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“Augmented Reality (AR) as a New Medium of Presenting Media News Content“

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Abstract

Emerging technologies such as virtual reality (VR) and augmented reality (AR) have laid the ground for what some journalists call immersive storytelling - a form of news production that allows first-person experiences of the events or situations described in news reports, and provides users with a sense of presence, i.e., the sense of “being there” or “closer to the truth”. The rising potential of the new technologies has attracted many news organisations. However, the studies on the psychological importance of using AR as a new medium for presenting information are non-existent. To fill the void, this research examines the influence of AR technology on the media industry and the way it affects users' experience with news stories.

Focusing on the experiential aspects of the human-computer interface, we explore the changes in media experiences, ranging from traditional PC-desktop interaction to fully immersive AR. We take an empirical approach to a discussion that until now has been largely theoretical. By using multimodal news stories as stimuli in two experiments, we describe the relationship between immersive and interactive mobile AR and the desired effects being the sensation of presence and a first-person perspective, and explore its influence on the users.

First, we employ a quantitative analysis of an experiment using a sample of 358 students in Vienna to measure: (1) *level of information recall* of the users’ of news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, and (2) *news evaluation* of the news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences. Results suggest that the intersection of immersion, sensation of presence and first-person perspective of a story positively affects psychological responses from users and generates higher levels of information recall and more positive evaluation of AR-enhanced news content compared to the news content without AR-enhancement.

This study is first of its kind to study *first-person perception* within the context of augmented reality. Linkages to the media and health psychology literature provide the basis for further investigation of females’ perception of first/other differential in respect to pro-social media messages. We study the perception of media effects on self and others of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video modalities with regard to an idealised female body.

The perception of media effects on self and others in the context of the first-person perception is used to measure both the perceptual and behavioural components of FPE theory. We explore the direction and magnitude of the self/other differences from the pro-social messages of idealised body image. Additionally, we test the association of the perception of media effects with participants' intention to engage in body image behaviour. Results of an experiment using a sample of 357 female students in Vienna indicate that they perceived AR-enhanced news with pro-social messages of idealised body image to have a greater effect on themselves than on others. Furthermore, findings show that participants are likely to act on the first-person perception in the form of engagement in body image behaviours.

Theoretical and practical implications of these findings are discussed.

Neu entstandene Technologien wie Virtual Reality (VR) und Augmented Reality (AR) haben den Weg für eine Entwicklung, die von manchen Journalisten als immersives Erzählen beschrieben wird, geebnet. Es ist eine Berichterstattung, die Selbsterfahrungen im Zusammenhang mit Ereignissen oder Situationen in den Nachrichten zulässt und Benutzern den Eindruck von Präsenz, d.h., das Gefühl „vor Ort zu sein“ oder „der Wahrheit näher zu sein“ vermittelt. Viele Nachrichtenorganisationen sind vom wachsenden Potential der neuen Technologien angesprochen. Dennoch gibt es so gut wie keine Forschungsarbeit über die psychologische Implikation der Verwendung von AR als neues Darstellungsmedium in der Berichterstattung. Um diese Forschungslücke zu schließen, wird diese Studie den Einfluss der AR-Technologie auf dem Mediensektor untersuchen und dabei auch beleuchten, wie sich diese Technologie auf die Erfahrung der Benutzer im Zusammenhang mit dieser Form der Berichterstattung auswirkt.

Mit dem Augenmerk auf die Erfahrungsaspekte der Mensch-Computer-Schnittstelle sollen die Veränderungen in der Erlebnisweise der Medien von der traditionellen Interaktion mit PC-Desktop zur vollständig immersiven AR untersucht werden. Mit Hilfe eines empirischen Ansatzes wird eine Diskussion aufgenommen, die bisher weitgehend theoretischer Natur war. Mit Hilfe von multimodalen Nachrichten als Reize wird die Beziehung zwischen immersiver und interaktiver mobiler AR beschrieben, wobei die angestrebten Wirkungen die der Präsenz und der Ich-Perspektive sein sollen. Ihr Einfluss auf die Benutzer soll ebenfalls untersucht werden.

Erstens wird eine quantitative Analyse eines Experiments mit 358 Studierenden in Wien durchgeführt, um folgendes zu erfassen: (1) Grad des Information-Recalls von Benutzern bei Nachrichten, die durch multimodale AR, PC Desktop Audio + Text + Bild und PC Desktop Audio + Video-Erlebnisse übermittelt werden und (2) Nachrichten-Auswertung bei Nachrichten, die durch multimodale AR, PC Desktop Audio + Text + Bild und PC Desktop Audio + Video-Erlebnissen übermittelt werden. Die Ergebnisse legen nahe, dass die Schnittstelle von Immersion, das Gefühl der Präsenz und die Ich-Perspektive einer Erzählung positive Auswirkungen auf die psychischen Reaktionen von Benutzern hat und ein höheres Grad an Information-Recall und eine positivere Auswertung von den mit AR versehenen Nachrichteninhalte generiert im Vergleich zu Nachrichteninhalten, die nicht mit AR versehen wurden.

Diese Studie wird als erste ihrer Art die first-person perception in der AR (Augmented Reality) zu untersuchen. Querverbindungen zu den Medien und zur Literatur aus dem Bereich der Gesundheitspsychologie bilden die Grundlage für weitere Untersuchung der Wahrnehmung von Selbst/Anders-Differential in Bezug auf positive Medieninhalte. Untersucht wird der Wirkung von Medieninhalten auf das Selbst und auf Andere von Nachrichten, die durch multimodale AR übermittelt werden im Vergleich zu Nachrichten, die durch PC Desktop Audio + Text + Bild und PC Desktop Audio + Video Modalitäten im Zusammenhang mit dem idealisierten Frauenkörper.

Auf der Grundlage von der Wahrnehmung der Wirkung von Medieninhalten in Bezug auf die first-person perception werden sowohl die wahrnehmungs- als auch die verhaltensmäßige Komponenten der FPE-Theorie gemessen und ausgewertet. Der Verlauf und das Ausmaß von Unterschieden zwischen Selbst und Anderen werden anhand der positiven Botschaften eines idealisierten Körperbildes untersucht. Die Wahrnehmung der Wirkung im Zusammenhang mit ihrer Absicht, sich mit ihrem Körperbild auseinanderzusetze, soll untersucht werden. Ergebnisse eines Experiments auf der Grundlage einer Stichprobe von 357 Studentinnen in Wien zeigen, dass in ihren Augen Nachrichten, die mit AR ergänzt und mit positiven Botschaften eines idealisierten Körperbilds versehen wurden, eine größere Wirkung auf sie als auf andere hatten. Darüber hinaus zeigen die Ergebnisse, dass die Teilnehmer dazu tendieren, auf die first-person perception in Form von Verhalten, das auf ihr Körperbild bezogen ist, zu reagieren.

Theoretische und praktische Implikationen dieser Ergebnisse werden besprochen.

CONTENTS

1.0 Introduction

The history of journalism and the media is greatly defined by technological advances. The invention of printing and moveable type, first in China and later in Europe, led to the mass printing of documents, and then of newspapers (*"The History of Journalism", n.d.*). The advent of the mass media made it possible for the first time for different people to access "the same news stories, told in the same way by the same person" (*"The History of Journalism", n.d.*). In the 20th century, radio and television emerged, changing the process of news reporting and widening the scope of people who could receive the news (Herbert, 2011). From the 1990s Internet and digital technologies began to transform the profession of journalism in many ways. More recently, new forms of technologies such as virtual reality (VR) and augmented reality (AR) have changed the way news are gathered, delivered and received.

In the 1980s and into the 1990s the development of digital media and technologies brought about predictions that space will disappear. "Due to rapid transportation technologies, instant transmission of information all over the world, and finally, the new possibility of moving in virtual spaces, space in the sense of material substrate seems to have become meaningless" (Löw, 2016, p. 2). As a consequence, the rhetoric about the "dissolution" or "annihilation" of space emerged.

A literature search from the 1990s shows a great deal of studies investigating the issues of offline and online reality, i.e., physical or actual reality and the virtual one. Virtual space was domesticated and existed parallel with the physical space leaving it useless (Manovich, 2006). With the turn of the 21st century the physical space became the focus of discussion among the media scholars who have pointed to the issue of mediation of the physical, i.e., real environment. Novel realities in which virtual merge with physical or replace one part of it have evolved.

Manovich (2006) emphasises that in the 21st century technologies will create a new kind of space by "overlaying the physical space with the dynamic data" (p. 223) which he refers to as "augmented space". Augmented space primarily denotes to AR technologies, but also other technologies that overlay dynamic, wirelessly accessible information onto physical spaces, such as electronic screens at shopping and entertainment areas. According to Manovich (2006), we are coming to the new paradigm in which the capacities of computing and telecommunication are gradually moving from desktop computing and are now being delivered to a mobile user instead. Therefore, Manovich (2006) claims that "augmenting the human also comes to mean augmenting the whole space in which someone lives, or through which someone passes" (p. 225).

Correspondingly, for Aurigi and De Cindio (2008), "'virtual' and 'physical' spaces are no longer two separate dimensions, but just parts of one continuum, of a whole" (p. 1). According to Allen (2008) augmented public space is characterised by the coexistence of built environment with "layers of information and media content – the 'media layer'" (p. 27, in: Aurigi & De Cindio). Allen (2008) argues tha the user experiences not only the actual structure of a built environment but also the virtual forms underlying the interaction with media content (in: Aurigi & De Cindio). Such a transformation was a result of merging the built environment with the media layer so that digital display technologies and communications media now coexist with architecture. Aurigi and De Cindio (2008) claim that the distinction between physical space and media layer is thus becoming blurred through the pervasive, mobile technologies.

New concepts such as mixed reality, augmented reality and augmented virtuality have evolved and are influencing and transforming our experiences of space, time and ourselves. The rising potential of the new technologies has attracted many news organisations. However, studies on the psychological importance of using augmented reality (AR) as a new medium of presenting the information are practically non-existent. To fill the void, this research will examine the influence of augmented reality (AR) technology on the media industry and the way it affects users' experience with news stories.

Augmented reality (AR) is perceived as a subcategory of mixed reality (MR). The word 'augment' is derived from Latin 'augere' (to increase) and appears twice in the Oxford Dictionary – as a noun meaning 'increase' or 'extension' and as a verb meaning 'to make (something) greater by adding to it' or 'increase' (*"Oxford Living Dictionaries"*, n.d.). The term 'augmented reality' was coined in 1992 by Tom Caudell, a researcher at Aircraft Manufacturer Boeing (Caudell & Mizell, 1992). The term was referred to a head-mounted apparatus that Tom Caudell and his colleague David Mizell suggested to replace diagrams and marking devices then used to guide workers on the factory floor. The head-mounted display

(HMD) system would give instructions to the workers in assembling electrical wires for aircrafts. (Figure 1)

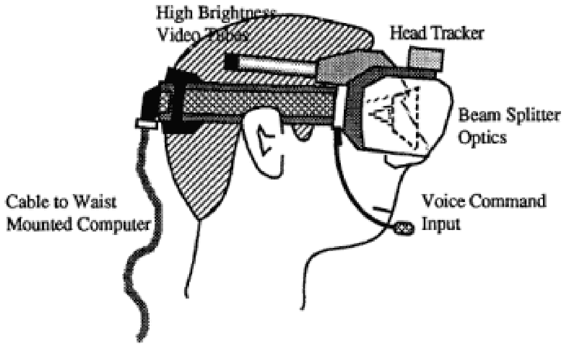

Figure 1: Head-mounted system (Caudell & Mizell, 1992)

In 1994, Milgram and Kishino explained mixed reality (MR) as a subset of virtual reality (VR), a particular 'Virtuality Continuum'. (Figure 2) Virtual reality (VR) environment is perceived as one in which "the physical laws ordinarily governing space, time, mechanics, material properties, etc." no longer exist (Milgram & Kishino, 1994, p. 2). It can portray some characteristics of the real environment, but it can also exceed the bounds of physical reality. 'Virtuality Continuum' connects real and virtual environments - at one end of the continuum is real environment, and at the opposite one are virtual environments. Everything in between is defined as mixed reality (MR). Augmented reality (AR) as a subcategory of mixed reality refers to "all cases in which the display of an otherwise real environment is augmented by means of virtual (computer graphic) objects" (Milgram & Kishino, 1994, p. 2). The counter-case of AR on the 'Virtuality Continuum' is thus augmented virtuality (AV), (Milgram & Kishino, 1994). In both AV and virtual environments (or VR) the surrounding environment is virtual, whereas in AR the surrounding environment is real.

Figure 2: Virtuality Continuum (Milgram & Kishino, 1994)

In 1997, Ronald Azuma published a survey on augmented reality (AR) complemented in 2001 due to rapid technological advances (Azuma, 1997; Azuma et al., 2001). Azuma et al. (2001) define AR as a system that "supplements the real world with virtual (computer-generated) objects that appear to coexist in the same space as the real world" (p. 34). An AR system is therefore defined by the following characteristics: (1) it combines real and virtual objects in a real environment; (2) it is interactive in real time; and (3) it is registered in 3D (Azuma, 1997; Azuma et al., 2001).

According to Azuma and colleagues (2001), AR is not restricted to certain display technologies, such as a head-mounted display (HMD), or limited to a sense of sight, but can be applied to all senses, including hearing, touch, and smell. AR has found use in different areas. In his survey, Azuma suggests the following list of AR applications and their benefits (1997): (1) In *medical* applications, AR can improve visualization tasks in the surgical rooms and thus precision. It can also be helpful for training purposes, as virtual instructions can remind the user about the required steps and indicate the organs; (2) AR can also be useful in *manufacturing and repair* of complex equipment, since the instructions might be easier to handle as 3D drawings than as manuals with text and images; (3) AR could furthermore be used to *annotate* objects and environments with certain information that can be public or private. For instance, it can provide users with the information about library content through hand-held displays. AR can also improve general *visualisation* tasks that can be useful, for example, to architects. For instance, by means of a HMD an architect can look through the window and see how a design for a new tower can change the view; (4) *Robot path planning*, i.e., control of the robot and its actions through the control of its virtual version is another useful application of AR. Finally, AR has found its place in the (5) *entertainment*, as well as in the (6) *military aircraft* industries. In the *entertainment* industries, exhibitors usually merge real actors and digital backgrounds in real time and in 3D. *Military aircrafts* and helicopters often use HMD systems to project vector graphics upon the pilot's view of real time (Azuma, 1997).

In recent years AR has found even higher use. Azuma et al. (2001) group new applications into three areas: (1) *mobile*, (2) *collaborative* and (3) *commercial*. Many researchers are developing *mobile* AR systems helpful in creating new applications in "navigation, situational awareness, and geolocated information retrieval" (Azuma et al., 2001, p. 40). Moreover, many AR applications today allow multiple people to simultaneously "view, discuss, and interact with the virtual 3D models", which is why Azuma et al. name new applications of AR as *collaborative* (Azuma et al, 2001, p. 42). Finally, Azuma et al. (2001) mention *commercial* applications of AR which refers to the real-time augmentation of broadcast video. The purpose is primary to enhance sports events through lines and markers that help viewers understand the game, and to place or replace ads in different scenes in a broadcast video (Azuma et al., 2001).

LaFlamme claims that the applications of AR technologies are just being realised and adds that "the modern buzz surrounding augmented reality is inspired by the emergent technologies and software that have turned augmented reality into a cutting-edge, technological phenomenon" (*"augmented reality", n.d.*). According to Caudell, who coined the term AR, the power and popularity of smartphones has "drastically opened up the market" for AR technology as compared to the nineties: "There were technical and cultural issues at that time that kept it in the research lab. In that sense it was probably ahead of its time" (as cited in: Parkin, 2016). Nowadays, the success of smartphone AR games such as *Pokémon Go!*, in which players search for animated characters hidden on real-life images on their smartphone screens and which in its first month was downloaded more than 100 million times and at the peak of its popularity earned $10m per day, has attracted not only attention, but also investments (Parkin, 2016).

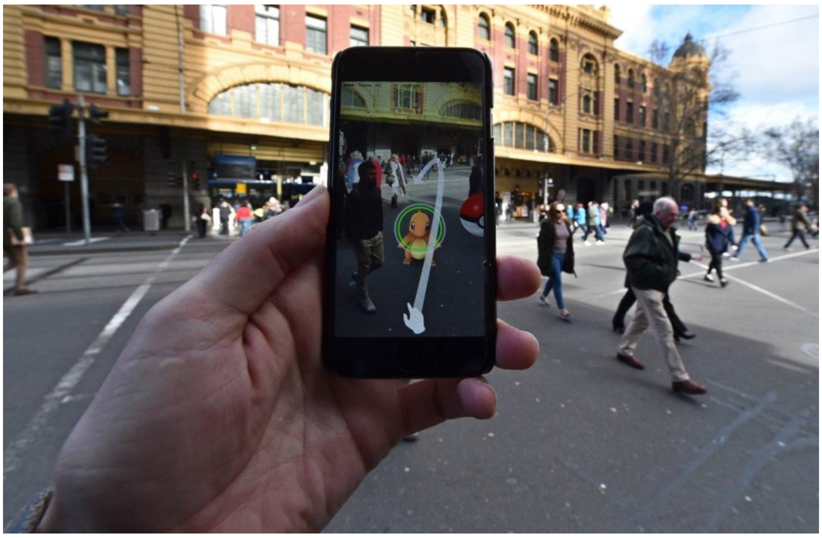

Figure 3: *Pokémon Go!* player haunts *Pokémon* via smartphone

(Image: *The Wall Street Journal Online, 2016*)

Social media platform *Snapchat*, probably the world's most widely used AR app allows users to send self-destruct 'snaps', i.e., images created via a selection of lenses that modify camera feed in mostly humorous ways, making user's eyes bigger, swapping users' faces, etc. Another AR app *inkHunter* lets users see what a tattoo would look like on their body, allowing them to edit designs, upload their own and share it with friends. (Figure 4)

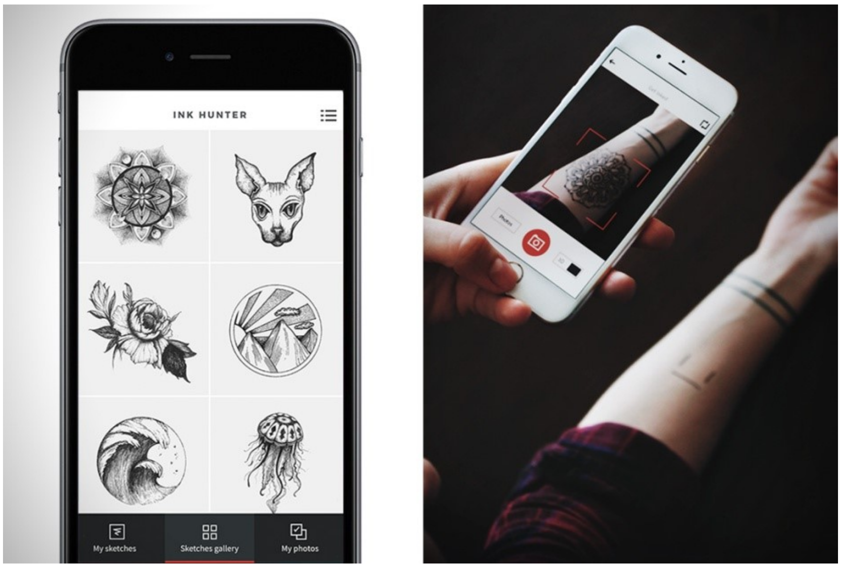

Figure 4: *inkHunter* - AR app (Image: *mobilegeeks.de, 2016*)

AR is increasingly securing its place in people’s life and has already attracted researchers in companies such as Google, Microsoft, Apple and IBM. According to Pavlik and Bridges (2013) AR has entered a third stage of development with an increasing variety of journalism and media applications. (Figure 5)

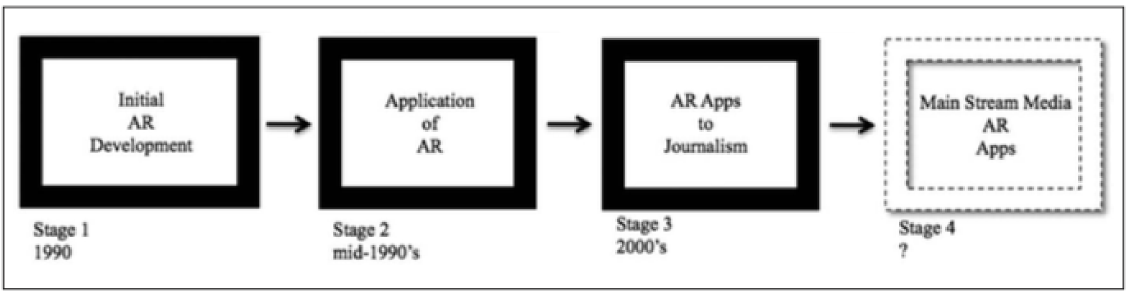

Figure 5: Stages of AR development (Pavlik & Bridges, 2013)

The first stage refers to the initial research and development of AR technology that was completely outside the fields of journalism and the media.

The second stage lasted about eight years and it involved the early evolution of AR into a system that could be applied to a wide array of human activities such as medicine, media, or the arts. During this period, AR was still expensive and mainly used in laboratories for research purposes.

The third stage has emerged with a variety of journalism and media applications, particularly in mobile context. This stage is characterised by several qualities, including the miniaturisation and commercialisation of AR technologies, the availability of AR on mobile devices in form of AR applications, or "apps" which are mostly free and easy to use. As a result, many journalism and media organisations adopted AR technologies for journalism and communication purposes.

The authors predict a fourth stage of development vital to the effective utilisation of AR, when journalism and media organisations will fully integrate AR as a storytelling medium, and as a routine tool in their work.

Extant research has examined technological issues of AR, whereas the studies on social and political dimensions are scarce. Azuma (1997) emphasises that social and political issues should not be ignored once AR moves from the research lab to the hands of real users (p. 33).

The aim of this study is to contribute to the research field of AR by analysing the way it affects journalism and the media industry in terms of users' experience with news stories. Media scholars often point out that our lives are very much dominated by the mediated experiences. It is therefore important to fill research gaps in investigating the influence of AR on journalism and media users in order to understand the transformation of an informed society whose inhabitants are increasingly becoming the users of AR technologies.

2.0 Operationalisation

Emerging technologies made ground for what some journalists call **immersive storytelling** - a form of production of news that allows first-person experiences of the events or situations described in news reports, and provides users with the sense of presence, i.e. the sense of "being there" or "closer to the truth" (De la Peña et al., 2010; Willis, 2003). Primary "inverted pyramid news-writing" is becoming replaced by "immersive and interactive multimedia news reports that can give readers/viewers a feeling of presence at news events" (Pavlik, 2000, p. 232).

Basic elements of immersive journalism are reflected in *interactive journalism* that implies that "the user enters a digitally represented world through a traditional computer interface" (De la Peña et al., 2010, p. 293). The user is enabled to navigate through a narrative, often having access to documents, photographic and audiovisual material of the actual story, as well as to experience it (De la Peña et al., 2010; see: Chapter 4.3).

For VR journalists, the main idea of immersive journalism is that enables the user, typically represented as a digital avatar – an animated 3D representation of the user, to enter a "virtually created scenario representing the news story" and see the story from the first-person perspective (De la Peña et al., 2010). A number of experiments and studies were made with a goal to prove that VR as an immersive technology is changing the journalism and media fields (see: De la Peña et al., 2010; Nafarrete, 2016). The area currently lacking research is how AR technology influences the growing number of users of immersive news stories.

Media companies are already experimenting with AR technology. Several researchers have tackled the question of the influence of AR on storytelling and journalism. However, no systematic approach has been taken in answering these questions.

The collaborative news team formed between online crime news service apbonline.com and students of the Center for New Media at Columbia University's Graduate School of Journalism in the USA used a 360-degree[1] video camera to record the site of shooting of West African immigrant Amadou Diallo. In the night of 1999, in the Bronx, NY, Diallo was shot by the

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[1] A spherical photograph or video that surrounds a viewer in every direction; it enables the viewer to choose a direction to look.

police officers as he stepped through the vestibule of his building. As the unarmed Diallo reached for a wallet to presumably show his ID card, the four plain-clothes police officers fired 41 shots at him (Pavlik, 2000). The 360-degree video enabled users to explore the crime scene on their own: the vestibule – zooming or panning anywhere inside, the physical space and artefacts such as bullet-holes, messages on the site made by police or visitors, and so forth. In contrast to linear narration, the users are able to examine the crime scene on their own, possibly discover additional details not noticed by the reporters or police, and thus develop their own story.

Today's AR technology increasingly relies on 360-degree videos. The New York Times' T Brand Studio and IBM collaborated on a "T Brand Studio AR" or "Outthink Hidden" app inspired by the film "Hidden Figures". The users can point their cameras at a QR code and bring to life virtual statues which can be moved 360 degrees. Additionally, the virtual statues offer biographies, images and audio content (Strange, 2017;*"Outthink hidden", n.d.*).

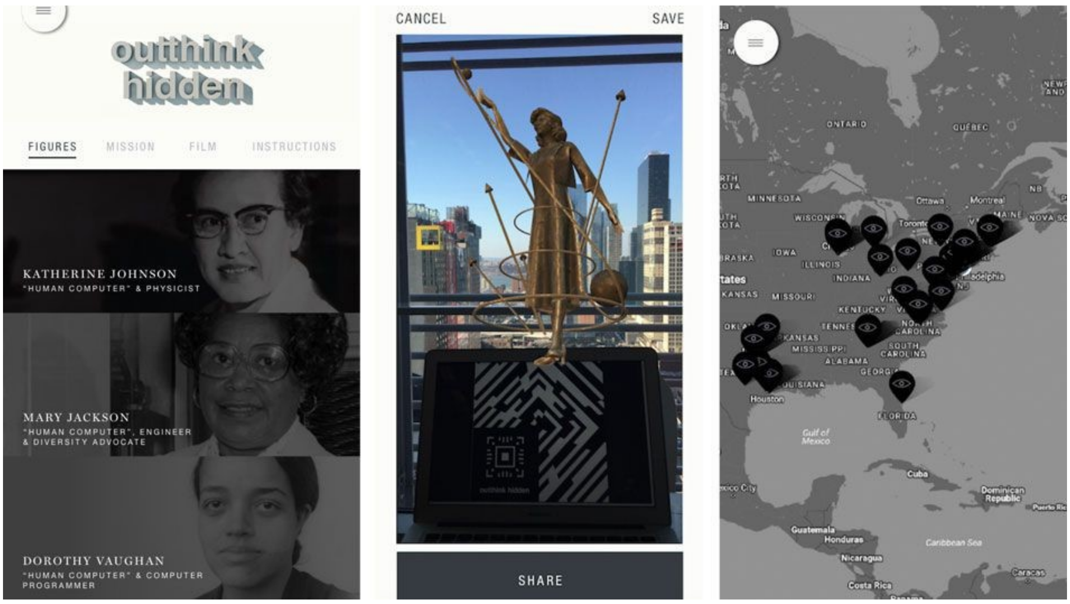


Figure 6: Outthink Hidden (Image: *mashable.com, 2017*)

One of the first media companies to use AR was Esquire which featured an AR cover in 2009, where actor Robert Downey Jr. introduced the December issue to the users; AR representations could also be found on ad pages. The readers were able to access and control the content on

Esquire's website by downloading an app and pointing AR marker on their webcams (Ostrow, 2009; *"Behind the Scenes of Augmented Esquire", 2009*). Other examples include Popular Science which used AR to animate wind tribunes on its July cover the same year, InStyle which integrated AR into its cover and a "Gifting in 3D" feature allowing users to click to buy products advertised in its December issue, and many others (Jannet, 2009; Fell, 2010).

Figure 7: Esquire's AR Issue (Image: *mashable.com, 2009*)

Empathetic Media, a company aiming at fostering empathy between storytellers and their audience via new technologies, amongst other AR experiments, conducted an experiment one day before the World Day against Trafficking in Persons. In collaboration with the Red Cross in Pancevo, Serbia, the company created an AR app called "Arc Stories" for #STOPtrafficking2016 project. The users were able to access stories about human trafficking by pointing their smartphones at stop signs. The stories featured audio and visual content and maps. The authors created an anti-human trafficking route and the users were called to walk together and find out more on the topic. The goal was to encourage the users to see the stories on their own and create their own opinions by discussing the topic with other users (Ciobanu, 2016).

Figure 8: #STOPtrafficking2016 project (Image: *journalism.co.uk, 2016*)

The number of examples of the use of AR technology in journalism, as well as in other spheres, is constantly increasing. The AR is gaining attention of researchers from different companies. In April, 2017 we were able to witness a sort of a rivalry between Facebook and Snapchat in taking over the AR market. At the company's annual conference F8, Facebook's chief executive Mark Zuckerberg presented what the company positioned as the first mainstream AR platform, a certain way for the users to manipulate the physical world through their smartphone cameras. Only six hours before the F8, the company's rival Snap Inc., the founder of Snapchat describing itself as a camera company, presented their new AR functions called World Lenses (Hern, 2017; Ingram, 2017; Isaac, 2017).

In the last few years, AR journalism has benefited from integrating augmented reality stories into smartphones to reach new users. In March 2017, The Washington Post revealed its plans to use AR in order to enhance reporting and storytelling the same year. In 2016 the Post used AR for the first time in a story explaining the events that led up to Freddie Gray's arrest and death in Baltimore in 2015. The users had to download the Arc app and could trigger the story by pointing their smartphones at the Washington Post logo features both in the newspaper and on the website (Ciobanu, 2016). Since then, The Washington Post has released several other augmented reality experiences for its users.

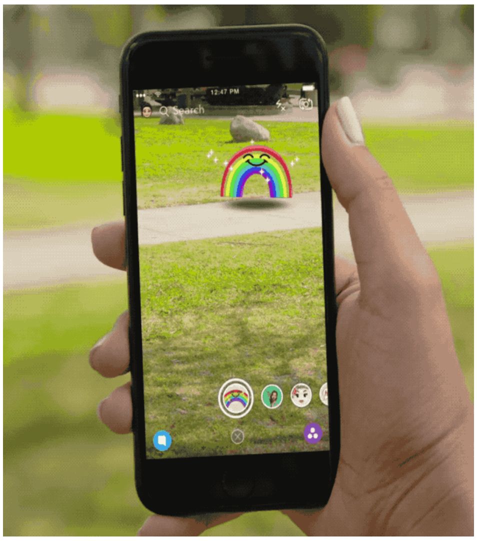


Figure 9: Snapchat's World Lenses (Image: *thecrunch.com, 2017*)

In 2019, the American weekly TIME launched TIME Immersive, an augmented reality and virtual reality app for its mobile users, to showcase new AR and VR projects. In cooperation with the Smithsonian's National Air and Space Museum, TIME produced its first AR story *Landing on the Moon* to celebrate the 50th anniversary of the Apollo 11 landing. The users are able to experience a 3D recreation of the Apollo 11 landing on any table top at home. Following the launch of TIME Immersive, the publication announced several immersive projects to be released (*"TIME Launches New Augmented Reality and Virtual Reality App, TIME Immersive, to Showcase Groundbreaking Visual Journalism", 2019).*

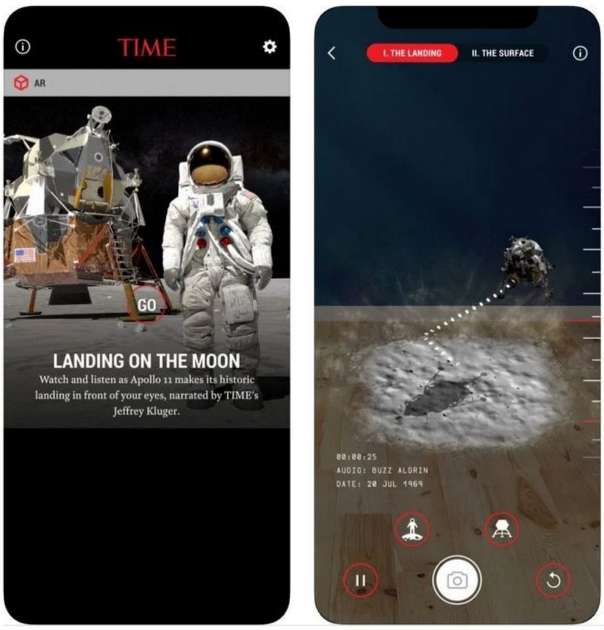


Figure 10: TIME Immersive (Image: *time.com, 2019*)

In partnership with The Mill, a visual effects production studio, fashion publication W Magazine developed an interactive September 2017 Collector's Issue. The magazine featured an interactive cover story on singer Katy Perry, allowing readers to experience the issue, go behind the scenes of the photo shoot and access special videos through the magazine's Beyond the Page app (Spinelle, 2019).

Figure 11: W Magazine, September 2017 Collector's Issue (Image: *arpost.co, 2019*)

Business news site Quartz is another example of news organisations incorporating AR in their reporting. For the first time in September 2017, the site delivered a story with 3D objects in augmented reality through Quartz's iPhone app. The users were able to view a model of the Cassini spacecraft that crashed into Saturn after making important discoveries, walk around it, and even experience its actual size (Keefe, 2017).

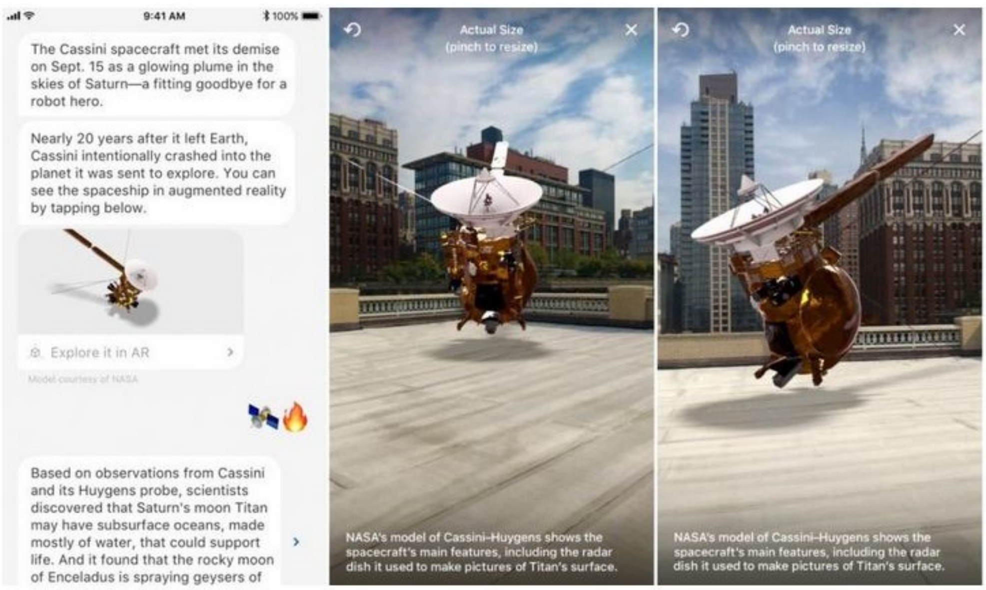


Figure 12: Quartz's iPhone App (Image: *qz.com, 2017*)

Yusuf Omar, the mobile editor of the Hindustan Times, uses Snapchat filters to report on sexual abuse and undercover drug searches: “Broadcasters have been blurring out faces, using silhouettes, and I just feel like you lose so much information. Facial expressions are critical when trying to understand. For the first time, we got to see somebody whose identity was hidden, but eyes were visible. You could see the drop of the jaw, the expressions on her forehead. It's so much more intimate for a viewer trying to relate to the story” (Mogul, 2016).

