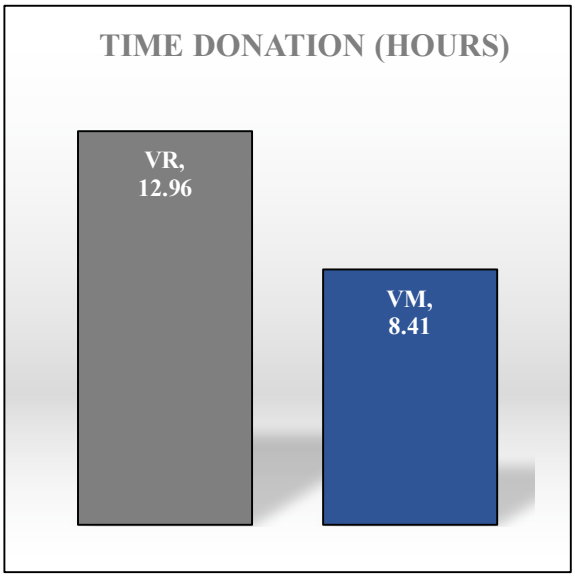


Figure 7.2: *Average Level of Time Donation (Hours) by Media Type*

7.3. Study 2 Discussion

The second study measured the difference in the intention of money and time donation between two independent groups: those who were exposed to a 3D, 360-degree advertisement of a social cause (VR condition), and those who watched the same ad on a regular, 2D flat screen of a laptop (VM condition). Similarly to study 1, immersion and alertness were tested to elucidate whether their statistically significant results identified in study 1 would hold true in this second round of testing. As hypothesized, participants in the VR condition reported higher intention to donate and volunteer towards a social cause – saving the Arctic from the negative consequences of climate change, when compared to those in the VM condition. Immersion and alertness were found to be significantly higher in VR vs. VM. A detailed discussion of these findings is presented in the general discussion section (Section 9).

Study 3 was designed to test whether the beneficial effect of VR on donation behaviour would hold true under the circumstances of social exclusion. Additionally, I set out to know whether levels of empathy and responsibility in the VR condition, identified in study 1, would hold true in those who feel socially excluded. In addition to empathy, in study 3 I decided to test the feeling of guilt, as literature shows that it is closely related to empathy (Miceli & Castelfranchi, 1998).

As discussed earlier in the literature review section (Section 4.2.), socially excluded people were found to donate and volunteer less and their prosocial motivation to help others was generally found at a lower level in comparison with those who feel socially included. As literature suggests, socially excluded people were also found to be less empathetic towards the misfortune of another person. Therefore the key focus of study 3 was to see if VR is capable of mitigating the relationship between VR and money and time donation in those who feel socially excluded.

8. Study 3

8.1. Design and Procedure

Study 3 is a 2 x 2 between-subjects design (media type: VR/VM x social belonging: SI/SE). The main intent was to test for the series of hypotheses in H3 and H4. Specifically, I was interested to see whether VR's richness, with its immersion and the sense of presence, can mitigate the emotional numbness in socially excluded people while still resulting in higher willingness to donate and volunteer towards a social cause.

The required sample size was calculated in G*Power 3[7] (Faul, Erdfelder, Lang, & Buchner, 2007), using a medium effect size of .25, a power of .80, and an α of .05. With one degree of freedom and four groups, the recommended sample size was 128. A total number of 122 undergraduate students from a large Canadian University participated in this study in exchange for a partial course credit (Mean age = 20.44, 73% females. $N_{VR\text{-}SI} = 30$, $N_{VR\text{-}SE} = 31$, $N_{VM\text{-}SI} = 30$, $N_{VM\text{-}SE} = 31$). As in the previous two studies, participants were recruited through the behavioural participant pool, using the SONA platform.

Upon entering the experiment space, the participants were randomly assigned into one of four conditions corresponding to combinations of social belonging and media type variables: VR-SE, VR-SI, VM-SE, VM-SI. Prior to VR and VM exposure, participants were exposed to a social belonging manipulation by playing a computer game called Cyberball. This is an animated ball-throwing computer game during which the participant is either included or excluded from

[7] G*Power a general stand-alone power analysis program for statistical tests commonly used in social and behavioral research

the game (Williams & Jarvis, 2006). Participants were not aware of the manipulation nature of the game. Instead, they were informed by the researcher that they will be tested on the effects of mental visualization which will be measured through the Cyberball game. Participants were told that they will be playing with three other students who would connect to the game via the Internet from a different lab. Participants were told that it does not matter how many times they catch or throw the ball. What matters is that their mental visualization of other players and the overall experience of the game. This cover story was also available on the welcome page of the game once participants logged into the game.

Participants in the SI condition received the ball one fourth of the time, while participants in the SE condition received the ball twice at the start of the game, and were afterwards excluded for the remainder of the game. The game was set for 35 throws, which resulted in the total duration of the game of about 4.5 minutes. Cyberball has been widely used by the researchers and was specifically developed for the scientific community from its prototype of a real ball-tossing game. This virtual analogue of a real ball-tossing game was intended to be more efficient and less traumatic. As pointed out by Williams and Jarvis (2006), the original face-to-face social exclusion manipulation game was cumbersome and required collaborators, training, and the task of ignoring and excluding, which was difficult to practice during the game.

After playing the computer game, the participants were asked to complete a short 3-question survey based on their game experience. The questions were:

a) To what extent were you included into the game by the participants?
b) What percentage of throws do you think you received during the Cyberball game?
c) On a scale from 1 to 9 how rejected/accepted did you feel during the game?

This manipulation check was adopted from Zadro, Williams and Richardson (2004), as they were previously tested and found to be effective. Participants' responses were documented and analyzed in IBM SPSS.

After the manipulation checks, similar to study 2, participants were asked to watch "The Source" video created by Charity Water [8]. This video depicts the hardship of not having access to potable water in rural regions of Ethiopia. Those who were randomly assigned to the VR condition watched the 3.5-minute video through the Oculus Rift VR headset. Participants in the VM condition watched the same video on a 14-inch laptop. At the end of the video, participants (those who felt socially included and excluded) were asked questions related to the social video. This study was designed to test the set of H3, and H4 hypotheses. I once again tested empathy (scale adopted from Escalas and Stern, 2003), responsibility (scale adopted from Basil et al., 2006), and guilt (scale adopted from Cotte et al., 2005), as well as the participants' willingness to donate and volunteer. In order to reconfirm the results of study 1 and 2, where VR (vs. VM) was found to provide higher level of alertness and immersion, scales of immersion and alertness were also included in study 3. In addition to measuring medium's richness through immersion and alertness, I added a new scale to test presence. This scale was adopted from Nah, Eschenbrenner, and DeWester (2011). See Appendix A. Other variables such as age and gender were included for future reference.

[8] Charity Water is a non-profit organization that is fundraising money to provide children with clean water in the areas of the world where it is not easy accessible/scarce

8.2. Results

8.2.1. Manipulation Checks

IBM SPSS was used to analyze the data and to perform a generalized linear two-way ANOVA with media type and social belonging as predictor variables, and empathy, responsibility, guilt, and money and time donation as response variables. Manipulation checks were evaluated using one-way ANOVA.

Manipulation Checks. Manipulation checks results are summarized in Table 8.1. There were three manipulation checks related to social belonging. As indicated in Table 8.1, participants in the SE reported that they felt drastically more excluded from the game when compared to people from the SI condition: F (1, 119) = 238.661, $p < .001$. Participants also reported feeling significantly rejected during the game: F (1,119) = 181.704, $p < .001$. Participants in the SE condition reported that they received six times fewer ball throws during the game than those in the SI condition: F (1, 119) = 105.926, $p < .001$.

Table 8.1: *Social Inclusion/Exclusion manipulation checks*

Manipulation Checks	**SI, N=60**	**SE, N=61**
	M (SD)	*M (SD)*
To what extent were you included by other participants during the game? F (1,119) = 238.661, $p < .001$	5.37 (1.29)	1.93 (1.15)
What percentage of throws do you think you received during the game? F (1,119) = 105.926, $p < .001$	35.22 (17.85)	9.34 (8.10)
On a scale from 1 to 7 how rejected/accepted did you feel during the game? F (1,119) = 181.704, $p < .001$	4.78 (1.39)	1.89 (0.93)

* All F values refer to the statistical significance between socially included and socially excluded groups

8.2.2. Main and Interaction Effects of Social Belonging and Media Type of Empathy, Guilt, Responsibility and Money and Time Donation

A factorial ANOVA was carried out with empathy, responsibility, guilt, money donation, and time donation as the dependent variables, and social belonging and media type as the independent variables. All statistically significant interaction effects were followed up with a planned contrasts analysis (using SPSS syntax) to determine significant interactions between the main effects.

Prior to the test, the following two-way ANOVA assumptions were met: 1) dependent variables were measured at the interval level, 2) independent variables (media type & social belonging) were categorical, 3) there was no relationship between the observations of each group, thus the independence of observations assumption was met, 4) normal distribution and homogeneity of variances were assumed, as the sample size was large enough to make such conclusion following the main principles of the Central Limit Theorem (Glenberg, 1988).

Empathy. The treatment means are illustrated in Table 8.2. and Figure 7.2. The main effect of media type on empathy was significant, $F(1, 118) = 19.673$, $p < 0.001$, indicating that people in the VR condition reported higher levels of empathy vs. VM. These results are in alignment with my findings from study 1. The main effect for social belonging, however, was not significant ($p > 0.05$). This is to say that both socially included and excluded participants felt equally empathetic towards a social cause. This finding did not support $H3_a$.

The interaction effect of media type and social belonging on empathy was not significant ($p > 0.05$), refuting $H4_a$. It is worth noting that there was no social belonging effect on empathy in the first place. Possible reasons for the observed behaviour are provided in the discussion section of this study. The treatment means are illustrated in Table 8.2. and Figure 7.2.