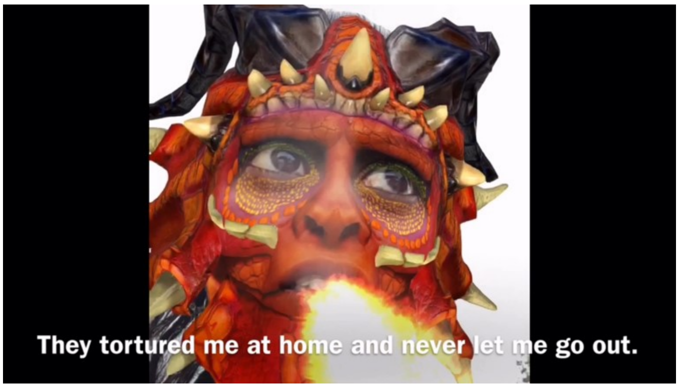


Figure 13: Selfie Journalism (Image: *ibtimes.co.uk, 2016*)

McClatchy New Ventures Lab used augmented reality to produce the series ‘What They Carried’ to tell a story of migrants crossing the Mexico-U.S. border through the personal belongings they chose to carry with them. For the first episode entitled ‘Belongings’, the producers made 3D models of the belongings that had been confiscated from undocumented migrants who were trying to cross into the United States: “Even with all the strangeness of this new medium, our hope is that what it does offer to journalism — the chance to see and experience things up close and personal, wherever you are — will offer a new angle on issues that deserve one” (Herrman & Walker, 2019).

Figure 14: What They Carried by McClatchy New Ventures Lab
(Image: *sketchfab.com, 2019*)

One of the most well-known examples of the news organisations using AR to tell the stories is The New York Times. The stories are still available online, but the producers recommend utilising AR through the NYT app for the best experience of the story. Graham Roberts, Director of Immersive Platforms Storytelling claims: “The camera can become a window into a world enhanced with digital information — adding a piece of sculpture to your bedroom or a car to your driveway. Neither actually there, but appearing to be and believably so” (Roberts, 2018).

Figure 15: The NYT App (Image: *designboom.com, 2019*)

Many other examples of the experiments, pilot studies or intentions in terms of AR technology and its opportunities to enhance the storytelling are available. In that respect, it is necessary to enrich the study field by investigating the impact of its use on the society. Our research will specifically focus on journalism and the media industry as an important part of the society. Therefore, we will take a systematic approach in examining the influence of AR in the field and the way it affects users’ experience with news stories.

We will employ a quantitative analysis of an experiment as a useful tool to empirically test and extend a theory and effects. In addition, we will extend our analysis with in-depth interviews with researchers and academics who have been experimented with fully immersive technologies and technologists at companies developing AR applications. These interviews will be conducted to obtain information about current and future trends in the AR field, particularly in respect to AR as an emerging form of storytelling in journalism.

2.1 Augmented Reality (AR) vs. Virtual Reality (VR)

We draw an important distinction between augmented reality (AR) and virtual reality (VR). Although similar to VR, augmented reality overlays physical world with virtual content rather than creating a fully simulated environment as is the case with VR. Therefore, AR and VR provide experiences that are qualitatively different from each other. In this thesis we focus on AR systems and take an empirical approach to investigate AR experience in the realm of journalism and the media.

A significant differential of AR is that that enables users to “remain in the physical world”. The users act in the same physical space they would act in regardless of whether AR is involved or not. At the same time, AR embeds digital information in the physical world in a way that the users can engage with in the same manner they would engage with the physical world without AR (Craig, 2013). On the other hand, in VR systems head-mounted displays transport and immerse the users into the virtual world disconnected from physical world that is no longer visible or audible.

The advantage of AR over VR and PC-desktop presentations is that the information is not presented on a separate display, but it is integrated with the user’s perceptions: “the user’s view of the world and computer interface literally become one” (Feiner, 2002, p. 50). In this way, the extra mental effort that is required from a user when switching his or her attention back and forth between a computer interface and physical-world activities is minimised. In this thesis, we will explore the benefits this minimised effort poses for the user’s information processing.

There are two modes in which the physical world and the virtual world can be integrated. The first mode implies gathering information from the physical world, generating the digital information in the computer, and, finally, merging these two worlds together in a computer to be displayed. The other mode simply implies projecting augmentations onto the physical world via projection devices (Craig, 2013). An important aspect of AR is that it enables spatial registration, meaning that the information has a location or space in the physical world that is independent of where the viewer happens to be (Figure 16; Craig, 2013; Chavan, 2016; Feiner, 2002).

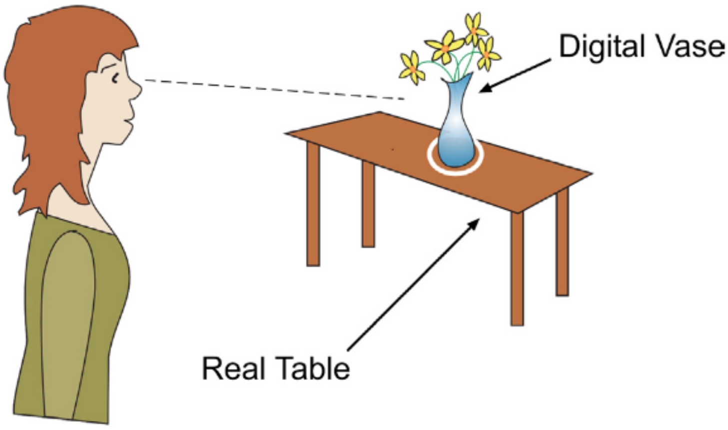


Figure 16: A digital vase is located on a real table. If the person turns away from the table or moves, the vase remains on the table. (Diagram courtesy of Beverly Carver, in: Craig, 2013)

AR content could be presented through various devices, including head-mounted displays and mobile devices with integrated cameras such as smartphones or tablets. AR applications for smartphones normally include global positioning systems (GPS) to detect the exact location of the user (Chavan, 2016). Using mobile applications, users can overlay virtual images on the physical world at any location. On the other hand, VR implies devices that can fully isolate the users in virtual, computer-generated world.

Throughout this thesis, we treat AR as a medium rather than technology. We consider medium in Craig's (2013) sense that it "mediates ideas between humans and computers, humans and humans, and computers and humans" (p. 1). We explain the way users engage with AR as a new medium of transmitting the media news content and explore the experiential benefits it has on the users of the content. Finally, we examine similarities and differences in the experiences with news delivered through multimodal AR as opposed to news delivered through PC-desktop computing.

3.0 Literature Review

Emerging technologies such as VR or AR are defined as fully immersive technologies which provide users with the sense of presence that enables the first-person perspective of a story.

3.1 On Immersion in Journalism

This chapter outlines the development of immersive media and explores the impact of their introduction in journalism. Our goal is to identify the general milestones, events and individuals that have marked the technical and conceptual development of immersive media and to show that the concept of immersion has a long history in the realm of journalism. We consider the terminology and pertinent concepts, beginning with an overview of traditional understandings and then moving to recent approaches that involve VR and AR technologies. We also consider the potential of evolving technologies to transform storytelling and modes of disseminating media news content. Digital media designers investigate different configurations of new media technologies. We, on the other hand, focus on exploring emerging media's unique capacities to create new forms of storytelling and influence users in qualitatively different ways as compared to traditional computing media. Drawing on research, we offer a discussion of the significant differences in presentations of media news content, starting with presentations via traditional media to those enabled by emerging AR technologies defined by the combination of immersive interfaces, sensation of presence, and first-person perspective of a story. We investigate each of the concepts and discuss the related literature.

3.1.1 Defining Immersion

There is a long history in explaining the concept of immersion. The Oxford dictionary broadly defines the word "immersive" as an adjective meaning: "(of a computer display or system) generating a three-dimensional image which appears to surround the user" (*"Oxford Living Dictionaries", n.d.*), but in this thesis we seek to investigate the experiential benefits of engaging the users with fully immersive technologies such as VR and AR. We define key terminology of immersion in journalism and map out experiential states and their influences on the users.

The concept of immersion has been described by various technology specialists and media theorists. For Murray (1997), immersion is a metaphorical term similar to the physical experience of being submerged in water: ”We seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool: the sensation of being surrounded by a completely other reality, as different as water is from air, that takes over all of our attention, our whole perceptual apparatus” (p. 98).

In the majority of cases, researchers in the domain of VR explain immersion as a product of technology which allows a sense of displacement from physical reality to virtual reality by surrounding users with visual – often also audio, tactile or other – stimuli. As Pimentel and Texeira (1993) explain, in the state of immersion, the participant's senses are isolated from the physical world and he is only able to register the information that comes from a computer (in: Lombardo, in: Schumaker & Lackey (eds.)). Similarly, Witmer and Singer (1998) describe immersion as a psychological state in which users have the feeling that they are enveloped by, included in, and simultaneously interact with an environment characterised by a continuous flow of a variety of stimuli and experiences. On the other hand, computer scientists Slater and Wilbur (1997) approach immersion from a technical point of view and define the concept of immersion as a description of a technology that shows the degree to which the computer displays are able to deliver “an inclusive, extensive, surrounding and vivid illusion of reality to the senses of a human participant” (para. 8). The authors emphasise that immersion in virtual environment requires self-representation, i.e., a virtual body that is at the same time part of the perceived environment, and a being that is performing the perceiving.

The concept has also attracted professionals in the film industry who see the potential in using VR systems to immerse participants in order to produce cognitive and emotional reactions such as empathy. Film-maker Chris Milk (2015) is the author of an award-winning VR documentary *Clouds Over Sidra*, produced by the United Nations in partnership with Hollywood production Studio, Vrse, and Samsung, that tells a story of a 12-year-old girl named Sidra. This documentary reports on the life at the Za'atari Refugee Camp in Jordan that is home to over 80,000 Syrians (*”Syrian Refugee Crisis”, n.d.;* Wakefield, 2015). In his TED talk, Milk describes virtual reality as a ”very experiential medium” that enables a new type of involvement with a story: ”when you are sitting there in her room, watching her, you are not watching her through a television screen, you are not watching her through a window, you are sitting there with her. When you look down, you are sitting on the same ground she's sitting on, and because of that, you feel her humanity in a deeper way, you empathise with her in a deeper way" (Milk, 2015). "For these eight minutes, 34 seconds, I am immersed in an alternate world of 360 degrees" (Milk, 2015, as cited in: Kool, 2016). In the VR film *"If Not Love"* we see a painful, 360-degree story of a mass shooting at a nightclub. Film-maker Rose Troche claims that this form enables authors to develop short stories, but in a more immersive way. The author explains: "I do pieces that take you to places that you don't want to go, and I don't want to take you to those places on a whim or in a cavalier way. I wouldn't want you to be immersed in this for more than seven minutes" (Gelt, 2017). A highly immersive 16-minute virtual reality environment installation *"Osmose"* created by Char Davies (1995) allows participants to navigate within the virtual world wearing a head-mounted display. According to the responses of approximately 25,000 individuals who have been immersed in Osmose, the after-effect of immersion can be very profound: "Immersants often feel as if they have rediscovered an aspect of themselves, of being alive in the world, which they had forgotten, an experience which many find surprising, and some very emotional" (*"Osmose", n.d.*).

AR immersion, by contrast, is taking a turn away from a sensorial suspension to a new social form of immersion. Margolis (2014) explains that sensorial immersion can be related to AR as it embeds reality in the nearby physical world, but adds virtual objects into that world (in: Geroimenko, 2014). AR technology enables objects to be added to visual perception in a way that the user is convinced they are as real as the physical objects they are surrounded with. According to Margolis (2014), the *Sensorial Immersion* as an idea of VR is being replaced by an emerging form of *Social Immersion* enabled by AR technologies, such as mobile AR (in: Geroimenko, 2014). In this new model, immersion is based on social interactivity and the reality is not replaced by the virtual one. Margolis and colleagues (2012) describe the emerging form of *Social Immersion* as "the social richness of a mediated environment", defined by its interactive feature, i.e., by the way an environment uses real and virtual means to layer networked information (as cited in: Geroimenko, 2014). Margolis (2014) emphasises that this form of media does not overlay only virtual objects, but also the stories that connect them to the people and places that inspire their meanings (in: Geroimenko, 2014). Socially immersive mobile AR enables "persistent connections between people and information" (Margolis, p. 159, in: Geroimenko, 2014).

3.1.2 Historical Overview: From New Journalism to Immersive Journalism

The concept of immersion in journalism appeared with the rise of New Journalism in the 1960s and 1970s when journalists began to experiment with new reporting and writing techniques. It has been traditionally understood as a "synonym of in-depth investigation" based on the premise that reporters must be present in the events they are writing about, or at least spend a long time learning about a reality their characters inhabit before they narrate about it (Domínguez, 2017; Humes, 2011, as cited in: Domínguez, 2017). In his work, Hunter S. Thompson was often a participant in the situations he wrote about (Domínguez, 2017; Wolfe, 1996). New Journalism connected reporting with the techniques of fiction, i.e., "the conflicting worlds of journalism and literature" (Dowling, 2019; Berning, 2011; Wolfe, 1996). It is primarily associated with the work of Tom Wolfe, even if Wolfe (1996) denies coining the term.

In his 1973 anthology, Wolfe and his co-editor Johnson provide a brief history of New Journalism and identify four literary techniques central to the genre that are traditionally used in realistic novel: (1) scene-by-scene construction, i.e., moving from scene to scene while telling the story rather than using sheer historical narrative, (2) extensive dialogue, i.e., recording the dialogue in full in order to establish and define character, and involve the reader, (3) third-person point of view, i.e., presenting the scenes through the eyes of a character in a story in order to enable a reader to experience the events in a same way a character does. Wolfe (1996) states that in many articles he wrote in 1963, 1964, and 1965 he switched back and forth, and often abruptly, between points-of-view. The fourth device implied (4) recording everyday details that might exist within a scene to establish a pattern of behaviours and possessions which serves individuals to express their position in the world or hope it to be. Thus, immersion in New Journalism appears to be a condition for good reporting as journalists have to gain confidence of individuals taking part in the story so that they would behave naturally (Sims, 1984).

New Journalism is perceived as a subcategory of literary journalism which unites the realm of the fiction writer that involves stories on everyday lives of people, and the nonfiction reports from centres of power (Sims, 1984). According to Sims (1984), in complex social worlds, "scraps of information" by centres of power are no longer satisfactory for the reader's desire to learn about people doing things as these only begin to explain the events and situations.

Therefore, he argues that literary journalism requires "immersion, structure, voice, and accuracy" as central forces (Sims, 1984, para. 20). The voice of the writer surfaces to show the reader that there is an author at work, but it also brings the authors into our world. Compared to fiction, literary journalists must be accurate. The feelings and dramatic moments of their characters have a "special power" because the reader knows the stories are true: "The literary quality of these works comes from the collision of another, real culture" (Sims, 1984, para. 5). Literary journalism has its own set of rules and demands immersion in complex and difficult subjects (para. 4). In his interview with McPhee, Sims (1984) concludes that in its simplest form immersion means "time spent on the job" and "trying to learn all there is about a subject" (para. 28 – 29).

In the early 2000s, New Journalism has seen a rebirth in the New New Journalism as Boynton calls it (Dowling, 2019; Shafer, 2005; Boynton, 2005). At the heart of the works of New New Journalists is essentially reportorial depth. Boynton (2005) who has been a sharp critic of Wolfe's career intentions in respect to his promotion of the New Journalism, finding him "transparently self-promotional" (Dowling, 2019, p. 10; Shafer, 2005), describes this next stage in literary evolution as "reportorially based, narrative-driven longform nonfiction" (p. xi).

In his book on the New New Journalism, Boynton (2005) interviews a group of New New Journalists to explore the methods and techniques they have developed. The author claims that contrary to the New Journalists, the new generation experiments more with the *way* one gets the story and the genre is more reportorial than literary. The New New Journalists have developed innovative immersion strategies and extended the time they have spent reporting (p. xiii). They share a dedication to "close-to-the-skin reporting," i.e., a belief that they can narrate the reality in both accurate and aesthetically pleasing way and bridge the gap between their subjective perspective and the reality they are observing by immersing themselves into the lives of their subjects for a longer period of time (p. xxvii). The New New Journalist Michael Lewis, the author of "Liar's Poker" and "Moneyball" relies on immersion by asking his subjects to travel with them (Boynton, 2005, p. 261; Shafer, 2005).

With the rise of digital media, literary journalism received its "digital reincarnation" in the form of online features such as multimedia narratives that borrow from the techniques of cinema and photography (Dowling, 2019; see: Chapter: 4.2). These digital longform narratives have power to immerse the senses in a way that showcases "the subjectivity of both narrator-journalists and their subjects" (Dowling, 2019, p. 9). The concept of immersion is therefore related to literary journalism's "unique visceral intimacy, a bold "escape from the cooler, paler ideas" of objectivist journalism" (Hartsock, 2016, p. 30, as cited in: Dowling, 2019, p. 10). Dowling (2019) explains that audiences enjoy control over their media, which present them with complex narratives that require attentional focus and continuous concentration. In that sense, immersion requires interaction defined by active engagement of the audiences rather than passive escape (Dowling, 2019).

The power of digital media is revealed in a set of functional affordances that enable new forms of storytelling and qualitatively different user engagement. Murray (2011) offers a useful framework for understanding the capabilities of digital media versus analogue media. The author identifies four affordances of digital media that enable various types of engagements and processes. First, there are procedural affordances, i.e., a set of rules computational media can embody and execute. Second, participatory capabilities of a computer that allow users to manipulate the virtual environment. Third, encyclopedic capabilities that allow computers to contain large amounts of data presented in various form. Finally, there are spatial capabilities of digital media that allows for navigation throughout the virtual environment created (in: Aston, 2017, as cited in: Dowling, 2019). Dowling (2019) claims that immersive media developments enabled a spatial orientation to the other three key affordances of digital media, and emphasises that each of the four affordances were more evenly represented in digital publications prior to the emergence of fully immersive storytelling such as 360 videos and VR because they lacked the capacity to represent three-dimensional space with a great resemblance to the real world, and to immerse the viewer so deeply (Aston, 2017, as cited in: Dowling, 2019).

In recent years, in an attempt to make VR technologies mainstream, news organisations began using immersive media, i.e., media that provide a concurrence of interaction, autonomy and presence in a computer-generated environment, such as Cardboard VR Headsets, 360-degree videos or mobile phone apps, in order to explore how to disseminate the news with VR (Sánchez Laws, 2020, p. 2 - 3). Thus, a new kind of journalism that requires "deep engagement" has been developed (Sánchez Laws, 2020, p. 2). It is a form of journalism that implies presence and attention in the situation.

In the late 1960s, Ivan Sutherland was the first to tackle the question of interaction with computer-driven immersive media in systematic scientific way (Sánchez Laws, 2020). During his time at the U.S. military, Sutherland was interested in experiments with remote monitoring. In one experiment, a camera was placed on a rooftop during a game of catch ball, while at the laboratory an observer assumed the camera perspective and controlled the device while moving his head. During the procedure, the observer was so immersed that he tried to avoid the ball when one of the players threw it at the camera. This level of immersion made Sutherland explore if it would be possible to immerse a person in a fully synthetic computer-generated reality and not only in a real distant location through a camera.

In collaboration with his student Bob Sproull at Harvard, Sutherland developed first see-through head-mounted display (HMD) which provided kind of AR experience since the user was able to see both the computer image and the physical location. The display called *Sword of Damocles* had a set of optical see-through relay optics for each eye, allowing users to simultaneously see a synthetic image and a surrounding real environment from different view points (Barfield, 2016; Figure 17). Sánchez Laws (2020) summarises some of the provisional answers Sutherland's work provides about the potential uses of immersive media and claims that he proposed that (1) one can understand abstract realities better through immersive media, (2) conventional laws of physics do not necessarily apply to immersive media worlds, and (3) computers could control our virtual reality, to the extent of controlling real tangible matter. Since Sutherland's invention, many attempts have been made to create a range of HMDs in the communities of VR, AR, and wearable computers.

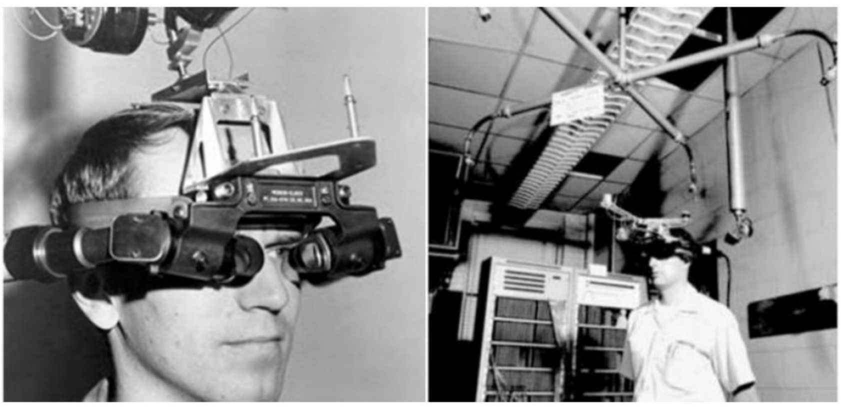


Figure 17: *The Sword of Damocles*, First Head Mounted Display (Image: *vroom.buzz*)

In November 2015, New York Times released over 2 million Google Cardboard headsets (Manly, 2015, as cited in: Kool, 2016). Followed by VR companies such as Vrse, RYOT, and Jaunt, these VR journalism producers developed news stories through immersive but non-interactive two-dimensional 360-degree films that provide an experience that is like "watching video feed of a fully-circumscribing panorama photo" (Kool, 2016, para. 13). Domínguez (2017) distinguishes between these 360-degree VR experiences, also known as *cinematic VR* and journalistic *spatial narratives* in VR that started with the work of Nonny de la Peña. *Spatial narratives* are defined as storytelling in which the physical and temporal dynamics of the scene, meaning where and when participants move, and their relative positions at each moment, are necessary to fully understand what happened (Emblematic Group, 2016, as cited in: Domínguez, 2017). Domínguez (2017) emphasises that *spatial narrative* with VR breaks with the tradition of visual cinematic representation and maximises the spatial construction intrinsic to the digital medium. In the case of *cinematic VR*, immersion in another place is challenged by the physical border of the screen that lessens the experience of spatial immersion. The user chooses "the angle of view of an enveloping image" and is not enabled to move around the scene. *Spatial narratives* allow the user to change the position in the scene and therefore also the perspective (Domínguez, 2017).

Across literature on immersive journalism, VR experiences are largely explained as "ultimate empathy machines" (Herrera et al., 2018). The success of VR technology lies in its ability to garner empathy which can make news stories more persuasive and impactful (Kool, 2016). While using a VR system, the viewer develops "a personal stake within another reality through an empathy-engendering machine" and becomes emotionally vulnerable (Kool, 2016, para. 22). The viewer can easily forget that the content is constructed with a specific intention. Additionally, this type of journalism creates empathy by putting us in other people's shoes and encouraging us to feel more for them. It does so by removing the frame, i.e., the screen's physical barrier and placing individuals at the centre of news mediation (Sánchez Laws, 2020). VR's potential for increased user engagement is particularly evident for its unique capacity for *narrative transportation*, i.e., a level of involvement that often leads to *parasocial responses* associated with heightened empathy. It is related to how realistically events are presented as more realistic media is more prone to activate mental images (Perse & Lambe, 2016, as cited in: Dowling, 2019). *Parasocial communication* refers to one-sided mediated communication that users experience with characters on a television, film, or web program. This experience is also described as *parasocial interaction*, which is the impression of face-to-face contact or even interpersonal exchange with the characters they view. *Parasocial communication* leads to a variety of interpersonal responses (see: Allen, 2017).

Immersion is an important factor of narrative transportation from the user's immediate physical surrounding. VR's ability to absorb the user into the virtual world and block the reality outside the simulation is fundamental to achieve immersion and therefore deeply engage the user with a narrative storyline (Loeffler & Anderson, 1994, as cited in: Sánchez Laws, 2020). As a result, users are more likely to develop higher levels of sympathetic understanding for subjects and acquire greater sense of immediacy in virtual events and situations.

3.1.3 The Emergence of Immersive AR as a Storytelling Medium

VR differs from other technologies for the 3D aspect, the capacity to generate increasingly more responsive simulations, the feeling of "being there" that the technology could create, and how the virtual environment changes in response to the user's own perspective and bodily movement (Loeffler & Anderson, 1994, as cited in: Sánchez Laws, 2020). Another difference is the ability of the system to immerse the user in a fully simulated world.

On the other hand, in AR systems, users are no longer acting in fully simulated spaces. The physical world is overlaid with virtual content, rather than replaced by a virtual environment. The use of the locative or geographically coded media capabilities of AR enables journalists to create *situated documentary*, a form of immersive storytelling that uses mobile AR (Pavlik & Bridges, 2013). With *situated documentary*, the user can experience past news events anywhere in the world with geo-tagged multimedia enhancements. The goal is to use interactive and immersive multimedia presentation embedded in the real world in order to tell stories on the locations where the events took place. Pavlik and Bridges (2013) argue that this format is a "natural extension" of *place-based journalism* as it places stories in a local context and let them add to users' direct experience with the world (p. 21).

Literature shows that *place-based journalism* had a long history before the advent of digital media mainly for its "power to move readers" (Dowling, 2019, p. 149). It includes politically efficacious reporting and textured narrative description, marked by the ability to draw the reader into the "setting of the past" through the use of "felt detail" enabled through empathy and emotion as crucial elements of the aesthetic of place-based narrative (Dowling, 2019, p.

149). Dowling (2019) takes African-American reporter Ida B. Wells' post-Civil War descriptions of case of lynching that helped spark progressive reform as an example. In the digital era, interactive web documentaries showed that compared to more pallid content, vivid images of media violence enabled greater attention to the program, greater emotional reactions to the story, and leveraged transportation, or involvement with the story" (Perse & Lambe, 2016, as cited in: Dowling, 2019).

The *situated documentaries* are immersive and experienced from a first-person perspective which allows the user to be a participant of past events rather than an observer. As Hayes (2011) explains these 'historic and futuristic' stories are factual and experienced in contextual locations, enabling users to see historical events through the AR system as it was through "dramatic, emotional and experiential factual stories". The story is interactive and involves multiple modalities. The *situated documentaries* associate the story with other related events, enabling the user to see where the story fits into a broader pattern of events, trends, and issues (Pavlik & Bridges, 2013). Finally, *situated documentaries* are dynamic and evolve as events in the real world evolve, and encourage the user to interpret and bring meaning to the story.

Hayes (2011) provides an overview of the first experiences that allow those who are at the place to immerse themselves via AR (see: *"Transmedia Futures: Situated Documentary via Augmented Reality"*). One of them was created by Philadelphia's Department of Records in cooperation with Azavea (A Geo Mapping Company) based on the 90,000 geocoded images from the PhillyHistory.org, a collaborative online database of historic photographs and maps from five Philadelphia area institutions. These experiences allowed users to see Philadelphia as it was through the ages by using smartphone apps that overlaid historic photographs on the current urban landscape (Figure 18). This mapping of historic images to modern buildings and places enables an immediate connection of the user with the past.

Another example is *HistoryPin* that combines archival collection from about 100 different institutions, including the New York Public Library and the Boston Museum, with user generated content. Via the map, users can explore street by street, while the location-aware tours can take them to the closest pictures. Once they get to one of them, they can find the full-screen picture with stories attached to it, and can see a comparison between then and now (Figure 19). According to Hayes (2011), *HistoryPin* is an example of how global community can communicate place-based stories to future generations.

Figure 18: Philly History via AR (Image: *personalizedmedia.com*)

Figure 19: HistoryPin (Image: *personalizedmedia.com*)

One of the first to experiment with AR photo mapping was the Museum of London, which developed *Street Museum*. Similar to Philly History, it layers historic photos of a city's past above maps though a smartphone AR app, allowing users to create their own historical tours (Figure 20) An extended version, *Londinium*, created in collaboration with the History Channel features videos layered onto the streets to give users the opportunity to experience Roman London.

Figure 20: View of Duncannon Street in the City of London decorated with bunting and banners for the coronation ceremony of Edward VII. (Image: *dailymail.co.uk*)

Compared to earlier interactive media such as CD-ROMs, as well as websites and VR, the spatial characteristics of AR are unique in the sense that AR combines the story world and the physical world in real time, while other digital forms immerse the users into an alternative virtual world (Moreno et al., 2001). The AR medium depends on a "delicate tension between the virtual and physical" to immerse the user in the story (Moreno et al., 2001, p. 150). In AR, most virtual objects and characters are "world-stabilised" to the physical realm that is not replaced by the machine and continues whether the machine is on or off (Moreno et al., 2001, p. 150). The AR experience *Alice's Adventures in New Media*, based on A Mad Tea Party, a chapter from Lewis Carroll's book Alice's Adventures in Wonderland, requires story time to be synchronised with real time and aims to make an environment that is responsive to the user, as well as to create illusion that the story world exists whether or not the user takes action. These goals are complimentary as they each allow story time to be in-sync with real time. The user assumes the role of Alice and takes part in the tea party with three interactive characters, the Mad Hatter, the Dormouse, and the March Hare. The characters are presented through a head-mounted display, and appear to be placed at the same physical table as the user. They view the user as an disruption to the party and ignore him or her. The user's goal is to get directions to the garden located in Wonderland. Each character has a set of 'primitive actions' that they can perform, including serving, receiving and sipping tea, asking riddles, and various reactions to events that may occur in the story environment. For instance, a character may splash the user or another character with tea. (Figures 21a, 21b and 21c) The user also has a range of gestures for virtually serving, receiving, sipping and throwing tea. The characters have "procedural behaviours" that direct how each character acts or reacts to the user or other characters in the story (Moreno et al., 2001, p. 150).

21a

21b

21c

Figures: 21a - The Mad Hatter (at the user's left) has just been splashed with tea, **21b** - The March Hare (at the user's right) reacts with laughter, **21c** - The Dormouse (opposite the user) will soon awaken from the noise. (Images: Moreno et al. 2001)

With the *Ghosts of Sweet Auburn*, MacIntyre and colleagues (2001) developed AR narratives to support tours of Atlanta's Sweet Auburn Historic District, which was the cultural and economic centre of the Black Community in Atlanta before and during the Civil Rights era, and was home to leaders such as Martin Luther King, Jr., and John Wesley Dobbs. In these experiences “ghostly figures” from Auburn’s past appear superimposed over the physical space and address users with their stories. (Figures 22a and 22b)

22a

22b

Figures: 22a – A ghostly narrator is sitting in a physical chair, speaking to the viewer, **22b** – the user is holding a book the ghost directed them toward, and as they look at different pages, the blank pages have dynamic content mapped onto them. (Images: MacIntyre et al., 2001)

There are many other examples on the opportunities of AR technology to enhance storytelling (Chapter 2.0). Discussions on the possibilities of VR and AR technology for journalism started in the late 1990s with professionals and researchers beginning to think about what changes in the way of telling factual stories they could implement. Domínguez (2017) referred to earlier seminars, organised by the University of Minnesota in 2001 and 2002, that focused on what games could bring to news reporting, and explored how interactive and immersive audio as well as video and 360-degree photography could be applied to journalism. All of them set paths of investigation for news storytelling and how to intensify the feeling of exploring a place that is reinforced through immersion. The idea of what constitutes an immersive format is influenced by the notion that the user can interact somehow with the story and have a sensation of presence in a place.

In our study, we offer an empirical approach to a discussion on how the transformation of the content of journalism via AR influences the user's experience with the content. Our theoretical framework further explains both the AR storytelling forms and the experiential benefits that arise at the intersection of immersion, sense of presence and first-person perspective.

3.1.4 A Major Shift in Approach: New Modes of Storytelling

Technological changes have drastically impacted journalism and the media. According to Pavlik and Bridges (2013), there are four major ways in which technological forces affect the field. First, they have altered the way of gathering, editing, and producing news, and have the potential to make media production more efficient. Second, technology changes the organisational structure of media companies, transforming their business models and practices. Digital technology can alter the delivery of news, greatly reducing the costs. Third, technology creates new relationships between media companies and audiences, opening up greater potential for increased interaction among audiences, news, and journalists. Fourth, developments in technology transform the defining features of media content and storytelling, disengaging audiences from traditional news forms and giving rise to new genres and storytelling possibilities (Pavlik and Bridges, 2013). This area is the main focus of the current study.

Storytelling is defined as an activity that allows people to "express experiences, thoughts and feeling" (Broström, 2002, p. 86). People produce and receive stories through conversations, texts and media (Broström, 2002). Based on the definition of a story as "the narrating or relating of an event or series of events, either true or false" by the American Heritage Dictionary, Polkinghorne (1988) suggests that the term "story" is equivalent to "narrative" and should refer to any narrative production in general (as cited in: Polkinghorne, 1988, p. 13)

According to the cognitive psychologist Jerome Bruner, narrative understanding is one of two basic modes of cognitive functioning, together with the logico-scientific mode, which he calls the "paradigmatic" mode. Each of these modes provides different ways of ordering experience, i.e., of constructing reality. As Bruner emphasises, compared to the extensive knowledge we have of how the paradigmatic processes used in formal science and logical reasoning work, we know “precious little” about how narrative processes work. Each mode functions differently and uses a different type of causality to connect events. While the paradigmatic mode looks for universal truths, the narrative mode searches for particular connections between events (Bruner, 1986, as cited in: Polkinghorne, 1988). The narrative organisational scheme configures a sequence of individual events into a unified happening. It makes individual events and human actions comprehensible by identifying the whole to which they contribute. Accordingly, narrative is a “meaning structure” that organises events and actions into a whole and that attributes significance to individual events and actions based on their effect on the whole (Polkinghorne, 1988, p. 18). Blair and Meyer (1997) coined the term “narrative intelligence” to describe the ability of human or computer to organise experience into narrative (cf.: Trappl & Petta, 1997).

With technological developments, it became possible to create digital interactive narratives that offer “a pre-specified level of story agency or choice to the audience”, i.e., allows them to have a certain level of influence on the plot. (Laurel, 1991, p. 21, as cited in: McErlean, 2018, p. 2). Murray (2018) defines agency as “an aesthetic pleasure” typical for digital environments, which results from the “well-formed exploitation of the procedural and participatory properties” (p. 12, in: Rouse et al., 2018). Once the computer behaves in a coherent way and the outcomes of participation are clear, the audience experience the pleasure of agency, i.e., of “making something happen in a dynamically responsive world” (p. 12). To support agency, interactive stories, as a new narrative form must contain vast amounts of story content and expressive interfaces (Stern, 2008, in: Spierling & Szilas, 2008).

Several authors pointed out the terminology problem of the term “interactive storytelling”. Hartmut Koenitz (2017) of the HKU University of the Arts, Utrecht, prefers the word ‘narrative’ to ‘story’. As he explains “there is no telling in interactive digital narratives in traditional sense, instead there is someone who creates a dynamic system, a narrative architect” (cited in: McErlean, 2018, p. 148). McErlean (2018) claims that interactive games, and more recently, interactive documentaries and features are progressively familiarising audiences with an interactive narrative paradigm and will eventually create an ‘interactive digital narrative literary’ (McErlean, 2018, p. 148). Correspondingly, Stern (2008) suggests that a new term that will emphasise agency and generativity is necessary since the verb ‘telling’ that implies “a preconceived notion of something to tell” is contradictory to the idea of giving audiences a control over an interactive story. Therefore, the author suggests the term "interactive storymaking" as a small deviation from the original term (p. 4, in: Spierling & Szilas, 2008).

Digital interactive narrative practice started in 1966 with Joseph Weizenbaum's chatterbot program ELIZA that introduced the first interactive digital character to audience (Murray, 2018, in: Rouse et al., 2018; Figure 23). ELIZA was made as a computer program for the study of natural language processing between humans and machine.

ELIZA program, simulated a conversation between the user in the role of a patient and ELIZA, the automated psychotherapist, by using pattern-matching techniques and scripts. The author drew the conversations on contemporary narrative tropes: neurotic seeking help and the "nondirective" therapist who simulated the often mocked teachings of the psychologist Carl Rogers who suggested neutral and echoing responses. At the time, the program was so effective that the creator had to warn people against accepting the possibility of actual automated therapists. The invention of ELIZA was followed by a rich set of interactive digital narratives.

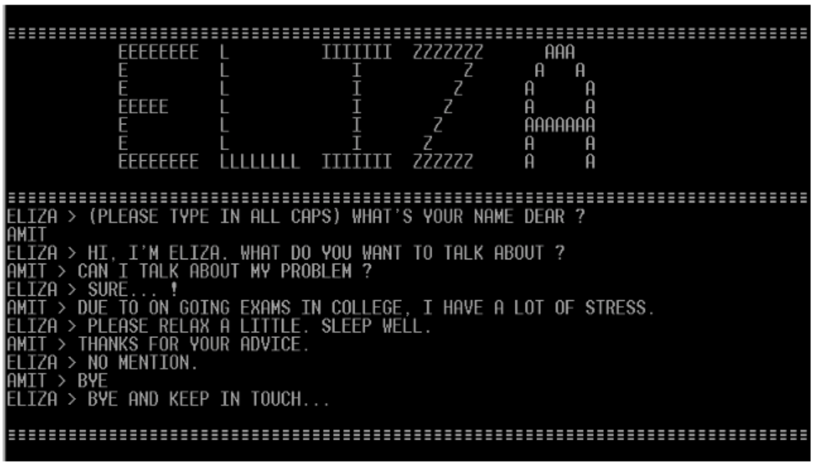


Figure 23: Example of an ELIZA bot conversation (Image: *steemit.com, 2017*)

There are two basic types of narratives used in narrative systems: *linear narrative* and *branching narrative*. *Linear narrative* presents a traditional form of narrative in which a sequence of events is narrated from beginning to end without the possibility of a user altering the way in which the story unfolds or ends. In a *branching* story structure, there are many user decision points in the story that alter the way in which a narrative unfolds or ends (Riedl & Young, 2005, Figure 24).

A *branching narrative* may produce variability in the experience a user has with a storytelling system. However, this variability is scripted into the system at design time and therefore limited by the designer's anticipation of the user's preferences. Based on feedback from the user, the system puts together pre-scripted sequences (Riedl & Young, 2005). Riedl and Young (2005) emphasise that interactive narrative systems have to consider the quality of the storytelling experience, but also balance the coherence, i.e., the user's ability to understand the connections between the events in the story against the amount of control allowed to the user.

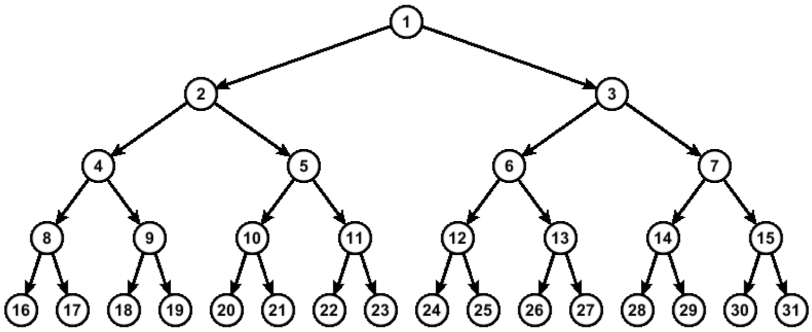


Figure 24: Branching Tree (Image: *thestoryelement.wordpres.com, 2015*)

In 2015, film-maker Steven Soderbergh announced an app-based branching interactive fiction called *Mosaic* (2017). The app also included what the author calls "discoveries", i.e., supplementary materials such as police reports, voicemails and emails between characters, and press clippings. The users were also free to go back and watch the story from perspectives they missed the first time. According to the author, the trick was to introduce just enough interactivity to enhance the narrative without making it feel like a video game: "I didn't feel I was relinquishing control at all – it's a fixed universe. I get to determine when those choice moments occur, and how they occur. I get to choose what the discoveries are, and how they pop up. Viewers will be able to shift their viewpoint among characters at will, and yet I'm still pulling the strings" (Newton, 2017).

In writing a branching story, quickly after the beginning of the story, the amount of content to be written explodes, making it impossible to develop an interactive story with meaningful breadth or depth in that way (Stern, 2008, in: Spierling & Szilas, 2008). However, as Stern (2008) explains, researchers and developers must embrace the amount of story potential that lies in in that "combinatorial explosion" as it represents the target for what giving players true agency means (p. 3; In: Spierling & Szilas, 2008). The way to succeed in achieving these results is through the real-time generation of story content from smaller building blocks. Researchers and developers should create systems that can generate the nodes of an "impossibly-large branching story graph", in response to the player's direction (Stern, 2008, p. 3; In: Spierling & Szilas). Only the nodes needed at a certain moment should be generated, and not the entire graph.

An alternative approach to a branching narrative would be *narrative mediation* as introduced by Riedl and Young (2005). It is a technique that enables a centralised "author" agent to control characters' actions. The system generates a story as a linear progression of events and then anticipates all the ways in which interactive user would interact with the world and with other characters. With narrative mediation, the story is represented by a plan that considers all the actions that will be performed during a storytelling session. For every exception that the user can make that deviates too severely from the linear story, the system generates an alternative storyline that begins at the point of the exception. In order to prevent a narrative mediation tree from growing infinitely large, there are interventions in some user actions. During an intervention, a user action is replaced by a similar action, that is called a failure-mode. The system has a list of failure-modes for each possible user action, with different effects. In cases when intervention is considered the best action for handling an exception, a failure-mode that does not threaten the plan with its effects is selected for execution instead.

AR systems have introduced new forms of narrative creativity that enable users to fully immerse themselves in the story and experience the story from the first-person perspective (see: Section I). However, the studies on the influence of these new narratives on users are scarce. This study aims to enrich journalism and media research by analysing the psychological importance of adding multimodal AR representation for users and their experience with news content, and investigating similarities and differences in respect to news delivered through PC desktop experiences.

The application of interactive digital media to journalistic practice includes a variety of illustrations and infographics added to 3D embodied experiences in video games (De la Peña et al., 2010; see also: Chapter 4.3). One example is the *"news games"* that range from simple 2D animations to 3D game play. For instance, *Gone Gitmo* (Figure 25; *"Gone Gitmo", n.d.*), a virtual representation of Guantánamo Bay prison originally designed for a multiplayer game *Second Life* (http://www.secondlife.com), experiments with avatar agency, spatial narrative, and the integration of documentary video within the computer graphics environment. The player is represented by an avatar of a prisoner that actively participates in the narrative by being hooded and transported in a C-17 transport plane to a cage in Camp X-Ray. Leaving the cage, the participant is presented a documentary footage of detainees. Moving around the space triggers original video of the Guantánamo Bay prison made by the U.S. Department of Defence. De la Peña and colleagues (2010) claim that embedding "the primary source material" documenting the physical space within the virtual space enhances the narrative and the sense of immersion and therefore validates the digital build (p. 293). The example would typically be called interactive journalism or "low-level immersive journalism" (De la Peña et al., 2010, p. 299) that reflects basic elements of what we are calling immersive journalism (see: Chapter 2.0).

Figure 25: Screenshot of the virtual environment of Gone Gitmo news game
(Image: *multiplejournalism.org, n.d.*)

Compared to experiences mediated through traditional desktop computing, highly immersive environments such as VR or AR benefit from the amount of immersion enabled to the users. Immersion allows the audience to focus on the reality created by the narrative (McErlean, 2018, p. 124): "The success of VR rests upon its ability to 'immerse' the user and keep them immersed" (McErlean, 2018, p. 126).

According to De la Peña and colleagues (2010), the goal of immersive journalism is not only to present the facts, but rather the opportunity to experience the facts. In their studies on VR, the authors have discovered that materials experienced on desktop can be a great tool for conveying cognitive information, but they typically cannot replace a physical world experience in respect to emotional and visceral responses. Highly immersive VR environments can produce a qualitatively different way to experience the news from those experiences through traditional desktop computing and console gaming. Finally, the authors claim that audio-visual material is only “a sampling of the physical world” (p. 299), typically on two-dimensional screens with a low field of view, and it is by itself misleading: “while observing a human disaster in another part of the world by TV, the viewers may be misled to infer that they understand the human suffering involved. However, the fact is they are only viewing and hearing a low resolution, sampled, duplicate of reality that does not cater to all senses. In this respect, traditional media can be claimed to depreciate and underrepresent reality” (p. 299). Therefore, immersive environments allow for a much more faithful representation of real events by enabling for more immersive experiences (De la Peña et al., 2010).

In the same spirit, computer scientists Slater and Wilbur (1997) explain that looking at a TV screen or a movie is similar to looking through the glass at the scenario and events that are distant in place and time. The glass of the TV screen creates a discontinuity between our current reality, and the reality being presented through the display. Similarly, the scenario and events presented on a computer are not “real” but “computer generated”. The environment audiences are looking at are “virtual”, i.e., computations of something, rather than what it appears to be. Compared to computer generated environments, immersive virtual environments aim to realise “stepping through the class”, i.e., “stepping through a barrier” in which we want to preserve the sense of “being there”, i.e., the sense of presence (Slater & Wilbur, 1997).

In this study, our focus will be to explore the users’ experience with AR news content and investigate similarities and differences in the experiences with news delivered through multimodal AR, compared to news delivered through PC desktop computing. Based on experimental conditions, we seek to investigate the benefits of novel modes of storytelling that embed a user in a story and enable a full range of physical actions on the part of the participant.

3.2 Sense of Presence

In this chapter, we will illustrate a theoretical framework for understanding the concept of presence in respect to AR environments. We will analyse the related literature in presence theory and describe the interrelationships between the concepts of presence, immersion and interactivity. Our theoretical framework goes even further to explain the experiential benefits that arise from the sensation of presence in immersive and interactive AR environments.

3.2.1 Defining the Sense of Presence in AR Environments

A number of researchers from computer science, psychology, and philosophy have tackled the definition of the concept of presence and its relationship to immersion. In the majority of studies on AR, immersion is understood as the technological basis of presence (Slater et al., 2001). As Slater and Usoh (1993) explain the sensation of presence is "the psychological feeling of being there in the environment, of which immersion is the technological basis" (as cited in: Lombardo, 2014, p. 77, in: Schumaker & Lackey). However, in order for the sensation of presence to emerge, the role of technology should not be noticed by the individuals. As International Society for Presence Research describes it, presence is a psychological state or subjective perception in which individual's perception fails to acknowledge the role of the technology in the experience even though part or all of an individual's experience is created by and channelled through human-made technology (*"Presence defined", 2000*).

A body of theories point out the importance of the presence of other objects in the same space and the acknowledgment of their existence by individuals as one could not feel immersed in a world without a sense of presence of the objects that are in it, but also that objects could not be present to us if they were not part of the same space as our bodies. Immersion thus explains the world as a living space for the embodied subject, while presence confronts the subject with individual objects. (Ryan, 2001). On the basis of her AR artworks, the artist Margaret Dolinsky (2014) explains that immersion can occur between one person and an AR object as well as between multiple persons who are acting in relation to the existing AR object (in: Geroimenko, 2014). The artist claims that this psychological connectedness of immersion occurs once there is an emotional response to the AR system that is gauged by the sensation of presence: "Standing alongside the AR in the park and confronted by a man, I remained immersed within an augmented environment. We were listening to one another, engaged in a discursive reaction and ultimately we established our private interconnected network. We were immersed" (p. 297, in: Geroimenko, 2014).

Researchers use different terms to refer to the concept of presence. Lee (2004) examines various presence-related terms and proposes a unified terminology of the sense of presence that also emphasises the importance of individuals' experience of the objects they are confronted with. According to Lee (2004), presence as a general term "does not specify any technological domain"; it deals with "the perceptual process of the technology-generated stimuli" and it can therefore be used in the analyses of future technologies whose domains are still not determined (p. 29-30). In this respect, Lee (2004) claims that the generalisation of the term presence enables researchers to examine different presence-related phenomena that do not necessarily imply the feeling of transportation into a virtual environment, as in the case of AR technology, which does not replace physical environment, but rather layers virtual objects and stories onto the physical one.

Finally, Lee (2004) in his theory defines presence 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. 37). Para-authentic objects are those that "hold a valid connection" with the actual object that is represented (p. 34), whereas artificial ones are created or simulated by technology and do not exist in the real world. According to Lee (2004) presence can be divided into three types: (1) physical, (2) social, and (3) self-presence, based on a mix of two characteristics of virtuality (para-authentic vs. artificial) and the three domains of virtual experience (physical vs. social vs. self).

(1) Physical experience is related to the experience of physical objects (both entities and/or environments) and it becomes virtual once the experience of actual physical objects is mediated by technology or when the experienced physical objects are artificially created by technology. Therefore, physical presence is defined as a psychological state in which individuals perceive virtual (para-authentic or artificial) physical objects as actual physical objects in either sensory or non-sensory way. This means that physical presence happens when a technology user does not notice para-authentic nature of mediated objects or environments, or the artificial nature of simulated objects or environments. It does not require a sense of transportation.

(2) Social experience is related to the experience of social actors (humans and human-like intelligence). Experiencing humans or human-like intelligence is a part of experiencing physical entities. Thus, experiencing social actors is a part of experiencing physical objects (Lee, 2004). Social presence is therefore defined as a psychological state in which individuals perceive virtual (para-authentic or artificial) social actors as actual social actors in either a sensory or non-sensory way. Social presence is given when technology user does not notice the para-authenticity of mediated humans and/or the artificiality of simulated non-human social actors.

(3) Self-experience refers to users' experience of their own selves in everyday lives. It becomes virtual once the act of experiencing one's actual self is mediated by technology or when the experienced self is artificially constructed by technology. Self presence is defined as a psychological state in which individuals experience their virtual (para-authentic or artificial) self/selves as the actual self in either a sensory or non-sensory way. This means that technology user experiences self-presence once he or she does not notice the virtuality of either para-authentic representation of their own self or artificially constructed alter-selves inside virtual environments.

In defining the sense of presence, researchers also point out the importance of medium's ability to provide interactivity, i.e., to enable individuals to explore and act within a story. In this respect, the narratologist Ryan (2001) emphasises that a *theory of presence* in immersive environments must include a *theory of interactivity*. The author delineates three items proposed by Sheridan (1992) as the variables that control the experience of presence in virtual worlds and point out this dependency, being (1) the extent of sensory information, a factor that is responsible for the three-dimensionality of the display and its lifelikeness, (2) the ability to explore an environment, i.e. control of relation of sensors to environments; for instance, the ability of the individual to change his viewpoint of a visual field, or to reposition his/her head to localise sound, and (3) the ability to change physical environment. The second and third factor represent two different modes of interactivity that allows individuals to act and enhance their connection with the environment.

The AR community highlights that AR grounds interaction within the local physical environments and therefore any definition of presence applied to AR must emphasise "the *seamless* integration" of virtual content with the real environment (Steptoe et al., 2014). Steptoe and colleagues (2014) argue that Lombard and Ditton's definition of presence as "the perceptual illusion of non-mediation" is salient to the concept of AR because the "machinery" behind the AR experience should not be evident to the users (Lombard & Ditton, 1997, as cited in: Steptoe et al., 2014). According to Lombard and Ditton (1997) an "illusion of nonmediation" occurs when an individual fails to perceive or acknowledge the existence of a medium in his or her communication environment and responds as if the medium were not there. Similarly, Bolter and Grusin (1999) state that throughout the last several hundred years of Western visual representation, there has been an attempt to achieve "immediacy" by ignoring the presence of the medium: "A painting by the seventeenth-century artist Pieter Saenredam, a photograph by Edward Weston, and a computer system for virtual reality are different in many important ways, but they are all attempts to achieve immediacy by ignoring or denying the presence of the medium and the act of mediation. All of them seek to put the viewer in the same space as the objects viewed" (p. 11). A perceptual state of non-mediation in AR arises from a high level of technologically facilitated immersion and environmental consistency. In turn, it gives rise to realistic behaviours and responses. (Steptoe et al., 2014).

A number of studies indicates that the interface must provide continuous and unobtrusive experiences in order to induce a sensation of presence. Stimulating experiences succeed in engaging users and encouraging them to continue to act and experience the mediated or gaming environment. On the other hand, un-stimulating experiences or disruptive interaction can interrupt or break users' participation (Marsh et al., 2005). Disruption may happen when the users become overly aware of the medium and the existence of the physical interface such as a television set (Tang et al., 2004). However, in VR and AR interfaces, users benefit from a high sense of presence that is enabled through the elimination of the frame that exists in typical interfaces and media as well as through the enabled interaction with the interface. While in typical interfaces and media users interact with a medium in a two-dimensional surface, in typical VR and AR interfaces, users engage with the medium in a three-dimensional space. The elimination of the frame of the detached media, such as interface screen, provides higher levels of transparency and continuity. As Biocca and Levy (1995) state: "The use of head motion and hands gesture to interact with the computer transforms the human body to primordial communication interface to the environment" (as cited in: Tang et al., 2004, p. 204).

Another factor that is identified as playing a role in the high sensation of presence in AR environments is the existence of user's actual body. In their study, Tang and colleagues (2004) compared VR and AR and showed that the difference in spatial presence between VR and AR is that AR environments are "largely unmediated" and the users' sense of presence is higher in AR environments than in VR environments (p. 206). Findings suggest that the sense of presence in VR environment is lower compared to AR environment due to the absence of representations of the user's body.

In order to enable the sensation of presence in AR experiences, it is also important to generate believable behaviours and relationships between the real and virtual objects. One can find a number of AR endeavours across literature that illustrate a successfully developed interconnection between real and virtual objects. An AR system by Magnenat-Thalmann and Papagiannakis augmented real environment with animated virtual humans on the site of ancient Pompeii. The users were allowed to be immersed in the augmented scene and receive storytelling experiences from the virtual human actors (Figure 26). Barfield (2016) underlines that this combination of real and virtual is what makes AR storytelling so compelling. The essence of experience implies both real and virtual components, but their combination must be meaningful and powerful. The experience should not be based on reality by itself as in that case there is no contribution to the augmentation, but it also should not come primarily from virtual content as in that case the augmentation part would only be a novelty and a possible new form of media.

Figure 26: Virtual characters acting in an augmented storytelling drama on the site of ancient Pompeii (Image: Magnenat-Thalmann and Papagiannakis, 2005)

Theorists map out different interrelations of real and virtual in AR. Barfield (2016) delineates three approaches for AR storytelling where real and virtual form an important part of the experience: (1) *Reinforcing*, (2) *Re-skinning*, and (3) *Remembering.* In (1) *reinforcing* AR chooses an inherently compelling real environment (an object, person, or location) and attempts to use the power that is inherent in reality itself to form a new type of experience that is more forceful that either the virtual content or reality by themselves. Barfield (2016) uses the *110 Stories* experience designed by Brian August as an example. By using a mobile phone near or in Manhattan, one can get an outline of where the Twin Towers in the World Trade Center should be. (Figure 27) Barfield (2016) explains that there are two things that make *101 Stories* experience effective. First, the application does not show a detailed representation of the buildings, but only their outline that looks as if it were sketched with a pencil against the New York skyline. This reduction of realism sends the message that the towers are no longer there. Second, the application invites participants to not only capture and upload the augmented image, but also to create a story by adding personal comments.

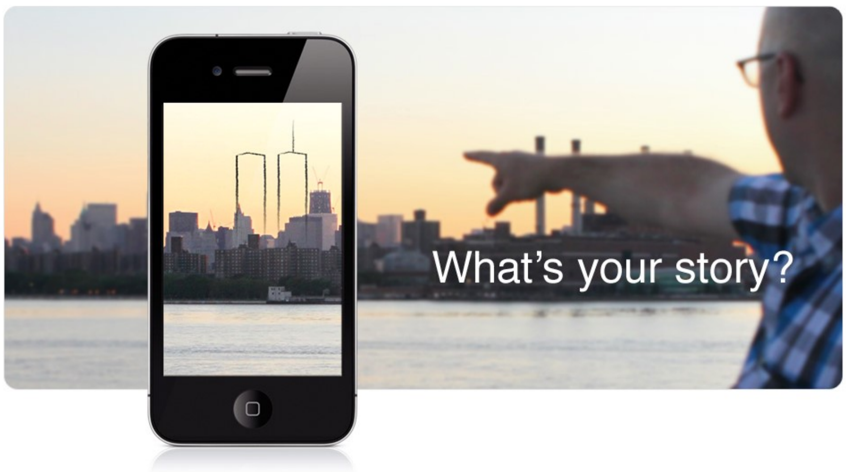


Figure 27: the *101 Stories* experience (Image: *101stories.com)*

In (2) *re-skinning*, reality is remade to suit the purposes of the story one wants to tell. Here, reality is either something specifically set up and then augmented by the creators, or the experience is designed to re-characterise an existing real surrounding. Compared to *reinforcing*, experiences based on *re-skinning* can function in the most arbitrary real locations as most of the "power from the experience" now comes from the virtual content.

The author specifies that AR is still evolving, so there are few examples of re-skinning, and those that exist often imply real environments that were specially created to support the needs of the story. One example is *AR Façade*, an immersive story experience developed as an augmented reality version of *Façade*, an interactive drama created by Mateas and Stern that runs on a PC desktop (2007, as cited in: Barfield, 2016). It takes place in an apartment which was replicated by the researchers as a setting of *AR Façade*. The participant has the role of a dinner guest visiting a couple whose marriage is about to break apart. (Figure 28) He or she walks around the real setting wearing a wearable AR system and interacts with virtual representations of the couple.

The aim was to enable participants to interact more naturally with the apartment and the virtual couple and provide them a greater sense of being in a real apartment. As a result, some participants were affected emotionally and decided to quit the experience early rather than participate in an uncomfortable social situation, while others became highly engaged and showed emotional connection such as running to follow one of the characters when she leaves the room.

Figure 28: *AR Façade*, an augmented reality interactive drama (Image: *Dow et al., n.d.*)

In their investigation of interactive documentaries, Walter and colleagues (2018) argue that empathy diminishes from the storyline the more dissimilar characters are from their audience: "If there is considerable social distance between the audience and the characters or the situation in which the characters find themselves, persuasion is less likely to occur" (as cited in: Dowling, 2019, p. 150). However, this limitation can be overcome by increasing the degree of social proximity between audience and characters, which is particularly possible with digital interactive documentaries, whose design enables users to explore the environments and lives of narrative figures autonomously. In this respect, highly immersive VR and AR environments carry an even greater impact due to story realism, enhanced sensation of presence in a story, as well as first-person perspective of the events, which is widely accepted across the studies. In our research, we will tackle the question of social distance between the self and the others in relation to the first-person perception of pro-social messages of an idealised body image (Section II).

In (3) *remembering*, AR storytelling draws upon memories and retells the stories. The setting is generally a place where these memories and stories actually happened. According to the author it is assumed that the combination of memories and stories with the actual real location can produce a new experience that is more powerful than either the real location or the virtual content. Compared to *reinforcing* in which locations have a meaning and power that most people know and agree upon, *remembering* is more personal.

Memories and viewpoints can make for compelling experiences even when they do not take place at a particular location. An example is the AR experience *Three Angry Men* (MacIntyre et al., 2003, as cited in: Barfield, 2016) and its successor, *Four Angry Men*. Inspired by the drama *Twelve Angry Men* by Reginald Rose, these experimental AR narratives allow participants to experience the memories and thoughts of characters from their particular points of view. The participant is seated at a table in the viewpoint of a jury member deliberating the case, able to see the other jurors. (Figure 29) He or she is not only able to hear what other jurors are saying, but also hears their inner thoughts. The participant is free to switch seats at any time. When he or she moves to the seat of another juror, the entire experience changes.

Figure 29: *Three Angry Men* AR experience, seeing two other jurors (Image: Barfield, 2016)

The interrelationship of three features - blending the virtual and physical worlds, continuous and implicit user control of the point of view, and interactivity - distinguishes AR from earlier media (MacIntyre et al., 2001). Although none of these features is unique, except for the blending of the virtual and physical worlds, their combination is.

These three features derive from “the personal nature of the human-computer interface” (MacIntyre et al., 2001, para. 8). First, personal AR displays enhance users’ perception of the world around them and therefore enable AR techniques to be used to present “synthetic information” anywhere in the user’s surroundings. This flowing combination of the physical and the virtual, as well as the inevitable tension that emerges between them, provides valuable dramatic possibilities that are impossible in any other medium. Second, the user wearing the display can look and walk around and control the point of view of the experience. Finally, since the user is located in the physical space, personal AR systems are “inherently interactive”. Even if the virtual content is non-interactive, the user is allowed to implicitly interact with the physical space.

Focusing on the experiential aspects of the human-computer interface, we will explore the changes in media experiences from traditional PC-desktop interaction to fully immersive AR. We will take an empirical approach to a discussion that has been largely theoretical up until now. By using multimodal news stories as stimuli, we will describe a relationship between immersive and interactive mobile AR and the desired effects being the sensation of presence and a first-person perspective and explore its influence on the users.

In Section I, we will examine how AR-enhanced storytelling affects the users and their processing and evaluation of media content and investigate similarities and differences between AR and PC-desktop representations of the content.

In Section II, we will expand the research in first-person effect studies by investigating the self-other differentials from pro-social media content of idealised body image, and test the association of the perception of media effects and the first-person differential on the self and others with intention to engage in body image behaviour. Furthermore, we will compare the findings with the ones derived from non-AR-enhanced media content.

3.3 First-person Perspective

With the advent of immersive AR, it became possible to embed virtual content in the physical world and present this mixed environment with a first-person perspective (Steptoe et al., 2014). The first-person perspective refers "to the point of view of the "I" as the way in which a human subject has access to herself/himself and the world and to her/his experiences, emotions, thoughts, and actions" and it is opposite of the external third-person perspective (Schraube, 2014, p. 733, In: Teo, 2014). Kelly (2016) calls this point of view "the "you-person" view", because "it's the position of feeling rather than the position of observing" (Yang, 2016).

This chapter looks at a range of studies on perspective-taking in both traditional and contemporary narrative formats and considers its influence on the users. We begin with a review of traditional understandings and then outline some of the benefits gained from perspective-taking: increased positivity in explicit and implicit intergroup evaluations, increased helping, reduced prejudice and negative stereotypes, and improved interpersonal communication. We move to recent investigations on perspective taking in immersive virtual environments and delineate the novelties it brought about for the users. Finally, we describe the state of the art in respect to research on perspective-taking in immersive AR environments.

3.3.1 Observations of Perspective-Taking in Traditional Media

A myriad of studies explores the process of *perspective taking*, "the mental simulation of a situation by placing oneself in the shoes of another via imagination" (Batson et al., 1997, as cited in: Ahn et al., 2016). Findings show that perspective taking facilitates a variety of favourable outcomes.

Research in this area indicates that perspective-taking can lead to a greater positivity toward a specific person or a group. Feeling empathy for a member of a stigmatised group can improve attitudes toward the group as a whole (Batson et al., 1997). Empathetic feelings often occur when one takes the perspective of a person in need, imagining how that person is affected by his or her plight. In an experiment by Batson and colleagues (1997), inducing empathy for a young woman with AIDS or a homeless man led to more positive attitudes toward people with AIDS, respectively the homeless.

Observations of the effects of perspective-taking on implicit racial evaluations show that perspective-taking reduces prejudice and attenuate negative stereotypes. In one study (Tod et al., 2011), non-black participants watched a 5-min. video showing a black man and a white man performing daily activities and receiving differential treatments because of their race. Participants were instructed to consider the black man's perspective or remain objective and emotionally detached as they watched the video. Findings show that perspective takers evinced more positive implicit racial evaluations compared to objective-focused participants. In subsequent experiments, perspective takers reported stronger feelings of warmth towards Blacks as a group than did control participants.

A variety of studies indicate that perspective-taking produces various behavioural outcomes such as helping. A Batson and colleagues (1981) study had subjects watch another female undergraduate receive electric shocks and found that empathy for the person in need leads to altruistic rather than egocentric motivation to help. Another study examined majority group members' collective action on behalf of a minority and found that out-group perspective-taking was positively associated with heterosexuals' collective action in response to hate crimes against non-heterosexuals, as well as whites' action in response to hate crimes against blacks (Mallett et al., 2008). Additionally, Clore and Jeffery (1972) found that perspective-takers evinced more positive responses to a specific disabled person (the experimenter) and increased support for spending university funds on facilities for disabled students.

Perspective-taking has also been linked to improved interpersonal communication. One investigation (Fussell & Krauss, 1989) had participants name or describe abstract figures either for another student (social condition) or for themselves (non-social condition). Second, participants attempted to match the stimulus figures to a set of descriptions: a third that the participant him- or herself formulated, a third that other participants formulated in the social condition, and the remaining that other participants formulated in the non-social condition. Findings show that participants did best with names or descriptions that they themselves had produced (86%), but when using names or descriptions that were not they own, they did better with descriptions that had been intended for another person (60%) that with those intended for the describer's use (49%). The descriptions intended for the use of another person were longer and employed less diverse vocabularies.

3.3.2 Perspective-Taking in Immersive Virtual Environments

Perspective in storytelling has a long history. By enabling alternative viewpoints both spatially and temporally, perspective enhances the interactive elements of a story (McErlean, 2018). The panorama paintings of the late eighteenth century were an early form of interactive narrative. They were "360° degree images which surrounded the viewers" (Rieser & Zapp, 2002, p. 28, as cited in: McErlean, 2018) and enabled them to 'engage' with the painting to create a story. McErlean (2018) calls these immersive art pieces "a precursor to modern interactive narrative systems" which appeared with the evolution of digital media (p. 45). Interactive titles require an active audience that navigates the narrative in a variety of ways, creating an individual perspective of the story and unique experience for a viewer (McErlean, 2018; see: Chapter 2.0 and Chapter 4.3). Moreover, the author of the interactive titles is not significantly present. On the contrary, the author is the one who created the work and then gave the authorial control to the users to develop their own perspective on the story. The audiences should be able to adjust their perspective and walk around and discover the events or objects they are viewing form different angles. This enables the audiences to focus more on the experiences of characters in the stories they are presented with (McErlean, 2018). With the emergence of fully immersive and interactive media such as AR and VR, more possibilities than ever are offered to comprehend another person's experiences.

Recent studies on perspective-taking has expanded the research by using immersive virtual environments that allow participants to "embody another person's perceptual experiences" (Ahn et al., 2013, p. 7). VR experiences, or immersive virtual environments are a "fully immersive and interactive computer-generated environments" that have users feel like they are acting inside a virtual environment by replacing "the user's perceptual input of the real world with perceptual input from a virtual world" (Herrera et al., 2018, p. 37). Compared to traditional media or imagination, VR's rich layers of simulated sensory information illustrate offline experiences in a more concrete and salient manner (Ahn, 2018).

Research shows that embodied experiences via immersive virtual environments have led to greater self-other merging, favourable attitudes, caring and helping behaviours toward people with disabilities compared to traditional perspective taking, which relies on imagination to put the self in another person's shoes. One study (Ahn et al., 2013) had a group of participants exposed to a red-green coloured immersive virtual environment world (Embodied Experiences condition (EE)), while another group of participants was exposed to a normal coloured immersive virtual environment world and instructed to imagine being colour-blind (Perspective-Taking condition (PT)). In Experiment 1, the authors compared EE against PT and found that EE was effective for participants with lower tendencies to feel concern for others 24 hours after the experimental treatment. With Experiment 2, the authors confirmed that an enhanced sense of realism during the EE led to greater self-other merging compared to PT. Finally, Experiment 3 showed that the effect of EE transferred into the physical world as well. Participants were more likely to voluntarily spend twice as much effort to help people with colour-blindness compared to participants who had only imagined being colour-blind.

Gehlbach and colleagues (2015) tested whether different ways to perspective taking, i.e. to “walk a mile in another’s shoes” (p. 523) result in different outcomes. By using a computer-based virtual reality simulation where participants were allowed to virtually walk around in the shoes of other characters and learn about them, the authors assigned participants to five different perspective-taking treatments or a control condition. The virtual environment included a golf course abutting a pond with a surrounding nature preserve (Figure 30a) and featured members from opposing groups: those who prioritised business development (a golf-course owner) and those who prioritised conservation (a park ranger). All participants took a first-person perspective within the virtual world as if they were looking through the eyes of the golf-course owner – rather than a third-person perspective where they could see their own avatar. Participants negotiated with a park ranger about six issues. In order to immerse themselves in their role as the golf-course owner and to learn the owner’s preferences, participants walked through the virtual world and met a club member, pro-shop manager, and building contractor who shared information about the owner’s perspective on the six issues (Figure 30b). Findings show that participants who received information about the other party foster more positive relationships and make greater concessions compared to participants who did not receive information about the other party. Moreover, those perspective takers who ‘experientially’ learned about the other party’s perspective felt more positive about their relationships and made greater concessions during the negotiation compared to those who were simply provided information about the other party’s perspective. These results suggest that immersive virtual environments can be an effective setting for facilitating environmental negotiation tasks and conflict resolutions: “Immersive virtual environment technology might allow individuals to engage in a heightened role taking experience in a way that is more experientially vivid than might be replicated through one’s imagination” (Gehlbach et al., 2015, para. 12).

Figure 30a and 30b: Screenshots of the virtual environment and negotiation with a club member (Image: Gehlbach et al., 2015)

Findings from another study show that immersive virtual environments produce a heightened feeling of interconnection between the self and nature which may be an effective tool for promoting involvement with environmental issues (Ahn et al., 2016). The study measured how different modalities increase a sense of nature as part of people’s self-identity and environmental involvement by comparing the effects of embodying animals through immersive virtual environments against watching the experience on video.

Immersive virtual environments place users directly into the shoes of another person instead of asking them to imagine the world from another person’s perspective, which proved to lead to a greater reduction in negative stereotypes. One study (Yee & Bailenson, 2006) found that negative stereotyping of the elderly was significantly reduced among participants who walked around a virtual environment in the avatar of an elderly person compared with those participants who inhabited the avatar of a younger person.

To date, no study has analysed the effects of perspective-taking in immersive AR environments that combine physical and virtual environments in real time. Lindgren (2012) investigated whether experience of actions in virtual environment from a first-person perspective benefits learning compared to a third-person, disembodied perspective. Findings show that participants who received the first-person perspective had a better memory for the important tasks, committed fewer errors and exhibited less help-seeking behaviour compared to participants who received the third-person perspective. The author emphasises that with the emergence of AR systems on mobile devices other types of virtual perspective-taking have become possible in educational contexts, but that the field lacks psychological studies on the specific learning and perspective.

The current study aims to contribute to the research field by analysing the effects of AR application in the context of journalism and the media and by investigating the influence AR-enhanced storytelling has on the users of these highly immersive news stories characterised by a sense of presence and first-person perspective of the story. In particular, we will employ a quantitative analysis of two experiments to measure: (1) *level of information recall* of the users' of news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, (2) *news evaluation* of the news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, and finally (3) *first-person perception of the pro-social messages of idealised body image*.

SECTION I

AR-Enhanced Storytelling and the Influence on Recall and Evaluation of Media News Content

With the rise of digital media, news organisations have altered their news-gathering and news-dissemination processes. Through digital media where computers output graphics to PC or AR displays news content can be presented in a variety of forms (Radu, 2014). AR-enhanced storytelling model is nonlinear, interactive and personalised. The user is no longer a passive consumer, but rather a participant experiencing a narrative from a first-person perspective. Nonlinear storytelling "invites the participant to explore the story in a variety of ways, perhaps beginning in the middle, moving across time, or space, or by topic" (Pavlik & Bridges, 2013, p. 22).

Historically, the media differed according to their modality. Print was predominantly textual, radio was aural, and television was audio-visual. With the arrival of computer-based media, this modality-based distinction became more complex because of the possibility to offer content in a number of different modalities: "Hence the label "multimedia" that we see applied to digital devices, even though they do not represent many media, but in fact many modalities rolled into one medium" (Sundar, 2008, p. 80, in: Metzger & Flanagin).

The growth of new modalities is greatly altering the nature of journalism. However, very little research has taken place to understand the psychological importance of adding multimodal AR representation for users and their experience with news content. The advantages of users' high immersion, i.e., a strong sense of presence and first-person perspective enabled through the AR system have not been sufficiently studied either. Such a state of art brings us to the following research question:

RQ1: How does AR-enhanced storytelling affect the users and their processing and evaluation of media content?

Considering that the primary function of journalism is to disseminate the information, we question whether multimodal AR as a new medium of presenting the information leads to improved information processing from sender to receiver, and more positive news evaluation compared to other multi-modality representations used in digital media.

4.1 The Information-processing Approach

The information-processing approach to human cognition focuses on how the human memory system acquires, transforms, compacts, elaborates, encodes, retrieves, and uses information (Moore, Burton & Myers, p. 980).

According to the **Atkinson and Shiffrin Multistore Model (1968)** the human memory system is divided into three main storage structures: sensory registers, short-term memory (STM), and long-term memory (LTM) and each of these structures is synonymous with a type of processing (Figure 31).