Table 8.2.: *The Treatment Means of Empathy*

	Media Type		
	Video Media (VM)	*Virtual Reality (VR)*	Total
Social Belonging	*M (SD)*	*M (SD)*	*M (SD)*
Social Inclusion (SI)	3.57 (1.49)	4.75 (1.29)	4.16 (1.51)
Social Exclusion (SE)	3.54 (1.68)	4.68 (1.28)	4.11 (1.59)
Total	3.56 (1.58)	4.72 (1.28)	4.14 (1.54)

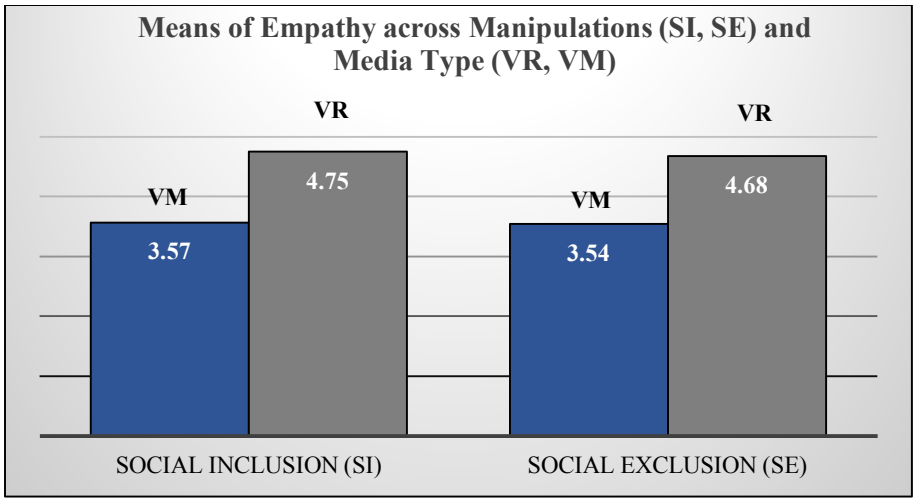


Figure 8.1: *Means of Empathy across Manipulations (SI, SE) and Media Type (VR, VM)*

Guilt. The treatment means are illustrated in Table 8.3 and Figure 8.2. The main effect of the media type was found to be significant: F (1, 118) = 5.62, $p < 0.05$. This, however, was not the case for social belonging ($p > 0.05$); $H3_b$ is therefore refuted. Similar to empathy, there was no statistically significant difference in the level of guilt between SI and SE. I propose several explanations to such findings in the discussion section of the study.

Interestingly, there was a unique interplay between media type and social belonging. The interaction effect yielded an F ratio of F (1, 118) = 5.42, $p < 0.05$. A follow-up planned contrast comparison analysis (using SPSS syntax) indicated that there is no significant difference in the

level of guilt between VR and VM in the SI condition ($p > 0.05$). However, in the SE condition participants experienced higher level of guilt in the VR than in VM. This result was statistically significant yielding an F ratio of F (1, 118) = 11.22, $p < 0.001$. These findings directly support $H4_b$, indicating that VR has no significant effect in the SI condition, but has a significant positive effect on guilt in the SE condition.

Table 8.3: *The Treatment Means of Guilt*

	Media Type		
	Video Media (VM)	*Virtual Reality (VR)*	Total
Social Belonging	*M (SD)*	*M (SD)*	*M (SD)*
Social Inclusion (SI)	4.50 (1.03)	4.50 (1.05)	4.50 (1.03)
Social Exclusion (SE)	4.00 (1.28)	4.93 (0.97)	4.47 (1.22)
Total	4.25 (1.18)	4.72 (1.03)	4.49 (1.13)

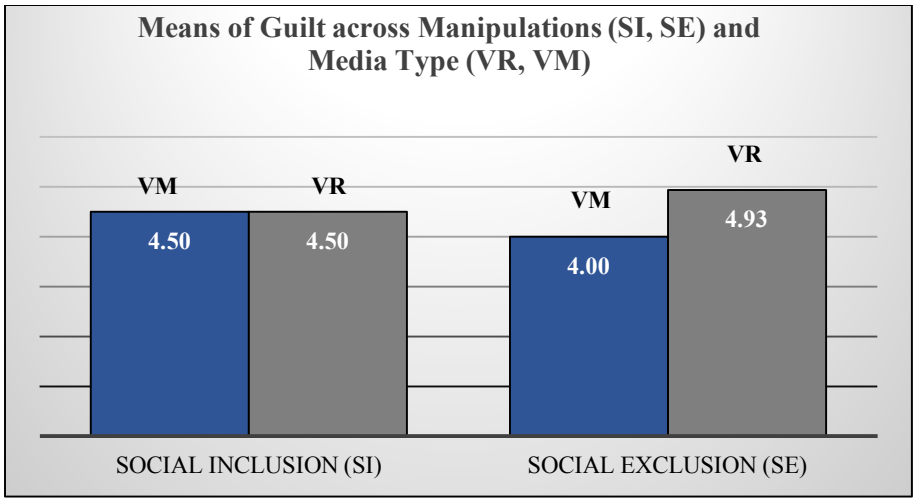


Figure 8.2: *Means of Guilt across Manipulations (SI, SE) and Media Type (VR, VM)*

Responsibility. The treatment means are illustrated in Table 8.4 and Figure 8.3. The main effect of the media type came out to be significant: F (1, 118) = 5.14, $p < 0.05$. These results are aligned with the findings from study 1. The main effect of social belonging, however,

was not significant ($p > 0.05$) and thus refutes $H3_c$. I offer several explanations for this in the discussion section of this study. Surprisingly, the interaction effect between media type and social belonging on responsibility came out to be marginally significant: F (1,118) = 3.66, p = 0.058. A planned contrast comparison revealed that there is a statistically significant difference in the level of responsibility in the SE condition between two media types, and it is much higher in VR than in VM yielding an F ratio of F (1, 118) = 8.88, $p < 0.01$. No statistical significance was noticed in the SI condition between two media types (p = .804). This is to say that VR elevated the feeling of responsibility in those who felt socially excluded, but not socially included. These findings directly support $H4_c$.

Table 8.4: *The Treatment Means of Responsibility*

	Media Type		
	Video Media (VM)	*Virtual Reality (VR)*	Total
Social Belonging	*M (SD)*	*M (SD)*	*M (SD)*
Social Inclusion (SI)	6.01 (0.75)	6.07 (0.64)	6.04 (0.69)
Social Exclusion (SE)	5.51 (1.17)	6.16 (0.80)	5.83 (1.05)
Total	5.75 (1.01)	6.11 (0.72)	5.93 (0.89)

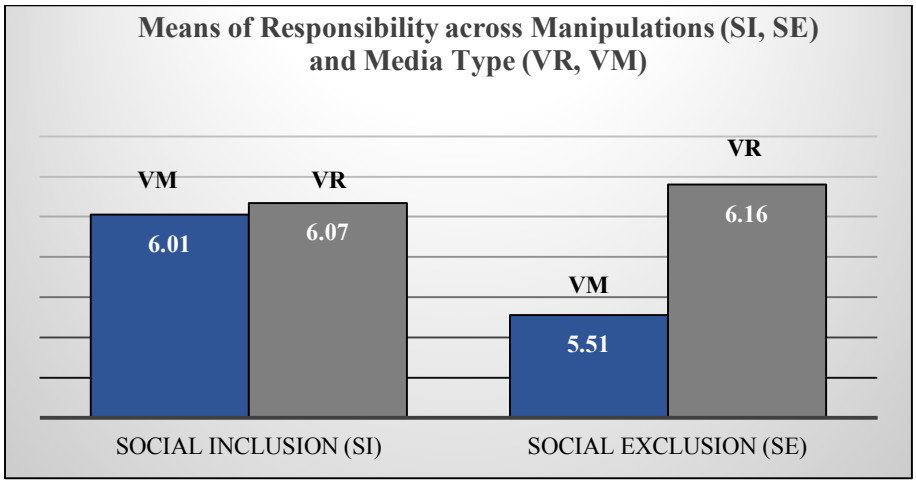


Figure 8.3: *Means of Responsibility across Manipulations (SI, SE) and Media Type (VR, VM)*

Money Donation. Neither main effects of the media type and social belonging, nor the interaction between them were significant ($p > 0.05$). These results refute $H3_d$, and $H4_d$ and contradict the money donation findings from study 2.

Time Donation. The treatment means of time donation are illustrated in Table 8.5 and Figure 8.4. In terms of time donation, the main effect of the media type came out to be significant: F (1,117) = 4.02, $p < 0.05$. The main effect of social belonging was also significant: F (1,117) = 6.68, $p < 0.05$. However, analysis of the means show that social exclusion results in higher intention of time donation. These findings contradict $H3_e$.The interaction effect came out to be significant F (1,117) = 4.03, $p < 0.05$. A planned contrast comparison revealed that those in the SE condition reported higher willingness to volunteer towards a cause in VR (vs. VM), F (1, 117) = 8.26, $p < 0.01$. No statistical significance was noticed in the SI condition between two media types ($p = 1$). These findings directly support $H4_e$, indicating that VR has no significant effect in the SI condition, but has a significant positive effect on time donation in the SE condition.