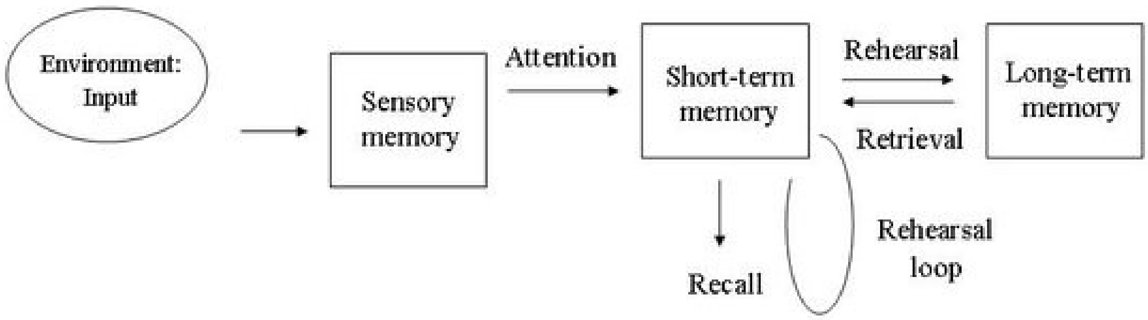


Figure 31: The Multistore Model of Memory, Atkinson and Shiffrin, 1968
(Image: *SimplyPsychology.org, 2017*)

The first stage of processing refers to registering stimuli in the memory: The sensory registers (one for each sense) briefly hold raw information until the stimulus pattern is recognised or lost. Pattern recognition is the matching of stimulus information with previously acquired knowledge (Moore, Burton & Myers, p. 980).

Compared to sensory memory, STM does not hold information in its raw sensory form (e.g., visual - icon, auditory - echo) but in its recognised form and it can maintain information longer than the sensory registers (Moore, Burton & Myers, p. 980). This holding process of the STM is known as maintenance rehearsal. It recycles information over and over as the system works with it (Moore, Burton & Myers, 2004). Miller (1956) found that STM has a limited capacity for information, particularly it has space for about seven items of information. Klatzky (1980) defined STM as work space in which information can be rehearsed, elaborated, used for decision making, lost, or stored in the third memory structure: LTM.

LTM acts as a permanent storage space for individuals' knowledge and works in combination with sensory registers and STM. The stimulus is firstly recognised in the sensory memory through comparison with information in LTM. Second, information manipulated in STM can be permanently stored in LTM (Moore, Burton & Myers, 2004).

The information in LTM has to be organised efficiently in order to be effectively encoded, stored, and retrieved. These processes are interdependent. The method of presentation has an important role in the way information is stored and retrieved, while the encoding is related to amount of elaboration and rehearsal conducted in STM (Klatzky, 1980; Moore, Burton & Myers, 2004). Elaboration uses information received from LTM after the stimulus is recognised. Since new information is compared to the old and manipulated information, it is either added or incorporated into the existing set of past experiences, and then encoded in LTM (Moore, Burton & Myers, 2004; Mayer, 1983). When the information is added, new structures are formed and result in new conceptualisations (Moore, Burton & Myers, 2004).

Retrieval of information is also an active process. Individuals access information by searching the memory structures. According to Moore and colleagues (2004), the speed and accuracy of retrieval are directly dependent on how the information was encoded and the attention being given to the stimulus (p. 981). In order to be recalled from LTM, information must be activated.

For many decades, researchers from a variety of disciplines have analysed information recall from news provided by the media. Whenever a new medium was introduced, researchers returned to the studies of information recall. This study adds to the research field by analysing the influence of adding AR as a new medium of presenting the media news content on the level of information recall.

4.2 Information Recall

Studies of the effect of message modalities, or type of communication transmission channel (e.g., audio, video, multimedia), have a long history in learning and communication research. Early research considered modalities to be a determinant of salience and subsequent processing activity (Skalski & Tamborini, 2005).

A Chaiken and Eagly (1983) study investigated the influence of media effects on persuasion, particularly persuasion involving source attributes unrelated to persuasive message content such as spokespersons. Subjects were presented with a persuasive message through one of three modalities: print, audiotape, or videotape. The message was delivered by either a likeable or an unlikeable communicator. The likeable communicator was found to be more persuasive in the audio and video modalities (compared to print), while the unlikeable communicator was more persuasive in the print modality (compared to audio or video). It was concluded that the video and audio modalities enhanced the salience of communicator-related information, leading the communicator characteristics to exert a stronger impact on persuasion.

Instructional design plays an important role in cognitive load, i.e., in the amount of effort necessary for memorisation and knowledge acquisition. A research on pictures in learning reports that pictures produce better memorisation scores than words which is known as the **pictorial superiority effect** (Levie, 1987).

Scholars found the positive impact of visuals on learning from television and print news. According to **dual-coding theory** (Paivio, 1971; Paivio, 1986) information delivered through two modalities - verbal and visual, instead of one - enhances storage potential and therefore positively affects memorisation. The theory was later applied to Mayer's **cognitive learning theory** which states that people learn more deeply by building mental representations from words and pictures than from words or pictures alone (2014).

A myriad of studies investigated the differences in the amount of information recall among participants in respect to modalities through which they received the news. One experiment (Williams et al., 1957) compared the effects of different mass media (television, radio and print) on learning. The authors found television to be the most effective in the level of information recall produced, followed by radio, and reading. The findings suggest that presentation of material by means of two sense modalities is more effective than either simple visual or aural presentation. Similarly, Katz and colleagues (1977) detected a slight increase in information recall of broadcast news that are seen and heard compared to those that are heard only. The authors also found that the difference was greater among the participants with higher level of education.

In a review of 30 studies of channel comparisons, Hartman (1961) concluded that in comparing the presentations through one channel alone or two channels, there is an advantage in combining channels when presenting the information. Severin (1967a; 1967b) compared sound only, picture only, sound and pictures, sound and unrelated pictures and concluded that participants receiving information delivered through audio and related pictures had the highest learning scores. The author explained the results by applying the **cue summation model,** which predicts that learning increases with an increasing number of available cues of stimuli. It is argued that additional learning cues are provided when the pictures are added to auditory material, and such presentations are more effective in learning than auditory material alone. Another study compared television and radio versions of an information program and found that TV versions presented in both audio and video produced greater learning and were more salient than radio versions of the program (Westley & Barrow, 1959)

With the evolution of websites, researchers have returned to the studies of modalities and information recall. Initially, websites included only texts, but have rapidly evolved to incorporate multimedia elements. The most influential article, which incorporated different modalities into a news stories was *Snow Fall: The Avalanche at Tunnel* by John Branch, (http://www.nytimes.com/projects/2012/snow-fall/index.html#/?part=tunnel-creek) published on the nytimes.com in 2012. The award-winning article raised a debate over multimedia stories being the future of online journalism (Greenfield, 2012), and encouraged other organisations to create multimedia articles and even coin a verb *to snowball a story* (Rue, 2013).

The New York Times started publishing multimedia stories on the website nytimes.com in 2000. Jacobson (2011) analysed 479 randomly selected multimedia stories published on the nytimes.com between January 1, 2000 and December 31, 2008 (Figure 32). Nytimes.com classified any non-textual standalone presentation as ‘multimedia’. Thus, a video is classified as multimedia, but a photograph that accompanies a textual story is not. “The characteristic shared by all these packages is that they could not appear as-is in the printed newspaper" (p. 870).

The author reported that The New York Times divided multimedia packages published between 2000 and 2008 into four categories: 'Video', 'Audio', 'Slide Show' and 'Interactive Features'. 'Video' refers to a single clip or video. Compared to 'Slide Shows', 'Videos' are more likely to be published as stand-alone entities, without a corresponding text. 'Audio' refers to an audio-only presentation. Around 2004, nytimes.com largely abandoned this category. 'Slide Show' refers to a range of photos, sometimes with captions. The users navigate a slide show by pressing a 'next' button. 'Slide Shows' do not include audio. Photo slide shows with audio belong to the category 'Interactive Features'. This category incorporates multiple media and/or interfaces for the presentation of the story.

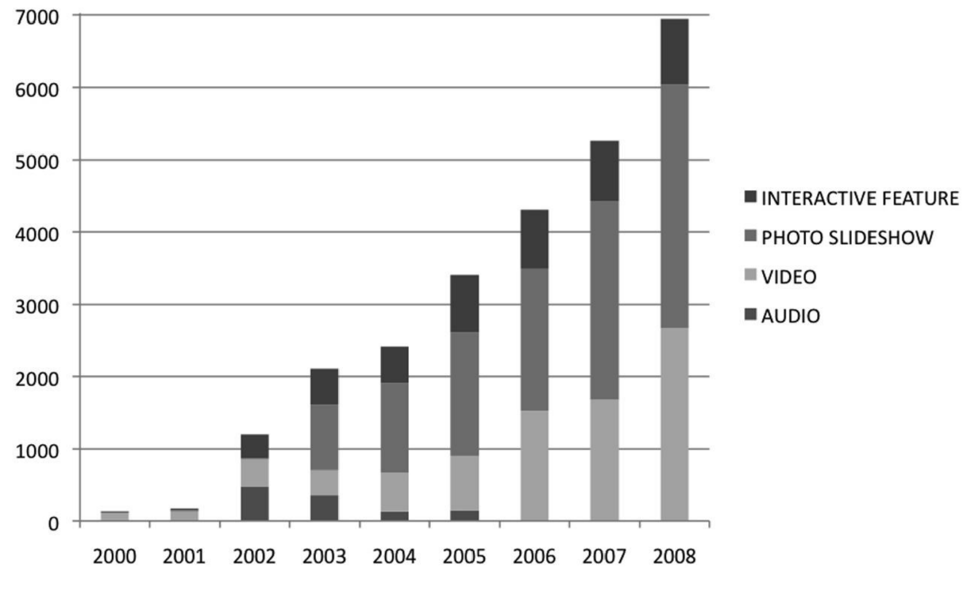


Figure 32: The number of multimedia packages published on nytimes.com 2000-2008, based on results from the multimedia search options on nytimes.com (Jacobson, 2011)

Sundar (2000) indicates that the term multimedia is somewhat misleading in the literature as it does not indicate the existence of multiple media, but multiple modalities of channels used in transmitting a message (see also: Marmolin, 1991). According to Hoogeveen (1997), multimedia is a property of a system or object where multiple perceptual representation media, such as speech, music, text graphic, still, animation and video, are used in an integrated manner (as cited in: Sundar, 2000, p. 481).

Multimedia presentations of news stories have given rise to multimedia journalism. Deuze (2004) provides two definition of multimedia journalism. First, multimedia journalism can be defined as the presentation of a news story package on a website using two or more media formats, such as (but not limited to) spoken and written word, music, moving and still images, graphic animations, including interactive and hypertextual elements (p. 140). Secondly, as the integrated (although not necessarily simultaneous) presentation of a news story package through different media, such as (but not limited to) a website, a Usenet newsgroup, e-mail, SMS, MMS, radio, television, teletext, print newspapers and magazines (p. 140).

Multimedia journalism should not be confused with online journalism (Deuze, 2004). Online journalism and multimedia journalism share existence on the Internet, but differ in the goals of journalism; online journalism does not necessarily involve multimodality that can be seen as a potential but not necessary element of added value to an online journalistic presentation.

A number of studies explores the effects of modalities on information recall of online news. An experimental study on the effects of multimedia on information recall of Internet news readers found that the multimedia site had slightly better recall results compared to text-only site (Berry, 2000). Another study examined the effect of modality and narration style on recall of online health information, and whether there are differences between younger and older adults. Audio-visual modality (compared to print) was found to increase information recall among both younger and older adults. Conversational narration style (compared to formal narration style) did not increase information recall, but the study found a synergetic effect between modality and narration style: audio-visual information in combination with conversational style increased information recall compared to written information with formal style or written information with conversational style among both younger and older adults. It was concluded that conversational style especially increases information recall when presented audio-visually (Bol et al., 2015).

Due to technological advances in recent years, new media researchers advocate that the right approach in studying the usefulness of modality as a way to distinguish media influence is to consider technology from the perspective of human experience rather than hardware (Skalski & Tamborini, 2005, p. 4 - 5). Therefore, new media researchers became interested in the concept of presence (Skalski & Tamborini, 2005). Highly immersive technologies such as augmented reality enable a strong feeling of presence in a mediated environment, but the studies of the effects of these technologies on the users are almost non-existent.

Multimodal AR as a new medium of transmitting the information by adding a layer of 3D virtual content onto the physical world has certain psychological effects on its users that are not researched enough. It is still not clear if AR helps of hinders users' memorisation and knowledge acquisition compared to other presentation designs used in digital media. Several studies indicate that content learned through AR experiences is memorised better than through non-AR experiences (Vincenzi et al., 2003; Valimont et. al., 2002). However, these studies are scarce and specifically focused on comparing AR to non-AR experiences in a classroom context. The research in media context is non-existent. Therefore, we come to the following research questions:

RQ1.1: How does AR-enhanced storytelling affect recall of media news information?
RQ1.1.1: What similarities and differences are found in the level of information recall from news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences?

According to Radu (2014) digital PC-based media is limited as the interaction is limited to mouse and keyboard, and does not evoke a strong feeling of presence. Also, the output is always on a two-dimensional screen. AR, on the other hand, allows users to visualise complex 3D content in the physical environment and leverages interaction (Radu, 2014). Moreover, AR systems do not only convey information, but appear to be inherently motivational and therefore can reduce cognitive load, increase interest, and encourage user exploration and creativity (Radu, 2014; Kaufmann & Dünser, 2007; Chignell and Waterworth, 1997).

Several studies reported that AR systems reduce the need for users to switch attention between different instructional media or to mentally transform representations (Tang et al., 2003; Pathomaree & Charoenseang, 2005; Neumann & Majors, 1998). On the other hand, the feeling of "being there" on desktop systems requires "additional mental recreation" since people are clearly "not located according to the rules of real-world SCs (sensorimotor contingencies)" (Slater, 2009, p. 3552). Moreover, in AR systems user's perceptual bandwidth is enhanced which leads to user's higher information processing capacity (Reeves & Naas, 2000; McDermott et al., 2010).

Finally, sense of presence and first-person perspective increase users' engagement with the content and can eventually lead to enhanced memorisation. In light of this discussion we propose the following hypothesis:

H1: AR-enhanced news content will generate greater information recall than the news content without AR enhancement.

4.3 News Evaluation

A great deal of research explores the role of psychologically meaningful message attributes such as modalities in the perceptual differences and formation of attitudes of the users.

The literature review shows the bulk of research exploring how the changes of modalities affect the perception of credibility of news stories that is defined as "a global evaluation of the objectivity of the story" (Sundar, 1999, p. 380). Pioneering research on media credibility took place in 1959 when the Television Information Office of the Roper Research Organisation that compared television to other media being newspapers, radio and magazines. On the whole, the results of the nationwide survey were in favour of television (Roper, 1978). The Roper studies were continued every two to three years during the 1960s and 1970s. Since 1961, television led as the most believable news medium and television viewing increased steadily between 1961 and 1974 (Roper, 1978). Since 1963, the Roper questions and the way findings are reported have attracted a great deal of controversy with newspapers editors and publishers criticising the studies (The Roper Organisation, 1975; Miller et al., 1988).

With the Roper studies, a number of researchers became interested in the phenomenon of news media credibility. Ibelema and Powell (2001) argued that television news shows higher credibility scores compared to newspapers due to additional visual and aural stimuli present in television news. In an earlier study, Carter and Greenberg (1965) tried to reveal why respondents chose one medium over another and found that respondents picked television because it was perceived as having a visual advantage. Newspapers were rated high because of the perceived advantage in completeness and accuracy, but were also perceived as being more biased than radio and television.

Many other studies found television to be perceived as more credible compared to media with lower sensory information such as radio or newspapers. Gaziano and McGrath (1986) reported findings that favoured television over newspaper. Powell and Ibelema (2009) analysed the relative credibility of local radio news, as compared to local television and local newspaper, among Alabama residents. The authors found that local radio news were perceived to have lower level of credibility compared to local television, but comparable to that of local newspapers.

A telephone survey conducted in the Detroit metropolitan area found that local television was perceived to be more 'believable' and 'truthful' than newspapers, but there was no difference in the perceived 'importance' of the local news presented by these media (Abel & Wirth, 1977). Another study conducted a survey of 627 Wisconsin adults and found that respondents rated television as most believable (46%), followed by newspapers (31%) and radio (11%) on a single-question ordinary measurement of believability (Jacobson, 1969). In addition, after sorting out the respondents according to their selection of the most believable medium, the author examined receivers' connotative judgments of three media by comparing the media with one another, employing a multidimensional index of 20 credibility and non-credibility judgments of media as news sources as a measurement. In the cross-media comparisons, the author found that the respondents rated television and radio as significantly more accurate than newspapers, but that the newspapers were considered significantly less unbiased than television and radio. Furthermore, the author reported that respondents considered television news to be more complete than news presented by radio and in newspapers. Findings also show that respondents who picked the newspaper as the most believable medium rated newspapers as more authentic than television, but rated television and radio as more objective. In addition, both television believers and radio believers considered newspapers to be significantly less objective than the medium they believed the most, but both television and radio believers found no difference in the objectivity of television and radio.

Research in the area shows that much of the literature examining demographic variables and media credibility is mixed. Westley and Severin (1964) were the first to study the correlates of media credibility and media use. The authors sampled nearly 1,000 respondents in Wisconsin and constructed profiles of those individuals who believed television to be the most credible news medium and compared them to those who perceived newspapers to be the most credible. They found that those who picked newspapers as the most credible were generally more men than women, had higher education and socio-economic status, resided in an urban area, were political independents, and belonged to more organised groups.

A telephone survey on media use and media credibility, conducted in San Jose, California, and a comparable one in Lansing, Michigan, obtained data on sex, education and age (Greenberg, 1966). Findings show that the sex of the respondents was significantly related to media credibility. The author reported that 78% of the women would believe a television news story more than one reported in the newspapers, compared to only 61% of the men. Among the men, the younger were more likely than the older to pick television: 67% of those under 30 and 51% of those over 40. Among women, the relationship was less linear: 76% of those under 30, 83% of those in their 30s, 86% of those in their 40s, and 72% of those over 40 selected television. Furthermore, the less educated were more likely than the better educated to believe the television news story than the newspaper version of the story.

Including individual differences, our study allows for comparisons of news evaluations in conjunction with demographic characteristics.

With television becoming increasingly digital, news stations started broadcasting their stories in high-definition television (HDTV) and on larger screens. A number of researchers examined how formal features of television impact viewers' perceptions of credibility. An experimental study on the influence of screen size on the perceived credibility of the presidential candidates had the participants receive clips from presidential campaigns to watch on a small (20-inch diagonal) or large (10-foot) screen, and rate the credibility of each candidate. The results show that both candidates were rated as more dangerous (i.e., less credible) on the larger screen (Bracken et al., 2003). In addition, Bracken (2006) investigated the influence of image quality on audiences' perceptions of source credibility for news anchors and local news. The author found that improved image quality (HDTV) had a positive influence on audience perceptions of source credibility and the overall credibility of newscasts.

Credibility evaluations often centre around the source of information. Among the first ones to conduct credibility studies were Hovland and colleagues (1953) who found that people are more likely to believe a fact when the source presents itself as credible. The credibility of a source was determined by its 'expertise' and 'trustworthiness'.

In one investigation of credibility of local black and white newscasters to a black audience in Pennsylvania (Johnson, 1984), participants rated local newscasters using the credibility evaluative variables of physical appearance, message believability and performance for comparisons. Findings show that 86 percent of the respondents rated black newscasters as more attractive than white newscasters, 66 percent found them more believable, but only 45 percent considered the black newscasters as better performers. In addition, the study found significant differences in appearance judgments by the respondents in regard to demographic characteristics. Specifically, young blacks preferred the appearance of black newscasters more often compared to older blacks (92 percent compared to 79 percent). Those with a high school education or more were more likely than those less educated to prefer the appearance of black newscasters (92 percent compared to 79 percent).

Another study examined perceptions about bias in the news media as an important dimension of news credibility (Rouner et al., 1999), in particular in the use of news sources by public affairs journalists. The authors suggested a relationship between news bias perception and media bias perceptions, and found that the less bias the members of the general public perceive in high biased journalism sources, relative to journalism professionals' own judgments, the greater their perceptions of general media bias.

Furthermore, research suggests that the medium of presentation interacts with the source to influence the degree of attitude change. In one study, a newscaster was utilised as a trustworthy source, while a candidate for political office was employed as an untrustworthy source to present a message through television, radio, or newspaper (Worchel et al., 1975). The communicators took positions that either agreed or disagreed with the audience's initial attitude. The results indicate that the newscaster was more effective in a television news story compared to a radio or written version, while the political candidate was least effective in the television presentation.

Andreoli and Worchel (1978) sought to show that involvement was the key to the interaction between medium and source trustworthiness based on Keating's claim (1972) that television is more effective than radio or newspaper in generating attitude change because it is more involving (as cited in: Andreoli & Worchel, 1978). The authors found that newscasters and former representatives (i.e., a retired politician) were perceived to be most trustworthy on television, while the candidate running for political office was least effective in using this type of presentation. The authors assume that the more ”live” the presentation, the more involved the audience becomes, presuming television to be the most ”live” medium compared to radio and newspapers. The authors believe that high involvement could highlight the trustworthiness of the source and the audience might be more willing to accept the source’s position. On the other hand, the negative image of the untrustworthy source could be enhanced in the television presentation and result in a greater rejection of his position.

Some research indicates that in Internet-based media source is a “murky entity” since multiple layers of sources that exist in online world results in “a confusing multiplicity of sources of varying levels of credibility” (Sundar, 2008, p. 73). Among others, the identity of sources could be assigned to a front-end box (e.g., computer or television), to an online location (e.g., nighties.com), to a group of other users (e.g., polled opinion of one’s friends on Facebook) to oneself (e.g., one’s space in myyahoo.com or playlist on iPod). According to Sundar (2008), depending on who or what is identified or perceived as the source, particular cognitive heuristics or ”mental shortcuts to judgmental rules that are already stored in memory” are likely to be triggered (p. 74) about ”their presumptive abilities to serve as the source” (p. 83), which, in turn, influence perceptions of credibility of news presented by that source.

Sundar (2008) emphasises several source-related heuristics that have a strong effect on credibility evaluations. A *machine heuristic* is likely to be triggered when the ”psychologically relevant agent” is the computer itself (p. 83). In one experiment, participants received an identical news story attributed to either news editor, other users, self, or the computer (Sundar & Nass, 2001). The news story which the participants thought the computer terminal had chosen was perceived higher in quality compared to the news story which they believed news editor had chosen, implying that if a machine chose the story, it must be objective and unbiased (as cited in: Sundar, 2008). Results also showed that when ”other users” were attributed as the source of online news, the news story was perceived as being higher in quality by the participants, due to the *bandwagon heuristic*, implying that if others think that this is a good story, then I should think so too.

Another heuristic that can be triggered is the *authority heuristic* that is likely to be operational whenever the source of content is identified as a topic expert or official authority: ”to the extent the interface agent of even simply a Web site identifies itself as an authority of some sort, it is likely to directly confer importance” (p. 84). Furthermore, the *social presence heuristic* is also likely to be triggered and influence credibility. In their interaction with a computer, users psychologically assume a social presence, or ”the idea that the user is communicating with a social entity rather than an inanimate object”, which might lead to more positive credibility evaluations (p. 84). A related heuristic is the *helper heuristic* manifested by such online behaviours as trusting and self-disclosure. The author takes the online chat-bots that can successfully elicit such behaviours as an example.

Finally, the *identity heuristic* is likely to be triggered and influence credibility evaluations whenever it is possible for a user to assert his or her identity through the technology: ”from blogs to podcasting, and from iPods to my yahoo and YouTube, digital technologies have evolved toward providing users with a strong sense of agency within the medium” (p. 85). All these heuristics have a great deal of influence on credibility evaluations, but their valence is likely to depend on the context of the content being evaluated (Sundar, 2008).

An important factor introduced by digital media is *interactivity* (see also: Chapter 2.0). The term interactivity implies both interaction and activity (Sundar, 2008). Research in the area indicates that the level of interactivity present in a certain medium depends on the degree to which its features enable interaction by a receiver and also provide a dialogue or mutual discourse (Roehm & Haugtvedt, 1999; in: Schumann & Thorson, 1999). Increased interactivity is therefore enabled through interface’s higher capacity to conduct a dialogue or information exchange between users and the interface.

Literature shows various studies on the amount of interactivity and its effects on content evaluation. Several researches classified different Web site features such as sliders, drags and zoom features under the aspect of interactivity and exposed participants to ordinal levels of interactivity (low, medium, and high). They found that higher levels of interactivity positively influenced users’ attitudes toward content and behavioural intentions.

In one experiment, the level of website interactivity was found to positively influence attitudes and behavioural intentions toward both the website and the product. Interactivity was manipulated by the number of interactive features embedded in the product image presented to the participants (Xu & Sundar, 2014). In the low-interactivity conditions, there was no interactive feature. In the medium-interactivity condition, participants were able to click the product image to receive more images of the product. Finally, there were interactive features in the high-interactivity condition. Participants were able to drag/click to spin a virtual camera in order to see it from different perspectives, mouse-over to zoom-in for visual details, and click to change the colour of the camera. Similarly, in the Schlosser study (2003), participants who were exposed to an interactive site giving users the possibility to click on or roll their mouse over on object image, showed greater purchase intentions compared to participants exposed to a passive site containing blocks of text and images. Another study found that participants in the low-interactivity condition which did not have any hyperlinks rated sites lower in both overall favourability and content compared to participants who were exposed to websites that were higher in interactivity, measured by multiple hyperlinks (Sundar et al., 2003). In this study, the authors emphasised the idea of *message contingency*, i.e., that subsequent messages are contingent or dependent on previous messages. They suggested that for interactivity to be realised the interface should have the functional features for mutual discourse and also ensure the resulting messages are interconnected. Furthermore, an investigation by Sicilia and colleagues (2005) showed that interactive version of a website with hyperlinks led to more information processing, higher favourability toward the product and the website, and induced a greater number of website-related thoughts.

Oh and Sundar (2015) also found that websites with higher modality were evaluated more positively by the users, and that the messages on the site were perceived more favourably. In the study, participants were assigned to one of the two groups. In a slider condition, participants received three images related to smoking and health with a drag-and-slide bar located under the same-sized images. The second group of participants received static images. Participants in the slider condition evaluated the whole website as 'more exciting', 'cool', 'imaginative', 'entertaining', and 'having higher quality', and were more likely to agree that the antismoking messages on the site were 'believable', 'informative', 'insightful', 'objective', 'interesting', and 'clear' than their counterparts. Additionally, Kiousis and Dimitrova (2006) confirmed that high modality positively influences users' evaluation of both the technology and the content they receive through the technology. In this study, participants received an online story about China being awarded the 2008 Summer Olympics through different modalities: text; text and pictures; text, pictures, and video. The authors reported the positive relationship between modality and issue salience. Salience was defined as "the degree to which a topic is prominent, significant, and important" (p. 178). In addition, the authors found that high modality created a more positive impression of the Web site. Online users perceived Web pages with higher modality as 'more attractive', 'better organised', and 'more functional'.

However, to date, no research has analysed the influence of multimodal AR on the level of positive perception of the news content, and identified the similarities and differences in users' news evaluation compared to other modalities. This state of art brings us to the following research questions:

RQ1.2: How does AR-enhanced storytelling affect news evaluation?
RQ1.2.1: What similarities and differences are found in the news evaluation dimensions of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences?

According to Biocca (1997) technological advances are characterised by what he calls progressive embodiment, which is a "steadily advancing immersion of sensorimotor channels to computer interfaces through a tighter and more pervasive coupling of the body to interface sensors and displays" (Biocca, 1997). The phenomenon is most obvious in virtual and augmented reality systems and results in a higher connection of the body and the system. We hypothesise that the strong bond of the body and the AR system will positively affect the evaluation of the content delivered through the system. In view of our discussion, we expect that the fact that the consumers of AR-enhanced storytelling are highly immersed and active participants of the narrative will lead to more positive evaluation of the news content delivered through multimodal AR compared to news delivered through other modalities. Therefore, we propose the following hypothesis:

H2: AR-enhanced news content will be evaluated more positively than the news content without AR enhancement.

5.0 METHOD

5.1 Definition of Research Framework

In order to answer the research questions and test the hypotheses, we employed a quantitative analysis of an experiment as a useful tool to empirically test and extend a theory and its effects. The goal of the experiment was to measure the **dependent variables**, i.e., (1) *level of information recall* of the users' of news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, and (2) *news evaluation* of the news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences.

The **independent variables** took form of the experimental treatments that included three multimedia stories, each with an identical amount of information but differing in the type of modalities (Figure 33: Research Model).

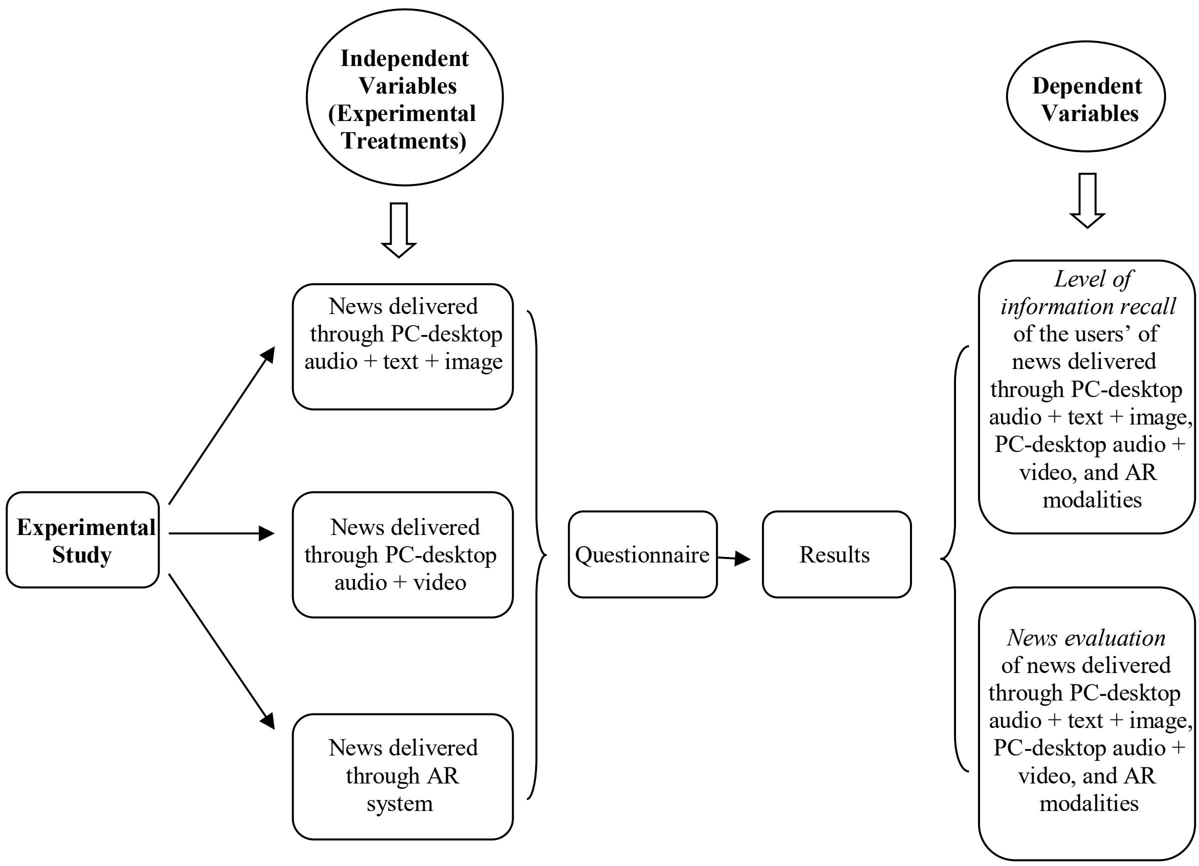


Figure 33: Research Model

5.2 Study Participants

In total, 358 students from the University of Vienna participated in the experiment. They were randomly assigned to one of the three conditions.

5.3 Stimulus Material

The **stimuli** included three versions of the news story *"One Building, One Bomb: How Assad Gassed His Own People"* published by The New York Times in June, 2018 (https://www.nytimes.com/interactive/2018/06/25/world/middleeast/syria-chemical-attack-douma.html) by Browne and colleagues. All three versions of the stimulus were made to look as similar as possible to avoid any incidental confounds. That is, the news stories were identical in the amount of information and differed only in terms of the type of modalities. The story reported on a chemical bomb attack that occurred in Douma, a neighbourhood near Damascus, Syria on April 7, 2018. The bomb was dropped onto the balcony of a multi-storey building. The United States and its European allies blamed Syrian President Bashar al-Assad and launched airstrikes to punish him. Syrian officials denied that bombing took place, and their Russian allies claimed that the attack was staged. The New York Times partnered with the research agency Forensic Architecture to create a virtual model of the crime scene using available images and video material previously published by the Russian media that were the first to be allowed access to the attack sites (see an interview with Nicholas Masterton (Forensic Architecture) in Section III). The New York Times and Forensic Architecture searched for physical evidence concerning how the canisters had arrived at each scene. The investigation uncovered many pieces of evidence that contradict Mr. Assad and his allies. In June 2018, The New York Times published the analysis as an augmented reality feature.

In the AR representation of the story, the participants were able to walk around the 3D motion of the weapon. Key pieces of evidence were highlighted once the participant came close. Each piece of evidence had a number with a corresponding short description in the form of a text that would also appear once the participant approached it. We developed a series of still images showing the analysis, ensuring that the pieces of evidence that are visible in the 3D motion – including the number, highlighter and text - are also captured on the images for the participants in the PC-desktop audio + text + image condition. In the next step, we created a video module from the developed still images for the participants in the PC-desktop audio + video condition.

Finally, we recorded the story for an audio modality. The audio modality was identical for each group and the source, i.e., The New York Times was mentioned.

5.4 Material Quality Check

Before the study, a group of 31 students from the University of Vienna was invited to participate in an analysis of the quality of the material prepared for the experiment. The students were asked to complete a questionnaire assessing their opinion on the quality of the stimulus material, in particular the audio and movie files, as well as to rate to quality of the questions and scales (see Appendix 1).

Additionally, the presence in the augmented reality environment was measured using an instrument developed by Regenbrecht, Botella, Baño & Schubert (2017) in order to ensure the environment is perceived as immersive by the participants (see Appendix 2). The Mixed Reality Experience Questionnaire (MREQ) is designed to be used as a measure of a user's sense of presence and their general experienced perception of an Augmented Reality, Virtual Reality, or Augmented Virtuality environments. It consists of 33 items with ten-point scales ranging from "disagree very strongly = 1" to "agree very strongly = 10"). Researchers are advised to apply all or some of the items. In this study, we used 8 items that are most applicable to AR environments (see Appendix 2).

Several minor changes were made in the stimulus material and evaluation scales as a result.

5.5 Procedure

The participants were invited to take part in a study about technology. After filling in a questionnaire assessing demographic characteristics and media use measures (see Appendix 3), the participants were exposed to multimedia stories, each with an identical amount of information but differing in the type of modalities.

The first group of participants received a PC-desktop multimedia story incorporating photos of the weapon and audio modality. The second group of participants received a PC-desktop multimedia story incorporating a video and audio modality. Finally, the third group of participants received the same story though AR system incorporating a 3D presentation of the weapon and audio modality.

Shortly after being exposed to the material, the participants were asked to fill out a questionnaire eliciting their memory of the information presented in the news content, as well as their evaluation of news story (see Appendix 4). Additionally, the presence in the augmented reality environment was measured (see Appendix 2 and Chapter 5.4).

At the end of the experiment, all participants were debriefed and encouraged to ask questions.

5.6 Measures

Information Recall. The participants answered six questions dealing with the information from the news stories. Scores on the questions were summed to produce an "information recall" index.

News Evaluation. The participants were asked to evaluate 12 items. The items were derived from Sundar (1999; 2000) and administered to participants in the following form: "For each word below, please CIRCLE THE DOT to indicate how well the word describes the news story you were presented with" followed by a series of 12 adjectives (Accurate, Believable, Biased, Clear, Comprehensive, Factual, Fair, Important, Informative, Objective, Persuasive, and Sensationalistic), each placed next to a 10-point scale anchored between "Describes Very Poorly = 1" to "Describes Very Well = 10".