Table 8.5: *The Treatment Means of Time Donation*

	Media Type		
	Video Media (VM)	*Virtual Reality (VR)*	Total
Social Belonging	*M (SD)*	*M (SD)*	*M (SD)*
Social Inclusion (SI)	10.97 (7.77)	10.97 (8.33)	10.97(7.98)
Social Exclusion (SE)	11.81 (8.13)	17.65 (7.78)	14.73 (8.42)
Total	11.39 (7.90)	14.42 (8.66)	12.89 (8.39)

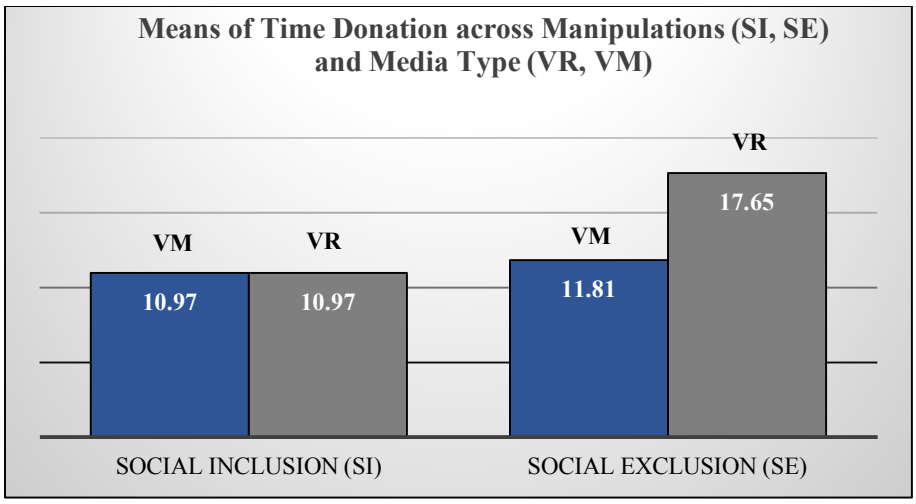


Figure 8.4: *Means of Time Donation across Manipulations (SI, SE) and Media Type (VR, VM)*

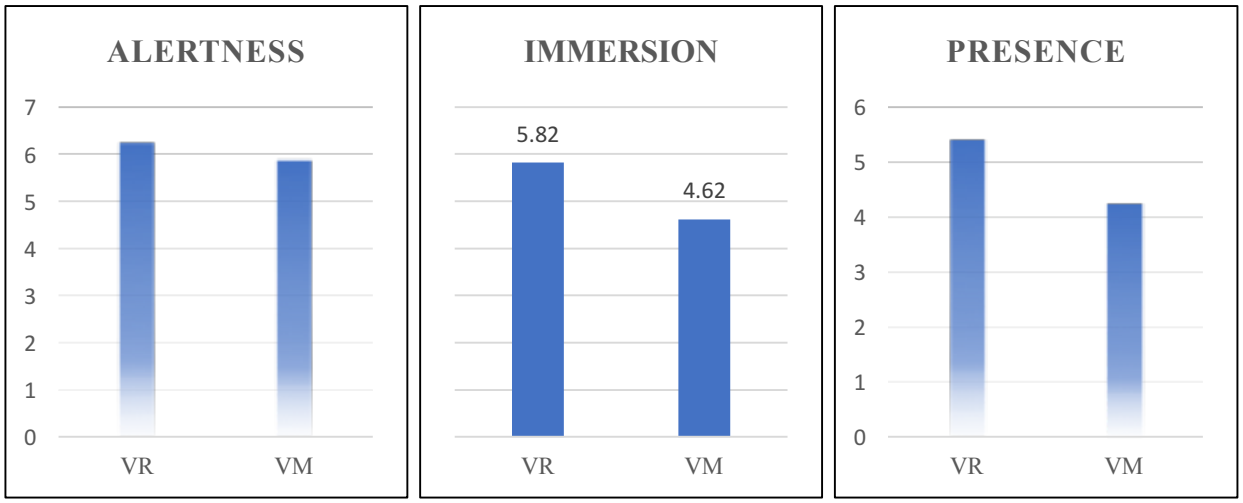


Figure 8.5: *Independent samples t-tests (VR vs. VM) – Alertness, Immersion, Presence*

To compare media richness and the level of presence in VR (vs. VM), I measured additional constructs: alertness, immersion and presence (Figure 8.5). In congruence with Study 1 and 2, participants in the VR condition (vs. VM) reported higher level of alertness: M_{VR} = 6.23 (SD = 0.83) vs. M_{VM} = 5.85 (SD = 0.94), t = 2.42, $p < 0.05$, Cohen's d = 0.44. In the same vein, immersion was reported at a higher level in the VR condition (vs. VM): M_{VR} = 5.82 (SD = 0.88) vs. M_{VM} = 4.62 (SD = 1.53), t = 5.30, $p < .001$, Cohen's *d* = 0.96. Similarly, presence was reported to be higher by the VR participants when compared to the subjects in the VM condition: M_{VR} = 5.40 (SD = 1.22) vs. M_{VM} = 4.25 (SD = 1.46), t = 4.68, $p < .001$, Cohen's *d* = 0.85. These results once again show that VR, due to its richness provides higher level of immersion, alertness and presence compared to traditional video media.

8.2.3. Multiple Mediation

Based on the results from Study 3, I decided to investigate the mechanism behind media type and its effects on money and time donation by building a multiple mediation model. I

iteratively looked at empathy, guilt and responsibility as mediators and their interrelation between media type and money and time donation.

In the $H4_a$ hypothesis, I suspected that socially excluded people in VR vs. VM would feel more empathetic towards a social cause due to social presence (even though this did not come out to be true), empathy was included into the model (Figure 8.4). Moreover, my decision to include empathy into the model is based on the fact that many scholars linked empathy to guilt (as cited in Miceli & Castelfranchi, 1998), suggesting that empathy lays the foundation for feeling guilty. In other words, one is less likely to feel guilty without going through an empathetic process. Furthermore, existential or social responsibility guilt (e.g., when one empathizes with someone less fortunate, by realizing his/her favourable conditions of living) is assumed to be triggered by empathy.

I tested the serial mediation, using model 6 of the SPSS Process (Preacher, Rucker, & Hayes, 2007). PROCESS, is an add on tool for SPSS and SAS, which assists in conducting mediation, moderation, or conditional process analysis. This statistical tool generates conditional effect in moderation and allows evaluating direct and indirect effects in mediation (Hays, 2012). Moreover, it offers many mediation and moderation models (simple and multiple) to choose from. This new way of establishing mediation argues that there is no need for a total significant effect of X on Y to occur, as earlier proposed by Baron and Kenny (1986) (Preacher and Hays, 2008). Instead, it offers the following: 1) to investigate the total indirect effect, or decide whether the set of mediators transmits the effect of X to Y; and 2) test hypotheses regarding individual mediators in the context of a multiple mediator model (i.e., investigating the specific indirect effect associated with each putative mediator) (Preacher & Hays, 2008, p. 882).

The model was run with media type being the independent variable (X) and time donation being the dependent variable (Y). This model was run at the social exclusion level only with three mediators: empathy (M1), guilt (M2) and responsibility (M3). The multiple mediation analysis was bootstrapped with 5,000 samples (Preacher & Hayes, 2008). Path coefficients correspond to changing the media type from VM to VR. The multiple mediation model revealed two main and statistically significant indirect effects: Path 1) media type to empathy to guilt to responsibility to time donation was significant (indirect effect = 0.506901, SE = 0.391691, 95% CI = 0.073469 to 1.851555); Path 2) media type to guilt to responsibility to time donation (indirect effect= 0.892361, SE = 0.622412, 95% CI = 0.089717 to 2.750294) was statistically significant as well. The overall results of the multiple mediation analysis indicate that empathy, guilt and responsibility fully mediate the relationship between VR and the intention to volunteer for a social cause. Figure 8.6 graphically illustrates these findings. The full SPSS Macro multiple mediation output of media type on time donation is presented in Appendix B.

It is worth noting that this model did not work for money donation, as there was no direct effect between media type and willingness to donate money at the SE level. The detailed SPSS Macro multiple mediation output of media type on money donation is presented in Appendix C.

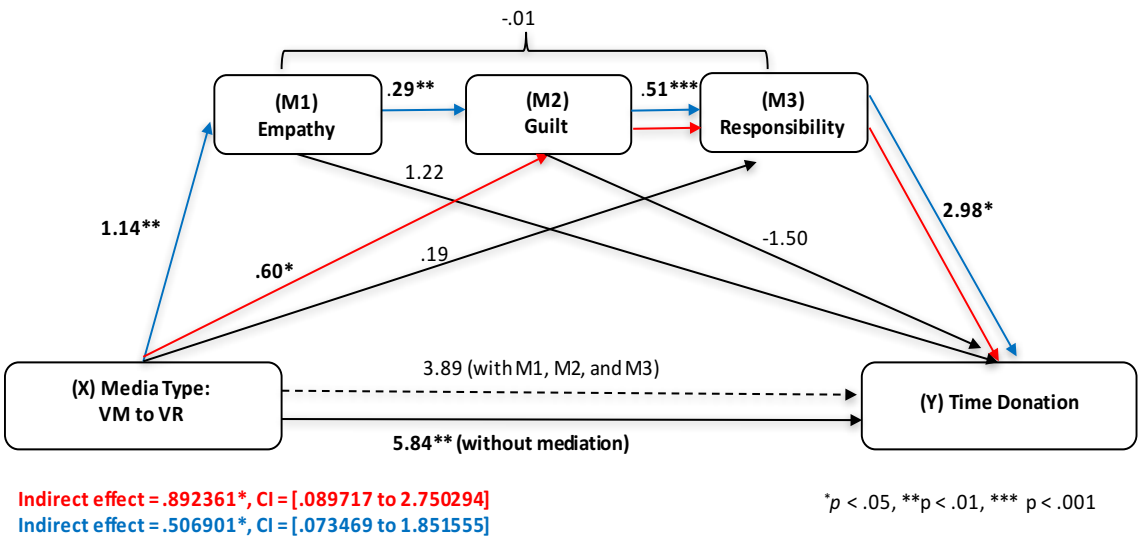


Figure 8.6: *Mediating role of Empathy, Guilt and Responsibility on Virtual Reality (VR) and Time Donation - SPSS PROCESS – Model 6*

8.3. Study 3 Discussion

In Study 3 I aimed to explore the effectiveness of VR in influencing prosocial behaviour within different social belonging conditions. Overall, I expected that social exclusion would result in a decline in prosocial behaviour, but VR would counteract this effect. The following table summarizes the relevant hypotheses and experimental outcomes.

Table 8.6: *Experimental Hypotheses and Results Summary*

H#	Effect Tested	Hypothesized	Observed
H3	SI vs. SE (SI → SE)	a) Empathy ↓[1] b) Guilt ↓ c) Responsibility ↓ d) Money Donation ↓ e) Time Donation ↓	a) Empathy = [2] b) Guilt = c) Responsibility = d) Money Donation = e) Time Donation ↑*
H4	(VM→VR)@SE vs	a) Empathy ↑ b) Guilt ↑	a) Empathy = b) Guilt ↑*

	(VM→VR)@SI	c) Responsibility ↑ d) Money Donation ↑ e) Time Donation ↑	c) Responsibility ↑* d) Money Donation = e) Time Donation ↑*

[1] SI > SE, [2] No different

In order to explore the proposed counteractive effect of VR, social exclusion would first have to be shown to diminish empathy, guilt, responsibility and money and time donation in socially excluded subjects. However, this was not the case. A statistically significant difference between SI and SE was noted only in time donation; socially excluded people reported higher intention to volunteer than socially included participants. This can be possibly explained by the fact that socially excluded individuals are more likely to volunteer to regain social inclusion. Empathy, guilt, responsibility and money donation intention were not statistically different. These results are not aligned with literature which suggests that socially excluded people feel less empathetic, less guilty, less responsible and tend to donate less money toward social causes. To account for the disconnect of these results with literature, I explored several possible explanations.

The first possibility is that the manipulation procedure might have been not as robust as I initially thought. The Cyberball manipulation game has been used by many social scientists to test ostracism and is a well-known and widely-used procedure with high validity. However, one study noted that a face-to-face social exclusion manipulation was more impactful than a computer-generated procedure (Twenge et al., 2007). Therefore, it is possible that using a face-to-face social exclusion manipulation could possibly result in a different outcome. This, of course, can only be addressed in future studies.

Since the manipulation check was validated to be statistically significant, I had to acknowledge the possibility of social exclusion having truly no net effect on prosocial behaviour. This, of course, would refute much of the literature reviewed in support of the hypotheses

development (See section 5). Further exploration of literature on the effects of social exclusion brought my attention back the fact that socially excluded people might respond in a contradictory way. Sources show that in some cases ostracized individuals cooperated more and retained social vs. individual thoughts and memories (Gardner, Pickett, & Brewer, 2000). In other words, exclusion can sometimes induce pro-social behaviour. Williams et al. (2007) suggest that people's response to social exclusion depends on the following four fundamental needs: *self-esteem, belonging, control, and meaningful existence*. Socially excluded people, who are concerned with control and meaningful existence, are expected to negatively react to prosocial behaviour. On the other hand, people with the primary need to belong, are expected to cooperate more and act prosocially to regain their position in society.

These opposing pro-social and anti-social effects of social exclusion suggest that the social belonging conditioning may have varied outcomes and is likely a more complex dependency than was originally assumed based on literature reviewed in the hypothesis development stage. It is therefore possible that the net zero effect between SI and SE could be explained by the fact that some participants of the study were concerned with belonging, while others were concerned with gaining control or meaningful existence. These opposing beliefs, and therefore responses to social exclusion, might have led to an overall zero net effect, thus confounding the results. Determining the participants' fundamental needs would have helped to better understand and explain participants' individual response to social exclusion and should be addressed in future studies.

I also aimed to reconfirm the effectiveness of VR over VM in terms of empathy, guilt, responsibility and money and time donation to examine whether study 1 and 2 findings would hold true. It was reassuring to observe a statistically significant difference between two media

types in empathy, guilt, responsibility and time donation. These findings are in alignment with study 1 and 2 and my previous arguments that VR is a richer medium of communication, which has shown to engage emotions, while encouraging the intention to act prosocially. Money donation, however, was not found to be significant. Since the level of guilt increased in VR over VM, I anticipated to observe a higher intention to donate money. As outlined in literature, one cannot feel guilty if he/she does not feel responsible. Responsibility, in turn, has been shown to mediate the relationship between guilt and prosocial behaviour, while leading to higher donations (Basil et al., 2006). Keeping in mind that the manipulation checks indicated a statistically significant difference between SI and SE, the zero effect between socially included and socially excluded people on money donation contradicts the literature. Previous studies showed that socially excluded people donated less money vs. socially included people (Twenge et al, 2007). The fact that media type had no effect on money donation contradicts the findings outlined in study 1. Moreover, if guilt and responsibility were triggered by the media type VR, it is not clear why responsibility did not result in an outcome of higher money donation. This unexpected result can be explained by several possibilities. First, it might be the case that participants did not trust Charity Water – a charitable organization presented in the video. In Study 2 participants were asked to indicate their willingness to donate to a cause that was advertised by Greenpeace, a well-known non-profit organization. In study 3, Charity Water, a small, not so well-known non-profit organization advertised a social cause. Bendapudi et al. (1996) state that awareness of a charitable organization might lead to generosity. Thus, by not knowing the organization, participants might have experienced lower trust towards Charity Water. This could possibly result in a lower intention to donate. Secondly, VR, with its media richness and augmented social presence, might possibly lead to an opposite reaction on

donations. Such a possible outcome might be triggered by the enlarged magnitude of a social issue. For example, one might think "Even if I donate $10 today, I do not think it is enough to make a difference." This is to say that potential negative effects of presence should be investigated.

Although social exclusion was found to generally have no net effect on the participants' empathy, guilt, responsibility and money donation, social exclusion played a role in the effectiveness of VR vs. VM. This is evident from the statistically significant interactions of the media type and social belonging variables presented in the factorial analysis in section 8.2.2. VR was found to result in a greater improvement of guilt, responsibility and time donation over VM in the SE case, as hypothesized in H4. Literature shows that socially excluded people need to be reassured that there is a chance for them to be included into the society again before they make an effort to repair lost social belonging (Twenge et al., 2007). I suspect that VR provides that reassurance to its socially excluded participants by first making them feel included due to enriched social presence of other actors within the virtual setting. Where in the SI condition social presence (facilitated through VR's richness) boosts participants' empathy, responsibility, money and time donation; in the SE condition, social presence likely helps them first overcome exclusion and then further helps them boost their emotional and cognitive engagement. In other words, in the SE condition, VR's social presence characteristic potentially has two beneficial effects: 1) reversing exclusion, 2) boosting emotional and cognitive engagement. Both effects contribute to VR's overall ability to increase empathy, guilt, responsibility and money and time donation, but the first effect is specific to the SE condition, making VR's total effect even stronger for socially excluded participants.

This research mainly concentrated on the richness of the medium by measuring immersion, presence and alertness. It should be noted that social presence is a specific subset of presence and was not directly measured in the study. Inclusion of the social presence scale would have provided better insight into the beneficial effects of social presence on socially excluded participants. Future studies might consider including the social presence scales proposed by Biocca et al. (2001) or Gunawardena and Zittle (1997).

Interestingly there was no interaction between social belonging and media type on empathy, as it was observed in guilt. Based on literature, social exclusion results in a lack of emotional responses (DeWall & Baumeister, 2006). However, VR as a rich medium of communication with higher social presence was hypothesized to boost it up ($H4_a$ and $H4_b$). Why did the interaction of VR and SE lead to higher level of guilt, but not empathy? Empathy and guilt are emotions and usually occur within similar social settings. Empathetic process has been hypothesized to be one of the main components that is present in guilt (Hoffman, 1982). Children, for example, learn to feel guilt through empathy (Miceli & Castelfranchi, 1998).

To investigate why socially excluded people in VR felt more guilty but did not indicate a higher level of empathy, I ran a multiple mediation analysis without empathy. To my surprise, the indirect effect between media type and time donation through guilt and responsibility was as high as with empathy, losing only 0.31% of the total effect of the model (indirect effect= 1.381172, SE = 0.889879, 95% CI = 0.197548 to 3.950466; SPSS macro output is available in Appendix D). This gives me reason to believe that guilt and empathy are closely related. I suspect that participants might have felt these emotions interchangeably. Future studies are needed to disambiguate the two, if necessary.

One of the most surprising results in Study 3 was that people in the SE condition (vs. SI) indicated a higher desire to volunteer, but not donate. To explain this discrepancy, I considered several possible explanations. As indicated in literature, when people are asked about money they become less helpful and more distant with others (Vohs, Mead, & Goode, 2006). This is supported by the fact that money-ask questions are linked to suppressing the goals of emotional well-being and happiness, instead, triggering the economic utility goals. Time-ask questions, on the other hand, are linked to the beliefs of personal happiness and connection with others (Liu & Aaker, 2008). Social belonging can be possibly the case where both parties, socially included and excluded people become sensitive when it comes down to money donation. Socially included people do not want to suppress the feeling of happiness and personal well-being when asked about money, thus indicating lower money donation. Socially excluded subjects, on the other hand, do not appreciate money-time questions that lead to suppressing the benefits of personal happiness and emotional well-being that they are thriving to reestablish. Instead, consciously or subconsciously, they prefer to lean towards volunteering/time donation. As indicated in literature, "Thoughts of spending time for a charity appear to activate an emotional mind-set, thereby making salient the connection between personal happiness and charitable giving—and possibly infecting the desire to achieve meaning and happiness in life." (Liu & Aaker, 2008, p. 552).