Media Use. Media use was measured by asking students to indicate how much time per week they spend (1) watching TV news programmes about politics, (2) reading news about politics in print media (magazines, newspapers, etc.), (3) accessing online news sites about politics on the Web. Student used a 10-point scale to report the time, anchored between "never" to "all seven days of the week".

Sense of Presence. The presence in the augmented reality environment was measured using an instrument developed by Regenbrecht, Botella, Baño & Schubert (2017) (see Appendix 2 and Chapter 5.4).

6.0 RESULTS

In order the address the research questions and test the hypotheses, the **dependent variables**, i.e., (1) *level of information recall* of the users' of news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, and (2) *news evaluation* of the news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, have been explored in this research along with a set of control demographic variables, media consumption and independent variables that took form of the experimental treatments.

Scale and Index Construction

Measures designed to elicit participants' level of information recall were combined to form a scale "Information Recall": participants' scores on six questions were summed to measure their recall.

In addition, an exploratory factor analysis with Varimax rotation and Kaiser normalisation was conducted upon the items relating to News Evaluation. The factor analysis yielded three factors with eigenvalues greater than one, together accounting for 58 % of the variance (Table 1).

There were 4 items with their principal loadings under the first factor (Informative, Factual, Objective, and Fair). Taken together, these items seem to represent the perceived credibility of a news story. Therefore, they were summed to create an index entitled "Credibility". Intercorrelations among the four items revealed a highly satisfactory level of internal consistency for the index (Cronbach's α = .72; see Appendix 5). The second factor was composed of two items (Comprehensive and Clear). The two individual items in this index were positively correlated with each other (Spearman-Brown coefficient p = .48). This factor might be understood as participants' perception of the quality of a news story. Therefore, the items with their highest loadings under this factor were summed to form an index named "Quality". The remaining factor was composed of two items (Sensationalistic and Biased) which were summed to form an index labelled "Likeability" (Spearman-Brown coefficient p = .06). The items that are negatively worded were recoded from left to right.

Rotated Component Matrix[a]

	Component		
	1	2	3
Informative	**.76**	.18	-.06
Factual	**.74**	-.08	.20
Objective	**.70**	.28	-.15
Fair	**.68**	.15	-.16
Comprehensive	.08	**.83**	.11
Clear	.22	**.74**	-.12
Sensationalistic	-.09	-.02	**.74**
Biased	.00	.00	**.65**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.
a. Rotation converged in 4 iterations.

Table 1: Factor Loadings of News Evaluation Items
Numbers in boldface type indicate primary loadings of a given variable (row) on the corresponding factor (column).

Research Questions and Hypotheses Testing

Data Analysis

In order to answer the research question and test the hypotheses relating to similarities and differences in information recall from the news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, a one-way analysis of variance (ANOVA) was performed on the dependent variable: Information Recall. In the analysis that yielded statistically significant results, post-hoc comparisons were made between the three experimental conditions using the Games-Howell test.

Similar one-way ANOVAs were conducted to assess the similarities and differences in News Evaluation dimensions of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences.

Results

Research questions 1 and 1.1 as well as the hypothesis 1 proposed to test similarities and differences in the level of information recall from the news delivered though PC desktop audio + text + image, PC desktop audio + video, and multimodal AR.

Significant effects were obtained for Information Recall once the information recall scale was subject to a one-way ANOVA. In particular, participants in PC-desktop Audio + Text + Image condition (M = .37) recalled significantly fewer information about the news story on Douma chemical attack than their counterparts in the PC-desktop Audio + Video (M = .46) and multimodal AR (M = .63) conditions. Participants in multimodal AR condition scored significantly higher on information recall than their counterparts in PC-desktop Audio + Text + Image and PC-desktop Audio + Video conditions. The critical value of the F (2, 355)-statistic was 38.2 at the 95% confidence interval, p < .001 (Tables 2 – 4). The hypothesis 1 suggesting that AR-enhanced news content will generate greater information recall than the news content without AR enhancement received support.

Descriptives
Information Recall

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Audio + Text + Image	120	.37	.26	.02	.32	.42	.00	1.00
Audio + Video	118	.46	.22	.02	.42	.50	.00	1.00
Audio + AR	120	.63	.22	.02	.59	.67	.17	1.00
Total	358	.49	.26	.01	.46	.51	.00	1.00

Test of Homogeneity of Variances
Information Recall

Levene Statistic	df1	df2	Sig.
4.308	2	355	.014

ANOVA
Information Recall

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.21	2	2.11	38.249	.000
Within Groups	19.56	355	.06		
Total	23.77	357			

Tables 2 - 4: One-way ANOVA: Information Recall

We also applied Welch's test and Games-Howell test for post-hoc analysis adopted as the most suitable method for post-hoc analysis of the data with unequal sample sizes and assumed unequal variances across the sample where the sample size and sample variance are inversely paired. The p – value of the Welch's test was $p < .001$, suggesting significant difference (Table 5).

Robust Tests of Equality of Means

Information Recall

	Statistic[a]	df1	df2	Sig.
Welch	37.288	2	235.343	.000

a. Asymptotically F distributed.

Table 5: Welch's Test: Information Recall

The results of post-hoc analysis indicated that there was a significant difference of means across the groups. It is observed from the magnitude of the reported values that the participants who received a news story through multimodal AR generated the greatest level of information recall, followed by the Audio + Video group. The lowest level of information recall was found among the participants in Audio + Text + Image condition. The mean difference was significant at the 0.05 level. The post-hoc analysis for information recall is reported below (Table 6 and Figure 34)

Multiple Comparisons

Dependent Variable: Information Recall

Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Audio + Text + Image	Audio + Video	-.09*	.03	.011	-.16	-.02
	Audio + AR	-.26*	.03	.000	-.34	-.19
Audio + Video	Audio + Text + Image	.09*	.03	.011	.02	.16
	Audio + AR	-.17*	.03	.000	-.24	-.10
Audio + AR	Audio + Text + Image	.26*	.03	.000	.19	.34
	Audio + Video	.17*	.03	.000	.10	.24

*. The mean difference is significant at the 0.05 level.

Table 6: Post-hoc Test: Information Recall

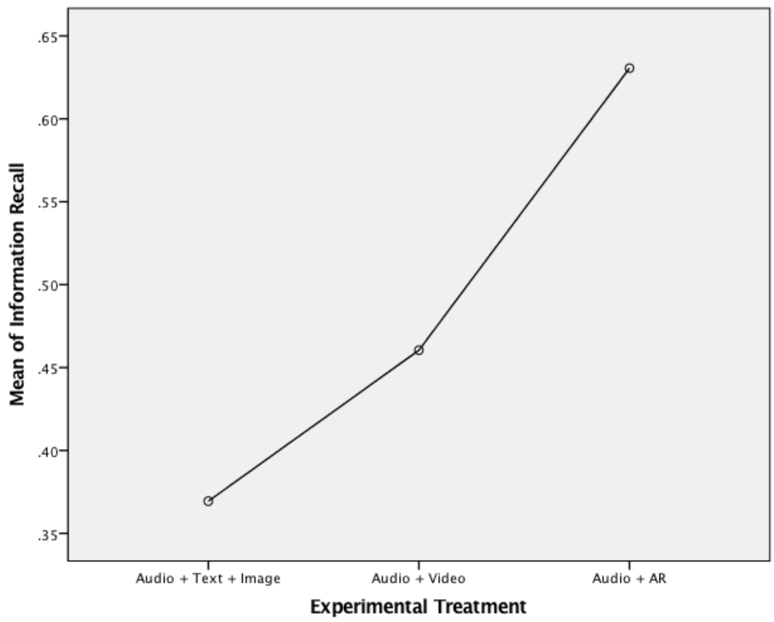


Figure 34: Post-hoc Test: Mean of Information Recall

Research questions 2 and 2.1 as well as Hypothesis 2 proposed to test similarities and differences in news evaluation of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences. A series of one-way ANOVAs with the *News Evaluation* items yielded statistically significant results for *News Credibility*, *Quality*, and *Likeability*.

Participants in multimodal AR condition rated the news as being significantly more credible (M = .45) than their counterparts in Audio + Text + Image (M = .02) and Audio + Video (M = -.47) conditions. The critical value of the F (2, 355)-statistic was 29.2 at the 95% confidence interval, p < .001 (Tables 7 – 9). The p – value of the Welch's test was p < .001 suggesting significant difference (Table 10). The results of post hoc-analysis indicate that there is a significant difference of means across the groups. The mean difference was significant at the 0.05 level. The post-hoc analysis for *News Credibility* is reported below (Table 11 and Figure 35).

Descriptives
Credibility

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Min.	Max.
Audio + Text + Image	120	.02	1.08	.10	-.18	.21	-2.75	2.53
Audio + Video	118	-.47	1.00	.09	-.66	-.29	-3.38	2.31
Audio + AR	120	.45	.65	.06	.33	.57	-1.15	1.86
Total	358	.00	1.00	.05	-.10	.10	-3.38	2.53

Test of Homogeneity of Variances
Credibility

Levene Statistic	df1	df2	Sig.
10.822	2	355	.000

ANOVA
Credibility

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	50.42	2	25.21	29.192	.000
Within Groups	306.58	355	.86		
Total	357.00	357			

Tables 7 - 9: One-way ANOVA: News Credibility

Robust Tests of Equality of Means
Credibility

	Statistic[a]	df1	df2	Sig.
Welch	36.074	2	223.239	.000

a. Asymptotically F distributed.

Table 10: Welch's Test: News Credibility

Multiple Comparisons
Dependent Variable: Credibility
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Audio + Text + Image	Audio + Video	.49*	.13	.001	.17	.81
	Audio + AR	-.43*	.12	.001	-.70	-.16
Audio + Video	Audio + Text + Image	-.49*	.13	.001	-.81	-.17
	Audio + AR	-.92*	.11	.000	-1.18	-.66
Audio + AR	Audio + Text + Image	.43*	.12	.001	.16	.70
	Audio + Video	.92*	.11	.000	.66	1.18

*. The mean difference is significant at the 0.05 level.

Table 11: Post-hoc Test: News Credibility

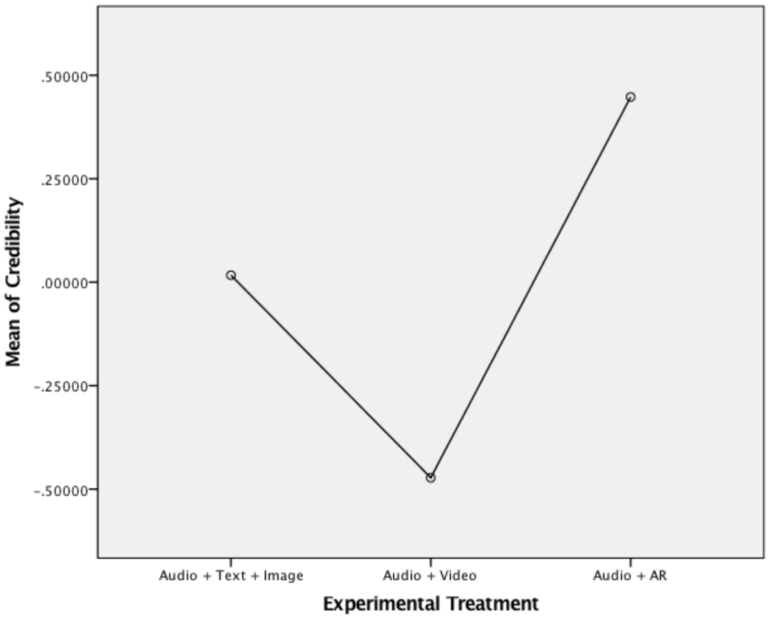


Figure 35: Post-hoc Test: Mean of News Credibility

One-way ANOVA with the *News Quality* items showed that participants in Audio + Text + Image condition rated the news as being significantly lower in quality (M = -.25) compared to participants in Audio + Video (M = .09) and multimodal AR (.16) conditions. The critical value of the F (2, 355)-statistic was 6.2 at the 95% confidence interval, p < .005 (Tables 12 –14). The p – value of the Welch's test was p < .05, suggesting significant difference (Table 15). The results of post-hoc analysis indicated that there was a significant difference of means between the groups Audio + Text + Image and Audio + Video as well as between Audio + Text + Image and multimodal AR at the 0.05 level. The difference between Audio + Video and multimodal AR, however, was not significant. The post-hoc analysis for *News Quality* is reported below (Table 16 and Figure 36).

Descriptives
Quality

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Audio + Text + Image	120	-.25	1.19	.11	-.47	-.04	-2.87	3.04
Audio + Video	118	.09	.87	.08	-.07	.25	-2.14	2.21
Audio + AR	120	.16	.86	.08	.01	.32	-2.62	1.91
Total	358	.00	1.00	.05	-.10	.10	-2.87	3.04

Test of Homogeneity of Variances
Quality

Levene Statistic	df1	df2	Sig.
10.266	2	355	.000

ANOVA
Quality

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.95	2	5.98	6.150	.002
Within Groups	345.05	355	.97		
Total	357.00	357			

Tables 12 - 14: One-way ANOVA: News Quality

Robust Tests of Equality of Means
Quality

	Statistic[a]	df1	df2	Sig.
Welch	5.075	2	232.923	.007

a. Asymptotically F distributed.

Table 15: Welch’s Test: News Quality

Multiple Comparisons
Dependent Variable: Quality
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Audio + Text + Image	Audio + Video	-.35*	.13	.029	-.66	-.03
	Audio + AR	-.42*	.13	.006	-.73	-.10
Audio + Video	Audio + Text + Image	.35*	.13	.029	.03	.66
	Audio + AR	-.07	.11	.805	-.33	.19
Audio + AR	Audio + Text + Image	.42*	.13	.006	.10	.73
	Audio + Video	.07	.11	.805	-.19	.33

*. The mean difference is significant at the 0.05 level.

Table 16: Post-hoc Test: News Quality

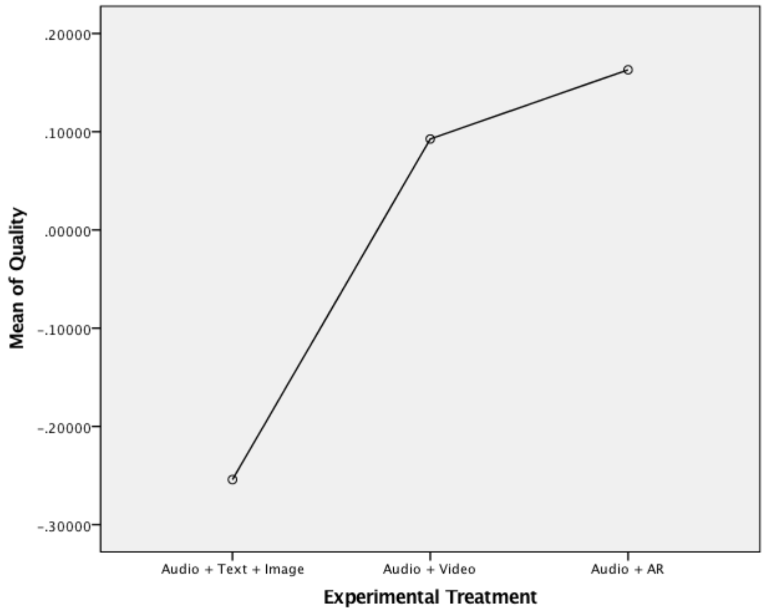


Figure 36: Post-hoc Test: Mean of News Quality

Finally, similar analyses for *News Likeability* showed that participants in Audio + Video condition rated the news as being significantly more likeable (M = .29) compared to their counterparts in Audio + Text + Image (M = .22) and multimodal AR (M = -.51) conditions. The critical value of the F (2, 355)-statistic was 26.7 at the 95% confidence interval, p < .001 (Tables 17 –19). The p – value of the Welch's test was p < .001, suggesting significant difference (Table 20). The results of post-hoc analysis indicated that there was a significant difference of means between the groups Audio + Text + Image and multimodal AR as well as Audio + Video and multimodal AR at the 0.05 level. The difference between Audio + Video and Audio + Text + Image, however, was not significant. The post-hoc analysis for *News Likeability* is reported below (Table 21 and Figure 37).

Descriptives
Likeability

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Audio + Text + Image	120	.22	1.01	.09	.02	.40	-2.47	2.34
Audio + Video	118	.29	.80	.07	.14	.44	-1.84	2.77
Audio + AR	120	-.51	.98	.09	-.68	-.33	-2.66	1.55
Total	358	.00	1.00	.05	-.10	.10	-2.66	2.77

Test of Homogeneity of Variances
Likeability

Levene Statistic	df1	df2	Sig.
4.065	2	355	.018

ANOVA
Likeability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	46.65	2	23.32	26.677	.000
Within Groups	310.36	355	.87		
Total	357.00	357			

Tables 17 - 19: One-way ANOVA: News Likeability

Robust Tests of Equality of Means
Likeability

	Statistic[a]	df1	df2	Sig.
Welch	26.297	2	234.645	.000

a. Asymptotically F distributed.

Table 20: Welch’s Test: News Likeability

Multiple Comparisons
Dependent Variable: Likeability
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Audio + Text + Image	Audio + Video	-.07	.12	.826	-.35	.21
	Audio + AR	.73*	.13	.000	.43	1.03
Audio + Video	Audio + Text + Image	.07	.12	.826	-.21	.35
	Audio + AR	.80*	.12	.000	.52	1.07
Audio + AR	Audio + Text + Image	-.73*	.13	.000	-1.03	-.43
	Audio + Video	-.80*	.12	.000	-1.07	-.52

*. The mean difference is significant at the 0.05 level.

Table 21: Post-hoc Test: News Likeability

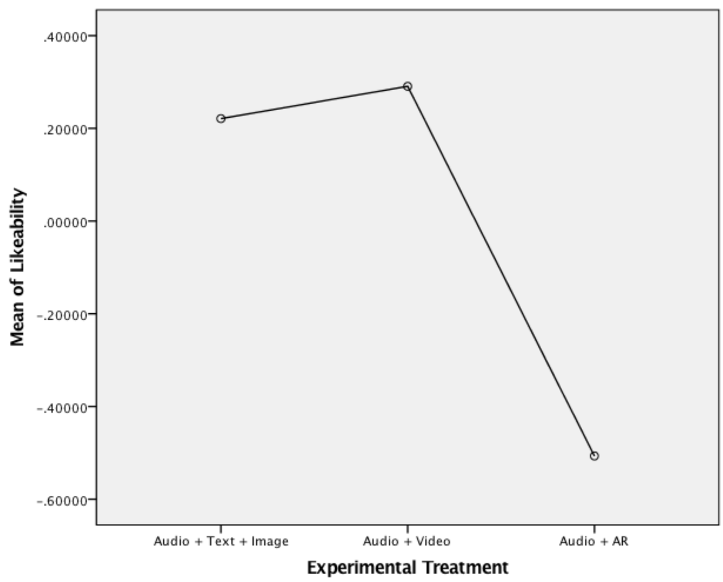


Figure 37: Post-hoc Test: Mean of News Likeability

Hypothesis 2 proposed that AR-enhanced news content will be evaluated more positively than the news content without AR enhancement. The findings show that participants in multimodal AR condition rated news significantly more credible and of better quality compared to their counterparts in Audio + Text + Image and Audio + Video conditions. However, they perceived news less likeable compared to participants in Audio + Text + Image and Audio + Video conditions. Hypothesis 2 was partially supported.

Control Measures

We performed a one-way ANCOVA to test whether demographic characteristics and media consumption make a difference in the participants' level of information recall. We included participants' gender, age, racial or ethnic heritage, level of education, employment status, net personal monthly income, marital status, number of children, and media consumption as covariates in the analysis. The results were statistically significant, F (2, 355) = 32.19, $p < .001$, $\eta^2_p = .16$. We found that participants' level of media consumption, F (2, 355) = 7.87, $p < .005$, $\eta^2_p = .02$, and, surprisingly, marital status, F (2, 355) = 4.94, $p < .05$, $\eta^2_p = .01$, were related to their level of information recall (see entire ANCOVA analysis in Appendix 6).

Similarly, we performed three sets of ANCOVA analyses to explore whether demographic characteristics and media consumption make a difference in the participants' evaluations of News Credibility, Quality, and Likeability. The results of the first set of ANCOVA analysis showed that, surprisingly, participants' number of children, F (2, 355) = 4.58, $p < .05$, $\eta^2_p = .01$, was related to their perception of news credibility. The result of the second set of ANCOVA analysis showed that participants' age, F (2, 355) = 6.68, $p < .05$, $\eta^2_p = .02$, was related to their perception of news quality. Finally, the third set of ANCOVA analysis showed that level of media consumption, F (2, 355) = 5.83, $p < .05$, $\eta^2_p = .02$, and, surprisingly, marital status, F (2, 355) = 4.29, $p < .05$, $\eta^2_p = .01$, were related to their perception of news likeability (see entire ANCOVA analyses in Appendixes 7, 8 and 9).

Discussion

As the findings of this study clearly show, differences in news presentation can influence outcomes in significant ways. Two conclusions are apparent.

First, comparison of PC desktop modalities (audio + text + image, and audio + video) with multimodal AR strongly suggests that AR presentations tend to enhance memory for news content. These results are very much consistent the with media research outlined earlier. It appears that the effects of AR-enhanced content lead to improved information processing and positively affect human memory system.

The second conclusion is that AR systems can contribute to a more positive perception of news credibility (i.e., informativeness, factuality, fairness and objectivity) and news quality (i.e., comprehensiveness and clearness). However, from the user's point of view, audio + video appears to be associated with sensationalism and biasedness of a story (i.e, likeability). In addition to theoretical significance, these findings have some useful practical implications for news organisations when it comes to deciding in which modalities to present the news story as well as for technology designers when estimating the influence AR technology could have on the users.

A unique contribution of this study lies in the empirical demonstration of the distinction between traditional PC desktop and AR news presentations in respect to the influence on the level of information recall and formation of users' attitudes and beliefs that we posited in our literature review. Our findings have significant implications for the theory and practice of emerging journalistic formats, speaking to the strong potential of AR technologies for journalism and the media. Rather than functioning as a mere tool for disseminating content, these technologies can add significant value to media news content and positively affect users' cognitive and psychological processes.

7.0 Implications for Future Research

In this study, we explored the effects of emerging journalistic formats on the users and their processing and evaluation of media content. We examined the psychological consequences of adding a layer of 3D virtual content onto the physical world via AR systems for the users, and compared similarities and differences found in the level of information recall, and in the news evaluation dimensions of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences.

The findings of the study indicate that differences in presentation formats affect cognitive and attitudinal outcomes in significant ways. A major contribution of this study lies in the empirical demonstration that the intersection of immersion, sensation of presence and first-person perspective of a story positively impacts psychological responses from users and generates higher levels of information recall and more positive evaluation of AR-enhanced news content in terms of credibility and quality of the news compared to the news content without AR-enhancement. Future research would benefit from testing these psychological effects further. Replication of the findings would increase confidence in the results. Building on this study, scholars may attempt various empirical approaches to explore cognitive and psychological effects of transmitting information via multimodal AR.

We focused on assessing and understanding the effects of AR representation on users' information recall and news evaluation. It would be interesting and required to complete a body of research on the effects of emerging narratives on various cognitive, attitudinal, and behavioural outcomes. Similarly, it would be beneficial to include other topics and issues in future examinations (e.g., advertisements, health, or cultural context).

AR presentations of media content proved to be important for imprinting storytelling elements in a user's memory. Journalist Joshua Foer explains that memory is greatly dependent on spatial understanding (Foer, 2012; Cadoux, 2019). Ancient Greeks adored a memorisation technique called the Method of Loci, more commonly known as the 'Memory Palace' (Metivier, 2020; Cadoux, 2019). According to the legend, Greek poet Simonides was commissioned to recite a poem to a group of nobles. Shortly after leaving the hall, the edifice collapsed and killed the people at the banquet. Simonides was the only one able to identify each body by name based on their location. Based on this experience, the poet invented the Memory Palace technique. The basic idea behind the Memory Palace technique is to associate pieces of information that one wants to memorise with a location one is familiar with. As one walks through that location, one places pieces of information in specific areas. Once someone wants to recall the information, they go through the mental route that makes the information easily available and enduring. The same method can hold true for journalistic storytelling as the effect of spatial journalism in the digital era could mark new paths in memorisation processes via impactful stories (Cadoux, 2019). Future research may see potential in exploring the opportunities spatial journalism with AR may offer for better cognitive, attitudinal, and behavioural outcomes.

Finally, the present study employed quantitative analysis of an experiment to examine cognitive and attitudinal outcomes from messages delivered through multimodal AR compared to those delivered through PC desktop audio + text + image, and PC desktop audio + video modalities among the students in Vienna. Future studies could conduct similar experiments with samples from different settings and cultures. Such research would enrich our understanding of the psychological effects of multimodal AR on its users in the realm of journalism and the media.

The findings reported here have significant implications for the theory and practice of emerging and traditional journalistic formats. This study adds to a growing body of research examining cognitive and psychological aspects of presenting news content through different modalities. This is important not only to contemporary academic research on fully immersive media, but also to media designers, since it may encourage new ways of thinking about the production of devices for storytelling in the realm of journalism.

SECTION II

First-person Perception of Idealised Body Image and Behavioural Consequences

The study investigated the first-person perception in relation to body-image factors using an experiment that involved 357 female students in Vienna. The goal of the study was to determine the perception of media effects on self and others of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video modalities in the context of idealised female body. Additionally, it tested the association of the perception of media effects and the first-person differential on the self and others with their intention to engage in body image behaviour.

Body image was coined by Austrian neurologist and psychoanalyst Paul Schilder in his "*The Image and Appearance of the Human Body"* (1935). It is defined as "the multifaceted psychological experience of embodiment" (Cash & Pruzinsky, 2002, p. XV). Body image encompasses one's body-related self-perceptions and self-attitudes, including thoughts, beliefs, feelings, and behaviours (Cash & Pruzinsky, 1990). According to Hutchinson (1985), body image is constructed via positive and negative feedback from significant others. In addition, media portrayals of idealised female bodies are believed to be one of the sources that greatly influence female's perception of what a desirable body and a beauty norm is (Lerner et al., 1973).

Research shows that media images idealising thinness and attractiveness as desirable physical traits of female body consequently contribute to negative perception of female body images (see: Cash & Pruzinsky, 2002; Botta, 1999; Levine & Smolak, 1998). At the same time, females claim that media effects on peers are greater than media effects on themselves. Literature review shows that the research field is rich with studies on the self-others difference of perceived media effects in which individuals perceive that media effects on others are greater than media effects on the self (Chia & Wen, 2010; Wei, Chia & Lo, 2011; Gunther & Mundy, 1993; Gunther & Thorson, 1992). This phenomenology is labelled **third-person perception**. Davison (1983) states that people tend to believe the media's "greatest impact will not be on 'me' or 'you', but on 'them' – the third persons" (p. 3). Nevertheless, the impact people perceive on others still lead them to take actions. These behavioural consequences are named the **third-person effect** (Perloff, 1999). The assumption of the third-person effect is that individuals differentiate the perceptions of media effects on the self and others, and are likely to behave in accordance with their perception or the way others are influenced by the media (Perloff, 1999; Milkie, 1999).

Past research indicates that the social desirability of the media messages may impact both the robustness and the direction of third-person perception gaps. People tend to perceive others as more likely to be influenced by socially undesirable media content such as pornography (Gunther, 1995; Rojas et. al, 1996; Lo & Wei, 2002), objectionable music lyrics (McLeod et al., 1997), or violence (Rojas et al., 1996, Hoffner, 1999) than one's self. This perception gap continues to be widely researched by scholars.

The third-person perception has been explained by several different psychological mechanisms. The most utilised ones include **social distance corollary** and **optimistic bias**.

8.1 Social Distance Corollary

Social distance refers to the way in which individuals target comparison groups when asked to make self-others comparisons. It is defined as ”a set of nested social or geographical levels. Each space in social distance between oneself and others entails an increase in social or geographic circle and makes others become increasingly general and abstract” (Wei et al., 2011). Perloff (1993) argues that social distance may be conceptualised in two different ways:

”According to one view, social distance falls along a continuum going from ”just like me” to ”not at all like me”. The category at one extreme includes the respondent, whereas the category at the other extreme would not. A second view is that social distance reflects the heterogeneity and size of the audience or group in question. According to this view, social distance is represented by a continuum that goes from ”my closest group or community” to ”my largest group or community” (p. 176).

Meirick (2004) argued that the definition of social distance as a set of nested social or geographical levels might not be appropriate when social groups are seen as opposing one another. He proposed an alternative definition of social distance that views social groups as ”adjacent circles - in-groups and out-groups” (p. 236). People accordingly perceive members of out-groups as distant and different from members of in-groups.

The corollary predicts that the magnitude of the third-person perception will enhance with increases in perceived social distance between the self and the others (e.g., Cohen et al., 1988; Duck et al., 1995; Wei & Lo, 2007). Accordingly, people perceive greater media effects on the more general and abstract others (Meirick, 2004), i.e., when the "comparison others become more distant or psychologically removed from the self" (Perloff, 1999, p. 364). Comparison groups can also be varied in terms of age, gender, race, and the like (Lambe & McLeod, 2005).

A good number of papers confirms a hypothesis that the amount of perceptual bias increases as social distance increases. One study reported that third-person perceptions of the effect of a defamatory newspaper article were larger as the comparison groups were defined more broadly (”other Stanford students” to ”other Californians” to ”public opinion at large”), (Cohen e al., 1988). Another study found that college women perceived that the effects of idealised body image on male friends were greater than the effects on female friends (Goodman & Walsh-Childers, 2004). A Milkie study (1999) found that although females perceived that the images they were presented with were unrealistic, they perceived that other females in the school, and especially males, valued such an appearance. In addition, Lo and Wei (2002) examined the third-person perception in the context of Internet pornography and found that female respondents perceived greater negative effects of Internet pornography on male others than on female others.

8.2 Optimistic Bias

Findings suggest that individuals make self-others comparisons in an egocentric manner, i.e. perceive self as superior and less likely than others to be influenced by the negative events (e.g., Gunther & Thorson, 1992; Gunther & Mundy, 1993; Gunther, 1995; Brosius & Engel, 1996). Weinstein (1980, 1982, 1983, 1987) originally labelled this phenomenon **”optimistic bias”**. Various underlying mechanisms have been suggested in research on optimistic bias and third-person perception. Gunther and Mundy (1993) most strongly argue that optimistic bias causes third-person perception, and that self-esteem through ego-enhancement is the basis of the bias:

”The optimistic bias would predict that people think others are more vulnerable to harmful influences of pornography, less resistant to the coercion of product advertisements, more susceptible to false information and its misleading effect on opinion, and less able to see through misinformation, or disinformation, in biased news. And indeed, such outcomes accurately summarise past research in the third-person effect” (p. 60).

8.3 Self-esteem

Self-esteem may be defined as a ”relatively stable set of self-attitudes reflecting description and self-evaluation of an individual’s behaviour and attributes” (Piers, 1996, as cited in Chapin, 2000a).

Research shows that individuals underestimate media influences on themselves to enhance self-esteem (Rucinski & Salmon, 1990; Duck et al., 1995). According to Gunther and Mundy (1993) individuals build self-esteem by seeing themselves as smarter or better than others. A body of research shows that individuals are motivated to preserve self-esteem even when the images of themselves compared to others are unrealistically positive. Weinstein (1980) labelled this phenomenon ’*unrealistic optimism*’.

8.4 Third-person Perception and Behavioural Consequences

Over the past decade, the researchers have expanded the investigation of the third person effect from the perceptual component into the behavioural component. Studies have found that individuals act on the third-person perceptual gaps. Most of the research on the behavioural outcome focused on the outcomes such as the support for media censorship, an attempt to prevent media content from being circulated (Gunther, 1995; Gunther & Hwa, 1996; Shah et al., 1999) and support of government regulations (Salwen & Driscoll, 1997; Wan & Youn, 2004).

There are two explanations, *preventive* and *punitive*, proposed to account for the relationship between the third person perception and behavioural component (Chia et al., 2004). The *preventive* explanation sees individuals’ support for censorship as a preventive action to protect others from negative media influence (McLeod et al., 1997; Shah et al., 1999). The *punitive* explanation views individuals’ support for censorship as an intention to penalise the media for the harm they have done to the subject of the negative or undesirable media content (Gunther, 1991).

8.5 Third-person Perception and Personal Attributes

Several moderator variables have been found to influence the magnitude of the third-person effect. In a study examining perceived impact of pro- and anti-smoking ads among children, Henriksen & Flora (1999) found that children's belief about the impact of advertisements varied with *age*. The difference between perceived influence of pro- and anti-smoking ads was significantly larger for younger than for older children (an interaction of grade level and advertising type). Children's optimistic belief that anti-smoking advertising is more influential than cigarette advertising diminishes with age (Henriksen & Flora, 1999).

A number of studies found that people with a higher level of *education* tended to exhibit stronger third-person perception (Tiedge et al, 1991; Gunther, 1995; Rucinski & Salmon, 1990).

In a study on the perceived effects of advertising on body-image factors in black and white college-age women, David and colleagues (2002) found that the perceived effect on others was significantly larger when the *race* of the model matched the *race* of the respondent. The authors also found that when exposed to Black models, Blacks showed significantly higher effect on self than when exposed to White models. On the other hand, among White respondents there was no significant effect of the race of the model on the perceived effect on self.

Gender has been included in a number of studies on third-person perception with mixed results. Literature review shows that gender-based perceptual bias is context specific and it is studied in relation to psychological distance and in-group / out-group membership (see: *Social Distance Corollary*). Lo & Wei (2002) found that female respondents perceived greater negative effects of Internet pornography on other males than on other females, and were more likely to support restrictions of Internet pornography. In a study conducted by Whalen and colleagues (1994), sixth-grade boys were more optimistic compared to sixth-grade girls about their invulnerability to HIV/AIDS.

In addition to individual attributes, past research shows that the amount of time spent consuming various media can also produce third-person effect. In a study on perceptions of media influence and support for campaign message restrictions during the 1996 presidential campaigns, Salwen (1998) suggested that *media use* may enhance the third-person perception as media use provide individuals with confidence in their knowledge. In addition, Park (2005) found that beauty and fashion magazines use increased women's desire to be thin due to the perceived influence of the thin ideal on others.

8.6 First-person Perception

Once researchers started investigating socially desirable media content, they found that socially desirable media content may produce a reverse first-person perception when individuals tend to perceive a stronger effect on self compared to others from media content seen as desirable and of sufficient quality to make respondents feel comfortable admitting self-influence (Perloff, 1999).

Innes and Zeitz (1988) were the first to find greater effects for self than others from persuasive socially desirable messages. They compared three media issues including political campaigns, media violence, and PSAs. The study found that those who viewed a PSA perceived a greater influence on the self compared to two other message contents. Gunther and Thorson (1992) continued to investigate positive messages in the form of PSAa. They reported a first-person effect from emotional ads for both commercial products and PSAs. There was a close relationship between first-person perception and product commercials deemed as pleasant, emotional, and moving being considered socially acceptable to be influenced by. This study was a first step towards the re-conceptualisation of the third-person effect by proposing that the opposite effect may be true.

In his study on perceived influences of PSAs about AIDS/HIV prevention targeted toward urban minority youth, Chapin (2000a) found an inverse relationship between third-person perception and optimistic bias. A similar phenomenon was found in a study among children, who believed that their peers would be more influenced by cigarette advertisements, whereas antismoking messages would have more impact on themselves (Henriksen & Flora, 1999). Hoorens and Ruiter (1996) also found a link between first-person perception from media content considered desirable to be influenced by and the desire to be influenced. In their study, people reported greater media effects on themselves compared to others from messages perceived as desirable to be influenced by. These messages included topics such as traffic safety, crime prevention, and organ donation.

The findings on message desirability are mostly explained by *self-enhancement* (Perloff, 1999; Golan & Day, 2008). Research indicates that self-enhancement is the motivation underlying both third-person perception and first-person perception.

Studies show that to enhance one's ego, an individual would acknowledge being affected by media content as much as or even more than others when the message is evaluated as positive (Perloff, 1999; Golan & Day, 2008). This study expands on research in first-person effect studies by examining the self-other differentials from the pro-social media content of an idealised body image. Based on the attribution of positive personal outcomes to pro-social media content, we expect individuals to perceive they are more influenced than others by pro-social messages of an idealised body image. We propose the following hypothesis:

H1: Participants will perceive pro-social messages of an idealised body image as having a greater influence on themselves than on others.