The multiple mediation analysis (Section 8.2.4., Figure 8.6), was based on the hypotheses H3 and H4 presented in section 8.2.2. The mediation analysis findings revealed that a change in media type from VM to VR at the SE level (i.e., a change to a richer medium), does not directly lead to higher intention to volunteer (Figure 8.6). Instead, VR's media richness triggers empathy, empathy leads to a higher level of guilt, guilt leads to a higher level of responsibility, which then

results in a higher intention to volunteer. This model illustrates that VR can assist its socially excluded viewers with the cognitive empathetic process (through empathy and guilt), and as a result, increase responsibility for somebody else's plight, leading to higher intention to donate time/volunteer, but not money.

9. General Discussion, Limitations, Future Research & Implications

The main motivation for this research was to investigate and explain the effects of virtual reality on people's responsibility towards social issues, and in turn, how and if empathy, guilt and responsibility lead to higher levels of money and time donation in VR vs. VM. Even though many assumptions have been made in the media about VR's capability to evoke empathy for humanitarian purposes, to my knowledge, this is the first comprehensive experimental research that provides empirically tested results of the proposed effects of VR.

The current literature on VR is mostly theoretical and provides information on what VR is and what it can possibly do. However, the prosocial implications of VR are mostly unexplored. Results of this research fulfill such dearth in literature by showing that VR is superior to traditional video media. In this research VR's dominance is explained by the MRT and the SPT theories which laid the foundation of the hypotheses development. Due to media richness and the augmented social presence provided by VR, people in this new medium reported to feel more empathetic, guilty, and responsible towards a cause. Moreover, they indicated higher intention to donate and volunteer. Additionally, this research looked at whether these emotional and prosocial behaviour outcomes would hold true in socially excluded people. Much literature shows that socially excluded individuals are emotionally and socially disengaged.

The first study demonstrated that people in the VR condition vs. VM, reported higher level of empathy and responsibility towards a social cause. Simple mediation illustrated that empathy fully mediates the relationship between VR and responsibility (see Figure 6.3). These findings alone provide insight into VR's capability to trigger empathy and social responsibility.

This knowledge can benefit social marketers and charitable organizations in selecting media appropriate for their fundraising campaigns.

The second study complemented the first by demonstrating that people intended to donate more money and time after watching a video in VR (vs. VM). These results show a logical continuation of VR's effect on empathy and responsibility. When people feel responsible for a cause their responsibility is most likely to manifest in action (i.e., donate, volunteer). These observations alone place VR at a more promising place to communicate social issues, while leading to a higher intention to support a cause through money or time donation.

The third study showed that VR had a more pronounced, positive effect on socially excluded people. They felt more guilty and responsible, indicating a higher desire to volunteer towards a social cause, but not donate money. These findings are inconsistent with previous reports on the negative effects of ostracism on prosocial behaviour. Although money donation behaviour needs further investigation, these results indicate that VR has the potential to mitigate the feeling of social exclusion and its negative effects on prosocial behaviour. Furthermore, based on these findings, VR seems to be better suited for soliciting time donation, but not money in socially excluded people.

Study 1, 2 and 3 present noteworthy findings; they suggest that the main positive implication of VR within social context is its teaching capability towards social responsibility through emotions. As suggested by the media, VR can play a role of an "empathy machine" while pledging higher humanitarian relief. While it is important to empathize with others, it is necessary to act in a socially responsible way to make a change. Emotions, such as empathy and guilt, play a significant role in the outcome of the prosocial behaviour, as they shape and direct human activity. Previous research has shown that responsibility mediates the relationship

between guilt and money donation. This research takes it further by showing that VR due to its richness and social presence enhances empathy, guilt and responsibility when compared to traditional video media. It plays a role of a catalyst to indirectly spark social responsibility, while leading to higher money and time donation. Additionally, this research shows that VR can boost the emotional numbness of socially excluded people, by making them feel more empathetic and guilty. This leads to a higher outcome of this emotional process, which is increased responsibility. Increased responsibility, finally, encourages to give back to the society through volunteering.

9.1. Limitations

There are several limitations to this research. The first overarching limitation is concerned with the representativeness (external validity) of the results. First, the lab studies were conducted in an artificially-contrived setting. Blaikie (2007) writes, "the most serious threat to the possibility of generalizing results obtained in social experiments comes from the fact that people may behave differently in experimental situations than they do in natural situations." (p. 169). While acknowledging that the natural social settings of a charitable event could be more suitable for this research, I proceeded with artificial settings to increase the internal control of the studies. The controlled environment was necessary to observe the investigated phenomenal behaviour while holding the independent variables constant, and manipulating the dependent variables.

Second, all three studies were conducted through an undergraduate student participation pool. This participant pool was primarily used due to its accessibility and I believe it to be appropriate for this initial investigation. I certainly acknowledge that it would be unfitting to generalize these research findings to the entire population, rather present clear and consistent

evidence that VR, as a rich medium of communication, is superior to VM in terms of communicating social issues, while pledging higher money and time donation outcome. Moreover, with support of the MRT and the SPT theories, I took a step to explain how VR effects depend on the richness of the medium and its capacity to provide enhanced face-to-face interaction where virtual social actors are perceived as real. However, I acknowledge that younger people (the average age of a participant was 20) might be more comfortable with the VR technology, and therefore more perceptive to its immersive and influential nature. Older people who are not tech-savvy, might perceive the richness of the VR technology as overwhelming and distracting. Thus, further studies should be conducted on a broader population of actual donors/volunteers in different age categories. This will allow testing the identified effects in the researched phenomenal behaviour, while further increasing the external validity of the findings.

Next, participants were not asked to provide actual monetary and time contributions. Instead, participants were asked to indicate their hypothetical charitable-donation intention. I decided not to involve actual money and time donation as the participant pool consisted of undergraduate students. I acknowledge that the actual money and time donation behaviour might be different if the participants were asked to provide real contributions. I understand that the intention and action to donate and volunteer might lead to two different outcomes. However, previous empirical studies show that indication to do something is directly linked to the actual action of doing it. People who indicated a higher intention for an action, were more likely to perform the action vs. those who did not indicate any intention (Liu & Aaker, 2008).

To mitigate the effects of the above-mentioned limitations in order to increase the external validity of the study, I conducted a quasi-experiment under natural social settings of a real charitable event. Blaikie (2007) writes that "quasi-experiments are included under natural

social settings to identify research in which experimental procedures are used outside the laboratory." (p. 166). I partnered with Amref, an international non-government charitable organization with an office in Toronto, which is concerned to improve health and health care in Africa. I was invited to attend their yearly fundraising event and was endorsed to recruit actual donors/volunteers to participate in the study (replication of Study 2). This study would also allow for testing VR vs. VM media with real money and time donation. Although this attempt was expected to be promising, I was not able to recruit the sufficient number of participants to meet the sample size and power requirements of the study (only ten people agreed to participate in the study). Nevertheless, by following the results of Study 1 and 2, I recommend that future research involves realistic money and volunteer time donation outside of the laboratory environment.

The third limitation of this research is concerned with the VR technology and its effects. Even though VR and its applications have been enthusiastically studied since the 90's and more so in the recent years, this phenomenon is yet to be fully understood. This research concentrated on the prosocial application of VR. It illuminated that people would indicate higher wiliness to donate and volunteer after being exposed to a social advertisement through VR, when compared to VM. I acknowledge that this effect might be related to the novelty of the technology and the excitement around its potential applications and constantly updated context, which is freely available to the public.

In conclusion, undoubtedly this research does not provide clearly identified and explained mechanisms behind VR's success over VM in advertising social issues. Moreover, more research needs to follow to understand fully the influential nature of this rich medium of communication and how it triggers empathy, responsibility, and higher charitable-donation outcome. Nevertheless, in terms of general explanation based on immersion, sense of presence and the

MRT and the SPT theories I was able to verify that VR is more efficient than VM, in terms of augmenting empathy, responsibility, and money and time donation. Moreover, VR was also shown to positively influence socially excluded and disengaged people by boosting their guilt, responsibility and time donation towards a social cause. The consistency of the findings across all three studies supported the initially conjectured theory that the positive effects of empathy, guilt, and responsibility on the prosocial behaviour of money and time donation are boosted by VR (vs. VM) at a higher level.

9.2. Future Research

More research is essential to understand the influential nature of VR and its effects on the society. Future studies can explore the emotions elicited by VR. Additionally, to further understand why people feel more empathetic through VR, it would be beneficial to conduct interviews in order to understand this phenomenon at a deeper level. It would be beneficial to investigate the sustainability of VR's effectiveness on influencing donation behaviour. That is, is the effect immediate or long-lasting? A longitudinal study on the retention of the empathetic effect of VR can help establish whether VR changes people's perception on issues or has a mere ephemeral effect. It is also suggested to conduct similar studies in the natural settings, with real/potential donors and volunteers to improve the external validity of the research. It would be beneficial to test VR and its prosocial application among all age categories. This nuance will allow identifying the reactional differences towards VR amongst younger and older generations. That is, does the sense of presence and immersion that VR provides persuade or divert older generations in the context of money and time donation? Lastly, it is essential to investigate the negative effects of the medium. Even though in this research I explored the beneficial potential

of VR, it is worth noting that VR can be used for propaganda, and stimulating the dystopian views of the reality. Ulrich (2015) was able to examine some propagandistic video games, such as "*America's Army"* and *"Glorious Mission"* and their influence on the public. He states that such comparison allows us to predict how VR can be used in the future to promote violent behaviour and indoctrination. Also, VR might have a negative effect towards money and time donation by presenting social issues at their face value, without any "filters" by "enlarging" the magnitude of the issues due to immersion and presence. This potentially might lead to withdrawal in social responsibility and prosocial behaviour, as one might feel too insignificant to make a difference.