To date, no research has analysed similarities and differences between the perceived media effects of pro-social messages of idealised female body images on self compared to others of news delivered through different modalities. To test these similarities and differences, the following research question has been proposed:

RQ1: What similarities and differences are found in the perceived media effects of pro-social messages of idealised female body images on self as compared to others of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences?

To date, only a small number of studies has investigated the magnitude of the perceived influence of media effects between comparison groups in the context of the first-person effect. In a study focusing on television-viewing behaviour, Peiser and Peter (2000) found that both third-person perception for undesirable behaviours and first-person perception for desirable behaviours were stronger if others were more socially distant.

To fill the lacuna, we test the magnitude of the first-person perception in relation to social distance between oneself and comparison others for the pro-social messages of idealised body image.

Based on the context desirability and social distance arguments, we hypothesise that the difference between perceived influence of pro-social messages of an idealised body image on self and others will be smaller when others are less socially distant from the self than when others are more socially distant from the self. Peiser and Peter (2000) defined socially more distant people as ”those who do not belong to one’s friends or acquaintances but the members, usually unknown, or wider social groups or even of the general public” (p. 31). We hypothesise that if the comparison others are socially more distant, out-group members, participants’ first-person perception of desirable messages will be more pronounced.

H2: If the comparison others are socially more distant, the first-person perception of pro-social messages of an idealised body image will be more pronounced.

8.7 First-person Perception and the First-person Perspective of the Story

Although the first-person perception phenomenon is very different from the third-person phenomenon, our literature search revealed that the majority of earlier studies explaining the mechanisms that may account for first-person perception rely on the same ones used to explain third-person perception, that is, mostly on an optimistic bias. Golan and Day (2008) argue that ”first- and third-person inquiry represent a unique rather than the same phenomenon and therefore may require different theoretical approaches in their interpretations” (p. 549).

In his study on perceived effects on self and others in relation to the strength of message persuasiveness, White (1997) introduced the Petty and Cacioppo’s *Elaboration Likelihood Model (ELM)* as the psychological mechanism that may account for perceived media effect differences, for both third- and first-person perception. White found that people tended to overestimate the effects of strong persuasive messages on self (first-person perception) and underestimate the effect of weaker persuasive messages on others (third-person perception). The author argued that the *Elaboration Likelihood Model*’s notion of peripheral cues (factors such as sender characteristics and non-content message cues) may account for the perceptual gaps.

This study has a goal to broaden the research field by investigating the direction and magnitude of self/other differences from the pro-social messages. Furthermore, as no study has tested first-person perception from media contact delivered through AR, we extend the investigation and test the perception of media effects on self and others of news delivered through different modalities in relation to the *point of view* difference.

The literature suggests that individuals must believe the content they are exposed to is realistic to be most influenced by it. Research has demonstrated that individuals who perceive the television they watch as more realistic are more likely to be influenced by the content they are presented with (Busselle & Greenberg, 2000; see also: Gunther, 1992). We argue that immersive AR-storytelling, providing a basis for the sense of presence which makes mediated experiences seem more like non-mediate ones, i.e. ”more ”real”” (Skalski & Tamborini, 2005; see also: Lombard & Ditton, 1997) and enables the first-person perspective that allows users to experience the narrative from the point of view of the ”I” will lead females to believe that the impact of AR-enhanced news of pro-social messages of an idealised body image will be greater on themselves than on others:

H3: Perceived effects of pro-social messages of idealised body image delivered through multimodal AR will be greater for the self than for the comparison groups.

8.8 Body Image Satisfaction and Perceived Media Effects

According to the *Social Comparison Theory* (Festinger, 1954), individuals compare themselves to others. Media users explore media stories and compare their body image to the body images presented by the media which affects their self-appraisal (see: Mills et al., 2002; Botta, 2003). Body image literature suggests that the sociocultural environment may contribute to individuals' dissatisfaction and discomfort with the body experience by the transmission of the thinness ideal in the media (Thompson & Heinberg, 1999). A number of studies have explored the sociocultural pressures to fulfil social norms of appearance and thinness which lead women to internalise a thin ideal body shape (see: Ogden, 1992; Stice, 1994).

Several studies examined body image dissatisfaction and perceived media effects from advertisements in magazines portraying idealised body images in the context of the third-person perception (e.g. Chia, 2007; Chia & Wen, 2010). To date, no study has examined the self/others differences of the perceived media effects from the pro-social messages of the idealised body image. To test this process, we propose the following hypothesis:

H4: Participants' perception of the effects that pro-social messages of the idealised body image on themselves and on others will be negatively associated with their (a) body dissatisfaction and (b) appearance ideal adoption.

8.9 First-person Perception and Behavioural Consequences

Although limited, research indicates support for first-person perception. However, empirical research on the *behavioural consequences* for first-person perception is almost non-existent. Our literature review points to the few studies that indirectly dealt with behavioural consequences of the first-person effect by measuring third-person perception of the socially desirable behavioural consequences. Compared to third-person behavioural consequences such as support for censorship and government regulations, research shows that socially desirable behavioural consequences are different. They can lead to real-life behavioural consequences, including engaging in socially desirable actions such as volunteering or donating to a non-profit organisation (Golan & Day, 2008).

There is only one study that directly tested a relationship between a first-person perception from a media content deemed positive and desirable to be influenced by and behavioural consequences. This study conducted by Day (2008) found a significant relationship between a first-person effect from corporate image advertisements and the intention to vote for regulations supporting the cause promoted in the ads. The underlying psychological mechanisms included *optimistic bias* and *attribution theory* according to which individuals are able to recognise the benefits of socially desirable messages and attribute a greater effect to self than others.

A study on public relations messages, found that the greater the third-person perception, the less likely the participants were to volunteer to help the company, donate money to help children with life-threatening illness, register to donate, or support the company, and prefer the company's products to its competitors (Park & Salmon, 2005). Additionally, Golan and Banning (2008) measured third-person perception and first-person perception gaps for socially undesirable media content, brand advertising, and public service announcements. The authors predicted a first-person perception from PSAs promoting socially desirable actions such as donating blood or giving money to a charity. However, they found a third-person perception, i.e., the individuals perceived a greater effect on others from the PSAa than themselves.

Nevertheless, the authors found that individuals were willing to act on the third-person perception in the form of engaging in the socially desirable actions outlined in the ads. The authors explained the findings by employing the *theory of reasoned action*.

Developed by Fishbein and Ajzen (1975), the *theory of reasoned action* is an attitude-behaviour theory that assumes people are sensible and sociable, and predicts people's motivations to engage in voluntary behaviours based on their desire to meet the social expectations. The *theory of reasoned action* states that a person's intention to engage in behaviour is a predictor of whether or not they perform the behaviour. The behavioural intention is the result of specific attitudes toward the behaviour (see also Golan & Day, 2008; Golan & Banning, 2008). Based on the *theory of reasoned action*, Golan and Banning (2008) predicted that the perception of the influence of socially desirable content such as PSAs (on self and others) would increase the likelihood of engaging in socially desirable actions such as donating blood or money and volunteering.

Although the previous studies are scarce and have provided mixed results regarding the direction of the perceptual gaps, the third-person effect research and the Day study (2008) that predicted a behavioural consequence from a first-person perception rather than a third-person perception, indicate that third-person perception and first-person perception can lead to real-life behavioural consequences, i.e., socially desirable actions.

Based on the research, we propose the following hypothesis:

H5: First-person perception of the pro-social messages of idealised body image will be positively associated with participants' intention to engage in women empowerment campaigns.

8.10 First-person Perception and Personal Attributes

Little is known regarding the influence of demographics on first-person perception. Only a few studies have investigated the influence of individual differences on first-person perception. In their research on public opinion, Glynn and Ostman (1988) reported that first-person perception increases with *age*. Similarly, Chapin (2000a) found an inverse relationship between *grade level* and third-person perception in his study on perceived influences of safer sex messages among 180 African-American middle school and high-school participants. Findings show that increased experiences with age reduce third-person perceptions.

Including individual differences, this study allows for comparison of first-person perception in conjunction with demographic characteristics and extends knowledge of first-person perception. Since the research on personal attributes and self/other comparisons is scarce, but suggests that differences should emerge, we propose the following research questions:

RQ2: How will self/other distinctions made by participants differ in their associations with age, family status, racial or ethnic heritage, education, employment status, and income?

8.11 First-person Perception and Media Variables

Wei and colleagues (2008) reported that college students exhibiting first-person perception also exhibit increased information seeking about avian flu. Thus, first-person perception may be linked with more active *media usage*.

In their study on the third-person effects of health news, Wei and colleagues (2008) emphasised that past research that explored the relationship between media exposure and the perceived effects of negative media content showed that higher exposure was related to fewer perceived effects on the self and others. For instance, Lo and Wei (2002) found that exposure to Internet pornography was negatively associated with the perceived effects of Internet pornography on the self and others. Wei and colleagues (2008) predicted that higher news exposure to desirable content, such as health news about avian flu will be positively correlated with greater perceived effects on the self and the self and others. Their hypothesis was supported. The authors found that the higher the exposure to the news about avian flue, the stronger was the effect of the coverage the participants perceived on themselves and others, and the smaller the perceptual bias between the self and others.

Furthermore, a Chapin (2000b) study found a strong relationship between *attitudes toward media messages* and first-person perception and called for further investigation of the role of attitudes toward the media in first/third-person perception. In Chapin's investigation, individuals who expressed liking and trust of safer-sex messages believed they were more influenced by them than were their peers (see also: Chapin, 2000a; Chapin, 2001).

In addition to demographic variables, this study will test the relationship between the first-person perception of the pro-social messages of an idealised body image and media use and attitudes toward the media:

RQ3: How will self/other differentials made by participants differ in their associations with participants' (1) media consumption and (2) attitude toward the media?

9.0 METHOD

9.1 Definition of Research Framework

In order to answer the research questions and test the hypotheses, we employed a quantitative analysis of an experiment as a useful tool to empirically test and extend a theory and effects. The goal of the experiment was to measure the **dependent variable**, i.e.: *first-person perception of the pro-social messages of idealised body image*.

The **independent variables** took form of the experimental treatments that included three multimedia stories, each with identical amount of information but differing in the type of modalities (Figure 38: Research Model).

9.2 Study Participants

In total, 357 female students from the University of Vienna participated in the experiment. They were randomly assigned to one of the three conditions.

9.3 Stimulus Material

The **stimuli** included three versions of the news story *"Ashley Graham, Unfiltered"* (https://www.nytimes.com/interactive/2018/09/04/style/ashley-graham-body-positive-movement-ar-ul.html) written by Joanna Nikas and published by The New York Times in September, 2018. All three versions of the stimulus were made to look as similar as possible to avoid any incidental confounds. That is, the news was identical in the amount of information and differed only in the type of modalities. The story consisted of an interview with the model and activist Ashley Graham on the topic of doctoring women's bodies and faces that had been a common practice in fashion magazines for years. The participants received the interview in an audio modality - identical for each group.

Ashley Graham's runway walk has been recorded as a 3D holographic motion by The New York Times for the AR representation of the story. We have obtained the same representation in a video format by the UK-based Aug-it!, a Digital AR Product Design & Immersive Marketing company. Finally, we developed a series of still images depicting Ms. Graham's front, back, and side body parts, ensuring all body parts that are visible in 3D motion and video are also captured on the images. In addition to having received the interview in an audio form, each group of participants received one of the three representations of Ms. Graham's runway walk.

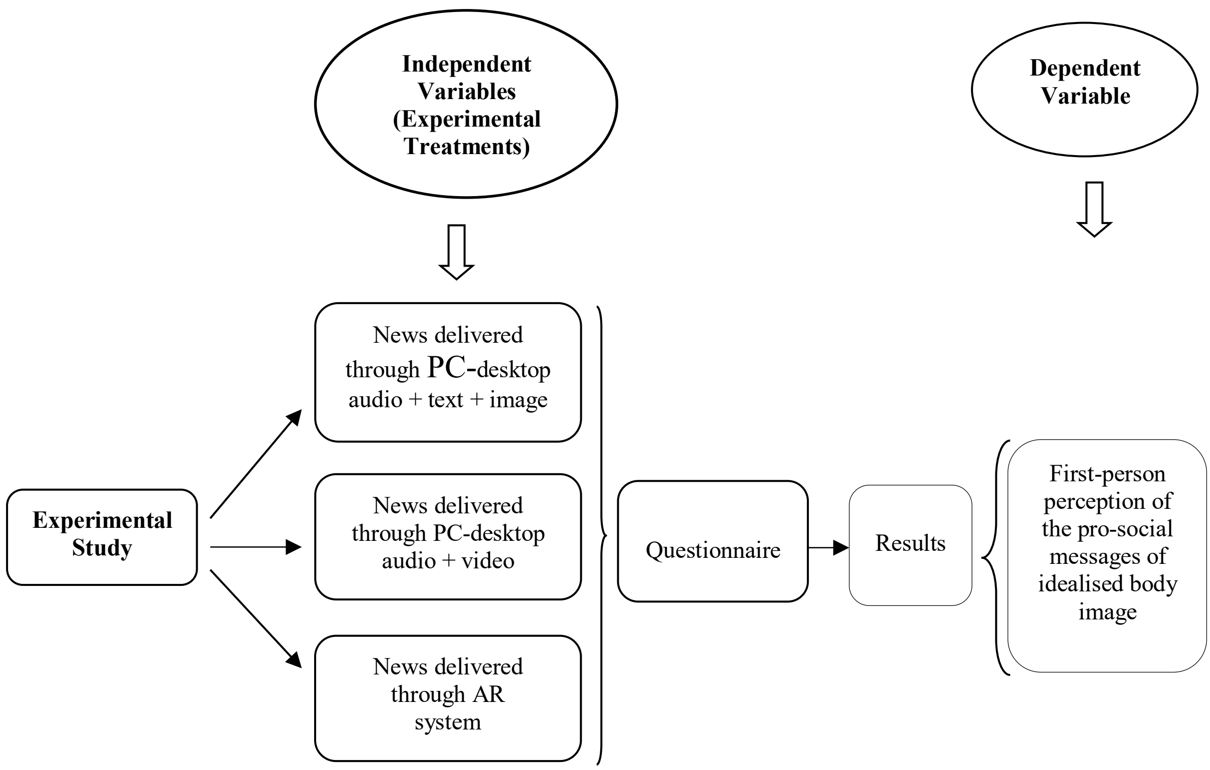


Figure 38: Research Model

9.4 Material Quality Check

Before the study, a group of 31 students from the University of Vienna was invited to participate in an analysis on the quality of the material prepared for the experiment. The students were asked to complete a questionnaire assessing their opinion on the quality of the stimulus material, in particular the audio and movie files, as well as to rate the quality of the questions and scales (see Appendix 10).

Additionally, the presence in the augmented reality environment was measured using an instrument developed by Regenbrecht, Botella, Baño & Schubert (2017) in order to ensure the environment is perceived as immersive by the participants. The Mixed Reality Experience Questionnaire (MREQ) is designed to be used as a measure of a user's sense of presence and their general experienced perception of an Augmented Reality, Virtual Reality, or Augmented Virtuality environments. It consists of 33 items with seven-point scales ranging from "strongly disagree = 1" to "strongly agree = 7"). Researchers are advised to apply all or some of the items. In this study, we used 12 items that are the most applicable to AR environments (see Appendix 11).

In his critical review and synthesis, Perloff (1999) takes issues with the fact that not all studies performed analyses of participants' perceptions of message desirability. According to Perloff (1999) it is crucial to be assured that the messages researchers deemed desirable are seen in the same light by the participants in order to make "valid inferences about message desirability effects" (p. 360). Accordingly, an analysis of message desirability was performed using a *positive-socially desirable index* developed by Huh et al., (2004). The index measured positive content by three semantic differential scales anchored by bad-good, unpleasant-pleasant, and unfavourable-favourable (Huh et al., 2004). The positive-socially desirable index also measured the desirability to be influenced by. A question with a 7-point scale ("much less = -3"; "much more = 3") was asked (Huh et al., 2004).

Several minor changes were made in the stimulus material and evaluation scales as a result.

9.5 Procedure

The participants were invited to take part in a study about technology. Upon arrival, the participants were asked to report their height and weight. Demographic characteristics and media use measures were also assessed (see Appendix 12). After filling in the questionnaires, the participants were exposed to multimedia stories, each with an identical amount of information but differing in the type of modalities.

The first group of participants received a PC based multimedia story incorporating photos of the model Ashley Graham walking the runway and an audio modality in the form of interview. The second group of participants received a PC based multimedia story incorporating a video of the model Ashley Graham walking and an audio modality in the form of interview. Finally, the third group of participants received the same story though AR system incorporating a 3D motion of Ashley Graham walking the runway and an identical audio modality in the form of an interview.

Shortly after being exposed to the material, the participants were asked to fill in a questionnaire that consisted of 6 sections: (1) Body Dissatisfaction Questionnaire, (2) Sociocultural Attitudes Towards Appearance Questionnaire, (3) Questions on Attitude Toward the Media, (4) Questions on Self-esteem, (5) Questions on First-person Perception, and (6) Questions on Behavioural Consequences (see Appendix 13).

At the end of the experiment, all participants were debriefed and encouraged to ask questions.

9.6 Measures

Body Mass. Body Mass was measured with the Body Mass Index (BMI): BMI = weight (kg) divided by height^2 (m^2) on self-report data.

Body Dissatisfaction. The Body Shape Questionnaire (BSQ) was used to measure body dissatisfaction. The BSQ is a 34-item, self-report questionnaire designed by Cooper et al. (1987) to investigate concerns about body shape. Since its development, the BSQ has been used in numerous studies. Shorter versions of the BSQ have also been examined and validated (Wade, 2016). A 16-item ”alternate form” presented by Evans and Dolan (1993) was adopted in this study (items 2, 4, 6, 12, 13, 14, 16, 18, 19, 23, 24, 27, 29-31, 33). The participants answered each item using a 10-point Likert-type scale (”never = 1”; ”always = 10”). A higher score indicated more dissatisfaction and discomfort with the body experience.

Awareness and Internalisation of the Thin Ideal. Sociocultural Attitudes Towards Appearance Questionnaire - 4R (SATAQ-4R) developed by Schaefer, L. M. et al. (2017) was used to measure the internalisation of appearance ideals (i.e., personal acceptance of societal ideals) and appearance pressures (i.e., pressures to achieve the societal ideal). The participants answered 31 items on a 10-point scale (”disagree very strongly = 1”; ”agree very strongly = 10”).

Attitude Toward the Media. Based on a scale developed by Greenberg and associates (1989), attitude toward the media was measured by asking respondents how much they liked and how much they trusted ”messages like the one they were presented with in a story” on a 10-point scale (”dislike extremely = 1”; ”like extremely = 10”). Responses to the items were summed to create a measure of attitudes toward pro-social messages of idealised body image (the media). A similar technique has been used in previous first-person perception studies (e.g. Chapin, 2000b).

Self-esteem. Self-esteem was measured with 10 items and a 10-point scale (”disagree very strongly = 1”; ”agree very strongly = 10”). The 10 items were adopted from Rosenberg scale (1965) and combined to create a scale of self-esteem.

Social Distance. Social distance was manipulated by presenting multiple targets for comparison (close female friends, other female students of their university, other female students attending other universities in Austria, close male friends, male students of their university, and male students attending other universities in Austria) that are presumed to increase psychological distance for each comparison.

First-person Perception. First-person perception was measured by asking female students about specific effects of body image presented in the news story on (1) themselves, (2) their close female friends, (3) other female students of their university, (4) other female students attending other universities in Austria, (5) their close male friends, (6) male students of their university, and (7) male students attending other universities in Austria. Specifically, female students were asked to focus on the model interviewed in the article and use a 10-point scale (”no influence at all = 1”; ”extreme influence = 10”) to answer the questions: ”How much influence do you think the model interviewed in the story you were presented with has on your perception of ideal body weight?” and ”How much influence do you think the model interviewed in the story you were presented with has on your perception of ideal body shape?”. The response scale and questions were repeated for each comparison group. The difference in scores between perceived effects of pro-social messages on oneself and others was calculated to measure the magnitude of first-person perception. A similar technique is commonly used in almost all first-person effect studies.

Behavioural Consequences. To create a first-person effect behavioural index for the engagement in women empowerment campaigns, female students were asked to compare their own likelihood of engaging in women empowerment campaigns: (1) I am likely to engage in women empowerment campaigns, relative to (2) their close female friends, (3) other female students of their university, (4) other female students attending other universities in Austria, (5) their close male friends, (6) male students of their university, and (7) male students attending other universities in Austria. Participants responded on a 10-point scale (”extremely unlikely = 1” to ”extremely likely = 10”). The responses were summed to create an index of respondent perceptions of their likelihood to engage in socially desirable action. A similar procedure was used by Golan and Banning (2008).

Demographics. Students' self-reported, age, marital status, number of children they have (if applicable), racial or ethnic heritage, highest level of education received, employment status, and monthly income were also collected.

Media Consumption. Media use was measured by asking students to indicate how much time per week they spend on (1) watching TV news programmes about health/fitness, (2) reading news about health/fitness in print media (magazines, newspapers, etc.), (3) surfing the Internet for health/fitness news. Student used a 10-point scale to report the time, anchored between ”never” to ”all seven days of the week”.

10.0 RESULTS

In order to address the research questions and test the hypotheses, the **dependent variable**, i.e., *first-person perception of the pro-social messages of idealised body image* of the news delivered through multimodal AR, PC desktop audio + text + image, and PC desktop audio + video experiences, has been explored in this research along with a set of control demographic variables, media consumption and independent variables that took form of the experimental treatments.

Scale and Index Construction.

Upon arrival, the participants reported their height and weight. We used the answers to compute subjects' *body mass index* (BMI, M = 22.61, SD = 2.42). We also asked the participants to report how much time per week they spend watching TV news programmes about health/fitness (M = 3.40, SD = 1.99), reading news about health/fitness in print media (magazines, newspapers, etc.), (M = 2.92, SD = 2.09), and surfing the Internet for health/fitness news (M = 3.74, SD = 2.28). We summed these three responses together to form a measure for *media consumption* (M = 3.35, SD = 1.41).

Body Dissatisfaction

After participants were presented with a news story through PC desktop audio + text + image, PC desktop audio + video, or multimodal AR, we measured participants' *Body Dissatisfaction* using The Body Shape Questionnaire (BSQ). We asked participants to rate their agreement level with 16 body-shape items (see Appendix 13). The 16 items formed a composite measure. Intercorrelations among the 16 items revealed a highly satisfactory level of internal consistency for the index (Cronbach's $\alpha = .68$; see entire Analysis in Appendix 14). The larger scores on the scale referred to higher levels of body dissatisfaction (M = 5.83, SD = .84).

One-way ANOVA showed that participants in PC-desktop Audio + Text + Image condition were more dissatisfied with body experience (M = 6.79) than their counterparts in the PC-desktop Audio + Video (M = 5.43) and multimodal AR (M = 5.27) conditions. The critical value of the F (2, 354)-statistic was 344.974 at the 95% confidence interval, $p < .001$. The descriptive statistics and results from ANOVA for each group of participants are listed in Tables 22 - 24.

Descriptives
Body Dissatisfaction

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Min.	Max.
Audio + Text + Image	120	6.79	.59	.05	6.68	6.89	5.25	7.81
Audio + Video	119	5.43	.47	.04	5.34	5.51	3.94	6.44
Audio + AR	118	5.27	.39	.04	5.20	5.34	4.31	6.31
Total	357	5.83	.84	.04	5.75	5.92	3.94	7.81

Test of Homogeneity of Variances
Body Dissatisfaction

Levene Statistic	df1	df2	Sig.
9.325	2	354	.000

ANOVA
Body Dissatisfaction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	165.98	2	82.99	344.974	.000
Within Groups	85.16	354	.24		
Total	251.14	356			

Tables 22 - 24: One-way ANOVA: Body Dissatisfaction

We also applied Welch's test and Games-Howell test for post-hoc analysis adopted as the most suitable method for post-hoc analysis of the data with unequal sample sizes and assumed unequal variances across the sample where the sample size and sample variance are inversely paired. The p – value of the Welch's test was $p < .001$, suggesting significant difference (Table 25).

Robust Tests of Equality of Means

Body Dissatisfaction

	Statistic[a]	df1	df2	Sig.
Welch	290.004	2	230.692	.000

a. Asymptotically F distributed.

Table 25: Welch's Test: Body Dissatisfaction

The results of post hoc analysis indicate that there is a significant difference of means across the groups. It is observed from the magnitude of the reported values that the participants who received a news story through multimodal AR generated the lowest level of body dissatisfaction, followed by the Audio + Video group. The greatest level of dissatisfaction with body experience was found among the participants in Audio + Text + Image condition. The mean difference was significant at the 0.05 level. The post hoc analysis for body dissatisfaction is reported below (Table 26 and Figure 39).

Multiple Comparisons

Dependent Variable: Body Dissatisfaction

Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Audio + Text + Image	Audio + Video	1.36*	.07	.000	1.20	1.52
	Audio + AR	1.51*	.06	.000	1.36	1.67
Audio + Video	Audio + Text + Image	-1.36*	.07	.000	-1.52	-1.20
	Audio + AR	.154*	.06	.017	.02	.29
Audio + AR	Audio + Text + Image	-1.51*	.06	.000	-1.67	-1.36
	Audio + Video	-.154*	.06	.017	-.29	-.02

*. The mean difference is significant at the 0.05 level.

Table 26: Post-hoc Test: Body Dissatisfaction

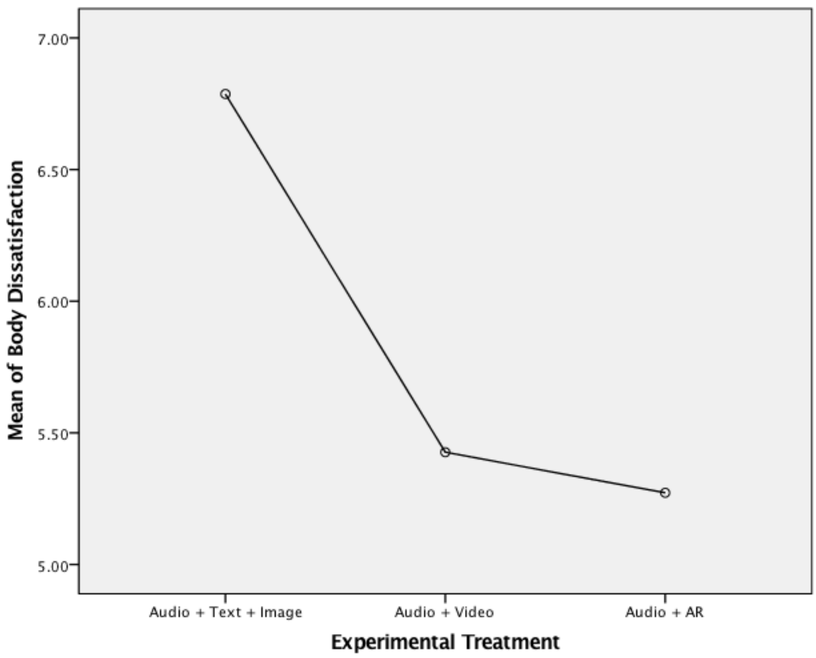


Figure 39: Post-hoc Test: Mean of Body Dissatisfaction

Internalisation of Appearance Ideals and Appearance Pressures

In the next step, we measured participants' attitudes towards appearance ideals using Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ). We asked participants to rate their agreement level with 15 items that tap the adoption of the thinness ideal. We summed the 15 items together to form a measure for *Internalisation of Appearance Ideals* (M = 5.05, SD = .98). Intercorrelations among the 15 items revealed a satisfactory level of internal consistency for the index (Cronbach's α = .66). The remaining items 16 – 31 were summed together to form a measure for *Appearance Pressures* to achieve the societal ideal (M = 4.87, SD = .86). Intercorrelations among the 16 items were positively correlated with one another (Cronbach's α = .65; see entire Analysis in Appendix 15).

One-way ANOVA showed that there were significant differences in sociocultural attitudes across groups in respect to *Internalisation of Appearance Ideals*. Participants in PC-desktop Audio + Text + Image condition had the highest recognition of social importance of appearance (M = 5.85), followed by participants in PC-desktop Audio + Video condition (M = 5.22), whereas participants in multimodal AR took the social importance of appearance low (M = 4.07). The critical value of the F (2, 354)-statistic was 232.751 at the 95% confidence interval, $p < .001$. In terms of *Appearance Pressures*, one-way ANOVA showed that participants in PC-desktop Audio + Text + Image and PC-desktop Audio + Video conditions perceived similar levels of pressure to achieve the societal ideal (M = 5.35; M = 5.34), whereas participants in multimodal AR perceived a lower level of pressures (M = 3.90). The critical value of the F (2, 354)-statistic was 283.383 at the 95% confidence interval, $p < .001$. The descriptive statistics and results from ANOVA for each group of participants are listed in Tables 27 - 29.

We also applied Welch's test and Games-Howell test for post-hoc analyses. In both cases, the p – value of the Welch's test was $p < .001$, suggesting significant difference (Table 30). The results of post hoc analysis indicate that the participants who received a news story through multimodal AR generated the lowest level of recognition of social importance of appearance, followed by the Audio + Video group. The greatest level of recognition of social importance of appearance was found among the participants in Audio + Text + Image condition. The mean difference was significant at the 0.05 level. The same goes for appearance pressures. However, there was no statistically significant difference between the groups Audio + Text + Image and Audio + Video in respect to pressures to achieve the societal ideal. The post-hoc analyses for *Internalisation of Appearance Ideals* and *Appearance Pressures* are reported below (Tables 31 - 32 and Figures 40 - 41).

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Internalisation of Appearance Ideals	Audio + Text + Image	120	5.85	.83	.08	5.70	6.00	4.07	8.13
	Audio + Video	119	5.22	.52	.05	5.13	5.32	4.27	6.67
	Audio + AR	118	4.07	.54	.05	3.98	4.17	2.93	6.20
	Total	357	5.05	.98	.05	4.95	5.16	2.93	8.13
Appearance Pressures	Audio + Text + Image	120	5.35	.65	.06	5.23	5.46	3.88	7.38
	Audio + Video	119	5.34	.45	.04	5.26	5.42	4.19	6.25
	Audio + AR	118	3.90	.49	.04	3.81	3.99	2.63	4.88
	Total	357	4.87	.86	.05	4.78	4.96	2.63	7.38

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Internalisation of Appearance Ideals	16.388	2	354	.000
Appearance Pressures	6.274	2	354	.002

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Internalisation of Appearance Ideals	Between Groups	192.93	2	96.46	232.751	.000
	Within Groups	146.71	354	.41		
	Total	339.64	356			
Appearance Pressures	Between Groups	163.58	2	81.79	283.474	.000
	Within Groups	102.14	354	.29		
	Total	265.72	356			

Tables 27 - 29: One-way ANOVA: Internalisation of Appearance Ideals and Appearance Pressures

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Internalisation of Appearance Ideals	Welch	241.449	2	229.677	.000
Appearance Pressures	Welch	326.183	2	231.843	.000

a. Asymptotically F distributed.

Table 30: Welch's Test: Internalisation of Appearance Ideals and Appearance Pressures

Multiple Comparisons
Games-Howell

Dependent Variable: Internalisation of Appearance Ideals

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Audio + Text + Image	Audio + Video	.63*	.09	.000	.42	.84
	Audio + AR	1.78*	.09	.000	1.56	1.99
Audio + Video	Audio + Text + Image	-.63*	.09	.000	-.84	-.42
	Audio + AR	1.15*	.07	.000	.99	1.31
Audio + AR	Audio + Text + Image	-1.78*	.09	.000	-1.99	-1.56
	Audio + Video	1.15*	.07	.000	-1.31	-.99

Dependent Variable: Appearance Pressures

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Audio + Text + Image	Audio + Video	.01	.07	.994	-.16	.18
	Audio + AR	1.44*	.07	.000	1.27	1.62
Audio + Video	Audio + Text + Image	-.01	.07	.994	-.18	.16
	Audio + AR	1.44*	.06	.000	1.29	.58
Audio + AR	Audio + Text + Image	-1.44*	.07	.000	-1.62	-1.27
	Audio + Video	-1.44*	.06	.000	-1.58	-1.29

*. The mean difference is significant at the 0.05 level.

Tables 31 - 32: Post-hoc Test: Internalisation of Appearance Ideals and Appearance Pressures

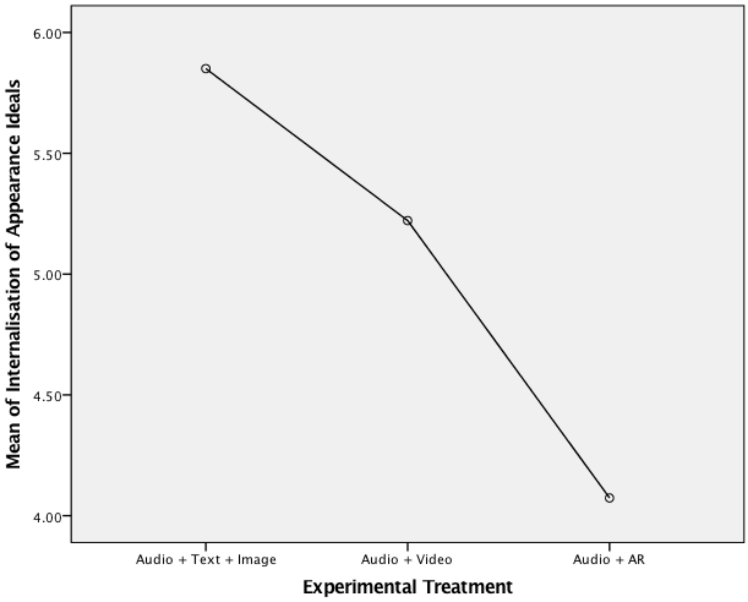


Figure 40: Post-hoc Test: Mean of Internalisation of Appearance Ideals

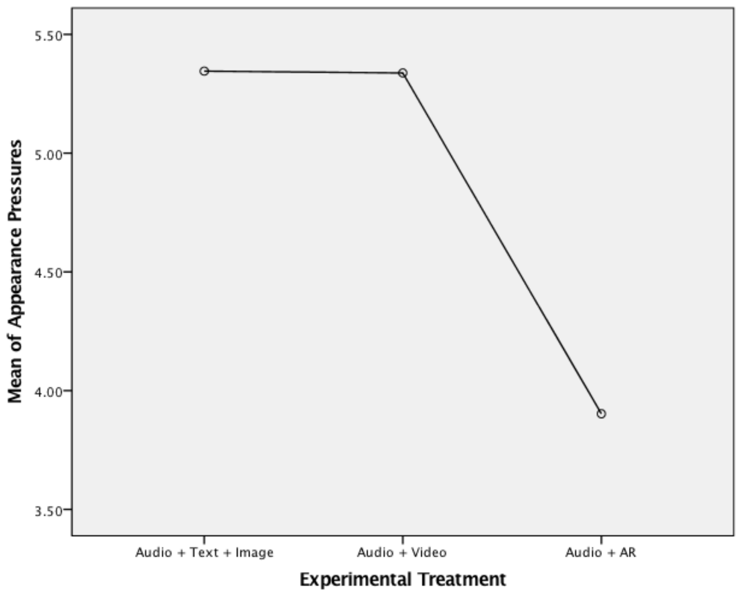


Figure 41: Post-hoc Test: Mean of Appearance Pressures

Attitude Toward the Media

To measure participants' attitude toward the media, we asked participants to report how much they liked and how much they trusted messages like the one they were presented with in a story. Responses to the items were summed to create a measure of *Attitude Toward Pro-Social Messages of Idealised Body Image* (M = 5.97, SD = 2.52). The resulting scale exhibited strong internal consistency (Spearman-Brown coefficient p = .74).

We found significant differences in attitudes towards the media when applying one-way ANOVA. Participants in multimodal AR were the most positive towards pro-social messages of idealised body image (M = 8.58), while participants in PC-desktop Audio + Text + Image condition were least in favour of this type of messages (M = 4.06), followed by participants in PC-desktop Audio + Video condition (M = 5.31). The descriptive statistics and results from ANOVA for each group of participants are listed in Tables 33 - 35.