Literature shows that trust sharply drops in socially excluded people (Twenge et al., 2007). Future studies might be interested to explore how VR can mitigate the diminished by social exclusion trust. Charitable organizations might benefit from such findings, as literature shows that trusted charitable organizations pledge higher prosocial outcome (Bendapudi et al., 1996).

Additionally, current research investigated the emotions involved in charitable-giving and how they are influenced by VR. It would be interesting to investigate whether and how VR affects people's cognitive process through positive values and ideas towards social responsibility and charitable-donation. In other words, does the inclusion of increased social and personal values and ideas provided within the 3D context positively affect social responsibility and money and time donation towards a cause? Is this effect a mere short-term reaction to the context, or it has a long-lasting effect by boosting one's personal values, and consequently social responsibility.

Lastly, based on Study 3, VR showed a significantly higher and positive effect on responsibility in socially excluded people when compared to VM. This finding lays a foundation for further studies to explore whether VR has the potential to not only boost emotions, but teach and encourage social responsibility in those who are socially disengaged.

9.3. Implications

Non-profit and charitable organizations have a difficult task to engage potential donors and volunteers into social issues they support. How people perceive the advertised issue mainly depends on their personal experience and understanding of the issue, as well as exposure to the information and how it is presented (Bendapudi et al., 1996). Understanding of a need is drastically affected by the way charities present it to the public, be it either through images on brochures, commercials, emails, and text messages. Such presentation methods assist potential volunteers and donors to create cognitive understanding of a current state of a social issue and its urgency. The process relies on the mental comparison of what it is and what and how it should be (Bendapudi et al., 1996). For example, when one observes that in some parts of the world people do not have access to clean water, which is a basic need for everyone to survive; he/she creates an image of a distant reality by comparing it to his/her reality while concluding through this comparison that every person should have access to clean water. Bendapudi et al. (1996) stress that donors perceive charities as agents that distribute help on their behalf and that charity's image depends on the media context through which the appeals are made. Authors state that people pay more attention to immediate cues, rather than remote cues. Thus, whether or not and by what degree donors rely on the charity's image is directly linked to the immediate cues provided by the charity. This process has the potential to benefit from VR, as its immersive

nature provides immediate cues about distant realities in a here-and-now mode. Furthermore, it allows potential donors to become direct and active agents in distributing help. Additionally, VR has the potential to educate people about social responsibility by providing first-hand exposure to social issues around the world. Lastly, VR medium can potentially deliver not only the 3D, 360-degree imagery, but the idea that a positive change is in your hands.

Many assumptions have been made in the media about VR's capability to evoke empathy for humanitarian purposes. However, to the best of my knowledge, this is the first comprehensive academic paper that examines the effects of VR on prosocial behaviour. This research is the first to explain whether and how VR can enhance people's willingness to donate when compared to traditional video media. This research contributes to the field of social marketing.

From a practical perspective, the research findings can provide social marketers and non-profit organizations with a better understanding of this new medium of communication. Also, this research results highlight VR's potential application in educating people about global issues and promoting social responsibility, while evoking empathy. While charitable and human rights organizations such as United Nations, Global Citizen and Amnesty International are exploring the potential use of VR in a charitable-donation context, findings outlined in this research provide such organizations with insight into the aspects of immersion and social presence and their effects on empathy, guilt, responsibility and donation behaviour of money and time when using VR in social advertisements. Also, this research explains that when it comes down to social belonging, VR is more likely to pledge higher volunteerism in those who feel socially excluded. However, it might be not as affective for pledging higher money donations in those who feel socially rejected.

As shown in study 1 and 2, by investing into VR's technology and content, charitable organizations have a higher chance to boost donors' empathetic process, which will lead to higher responsibility and higher intention to donate and volunteer when compared to traditional video media.

Social exclusion is a prominent factor to consider in prosocial behaviour, as it has been shown to negatively affect the empathetic process and the overall drop in charitable-donation outcome (see section 3.2.). Study 3 assists social marketers and social scientists in further understanding of VR effects when emotional engagement towards a social cause is dormant. Furthermore, results show that VR boosts guilt and responsibility in socially excluded people while pledging higher desire to volunteer for a cause. Although, additional studies are needed to investigate how VR can encourage more money donation (but not time), these research results lay the foundation to be cautious and not to generalize that VR is equally capable of delivering higher money and time donation in those who feel socially excluded.

From a theoretical perspective, this research contributes to the cumulative knowledge of the field of marketing, as this academic paper examines the effects of VR on prosocial behaviour in the context of social marketing. This research also contributes to literature on VR and its prosocial applications. This research allows social scientists to better understand the influential nature of VR and further incorporate its advantageous potential to benefit the society as a whole. This research makes several suggestions for future research to better understand both, positive and negative implications of VR.

Appendices

Appendix A: Scale Items

Measured on a 7-poin Likert scale (1 = strongly disagree to 7 = strongly agree)

Empathy Measurement - adopted from Escalas and Stern (2003)

1. While watching the ad, I experienced feeling as if the events were really happening to me.
2. While watching the ad, I felt as though I were one of the characters.
3. While watching the ad, I felt as though the events in the ad were happening to me.
4. While watching the commercial, I experienced many of the same feelings that the characters portrayed.
5. While watching the commercial, I felt as if the characters' feelings were my own.

Responsibility Measurement - adopted from Basil et al., (2006)

1. I should help because I am so much better off than they are.
2. I have a responsibility to do what I can to help.
3. Helping is the right thing to do.

Guilt Measurement - adopted from Cotte, Coulter, and Moore (2005)

To what extent did you feel/experience the following while watching the video?

Not guilty	1	2	3	4	5	6	7	Guilty
Irresponsible	1	2	3	4	5	6	7	Responsible
Not accountable	1	2	3	4	5	6	7	Accountable
Not ashamed	1	2	3	4	5	6	7	Ashamed

Immersion Measurement:

*To what extent do you feel you were a **part** of the video?*

Not Engaged	1	2	3	4	5	6	7	Engaged
Not Immersed	1	2	3	4	5	6	7	Immersed
Not Integrated	1	2	3	4	5	6	7	Integrated

Alertness Measurement:

*How **alert** were you during the video?*

Not alert	1	2	3	4	5	6	7	Alert
Not attentive	1	2	3	4	5	6	7	Attentive

Not focused 1 2 3 4 5 6 7 Focused

Telepresence Measurement - adopted from Nah, Eschenbrenner, and DeWester (2011)

Measured on a 7-poin Likert scale (1 = strongly disagree to 7 = strongly agree)

1. I forgot about my immediate surroundings when I was navigating in the Charity Water virtual/video tour in Ethiopia
2. When the virtual/video tour ended, I felt like I came back to the "real world" after a journey
3. During the virtual/video tour, I forgot that I was in the middle of an experiment
4. The computer-generated world seemed to be "somewhere I visited" rather than "something I saw"

Money Donation Measurement:

If you were going to donate for this cause, how much would you be willing to donate ($1 min, $100 max)? Please indicate here _____

Time Donation Measurement:

How many volunteer hours (in total) would you be willing to provide for the cause, as a one-time donation (1 hour min, 24 hours max)? Please indicate here _____

Manipulation Checks – Ostracism Measurement – adopted from Zadro, Williams, and Richardson (2003)

1. To what extent were you included into the Cyberball game by other participants?

Excluded 1 2 3 4 5 6 7 Included

2. What percentage of throws do you think you received during the Cyberball game? Please indicate here _____

3. On a scale from 1 to 7 how rejected/accepted did you feel during the game?

Rejected 1 2 3 4 5 6 7 Accepted

Appendix B: SPSS Process Output – Time Donation (Study 3)

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com

****
Model = 6

Y = Time Donation
X = Media Type
M1 = Empathy
M2 = Guilt
M3 = Responsibility

Sample size
62

****
Outcome: **Empathy (M1)**

Model Summary

R	R-sq	MSE	F	df1	df2	p
.362601	.131479	2.225290	9.082976	1.000000	60.000000	.003776

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.258065	.966016	1.302323	.197783	-.674265	3.190394
X	**1.141935**	.378903	3.013798	**.003776**	.384013	1.899858

****
Outcome: **Guilt (M2)**

Model Summary

R	R-sq	MSE	F	df1	df2	p
.524381	.274976	1.112274	11.188298	2.000000	59.000000	.000076

Model

	coeff	se	t	p	LLCI	ULCI
constan	1.783090	.692548	2.574681	.012562	.397296	3.168883
M1	**.294211**	.091272	3.223454	**.002065**	.111575	.476846
X	**.591450**	.287442	2.057632	**.044053**	.016277	1.166623

****
Outcome: **Responsibility (M3)**

Model Summary

R	R-sq	MSE	F	df1	df2	p
.624533	.390042	.707528	12.362827	3.000000	58.000000	.000002

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.110327	.582556	5.339105	.000002	1.944208	4.276446
M1	-.006072	.078946	-.076915	.938956	-.164100	.151955
M2	**.506617**	.103834	4.879101	**.000009**	.298769	.714465
X	.193002	.237337	.813198	.419430	-.282082	.668085

****
Outcome: **Time Donation (Y)**

Model Summary

R	R-sq	MSE	F	df1	df2	p
.500901	.250902	56.857066	4.772872	4.000000	57.000000	.002165

Model

	coeff	se	t	p	LLCI	ULCI
constant	-10.663113	6.377745	-1.671925	.100021	-23.434407	2.108180
M1	1.218057	.707734	1.721067	.090663	-.199164	2.635278
M2	-1.499686	1.105447	-1.356633	.180247	-3.713319	.713947
M3	**2.978126**	1.177081	2.530094	**.014191**	.621047	5.335204
X	3.885210	2.139670	1.815799	.074662	-.399432	8.169853

********** TOTAL EFFECT MODEL **********
Outcome: **Time Donation (Y)**

Model Summary

R	R-sq	MSE	F	df1	df2	p
.349480	.122136	63.298925	8.347744	1.000000	60.000000	.005366

Model

	coeff	se	t	p	LLCI	ULCI
constant	.129032	5.152156	.025044	.980103	-10.176872	10.434936
X	**5.838710**	2.020842	2.889246	**.005366**	1.796402	9.881018

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
5.838710	2.020842	2.889246	**.005366**	1.796402	9.881018

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
3.885210	2.139670	1.815799	.074662	-.399432	8.169853

Indirect effect(s) of X on Y

Effect	Boot SE	BootLLCI	BootULCI

Total:	1.953499	1.227769	-.234799	4.489748
Ind1 :	1.390943	1.029176	-.024503	4.254307
Ind2 :	-.503849	.390066	-1.794496	-.034296
Ind3 :	-.020650	.302226	-.683144	.591166
Ind4 :	**.506901**	**.388831**	**.070058**	**1.877446**
Ind5 :	-.886989	.640434	-2.609069	.013147
Ind6 :	**.892361**	**.637914**	**.085823**	**2.913506**
Ind7 :	.574783	.738249	-.573559	2.409628
(C1)	1.894792	1.246727	.194096	5.492792
(C2)	1.411593	1.077354	-.033907	4.507724
(C3)	.884042	1.038931	-.704887	3.668620
(C4)	2.277932	1.282856	.291260	5.539241
(C5)	.498582	1.255468	-1.759797	3.407790
(C6)	.816160	1.340723	-1.467632	3.923963
(C7)	-.483199	.474684	-1.929144	.135042
(C8)	-1.010750	.698768	-3.467171	-.181513
(C9)	.383140	.614122	-.569305	2.007447
(C10)	-1.396210	.757226	-3.613050	-.366734
(C11)	-1.078632	.895247	-3.489134	.255566
(C12)	-.527551	.538761	-2.586337	.035476
(C13)	.866338	.753649	-.266416	2.810231
(C14)	-.913011	.682827	-3.001959	-.050764
(C15)	-.595433	.885451	-2.741413	.899789
(C16)	1.393889	.766277	.256509	3.380327
(C17)	-.385460	.609881	-2.091595	.570802
(C18)	-.067882	.785877	-1.709698	1.585397
(C19)	-1.779350	1.122612	-5.213275	-.240337
(C20)	-1.461772	.963259	-3.755314	.059160
(C21)	.317578	1.025493	-1.310780	3.203157

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.231963	.143456	-.032817	.526601
Ind1 :	.165163	.121397	-.004876	.498241
Ind2 :	-.059828	.046490	-.208216	-.003159
Ind3 :	-.002452	.035870	-.079134	.070117
Ind4 :	.060190	.045613	.008518	.218736
Ind5 :	-.105323	.076778	-.310200	.005172
Ind6 :	.105961	.074974	.009612	.333483
Ind7 :	.068251	.088579	-.070408	.286303

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.116928	.071728	-.014770	.265135
Ind1 :	.083256	.060701	-.001645	.251453
Ind2 :	-.030158	.023237	-.105046	-.002019
Ind3 :	-.001236	.017930	-.039773	.034890
Ind4 :	.030341	.022793	.004457	.111190
Ind5 :	-.053091	.038385	-.157274	.001816
Ind6 :	.053413	.037462	.005142	.168127
Ind7 :	.034404	.044268	-.034099	.143885

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.334577	.921899	-.049927	1.163706
Ind1 :	.238228	.764611	-.007884	1.165421
Ind2 :	-.086295	.257816	-.483574	-.001642
Ind3 :	-.003537	.142829	-.136412	.143298
Ind4 :	.086817	.237378	.011183	.460880
Ind5 :	-.151915	.532732	-.943273	.012270
Ind6 :	.152835	.450725	.009718	.901349
Ind7 :	.098443	.649406	-.124600	.607295

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.502804	51.013810	-2.140025	9.074345
Ind1 :	.358010	20.250696	-.097486	10.364237
Ind2 :	-.129684	15.296444	-4.239710	.016313
Ind3 :	-.005315	5.357910	-.696310	.364254
Ind4 :	.130469	14.953410	.001903	3.892849
Ind5 :	-.228299	13.038945	-4.059950	.097999
Ind6 :	.229681	14.007419	-.018030	4.850504
Ind7 :	.147941	34.130231	-.283721	4.667096

Indirect effect key

Ind1 : Media Type -> Empathy -> Time Donation
Ind2 : Media Type -> Empathy -> Guilt -> Time Donation
Ind3 : Media Type -> Empathy -> Responsibility -> Time Donation
Ind4 : Media Type -> Empathy -> Guilt -> Responsibility ->Time Donation
Ind5 : Media Type -> Guilt -> Time Donation
Ind6 : Media Type -> Guilt -> Responsibility -> Time Donation
Ind7 : Media Type -> Responsibility -> Time Donation

Specific indirect effect contrast definitions

(C1)	Ind1	minus	Ind2
(C2)	Ind1	minus	Ind3
(C3)	Ind1	minus	Ind4
(C4)	Ind1	minus	Ind5
(C5)	Ind1	minus	Ind6
(C6)	Ind1	minus	Ind7
(C7)	Ind2	minus	Ind3
(C8)	Ind2	minus	Ind4
(C9)	Ind2	minus	Ind5
(C10)	Ind2	minus	Ind6
(C11)	Ind2	minus	Ind7
(C12)	Ind3	minus	Ind4
(C13)	Ind3	minus	Ind5
(C14)	Ind3	minus	Ind6
(C15)	Ind3	minus	Ind7
(C16)	Ind4	minus	Ind5
(C17)	Ind4	minus	Ind6
(C18)	Ind4	minus	Ind7

```
(C19)  Ind5     minus     Ind6
(C20)  Ind5     minus     Ind7
(C21)  Ind6     minus     Ind7

******************* ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
     5000

Level of confidence for all confidence intervals in output:
   95.00
------ END MATRIX -----
```

Appendix C: SPSS Process Output – Money Donation (Study 3)

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com

****
Model = 6
Y = Money Donation
X = Media Type
M1 = Empathy
M2 = Guilt
M3 = Responsibility

Sample size
62

****
Outcome: Empathy (M1)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.362601	.131479	2.225290	9.082976	1.000000	60.000000	.003776

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.258065	.966016	1.302323	.197783	-.674265	3.190394
X	1.141935	.378903	3.013798	.003776	.384013	1.899858

****
Outcome: Guilt(M2)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.524381	.274976	1.112274	11.188298	2.000000	59.000000	.000076

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.783090	.692548	2.574681	.012562	.397296	3.168883
M1	.294211	.091272	3.223454	.002065	.111575	.476846
X	.591450	.287442	2.057632	.044053	.016277	1.166623

****
Outcome: Responsibility (M3)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.624533	.390042	.707528	12.362827	3.000000	58.000000	.000002

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.110327	.582556	5.339105	.000002	1.944208	4.276446
M1	-.006072	.078946	-.076915	.938956	-.164100	.151955
M2	.506617	.103834	4.879101	.000009	.298769	.714465
X	.193002	.237337	.813198	.419430	-.282082	.668085

****
Outcome: Money Donation (Y)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.541631	.293364	749.738745	5.915976	4.000000	57.000000	.000471

Model

	coeff	se	t	p	LLCI	ULCI
constant	-22.479394	23.159538	-.970632	.335832	-68.855858	23.897070
M1	5.940790	2.569997	2.311594	.024437	.794428	11.087153
M2	5.964780	4.014215	1.485915	.142812	-2.073596	14.003156
M3	6.077087	4.274341	1.421760	.160545	-2.482185	14.636360
X	-8.011576	7.769796	-1.031118	.306841	-23.570421	7.547270

********** TOTAL EFFECT MODEL **********
Outcome: Money Donation (Y)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.132722	.017615	990.192473	1.075858	1.000000	60.000000	.303788

Model

	coeff	se	t	p	LLCI	ULCI
constant	23.322581	20.377488	1.144527	.256951	-17.438691	64.083853
X	8.290323	7.992708	1.037236	.303788	-7.697564	24.278209

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
8.290323	7.992708	1.037236	.303788	-7.697564	24.278209

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-8.011576	7.769796	-1.031118	**.306841**	-23.570421	7.547270

Indirect effect(s) of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	16.301898	5.929880	6.374811	29.806294
Ind1 :	6.783999	3.937479	.864462	17.149254

Ind2 :	2.003985	1.975252	-.110804	8.093499
Ind3 :	-.042138	.706393	-1.520842	1.384603
Ind4 :	1.034368	.956843	.073015	4.414909
Ind5 :	3.527867	3.808828	-.422682	14.832262
Ind6 :	1.820929	1.664470	-.036328	7.358023
Ind7 :	1.172888	1.712071	-1.213414	6.265326
(C1)	4.780014	4.595889	-2.977057	15.442538
(C2)	6.826138	4.015934	.884292	17.691540
(C3)	5.749631	4.016984	-.544489	15.802267
(C4)	3.256132	6.002279	-8.281298	15.051884
(C5)	4.963071	4.470423	-2.360761	15.975215
(C6)	5.611112	4.465270	-1.826328	16.317939
(C7)	2.046124	2.162415	-.739658	8.229573
(C8)	.969617	2.258863	-2.308092	7.150067
(C9)	-1.523882	3.166788	-11.011349	2.150985
(C10)	.183056	2.840498	-4.942404	6.529033
(C11)	.831098	2.719418	-4.208627	6.614462
(C12)	-1.076507	1.226886	-6.429354	.087435
(C13)	-3.570006	3.897025	-14.914589	.997256
(C14)	-1.863067	1.719510	-7.457200	.105380
(C15)	-1.215026	2.042526	-7.154828	1.741888
(C16)	-2.493499	4.151916	-13.454428	2.863616
(C17)	-.786560	1.480195	-5.469633	.915991
(C18)	-.138519	1.820047	-3.906595	3.525268
(C19)	1.706938	3.992079	-3.670109	12.893173
(C20)	2.354980	4.354782	-3.680547	13.446471
(C21)	.648041	2.442666	-2.320003	8.771176