Descriptives

Attitude toward the media

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min	Max
Audio + Text + Image	120	4.06	2.26	.21	3.65	4.47	1.00	9.50
Audio + Video	119	5.31	1.43	.13	5.05	5.57	1.50	9.00
Audio + AR	118	8.58	1.01	.09	8.40	8.77	5.50	10.00
Total	357	5.97	2.52	.13	5.71	6.23	1.00	10.00

Test of Homogeneity of Variances

Attitude toward the media

Levene Statistic	df1	df2	Sig.
26.836	2	354	.000

ANOVA

Attitude toward the media

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1292.46	2	646.23	235.534	.000
Within Groups	971.26	354	2.74		
Total	2263.72	356			

Tables 33 - 35: One-way ANOVA: Attitudes Toward the Media

The p – value of the Welch's test was $p < .001$ suggesting significant difference (Table 36). The results of post-hoc analysis indicate that the participants who received a news story via Audio + Text + Image modalities were least positive in their attitude towards pro-social messages of idealised body images, compared to their counterparts in Audio + Video and multimodal AR conditions. The mean difference was significant at the 0.05 level. The post-hoc analyses for *Attitude Toward the Media* are reported below (Table 37 and Figure 42).

Robust Tests of Equality of Means

Attitude toward the media

	Statistic[a]	df1	df2	Sig.
Welch	325.943	2	218.631	.000

a. Asymptotically F distributed.

Table 36: Welch's Test: Attitudes Toward the Media

Multiple Comparisons

Dependent Variable: Attitude toward the Media

Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Audio + Text + Image	Audio + Video	-1.25*	.24	.000	-1.83	-.67
	Audio + AR	-4.52*	.23	.000	-5.05	-3.98
Audio + Video	Audio + Text + Image	1.25*	.24	.000	.67	1.83
	Audio + AR	-3.27*	.16	.000	-3.65	-2.89
Audio + AR	Audio + Text + Image	4.52*	.23	.000	3.98	5.05
	Audio + Video	3.27*	.16	.000	2.89	3.65

*. The mean difference is significant at the 0.05 level.

Table 37: Post-hoc Test: Attitudes Toward the Media

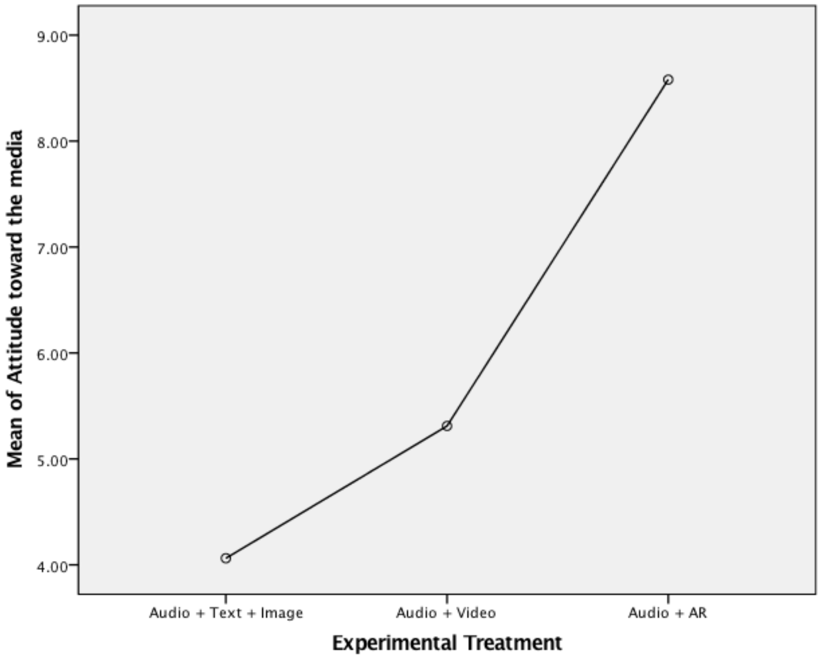


Table 42: Post-hoc Test: Mean of Attitude Toward the Media

Self-esteem

Students' responses on 10-item Rosenberg scale were combined to create a scale of *Self-Esteem* (M = 5.26, SD = 1.09). We reversed five items of the scale so that large sores referred to higher levels of self-esteem. However, one-way ANOVA showed that the differences between the groups were not statistically significant ($p > .05$). The participants in all three conditions: Audio + Text + Image, Audio + Video, and multimodal AR scored a similar level of self-esteem. The descriptive statistics and results from ANOVA for each group of participants are listed in Tables 38 - 42; Figure 43.

Descriptives
Self-esteem

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Audio + Text + Image	120	5.14	1.18	.11	4.93	5.36	2.70	8.60
Audio + Video	119	5.28	.81	.07	5.14	5.43	3.70	7.10
Audio + AR	118	5.35	1.23	.11	5.12	5.57	2.70	8.10
Total	357	5.26	1.09	.06	5.14	5.37	2.70	8.60

Test of Homogeneity of Variances
Self-esteem

Levene Statistic	df1	df2	Sig.
7.806	2	354	.000

ANOVA
Self-esteem

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.59	2	1.30	1.089	.338
Within Groups	421.10	354	1.19		
Total	423.69	356			

Tables 38 - 40: One-way ANOVA: Self-esteem

Robust Tests of Equality of Means
Self-esteem

	Statistic[a]	df1	df2	Sig.
Welch	.929	2	226.598	.397

a. Asymptotically F distributed.

Table 41: Welch's Test: Self-esteem

Multiple Comparisons
Dependent Variable: Self-esteem
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Audio + Text + Image	Audio + Video	-.14	.13	.527	-.45	.17
	Audio + AR	-.20	.16	.397	-.57	.17
Audio + Video	Audio + Text + Image	.14	.13	.527	-.17	.45
	Audio + AR	-.06	.14	.892	-.38	.26
Audio + AR	Audio + Text + Image	.20	.16	.397	-.17	.57
	Audio + Video	.06	.14	.892	-.26	.38

Table 42: Post-hoc Test: Self-esteem

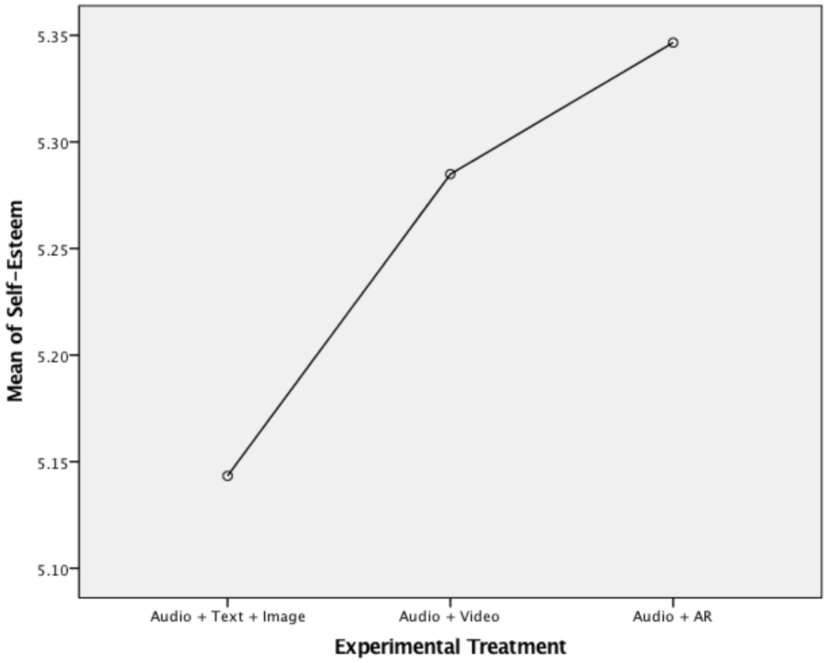


Table 43: Post-hoc Test: Mean of Self-esteem

Perceptions of Media Effects

We combined participants' responses to the two questions to form a composite measure for participants' *Perception of Media Effects on the Self* (Spearman-Brown coefficient p = .88; M = 7.82, SD = 2.26). We repeated the procedure to create a composite measure for participants: *Perception of Media Effects on Close Female Friends* (Spearman-Brown coefficient p = .85; M = 6.92, SD = 2.71), *Perception of Media Effects on Other Female Students of This University* (Spearman-Brown coefficient p = .84; M = 6.04, SD = 2.68), *Perception of Media Effects on Other Female Students Attending Other Universities in Austria* (Spearman-Brown coefficient p = .78; M = 5.20, SD = 2.12), *Perception of Media Effects on Close Male Friends* (Spearman-Brown coefficient p = .75; M = 3.61, SD = 2.06), *Perception of Media Effects on Male Students of This University* (Spearman-Brown coefficient p = .71; M = 2.69, SD = 1.77), and *Perception of Media Effects on Male Students Attending Other Universities in Austria* (Spearman-Brown coefficient p = .79; M = 1.90, SD = 1.55). The descriptive statistics for each group of participants are listed in Table 43.

Magnitude of First-person Perception

The difference in scores between perceived effects of pro-social messages on oneself and others was calculated to measure the magnitude of first-person perception. First-person effect scores were computed by subtracting the size of the perceived effect on others from the size of the perceived effect on self for each self – other pair.

		N	Mean	Std. Deviation
Perception of Media Effects on Self	Audio + Text + Image	120	6.89	2.70
	Audio + Video	119	7.66	2.05
	Audio + AR	118	8.94	1.33
	Total	357	7.82	2.26
Perception of Media Effects on Close Female Friends	Audio + Text + Image	120	5.93	2.76
	Audio + Video	119	6.93	2.73
	Audio + AR	118	7.91	2.24
	Total	357	6.92	2.71
Perception of Media Effects on Other Female Students of This University	Audio + Text + Image	120	5.09	3.09
	Audio + Video	119	6.11	2.85
	Audio + AR	118	6.92	1.49
	Total	357	6.04	2.68
Perception of Media Effects on Other Female Students Attending Other Universities in Austria	Audio + Text + Image	120	4.28	2.48
	Audio + Video	119	5.26	2.09
	Audio + AR	118	6.08	1.15
	Total	357	5.20	2.12
Perception of Media Effects on Close Male Friends	Audio + Text + Image	120	3.54	2.41
	Audio + Video	119	4.53	1.92
	Audio + AR	118	2.77	1.30
	Total	357	3.61	2.06
Perception of Media Effects on Male Students Attending This University	Audio + Text + Image	120	2.62	1.60
	Audio + Video	119	3.64	2.04
	Audio + AR	118	1.80	1.01
	Total	357	2.69	1.77
Perception of Media Effects on Male Students Attending Other Universities in Austria	Audio + Text + Image	120	1.84	1.21
	Audio + Video	119	2.82	2.03
	Audio + AR	118	1.04	.17
	Total	357	1.90	1.55

Table 43: Mean scores for the Perception of Media Effects sorted by experimental treatment

Research Questions and Hypotheses Testing

Research questions 1 and 3 as well as the hypotheses 1, 2, 3 and 4 proposed to test the first-person perception in the context of pro-social messages of idealised body image and whether the first-person perception would vary across the groups.

Hypothesis 1 predicted the perceived effect of pro-social messages of idealised body image on self would be greater than the perceived effect on others. To test the hypothesis, we combined participants' perceptions of media effects on female and male others to compose a measure for participants' perception of *overall media effects on others*. Three sets of paired *t* tests with Bonferroni corrections were performed to compare the participants' perceptions of media effects on themselves to the participants' perceptions of media effects on others: one set for participants exposed to a news story presented through PC-desktop Audio + Text + Image modalities, the second one for the participants exposed to a news story presented through PC-desktop Audio + Video modalities, and the third one for the participants exposed to a news story presented through multimodal AR. The results show that in all three conditions Audio + Text + Image, Audio + Video, and multimodal AR, participants' perception of media effects on the self was significantly larger than participants' perception of media effects on others ($p < .001$). Tables 44 and 45 present the results that demonstrate overall support for Hypothesis 1.

Paired Samples Statistics

Experimental Treatment			Mean	N	Std. Deviation	Std. Error Mean
Audio + Text + Image	Pair 1	Perception of Media Effects on Self	6.89	120	2.70	.25
		Perception of Media Effects on Others	3.88	120	.95	.09
Audio + Video	Pair 1	Perception of Media Effects on Self	7.66	119	2.05	.19
		Perception of Media Effects on Others	4.88	119	.90	.08
Audio + AR	Pair 1	Perception of Media Effects on Self	8.94	118	1.33	.12
		Perception of Media Effects on Others	4.42	118	.60	.06

Table 44: Mean Scores of Perceived Media Effects of Pro-social Messages of Idealised Body Image on Self and Others Sorted According to the Experimental Treatment

Paired Samples Test

Pair 1: Perception of Media Effects on Self – Perception of Media Effects on Others

Experimental Treatment: Audio + Text + Image

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
3.01	2.83	.26	2.50	3.52	11.64	119	.000

Experimental Treatment: Audio + Video

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
2.77	2.21	.20	2.37	3.18	13.70	118	.000

Experimental Treatment: Audio + AR

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
4.52	1.53	.14	4.24	4.80	32.13	117	.000

Table 45: Paired *t* test:

Perception of Media Effects on Self vs. Perception of Media Effects on Others

Hypothesis 2 postulated that the first-person perception of pro-social messages of idealised body image would be more pronounced if the comparison others are socially more distant. To test this hypothesis, we separated the participants' perceptions of media effects on female others from the participants' perceptions of the media effects of male others. Three sets of *t* tests with Bonferroni corrections were performed: one set for participants exposed to a news story presented through PC-desktop Audio + Text + Image modalities, the second one for the participants exposed to a news story presented through PC-desktop Audio + Video modalities, and the third one for the participants exposed to a news story presented through multimodal AR. All three groups of participants perceived that the first-person effect of pro-social messages of an idealised body image was greater when the comparison others were male others rather than female others (see Tables 46 and 47).

Paired Samples Statistics

Experimental Treatment			Mean	N	Std. Deviation	Std. Error Mean
Audio + Text + Image	Pair 1	Perception of Media Effects on the Self	6.89	120	2.70	.25
		Perception of Media Effects on Female Others	5.10	120	1.55	.14
	Pair 2	Perception of Media Effects on the Self	6.89	120	2.70	.25
		Perception of Media Effects on Male Others	2.67	120	1.08	.10
Audio + Video	Pair 1	Perception of Media Effects on the Self	7.66	119	2.05	.19
		Perception of Media Effects on Female Others	6.10	119	1.39	.13
	Pair 2	Perception of Media Effects on the Self	7.66	119	2.05	.19
		Perception of Media Effects on Male Others	3.66	119	1.16	.11
Audio + AR	Pair 1	Perception of Media Effects on the Self	8.94	118	1.33	.12
		Perception of Media Effects on Female Others	6.97	118	1.09	.10
	Pair 2	Perception of Media Effects on the Self	8.94	118	1.33	.12
		Perception of Media Effects on Male Others	1.87	118	.57	.05

Table 46: Mean Scores of Perceived Media Effects of Pro-social Messages of Idealised Body Image on Self and Female/Male Others Sorted According to the Experimental Treatment

Paired Samples Test

Experimental Treatment: Audio + Text + Image

Pair 1: Perception of Media Effects on Self – Perception of Media Effects on Female Others

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Dviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
1.79	2.97	.27	1.25	2.33	6.61	119	.000

Pair 2: Perception of Media Effects on Self – Perception of Media Effects on Male Others

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
4.23	3.00	.27	3.68	4.77	15.45	119	.000

Experimental Treatment: Audio + Video

Pair 1: Perception of Media Effects on Self – Perception of Media Effects on Female Others

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Dviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
1.55	2.36	.22	1.13	1.98	7.19	118	.000

Pair 2: Perception of Media Effects on Self – Perception of Media Effects on Male Others

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
3.99	2.43	.22	3.55	4.44	17.95	118	.000

Table 47: Paired *t* test: Perception of Media Effects on Self versus Gendered Others

In addition, a series of paired *t* tests with Bonferroni corrections was carried out. It was found that in all three conditions, i.e., PC-desktop Audio + Text + Image, PC-desktop Audio + Video, and multimodal AR, participants' perceptions of media effects on themselves were significantly larger for each level of equal social distance: (1) close female friends, (2) other female students of the university, (3) other female students attending other universities in Austria, (4) close male friends, (5) male students of the university, and (6) male students attending other universities in Austria ($p < .005$). Hypothesis 2 was largely supported (see Table 48). Overall, the participants in multimodal AR condition perceived a greater first-person effect of pro-social messages of idealised body images on self as compared to others. Hypothesis 3 that predicted the perceived effect of pro-social messages of idealised body image delivered through multimodal AR to be greater for the self than for the comparison groups received support (see Table 48).

Paired Samples Test

Experimental Treatment: Audio + Text + Image

Pair 1: Perception of Media Effects on Self – Perception of Media Effects on Close Female Friends

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Dviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
.96	3.50	.32	.33	1.59	3.00	119	.003

Pair 2: Perception of Media Effects on Self – Perception of Media Effects on Other Female Students of This University

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
1.08	4.01	.37	1.08	2.53	4.93	119	.000

Pair 3: Perception of Media Effects on Self – Perception of Media Effects on Other Female Students Attending Other Universities in Austria

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
2.61	3.77	.34	1.93	3.29	7.59	119	.000

Pair 4: Perception of Media Effects on Self – Perception of Media Effects on Close Male Friends

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
3.35	3.73	.34	2.68	4.02	9.86	119	.000

Pair 5: Perception of Media Effects on Self – Perception of Media Effects on Male Students of This University

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
4.27	3.25	.30	3.68	4.86	14.38	119	.000

Pair 6: Perception of Media Effects on Self – Perception of Media Effects on Male Students Attending Other Universities in Austria

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
5.05	2.97	.27	4.52	5.59	18.64	119	.000

Experimental Treatment: Audio + Video

Pair 1: Perception of Media Effects on Self – Perception of Media Effects on Close Female Friends

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
.73	2.73	.25	.23	1.22	2.90	118	.004

Pair 2: Perception of Media Effects on Self – Perception of Media Effects on Other Female Students of This University

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
1.55	3.75	.34	.87	2.23	4.50	118	.000

Pair 3: Perception of Media Effects on Self – Perception of Media Effects on Other Female Students Attending Other Universities in Austria

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
2.39	3.04	.28	1.84	2.94	8.58	118	.000

Pair 4: Perception of Media Effects on Self – Perception of Media Effects on Close Male Friends

Paired Differences

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
3.13	2.90	.27	2.60	3.66	11.77	118	.000

Pair 5: Perception of Media Effects on Self – Perception of Media Effects on Male Students of This University

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
4.02	3.21	.29	3.43	4.60	13.66	118	.000

Pair 6: Perception of Media Effects on Self – Perception of Media Effects on Male Students Attending Other Universities in Austria

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
4.84	2.62	.24	4.36	5.31	20.17	118	.000

Experimental Treatment: Audio + AR

Pair 1: Perception of Media Effects on Self – Perception of Media Effects on Close Female Friends

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
1.03	2.80	.26	.52	1.54	3.98	117	.000

Pair 2: Perception of Media Effects on Self – Perception of Media Effects on Other Female Students of This University

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
2.01	2.05	.19	1.64	2.39	10.64	117	.000

Pair 3: Perception of Media Effects on Self – Perception of Media Effects on Other Female Students Attending Other Universities in Austria

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
2.86	1.75	.16	2.54	3.18	17.75	117	.000

Pair 4: Perception of Media Effects on Self – Perception of Media Effects on Close Male Friends

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
6.17	1.97	.18	5.81	6.52	34.00	117	.000

Pair 5: Perception of Media Effects on Self – Perception of Media Effects on Male Students of This University

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
7.14	1.53	.14	6.86	7.41	50.67	117	.000

Pair 6: Perception of Media Effects on Self – Perception of Media Effects on Male Students Attending Other Universities in Austria

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
7.89	1.33	.12	7.65	8.14	64.25	117	.000

Figure 48: Perception of Media Effects on Self vs. Perception of Media Effects on Others for Each Level of Social Distance

In order to further explore the media effects of pro-social messages of idealised body image on self and others and answer our research question 1 regarding similarities and differences found in the perceived media effects on self as compared to others of news delivered through multimodal AR as compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences, we conducted two one-way ANOVAs to assess the similarities and differences in the perceived media effects of pro-social messages of idealised female body image on self and others from news delivered through multimodal AR as compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences. The analysis showed that the perceived influence on self was larger in the multimodal AR condition ($M = 8.94$) than in PC-desktop Audio + Video ($M = 7.66$) and PC-desktop Audio + Text + Image conditions ($M = 6.89$). The critical value of the F (2, 354)-statistic was 28.618 at the 95% confidence interval, $p < .001$. The perceived influence of on others was the largest in PC-desktop Audio + Video condition ($M = 4.88$), followed by multimodal AR ($M = 4.42$) and PC-desktop Audio + Text + Image condition ($M = 3.88$). The critical value of the F (2, 354)-statistic was 43.134 at the 95% confidence interval, $p < .001$ for others. The descriptive statistics and results from ANOVAs for each group of participants are presented below (self: Tables 49 – 51, others: Tables 54 – 56).

We also applied Welch's tests and the Games-Howell tests for post-hoc analysis adopted as the most suitable method for post-hoc analysis of the data with unequal sample sizes and assumed unequal variances across the sample where the sample size and sample variance are inversely paired. For both analyses, p – value of the Welch's tests were $p < .001$, suggesting significant differences (self: Table 52, others: Table 57).

The results of the first post-hoc analysis indicated that there was a significant difference of means across the groups. It was observed from the magnitude of the reported values that the participants who received a news story through multimodal AR perceived greater influence of media effects on themselves than participants in Audio + Video condition and the participants in Audio + Text + Image condition. The mean difference was significant at the 0.05 level. The post-hoc analysis for the perceived influence of media effects of pro-social messages of idealised female body image on self is reported below (Table 53 and Figure 44).

The results of the second post-hoc analysis also indicated that there was a significant difference of means across the groups. It was observed from the magnitude of the reported values that the greatest influence of the perceived media effects on others was from a news story delivered though Audio + Video compared to news stories delivered through multimodal AR and Audio + Text + Image. The mean difference was significant at the 0.05 level. The post-hoc analysis for the perceived influence of media effects of pro-social messages of idealised female body image on self is reported below (Table 58 and Figure 45).

Descriptives
Perception of Media Effects on Self

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Audio + Text + Image	120	6.89	2.70	.25	6.40	7.38	1.00	10.00
Audio + Video	119	7.66	2.05	.19	7.28	8.03	2.00	10.00
Audio + AR	118	8.94	1.33	.12	8.69	9.18	1.00	10.00
Total	357	7.82	2.26	.12	7.59	8.06	1.00	10.00

Test of Homogeneity of Variances
Perception of Media Effects on the Self

Levene Statistic	df1	df2	Sig.
39.342	2	354	.000

ANOVA
Perception of Media Effects on Self

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	253.72	2	126.86	28.618	.000
Within Groups	1569.24	354	4.43		
Total	1822.96	356			

Tables 49 - 51: One-way ANOVA: Perception of Media Effects on Self

Robust Tests of Equality of Means
Perception of Media Effects on the Self

	Statistic[a]	df1	df2	Sig.
Welch	35.677	2	218.417	.000

a. Asymptotically F distributed.

Table 52: Welch's Test: Perception of Media Effects on Self

Multiple Comparisons
Dependent Variable: Perception of Media Effects on Self
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Audio + Text + Image	Audio + Video	-.76*	.31	.038	-1.50	-.03
	Audio + AR	-2.04*	.28	.000	-2.70	-1.39
Audio + Video	Audio + Text + Image	.76*	.31	.038	.03	1.50
	Audio + AR	-1.28*	.22	.000	-1.81	-.75
Audio + AR	Audio + Text + Image	2.04*	.28	.000	1.39	2.70
	Audio + Video	1.28*	.22	.000	.75	1.81

*. The mean difference is significant at the 0.05 level.

Table 53: Post-hoc Test: Perception of Media Effects on Self

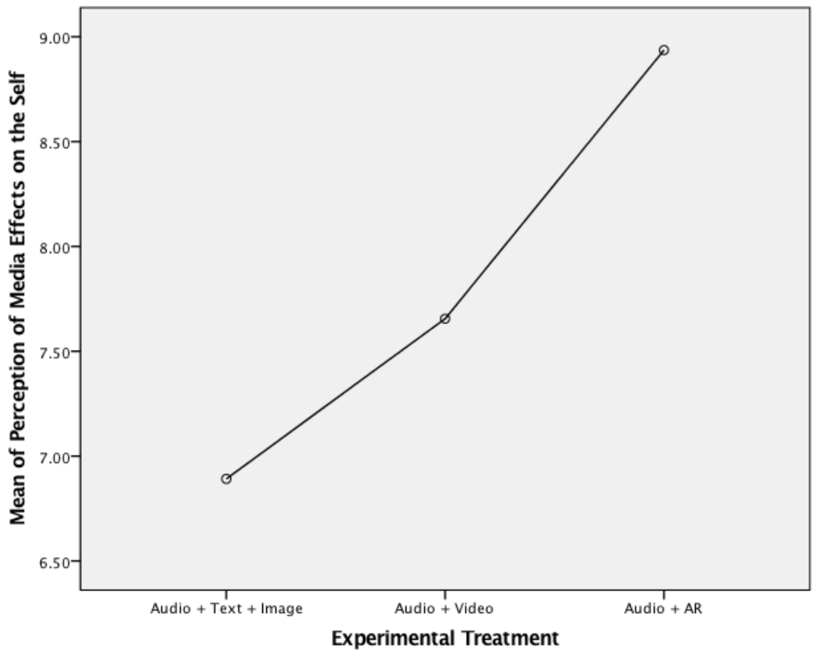


Figure 44: Post-hoc Test: Perception of Media Effects on Self

Descriptives

Perception of Media Effects on Others

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Audio + Text + Image	120	3.88	.95	.09	3.71	4.06	1.67	6.00
Audio + Video	119	4.88	.90	.08	4.72	5.04	2.58	6.83
Audio + AR	118	4.42	.60	.06	4.31	4.53	2.67	5.67
Total	357	4.39	.92	.05	4.30	4.49	1.67	6.83

Test of Homogeneity of Variances

Perception of Media Effects on Others

Levene Statistic	df1	df2	Sig.
12.831	2	354	.000

ANOVA

Perception of Media Effects on Others

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	59.60	2	29.80	43.134	.000
Within Groups	244.55	354	.69		
Total	304.15	356			

Tables 54 - 56: One-way ANOVA: Perception of Media Effects on Others

Robust Tests of Equality of Means

Perception of Media Effects on Others

	Statistic[a]	df1	df2	Sig.
Welch	34.802	2	226.071	.000

a. Asymptotically F distributed.

Table 57: Welch's Test: Perception of Media Effects on Others

Multiple Comparisons
Dependent Variable: Perception of Media Effects on Others
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Audio + Text + Image	Audio + Video	-.10*	.12	.000	-1.28	-.72
	Audio + AR	-.54*	.10	.000	-.78	-.29
Audio + Video	Audio + Text + Image	.10*	.12	.000	.72	1.28
	Audio + AR	.46*	.10	.000	.23	.69
Audio + AR	Audio + Text + Image	.54*	.10	.000	.29	.78
	Audio + Video	-.46*	.10	.000	-.69	-.23

*. The mean difference is significant at the 0.05 level

Table 58: Post-hoc Test: Perception of Media Effects on Others

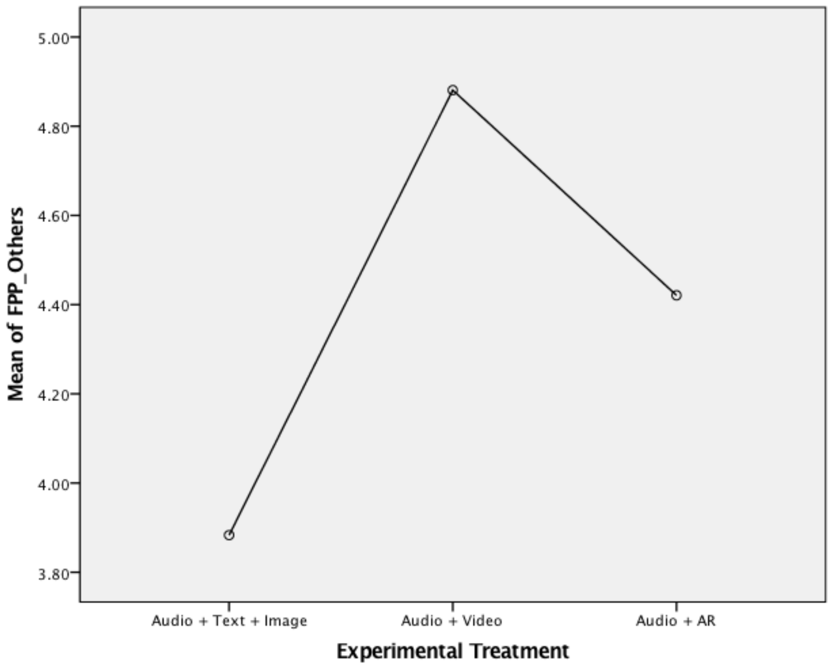


Figure 45: Post-hoc Test: Perception of Media Effects on Others

In the next step, we conducted a one-way ANOVA to assess the similarities and differences in the magnitude of the first-person perception of pro-social messages of idealised female body image of news delivered through multimodal AR compared to news delivered through PC desktop audio + text + image, and PC desktop audio + video experiences. The analysis showed that first-person perception was the largest in the multimodal AR condition (M = 4.52), followed by PC-desktop Audio + Text + Image (M = 3.01) and PC-desktop Audio + Video conditions (M = 2.77). The critical value of the F (2, 354)-statistic was 20.771 at the 95% confidence interval, $p < .001$. The descriptive statistics and results from ANOVA for each group of participants are listed in Tables 59 - 61.

Descriptives

First-person Perception

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean: Lower Bound	95% Confidence Interval for Mean: Upper Bound	Min.	Max.
Audio + Text + Image	120	3.01	2.83	.26	2.50	3.52	-5.00	7.50
Audio + Video	119	2.77	2.21	.20	2.37	3.18	-3.75	6.00
Audio + AR	118	4.52	1.53	.14	4.24	4.79	-4.08	7.08
Total	357	3.43	2.38	.13	3.18	3.68	-5.00	7.50

Test of Homogeneity of Variances

First-person Perception

Levene Statistic	df1	df2	Sig.
30.591	2	354	.000

ANOVA

First-person Perception

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	211.52	2	105.76	20.771	.000
Within Groups	1802.44	354	5.09		
Total	2013.96	356			

Tables 59 - 61: One-way ANOVA: First-person Perception

We also applied Welch's test and the Games-Howell test for post-hoc analysis adopted as the most suitable method for post-hoc analysis of the data with unequal sample sizes and assumed unequal variances across the sample where the sample size and sample variance are inversely paired. The p – value of the Welch's test was $p < .001$, suggesting significant difference (Table 62).

Robust Tests of Equality of Means
First-person Perception

	Statistic[a]	df1	df2	Sig.
Welch	30.378	2	222.622	.000

a. Asymptotically F distributed.

Table 62: Welch's Test: First-person Perception

The results of post-hoc analysis indicated that the first-person perception was greatest among the participants who received a news story through multimodal AR, followed by the participants in Audio + Video condition and the participants in Audio + Text + Image condition. However, there was no statistically significant difference between the groups Audio + Text + Image and Audio + Video in respect to first-person perception. The post-hoc analysis for first-person perception is reported below (Table 63 and Figure 46).

Multiple Comparisons
Dependent Variable: First-person Perception
Games-Howell

(I) Experimental Treatment	(J) Experimental Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Audio + Text + Image	Audio + Video	.23	.33	.757	-.54	1.01
	Audio + AR	-1.51*	.29	.000	-2.20	-.81
Audio + Video	Audio + Text + Image	-.23	.33	.757	-1.01	.54
	Audio + AR	-1.74*	.25	.000	-2.32	-1.16
Audio + AR	Audio + Text + Image	1.51*	.29	.000	.81	2.20
	Audio + Video	1.74*	.25	.000	1.16	2.32

*. The mean difference is significant at the 0.05 level.

Table 63: Post-hoc Test: First-person Perception

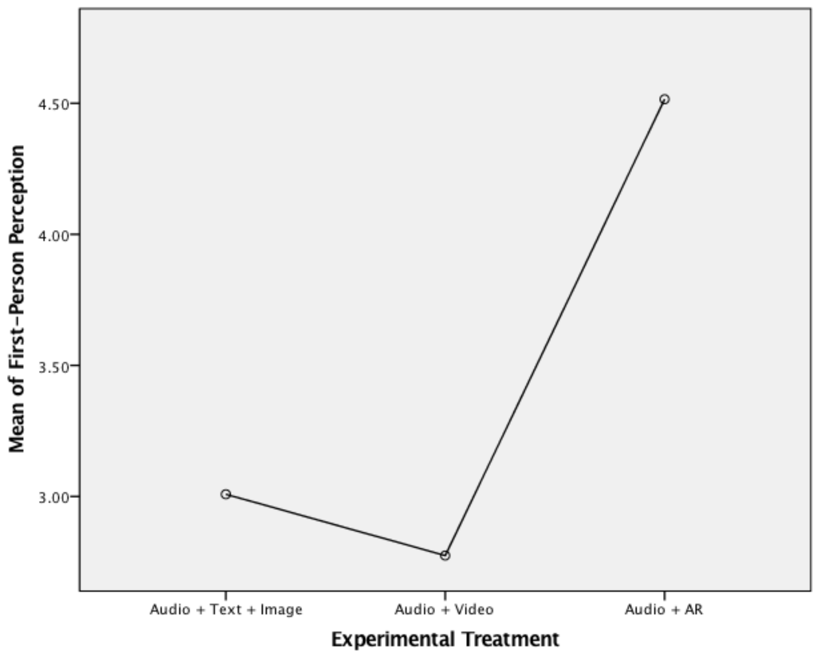


Figure 46: Post-hoc Test: First-person Perception

Hypothesis 4 postulated an association between the participants' perception of media effects on themselves and others and their (a) body dissatisfaction and (b) appearance ideal adoptions. To test this hypothesis, we performed three sets of hierarchical multiple regression analyses. The first set of regression analyses used participants' body dissatisfaction as the dependent variable. The other two sets of regression analyses separately examined participants' internalisation of appearance ideals and appearance pressures. Participants' age, racial or ethnic heritage, level of education, net personal monthly income, marital status, and number of children were controlled in the first block. Media consumption was added in the second block, BMI in the third, while self-esteem was included in the fourth block. Finally, we controlled for the sum of perceived media effects on the self, and others in the fifth block.

The results of the first set of hierarchical multiple regression showed that at Stage one, demographic characteristics ($F (6, 350) = 3.12, p < .005$) contributed significantly to the regression model as indicated by the Sig. F Change (R^2 Change = .051, $F (6, 350) = 3.12, p < .005$) and accounted for 5.1% of the variation in body dissatisfaction. Participants' education level made a unique statistically significant contribution ($\beta = -.21, p < .001$). Media consumption was not a significant contribution in the model ($F (7, 349) = 2.79, p > .005$) as indicated by Sig. F Change (R^2 Change = .002, $F (1, 349) = .87, p > .05$). Similarly, the entry of BMI ($F (8, 348) = 2.89, p < .005$) at Stage 3 and self-esteem ($F (9, 347) = 2.68, p < .005$) at

Stage 4 did not make a significant contribution to the model as indicted by Sig. F Change (R^2 Change = .009, F (1, 348) = 3.39, p > .05 and R^2 Change = .003, F (1, 347) = 1.02, p > .05). After the entry of perception of media effects on self, and perception of media effects on others at Stage 5 the total variance explained by the model as a whole was 18.9% (F (11, 345) = 7.29, p < .001). The introduction of these two variables explained the additional 12.4% of variance in body dissatisfaction, after controlling for demographic characteristics, media consumption, BMI, and self-esteem (R^2 Change = .124, F (2, 345) = 26.31, p < .001). Both perception of media effects on self (β = -.13, p < .05), and perception of media effects on others (β = -.32, p < .001) variables were statistically significant negative predictors of body dissatisfaction, suggesting that the stronger participants' perception of media effects of pro-social messages of idealised body image on themselves as well as on their peers, the less likely participants would be to feel dissatisfied with their bodies. Hypothesis 4a received support. In the final model, education level was also a statistically significant negative predictor of body dissatisfaction (β = -.19, p < .001), suggesting that participants with higher levels of education were less likely to feel dissatisfied with their bodies. Another statistically significant but positive predictor of body dissatisfaction in the final model was BMI (β = .10, p < .05). The results of the first set of hierarchical multiple regression are presented below (Tables 64 – 66; see entire analysis in Appendix 16).