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.517736	.179319	.207857	.907504
Ind1 :	.215455	.129348	.023485	.564022
Ind2 :	.063645	.062728	-.004163	.256889
Ind3 :	-.001338	.022642	-.049509	.044318
Ind4 :	.032851	.030918	.002002	.141905
Ind5 :	.112042	.116479	-.015653	.439535
Ind6 :	.057831	.051551	-.001636	.224731
Ind7 :	.037250	.055193	-.039687	.205118

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.260981	.089763	.106350	.459801
Ind1 :	.108607	.064693	.013156	.284575
Ind2 :	.032082	.031337	-.001792	.128609
Ind3 :	-.000675	.011325	-.024630	.022128
Ind4 :	.016559	.015483	.001127	.073056
Ind5 :	.056479	.058175	-.007435	.219709
Ind6 :	.029152	.025801	-.000519	.113210
Ind7 :	.018777	.027621	-.019445	.103342

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	1.966377	2.77171E+012	-1.737949	142.712265
Ind1 :	.818303	1.67809E+012	-.199080	104.267960
Ind2 :	.241726	333791525539	-.164067	13.518405
Ind3 :	-.005083	29011880842	-.976187	.311627
Ind4 :	.124768	59984128956	-.056069	11.433686
Ind5 :	.425540	771582153598	-.366178	26.603042
Ind6 :	.219645	223375842201	-.122639	25.839657
Ind7 :	.141477	39289226076	-.177138	30.333353

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	-2.034793	25.429837	-138.365909	1.526901
Ind1 :	-.846775	15.321264	-96.213223	.089491
Ind2 :	-.250136	6.177567	-22.002666	.117266
Ind3 :	.005260	1.711773	-.238131	1.214253
Ind4 :	-.129109	2.948656	-14.114575	.027303
Ind5 :	-.440346	9.628675	-20.228277	.494959
Ind6 :	-.227287	5.588752	-23.501914	.045607
Ind7 :	-.146399	4.771953	-11.890786	.188390

Indirect effect key

Ind1 : MediaTyp -> Empathy -> Money_Donation
Ind2 : MediaTyp -> Empathy -> Guilt -> Money_Donation
Ind3 : MediaTyp -> Empathy -> Responsi -> Money_Donation
Ind4 : MediaTyp -> Empathy -> Guilt -> Responsi -> Money_Donation
Ind5 : MediaTyp -> Guilt -> Money_Donation
Ind6 : MediaTyp -> Guilt -> Responsi -> Money_Donation
Ind7 : MediaTyp -> Responsi -> Money_Donation

Specific indirect effect contrast definitions

(C1) Ind1 minus Ind2
(C2) Ind1 minus Ind3
(C3) Ind1 minus Ind4
(C4) Ind1 minus Ind5
(C5) Ind1 minus Ind6
(C6) Ind1 minus Ind7
(C7) Ind2 minus Ind3
(C8) Ind2 minus Ind4
(C9) Ind2 minus Ind5
(C10) Ind2 minus Ind6
(C11) Ind2 minus Ind7
(C12) Ind3 minus Ind4
(C13) Ind3 minus Ind5
(C14) Ind3 minus Ind6
(C15) Ind3 minus Ind7
(C16) Ind4 minus Ind5
(C17) Ind4 minus Ind6
(C18) Ind4 minus Ind7
(C19) Ind5 minus Ind6
(C20) Ind5 minus Ind7

(C21) Ind6 minus Ind7

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

Level of confidence for all confidence intervals in output:
95.00

------ END MATRIX -----

Appendix D: SPSS Process Output – Time Donation with two mediators: Guilt and Responsibility

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com

****
Model = 6
Y = Time Donation
X = IV1
M1 = Guilt
M2 = Responsibility

Sample size
62

****
Outcome: Guilt(M1)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.383783	.147290	1.286358	10.363879	1.000000	60.000000	.002075

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.153226	.734466	2.931689	.004765	.684067	3.622385
X	.927419	.288081	3.219298	.002075	.351168	1.503671

****
Outcome: Responsibility (M2)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.624483	.389980	.695607	18.859036	2.000000	59.000000	.000000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.109342	.577488	5.384256	.000001	1.953785	4.264899
M1	.503526	.094935	5.303918	.000002	.313561	.693492
X	.188934	.229412	.823558	.413507	-.270120	.647988

****
Outcome: Time Donation (Y)

Model Summary

R	R-sq	MSE	F	df1	df2	p

.460406	.211974	58.780474	5.200543	3.000000	58.000000	.002998

Model

	coeff	se	t	p	LLCI	ULCI
constant	-10.401981	6.482888	-1.604529	.114030	-23.378969	2.575007
M1	-.869442	1.060527	-.819821	.415675	-2.992330	1.253446
M2	2.957667	1.196764	2.471387	.016417	.562069	5.353265
X	4.705072	2.120958	2.218372	.030458	.459489	8.950655

********** TOTAL EFFECT MODEL **********
Outcome: Time Donation (Y)

Model Summary

R	R-sq	MSE	F	df1	df2	p
.349480	.122136	63.298925	8.347744	1.000000	60.000000	.005366

Model

	coeff	se	t	p	LLCI	ULCI
constant	.129032	5.152156	.025044	.980103	-10.176872	10.434936
X	5.838710	2.020842	2.889246	.005366	1.796402	9.881018

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
5.838710	2.020842	2.889246	.005366	1.796402	9.881018

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
4.705072	2.120958	2.218372	.030458	.459489	8.950655

Indirect effect(s) of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	1.133637	1.101784	-.757383	3.565538
Ind1 :	-.806337	.899404	-2.552941	.908913
Ind2 :	**1.381172**	**.889879**	**.197548**	**3.950466**
Ind3 :	.558803	.699569	-.496299	2.358134
(C1)	-2.187509	1.502218	-6.005277	.029159
(C2)	-1.365141	1.236353	-3.968073	.846131
(C3)	.822369	1.127596	-.571281	4.286430

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.134610	.130399	-.096508	.418088
Ind1 :	-.095746	.107938	-.303544	.115168
Ind2 :	.164003	.104339	.023490	.455873
Ind3 :	.066353	.083868	-.061204	.283519

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Total:	.067855	.065220	-.045749	.210495

```
Ind1 :    -.048264     .053956    -.152847     .056526
Ind2 :     .082671     .052206     .012459     .230733
Ind3 :     .033448     .041888    -.030091     .141437

Ratio of indirect to total effect of X on Y
             Effect     Boot SE    BootLLCI    BootULCI
Total:     .194159     .359074    -.156092     .908910
Ind1 :    -.138102     .322304    -.802520     .166291
Ind2 :     .236554     .430258     .022618    1.135441
Ind3 :     .095707     .211051    -.104416     .609655

Ratio of indirect to direct effect of X on Y
             Effect     Boot SE    BootLLCI    BootULCI
Total:     .240939    8.287241    -.189650    3.458608
Ind1 :    -.171376    5.965919   -1.897341     .313809
Ind2 :     .293550   15.348398     .010151    3.793293
Ind3 :     .118766    5.556752    -.131809    2.562251

Indirect effect key
 Ind1 :  IV1     ->     Guilt    ->     Time_Don
 Ind2 :  IV1     ->     Guilt    ->     Responsi ->     Time_Don
 Ind3 :  IV1     ->     Responsi ->     Time_Don

Specific indirect effect contrast definitions
(C1)  Ind1     minus     Ind2
(C2)  Ind1     minus     Ind3
(C3)  Ind2     minus     Ind3

******************* ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

Appendix E: VR Oculus Rift – Virtual Reality Demonstration

Appendix F: Research Ethics Approval – Study 3

To: Maria Kandaurova Retail Management

Re: REB 2017-265: The Effect of Virtual Reality on Empathy, Responsibility, and Donation Behaviour of Time and Money

Date: August 25, 2017

Dear Maria Kandaurova,

The review of your protocol REB File REB 2017-265 is now complete. The project has been approved for a one year period. Please note that before proceeding with your project, compliance with other required University approvals/certifications, institutional requirements, or governmental authorizations may be required.

This approval may be extended after one year upon request. Please be advised that if the project is not renewed, approval will expire and no more research involving humans may take place. If this is a funded project, access to research funds may also be affected.

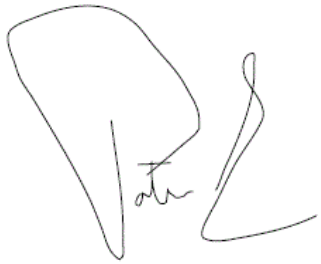
Please note that REB approval policies require that you adhere strictly to the protocol as last reviewed by the REB and that any modifications must be approved by the Board before they can be implemented. Adverse or unexpected events must be reported to the REB as soon as possible with an indication from the Principal Investigator as to how, in the view of the Principal Investigator, these events affect the continuation of the protocol.

Finally, if research subjects are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the

ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research.

Please quote your REB file number (REB 2017-265) on future correspondence. Congratulations and best of luck in conducting your research.

Dr. Patrizia Albanese, PhD Chair, Ryerson University Research Ethics Board



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