Model Summary[f]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.225[a]	.051	.034	.83	.051	3.12	6	350	.005
2	.230[b]	.053	.034	.83	.002	.87	1	349	.353
3	.249[c]	.062	.041	.82	.009	3.39	1	348	.066
4	.255[d]	.065	.041	.82	.003	1.02	1	347	.314
5	.434[e]	.189	.163	.77	.124	26.31	2	345	.000

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self
f. Dependent Variable: Body Dissatisfaction

Table 64: Hierarchical Multiple Regression Analysis Predicting Body Dissatisfaction – Model Summary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.74	6	2.12	3.117	.005[b]
	Residual	238.40	350	.68		
	Total	251.14	356			
2	Regression	13.33	7	1.90	2.794	.008[c]
	Residual	237.81	349	.68		
	Total	251.14	356			
3	Regression	15.62	8	1.95	2.886	.004[d]
	Residual	235.52	348	.68		
	Total	251.14	356			
4	Regression	16.31	9	1.81	2.678	.005[e]
	Residual	234.83	347	.68		
	Total	251.14	356			
5	Regression	47.39	11	4.31	7.294	.000[f]
	Residual	203.76	345	.59		
	Total	251.14	356			

a. Dependent Variable: Body Dissatisfaction
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Selfesteem
f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

Table 65: Hierarchical Multiple Regression Analysis Predicting Body Dissatisfaction – ANOVA

Model		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	7.14	.35		20.22	.000		
	Age Group	-.08	.07	-.06	-1.14	.256	.93	1.08
	Marital status	.04	.07	.03	.57	.570	.93	1.08
	Number of children	.10	.14	.04	.71	.477	.86	1.16
	Racial or ethnic heritage	.01	.03	.01	.18	.859	.98	1.02
	Level of education	-.37	.09	-.21	-3.95	.000	.94	1.07
	Net personal monthly income	-.02	.21	-.01	-.11	.910	.77	1.30
2	(Constant)	7.23	.37		19.74	.000		
	Age Group	-.08	.07	-.06	-1.08	.283	.93	1.08
	Marital status	.04	.07	.03	.55	.580	.93	1.08
	Number of children	.10	.14	.04	.71	.481	.86	1.16
	Racial or ethnic heritage	.01	.03	.02	.30	.767	.97	1.04
	Level of education	-.37	.09	-.21	-3.96	.000	.94	1.07
	Net personal monthly income	-.02	.21	-.01	-.12	.906	.77	1.30
	Media Consumption	-.03	.03	-.05	-.93	.353	.98	1.02
3	(Constant)	6.38	.59		10.85	.000		
	Age Group	-.07	.07	-.05	-.99	.323	.92	1.08
	Marital status	.04	.07	.03	.55	.582	.93	1.08
	Number of children	.09	.14	.04	.66	.512	.86	1.16
	Racial or ethnic heritage	.01	.03	.01	.24	.814	.96	1.04
	Level of education	-.35	.09	-.21	-3.80	.000	.93	1.08

	Net personal monthly income	.00	.21	.00	.01	.990	.76	1.30
	Media Consumption	-.03	.03	-.05	-.85	.397	.98	1.02
	Body Mass Index	.03	.02	.10	1.84	.066	.98	1.02
4	(Constant)	6.57	.62		10.65	.000		
	Age Group	-.07	.07	-.05	-.97	.331	.92	1.08
	Marital status	.04	.07	.03	.57	.572	.93	1.08
	Number of children	.09	.14	.04	.62	.534	.86	1.16
	Racial or ethnic heritage	.01	.03	.01	.17	.867	.96	1.04
	Level of education	-.36	.09	-.21	-3.84	.000	.93	1.08
	Net personal monthly income	-.00	.21	-.00	-.02	.983	.77	1.30
	Media Consumption	-.03	.03	-.04	-.84	.400	.98	1.02
	Body Mass Index	.04	.02	.10	1.95	.053	.96	1.04
	Self-esteem	-.04	.04	-.05	-1.01	.314	.97	1.03
5	(Constant)	7.93	.61		13.08	.000		
	Age Group	-.02	.07	-.02	-.35	.730	.92	1.09
	Marital status	.02	.06	.02	.35	.728	.92	1.08
	Number of children	.03	.13	.01	.24	.811	.86	1.17
	Racial or ethnic heritage	.00	.03	.00	.05	.959	.96	1.04
	Level of education	-.33	.09	-.19	-3.77	.000	.93	1.08
	Net personal monthly income	.06	.19	.02	.32	.746	.76	1.32
	Media Consumption	-.03	.03	-.05	-.92	.360	.98	1.02
	Body Mass Index	.04	.02	.10	2.05	.041	.96	1.04
	Self-esteem	-.02	.04	-.03	-.50	.618	.97	1.03
	Perception_Self	-.05	.02	-.13	-2.68	.008	.97	1.03
	Perception_Others	-.29	.05	-.32	-6.56	.000	.98	1.02

Table 66: Hierarchical Multiple Regression Analysis Predicting Body Dissatisfaction – Coefficients

The Residuals Statistics table (Table 67) showed the minimum to have a standardised residual of -1.95 and the maximum to have a standardised residual of 2.56. We can say that the standardised residuals are normally distributed (Figure 47).

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.70	7.13	5.83	.36	357
Residual	-1.50	1.97	.00	.76	357
Std. Predicted Value	-3.10	3.55	.00	1.00	357
Std. Residual	-1.95	2.56	.00	.98	357

a. Dependent Variable: Body Dissatisfaction

Table 67: Hierarchical Multiple Regression Analysis Predicting Body Dissatisfaction – Residuals Statistics

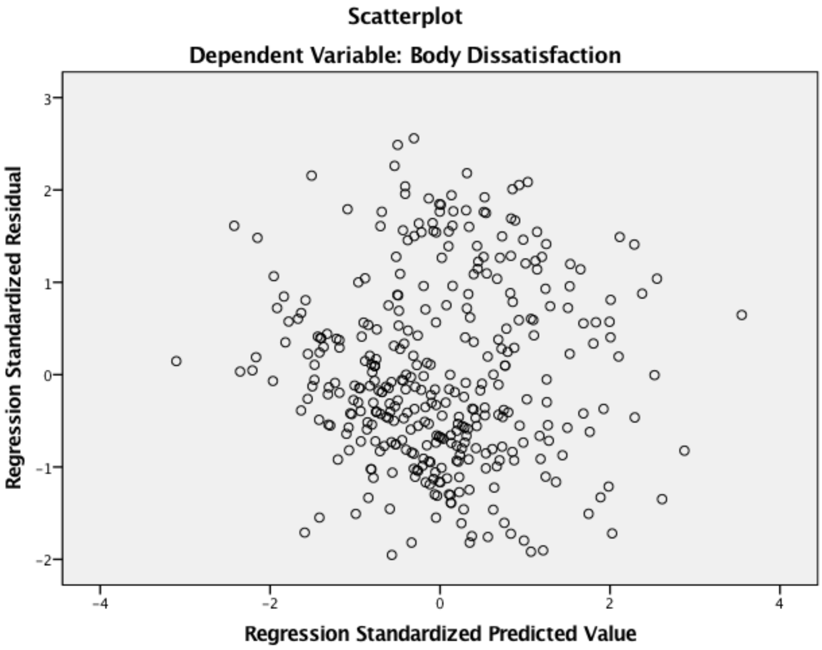


Figure 47: Hierarchical Multiple Regression Analysis Predicting Body Dissatisfaction – Scatterplot

The results of the second set of hierarchical multiple regression showed that demographic characteristics were not a significant contribution in the regression model, F (6, 350) = 1.73, p > .005 as indicated by Sig. F Change (R^2 Change = .029, F (6, 350) = 1.73, p > .05). The entry of media consumption, F (7, 349) = 1.48, p > .05 at Stage 2 and BMI, F (8, 348) = 1.46, p > .05 at Stage 3 also did not make a significant contribution in the model as indicated by Sig. F Change (R^2 Change = .000, F (1, 349) = .00, p > .05, and R^2 Change = .004, F (1, 348) = 1.34, p > .05). The total variance of the model at Stage 3 was 3.3%. However, the entry of self-esteem at Stage 4 was a significant contribution in the model, F (9, 347) = 1.83, p > .05 as indicated by the Sig. F Change (R^2 Change = .013, F (1, 347) = 4.65, p > .05). The total variance of the model at Stage 4 was 4.5%. Self-esteem was a statistically significant negative predictor of internalisation of appearance ideals (β = -.12, p < .05). After the entry of perception of media effects on self, and perception of media effects on others at Stage 5 the total variance explained by the model as a whole was 13.4% (F (11, 345) = 4.86, p < .001). The introduction of these two variables explained the additional 8.9% of variance in internalisation of appearance ideals, after controlling for demographic characteristics, media consumption, BMI, and self-esteem (R^2 Change = .089, F (2, 345) = 17.70, p < .001). The results from the final regression equation (F (11, 345) = 4.86, p < .001) showed that perception of media effects on self was a unique statistically significant negative predictor of the internalisation of thin-ideals (β = -.30, p < .001), suggesting that the stronger participants' first-person perception of media effects of pro-social messages of idealised body image, the less likely participants would be to internalise the thin-ideals. However, participants' perception of media effects on others was not significantly associated with their likelihood to adopt the thinness ideals (β = -.02, p > .05). Hypothesis H4ba was partially supported. In the final model self-esteem was also a statistically significant and negative predictor of the internalisation of appearance ideals (β = -.10, p < .05), suggesting that participants with higher levels of self-esteem were less likely to internalise the thin-ideals. The results of the second set of hierarchical multiple regression are presented below (Tables 68 – 70; see entire analysis in Appendix 17).

Model Summary[f]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.170[a]	.029	.012	.97	.029	1.73	6	350	.112
2	.170[b]	.029	.009	.97	.000	.00	1	349	.999
3	.180[c]	.033	.010	.97	.004	1.34	1	348	.249
4	.213[d]	.045	.021	.97	.013	4.65	1	347	.032
5	.366[e]	.134	.107	.92	.089	17.70	2	345	.000

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self
f. Dependent Variable: Internalisation of Appearance Ideals

Table 68: Hierarchical Multiple Regression Analysis Predicting Internalisation of Appearance Ideals – Model Summary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.80	6	1.63	1.733	.112[b]
	Residual	329.84	350	.94		
	Total	339.64	356			
2	Regression	9.80	7	1.40	1.481	.173[c]
	Residual	329.84	349	.95		
	Total	339.64	356			
3	Regression	11.06	8	1.38	1.464	.169[d]
	Residual	328.58	348	.94		
	Total	339.64	356			
4	Regression	15.40	9	1.71	1.832	.062[e]
	Residual	324.24	347	.93		
	Total	339.64	356			
5	Regression	45.58	11	4.14	4.861	.000[f]
	Residual	294.06	345	.85		
	Total	339.64	356			

a. Dependent Variable: Internalisation of Appearance Ideals
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

Table 69: Hierarchical Multiple Regression Analysis Predicting Internalisation of Appearance Ideals – ANOVA

		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5.95	.42		14.31	.000		
	Age Group	-.17	.08	-.11	-1.98	.049	.93	1.08
	Marital status	.03	.08	.02	.35	.725	.93	1.08
	Number of children	.30	.16	.11	1.88	.061	.86	1.16
	Racial or ethnic heritage	.01	.04	.02	.33	.739	.98	1.02
	Level of education	-.11	.11	-.06	-1.05	.295	.94	1.07
	Net personal monthly income	-.32	.24	-.08	-1.30	.196	.77	1.30
2	(Constant)	5.95	.43		13.78	.000		
	Age Group	-.17	.08	-.11	-1.97	.049	.93	1.08
	Marital status	.03	.08	.02	.35	.725	.93	1.08
	Number of children	.30	.16	.11	1.88	.061	.86	1.16
	Racial or ethnic heritage	.01	.04	.02	.33	.741	.97	1.04
	Level of education	-.11	.11	-.06	-1.05	.296	.94	1.07
	Net personal monthly income	-.32	.24	-.08	-1.30	.196	.77	1.30
	Media Consumption	.00	.04	.00	-.00	.999	.98	1.02
3	(Constant)	5.32	.70		7.65	.000		
	Age Group	-.16	.09	-.11	-1.92	.056	.92	1.08
	Marital status	.03	.08	.02	.35	.728	.93	1.08
	Number of children	.30	.16	.11	1.85	.065	.86	1.16
	Racial or ethnic heritage	.01	.04	.02	.29	.771	.96	1.04
	Level of education	-.10	.11	-.05	-.95	.344	.93	1.08
	Net personal monthly income	-.30	.24	-.07	-1.21	.227	.77	1.30
	Media Consumption	.00	.04	.00	.05	.959	.98	1.02

	Body Mass Index	.03	.02	.06	1.16	.249	.98	1.02
4	(Constant)	5.79	.73		7.98	.000		
	Age Group	-.16	.08	-.10	-1.89	.060	.92	1.08
	Marital status	.03	.08	.02	.38	.702	.93	1.08
	Number of children	.29	.16	.10	1.79	.075	.86	1.16
	Racial or ethnic heritage	.01	.04	.01	.15	.883	.96	1.04
	Level of education	-.11	.11	-.06	-1.05	.294	.93	1.08
	Net personal monthly income	-.31	.24	-.08	-1.29	.198	.77	1.30
	Media Consumption	.00	.04	.00	.06	.950	.98	1.02
	Body Mass Index	.03	.02	.08	1.40	.162	.96	1.04
	Self-esteem	-.10	.05	-.12	-2.16	.032	.97	1.03
5	(Constant)	6.51	.73		8.94	.000		
	Age Group	-.13	.08	-.09	-1.63	.104	.92	1.09
	Marital status	.01	.08	.01	.13	.893	.92	1.08
	Number of children	.24	.15	.09	1.58	.114	.86	1.17
	Racial or ethnic heritage	.00	.04	.00	.00	1.00	.96	1.04
	Level of education	-.09	.10	-.05	-.88	.377	.93	1.08
	Net personal monthly income	-.15	.23	-.04	-.66	.511	.76	1.32
	Media Consumption	.00	.04	.00	.07	.945	.98	1.02
	Body Mass Index	.03	.02	.08	1.63	.105	.96	1.04
	Self-esteem	-.09	.05	-.10	-1.93	.054	.97	1.03
	Perception_Self	-.13	.02	-.30	-5.89	.000	.97	1.03
	Perception_Others	-.02	.05	-.02	-.46	.649	.98	1.02

Table 70: Hierarchical Multiple Regression Analysis Predicting Internalisation of Appearance Ideals – Coefficients

The Residuals Statistics table (Table 71) showed the minimum to have a standardised residual of -2.01 and the maximum to have a standardised residual of 3.21, which is slightly out of range. Looking at the scatterplot, we can still say that the standardised residuals are approximately normally distributed (Figure 48).

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.39	6.27	5.05	.36	357
Residual	-1.85	2.96	.00	.91	357
Std. Predicted Value	-1.86	3.39	.00	1.00	357
Std. Residual	-2.01	3.21	.00	.98	357

a. Dependent Variable: Internalisation of Appearance Ideals

Table 71: Hierarchical Multiple Regression Analysis Predicting Internalisation of Appearance Ideals – Residuals Statistics

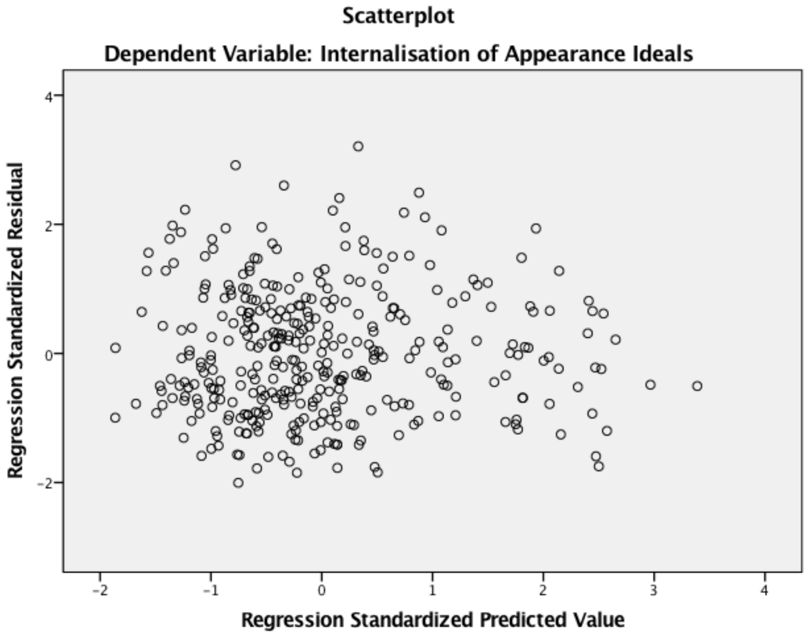


Figure 48: Hierarchical Multiple Regression Analysis Predicting Internalisation of Appearance Ideals – Scatterplot

Finally, the results of the third set of hierarchical multiple regression showed that at Stage one, demographic characteristics contributed significantly to the regression model, F (6, 350) = 3.12, p < .005, and accounted for 5.1% of the variation in participants' awareness of sociocultural influence on appearance. Participants' age made a unique statistically significant contribution (β = -.18, p < .001). Media consumption was not a significant contribution in the model (F (7, 349) = 2.91, p > .005) as indicated by Sig. F Change (R^2 Change = .004, F (1, 349) = 1.56, p > .05). Similarly, the entry of BMI, F (8, 348) = 2.57, p > .005 at Stage 3 and self-esteem, F (9, 347) = 2.41, p > .005 at Stage 4 did not make a significant contribution to the model as indicated by Sig. F Change (R^2 Change = .001, F (1, 348) = .23, p > .05, and R^2 Change = .003, F (1, 347) = 1.20, p > .05). The total variance of the model at Stage 4 was 5.9%. After the entry of perception of media effects on the self, and perception of media effects on others at Stage 5 the total variance explained by the model as a whole was 15.2% (F (11, 345) = 5.62, p < .001). The introduction of these two variables explained the additional 9.3% of variance in participants' awareness of sociocultural influence on appearance, after controlling for demographic characteristics, media consumption, BMI, and self-esteem (R^2 Change = .093, F (2, 345) = 18.93, p < .001). The results from the final regression equation (F (11, 345) = 5.62, p < .001) showed that perception of media effects on self was a unique statistically significant negative predictor of the awareness of appearance pressures (β = -.31, p < .001), suggesting that the stronger participants' first-person perception of media effects of pro-social messages of idealised body image, the smaller the level of pressure to achieve the societal ideal. However, participants' perception of media effects on others was not significantly associated with their level of pressure to achieve the societal ideal (β = .01, p > .05). Hypothesis H4bb was partially supported. In the final model age was also a statistically significant and negative predictor of the appearance pressures (β = -.16, p < .005), suggesting that older participants were less likely to feel pressured to achieve the societal appearance ideal. The results of the third set of hierarchical multiple regression are presented below (Tables 72 - 74; see entire analysis in Appendix 18).

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.225[a]	.051	.035	.85	.051	3.12	6	350	.005
2	.235[b]	.055	.036	.85	.004	1.56	1	349	.212
3	.236[c]	.056	.034	.85	.001	.23	1	348	.634
4	.243[d]	.059	.035	.85	.003	1.20	1	347	.275
5	.390[e]	.152	.125	.81	.093	18.93	2	345	.000

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self
f. Dependent Variable: Appearance Pressures

Table 72: Hierarchical Multiple Regression Analysis Predicting Awareness of Appearance Pressures – Model Summary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.51	6	2.25	3.124	.005[b]
	Residual	252.21	350	.72		
	Total	265.72	356			
2	Regression	14.63	7	2.09	2.905	.006[c]
	Residual	251.09	349	.72		
	Total	265.72	356			
3	Regression	14.80	8	1.85	2.565	.010[d]
	Residual	250.93	348	.72		
	Total	265.72	356			
4	Regression	15.66	9	1.74	2.414	.011[e]
	Residual	250.06	347	.72		
	Total	265.72	356			
5	Regression	40.39	11	3.67	5.621	.000[f]
	Residual	225.34	345	.65		
	Total	265.72	356			

a. Dependent Variable: Appearance Pressures
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

Table 73: Hierarchical Multiple Regression Analysis Predicting Awareness of Appearance Pressures – ANOVA

Model		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	6.02	.36		16.57	.000		
	Age Group	-.25	.07	-.18	-3.36	.001	.93	1.08
	Marital status	-.02	.07	-.02	-.34	.737	.93	1.08
	Number of children	.20	.14	.08	1.40	.163	.86	1.16
	Racial or ethnic heritage	-.01	.03	-.01	-.26	.795	.98	1.02
	Level of education	-.16	.10	-.09	-1.72	.086	.94	1.07
	Net personal monthly income	-.19	.21	-.05	-.91	.363	.77	1.30
2	(Constant)	6.15	.38		16.32	.000		
	Age Group	-.24	.07	-.18	-3.28	.001	.93	1.08
	Marital status	-.03	.07	-.02	-.36	.723	.93	1.08
	Number of children	.20	.14	.08	1.39	.166	.86	1.16
	Racial or ethnic heritage	-.00	.03	-.01	-.10	.922	.97	1.04
	Level of education	-.17	.10	-.09	-1.73	.084	.94	1.07
	Net personal monthly income	-.20	.21	-.05	-.92	.359	.77	1.30
	Media Consumption	-.04	.03	-.07	-1.25	.212	.98	1.02
3	(Constant)	5.92	.61		9.75	.000		
	Age Group	-.24	.07	-.18	-3.25	.001	.92	1.08
	Marital status	-.03	.07	-.02	-.36	.722	.93	1.08
	Number of children	.19	.14	.08	1.37	.170	.86	1.16
	Racial or ethnic heritage	-.00	.03	-.01	-.11	.909	.96	1.04
	Level of education	-.16	.10	-.09	-1.69	.093	.93	1.08
	Net personal monthly income	-.19	.21	-.05	-.88	.379	.77	1.30
	Media Consumption	-.04	.03	-.07	-1.23	.222	.98	1.02

	Body Mass Index	.01	.02	.03	.48	.634	.98	1.02
4	(Constant)	5.71	.64		8.96	.000		
	Age Group	-.24	.07	-.18	-3.26	.001	.92	1.08
	Marital status	-.03	.07	-.02	-.37	.710	.93	1.08
	Number of children	.20	.14	.08	1.41	.159	.86	1.16
	Racial or ethnic heritage	-.00	.03	-.00	-.04	.968	.96	1.04
	Level of education	-.16	.10	-.09	-1.63	.103	.93	1.08
	Net personal monthly income	-.18	.21	-.05	-.84	.400	.77	1.30
	Media Consumption	-.04	.03	-.07	-1.23	.219	.98	1.02
	Body Mass Index	.01	.02	.02	.35	.728	.96	1.04
	Self-esteem	.05	.04	.06	1.09	.275	.97	1.03
5	(Constant)	6.23	.64		9.77	.000		
	Age Group	-.22	.07	-.16	-3.12	.002	.92	1.09
	Marital status	-.04	.07	-.03	-.65	.514	.92	1.08
	Number of children	.17	.14	.07	1.22	.224	.86	1.17
	Racial or ethnic heritage	-.01	.03	-.01	-.20	.844	.96	1.04
	Level of education	-.14	.09	-.08	-1.52	.130	.93	1.08
	Net personal monthly income	-.04	.20	-.01	-.17	.865	.76	1.32
	Media Consumption	-.04	.03	-.07	-1.29	.199	.98	1.02
	Body Mass Index	.01	.02	.03	.54	.588	.96	1.04
	Self-esteem	.06	.04	.07	1.43	.154	.97	1.03
	Perception_Self	-.12	.02	-.31	-6.15	.000	.97	1.03
	Perception_Others	.01	.05	.01	.26	.793	.98	1.02

Table 74: Hierarchical Multiple Regression Analysis Predicting Awareness of Appearance Pressures – Coefficients

The Residuals Statistics table (Table 75) showed the minimum to have a standardised residual of -2.97 and maximum to have a standardised residual of 3.04, which is just slightly out of range. Looking at the scatterplot, we can still say that the standardised residuals are approximately normally distributed (Figure 49).

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.09	5.98	4.87	.34	357
Residual	-2.40	2.45	.00	.80	357
Std. Predicted Value	-2.31	3.31	.00	1.00	357
Std. Residual	-2.97	3.04	.00	.98	357

a. Dependent Variable: Appearance Pressures

Table 75: Hierarchical Multiple Regression Analysis Predicting Awareness of Appearance Pressures – Residuals Statistics

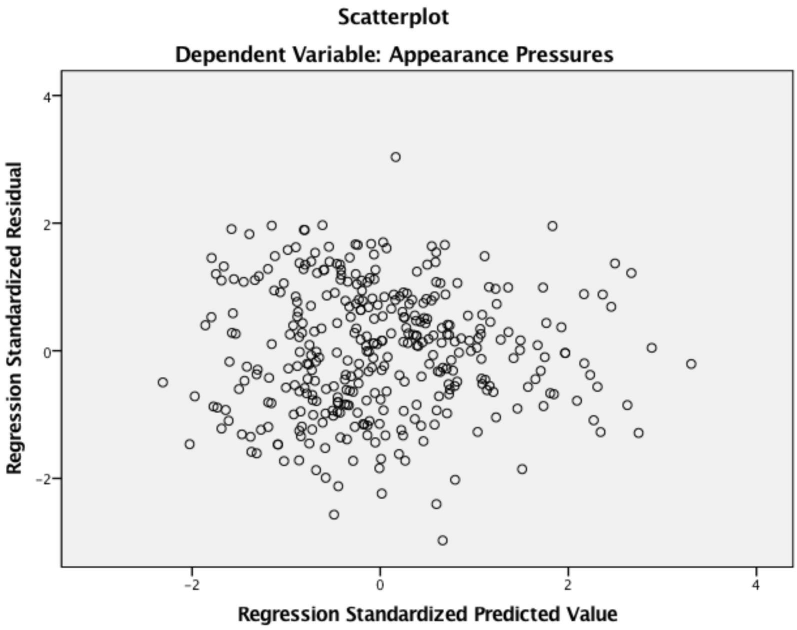


Figure 49: Hierarchical Multiple Regression Analysis Predicting Awareness of Appearance Pressures – Scatterplot

Hypothesis 5 predicted that first-person perception of the pro-social messages of idealised body image would be positively associated with participants' intention to engage in women's empowerment campaigns. To test it, a hierarchical multiple regression was performed in which participants' *intention to engage in women's empowerment campaigns* was used as the dependent variable. Participants' age, racial or ethnic heritage, level of education, net personal monthly income, marital status, and number of children were controlled in the first block. Media consumption was added in the second block, BMI in the third, while self-esteem was included in the fourth block. The final block entered the first-person perception.

The results showed that demographic characteristics (F (6, 350) = 1.55, p > .005), as well as media consumption (F (7, 349) = 1.33, p > .005), BMI (F (8, 348) = 1.30, p > .005), and self-esteem (F (9, 347) = 1.21, p > .005) did not contribute significantly to the regression model as indicated by Sig. F Change (Stage 1: R^2 Change = .026, F (6, 350) = 1.55, p > .05, Stage 2: R^2 Change = .000, F (1, 349) = .021 p > .05, Stage 3: R^2 Change = .003, F (1, 348) = 1.15, p > .05, and Stage 4: R^2 Change = .001, F (1, 347) = .50, p > .05). The total variance of the model at Stage 4 was 3%. After the entry of first-person perception at Stage 5 the total variance explained by the model as a whole was 6.2% (F (10, 346) = 2.30, p < .05). The introduction of this variable explained the additional 3.2% of variance in participants' likelihood to engage in socially desirable action, after controlling for demographic characteristics, media consumption, BMI, and self-esteem (R^2 Change = .032, F (1, 346) = 11.75, p < .001). The results from the final regression equation showed that first-person perception was a unique statistically significant positive predictor of the participants' likelihood to engage in women empowerment campaigns (β = .18, p < .001), suggesting that the stronger participants' first-person perception of media effects of pro-social messages of idealised body image, the larger their perceived likelihood to engage in women's empowerment campaigns. Hypothesis 5 received support. The results of the hierarchical multiple regression are presented below (Tables 76 - 78; see entire analysis in Appendix 19).

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.161[a]	.026	.009	2.51	.026	1.55	6	350	.162
2	.161[b]	.026	.006	2.51	.000	.02	1	349	.886
3	.171[c]	.029	.007	2.51	.003	1.15	1	348	.285
4	.175[d]	.030	.005	2.52	.001	.50	1	347	.482
5	.250[e]	.026	.035	2.48	.032	11.75	1	346	.001

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, First-person Perception
f. Dependent Variable: Perceived Intention_Self

Table 76: Hierarchical Multiple Regression Analysis Predicting Perceived Intention of Self to Engage in Socially Desirable Action – Model Summary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.55	6	9.76	1.548	.162[b]
	Residual	2206.41	350	6.30		
	Total	2264.99	356			
2	Regression	58.68	7	8.38	1.326	.237[c]
	Residual	2206.28	349	6.32		
	Total	2264.96	356			
3	Regression	65.94	8	8.24	1.304	.240[d]
	Residual	2199.02	348	6.32		
	Total	2264.96	356			
4	Regression	69.07	9	7.68	1.213	.286[e]
	Residual	2195.88	347	6.33		
	Total	2264.96	356			
5	Regression	141.18	10	14.12	2.300	.013[f]
	Residual	2123.78	346	6.14		
	Total	2264.96	356			

a. Dependent Variable: Perceived Intention_Self
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, First-person Perception

Table 77: Hierarchical Multiple Regression Analysis Predicting Perceived Intention of Self to Engage in Socially Desirable Action – ANOVA

		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	6.15	1.08		5.72	.000		
	Age Group	.39	.22	.10	1.77	.078	.93	1.08
	Marital status	.26	.21	.07	1.22	.223	.93	1.08
	Number of children	-.83	.42	-.11	-1.98	.049	.86	1.16
	Racial or ethnic heritage	.11	.10	.06	1.11	.266	.98	1.02
	Level of education	.08	.28	.02	.30	.768	.94	1.07
	Net personal monthly income	.31	.63	.03	.50	.619	.77	1.30
2	(Constant)	6.19	1.12		5.55	.000		
	Age Group	.39	.22	.10	1.77	.078	.93	1.08
	Marital status	.26	.21	.07	1.22	.225	.93	1.08
	Number of children	-.83	.42	-.11	-1.98	.049	.86	1.16
	Racial or ethnic heritage	.11	.10	.06	1.12	.263	.97	1.04
	Level of education	.08	.28	.02	.29	.769	.94	1.07
	Net personal monthly income	.31	.63	.03	.50	.620	.77	1.30
	Media Consumption	-.01	.10	-.01	-.14	.886	.98	1.02
3	(Constant)	7.70	1.80		4.29	.000		
	Age Group	.38	.22	.09	1.72	.087	.92	1.08
	Marital status	.26	.21	.07	1.22	.224	.93	1.08
	Number of children	-.82	.42	-.11	-1.95	.053	.86	1.16
	Racial or ethnic heritage	.12	.10	.06	1.16	.248	.96	1.04
	Level of education	.06	.28	.01	.20	.840	.93	1.08
	Net personal monthly income	.26	.63	.03	.42	.676	.77	1.30
	Media Consumption	-.02	.10	-.01	-.19	.848	.98	1.02

	Body Mass Index	-.06	.06	-.06	-1.07	.285	.98	1.02
4	(Constant)	8.11	1.89		4.29	.000		
	Age Group	.38	.22	.10	1.73	.085	.92	1.08
	Marital status	.26	.21	.07	1.23	.220	.93	1.08
	Number of children	-.82	.42	-.11	-1.97	.050	.86	1.16
	Racial or ethnic heritage	.11	.10	.06	1.11	.269	.96	1.04
	Level of education	.05	.28	.01	.17	.865	.93	1.08
	Net personal monthly income	.25	.63	.02	.39	.694	.77	1.30
	Media Consumption	-.02	.10	-.01	-.19	.850	.98	1.02
	Body Mass Index	-.06	.06	-.05	-.98	.326	.96	1.04
	Self-esteem	-.09	.12	-.04	-.70	.482	.97	1.03
5	(Constant)	7.91	1.86		4.25	.000		
	Age Group	.37	.22	.09	1.70	.090	.92	1.08
	Marital status	.28	.21	.07	1.36	.175	.93	1.08
	Number of children	-.79	.41	-.11	-1.92	.056	.86	1.16
	Racial or ethnic heritage	.12	.10	.06	1.19	.233	.96	1.04
	Level of education	.03	.28	.01	.11	.910	.93	1.08
	Net personal monthly income	.02	.63	.00	.03	.976	.76	1.32
	Media Consumption	-.02	.09	-.01	-.20	.844	.98	1.02
	Body Mass Index	-.06	.06	-.06	-1.11	.268	.96	1.04
	Self-esteem	-.10	.12	-.04	-.78	.434	.97	1.03
	First-person Perception	.19	.06	.18	3.43	.001	.98	1.02

Table 78: Hierarchical Multiple Regression Analysis Predicting Perceived Intention of Self to Engage in Socially Desirable Action – Coefficients

The Residuals Statistics table (Table 79) showed the minimum to have a standardised residual of -2.80 and the maximum to have a standardised residual of 1.67. We can say that the standardised residuals are approximately normally distributed (Figure 50).

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.86	9.34	7.78	.63	357
Residual	-6.93	4.14	.00	2.44	357
Std. Predicted Value	-3.05	2.48	.00	1.00	357
Std. Residual	-2.80	1.67	.00	.99	357

a. Dependent Variable: Perceived Intention_Self

Table 79: Hierarchical Multiple Regression Analysis Predicting Perceived Intention of Self to Engage in Socially Desirable Action – Residuals Statistics

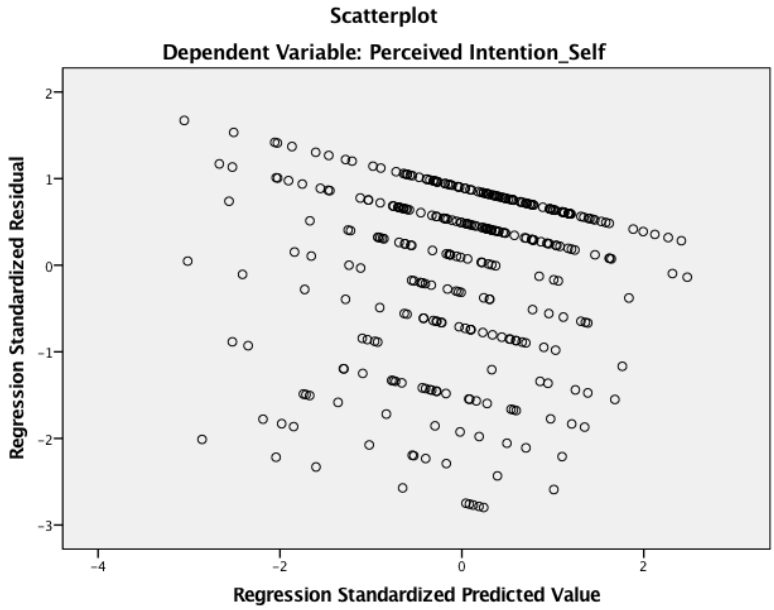


Figure 50: Hierarchical Multiple Regression Analysis Predicting Perceived Intention of Self to Engage in Socially Desirable Action – Scatterplot

To explore research question 2 that proposed to test whether demographic characteristics make a difference in the participants' perception of media effects on themselves and their peers, we performed two sets of one-way ANCOVAs. We included participants' age, marital status, racial or ethnic heritage, level of education, and net monthly income as covariates in the analyses. The results were statistically significant, F (2, 354) = 25.65, p < .001, $\eta^2_p = .13$ for the first set, and F (2, 354) = 43.74, p < .001, $\eta^2_p = .20$ for the second set of ANCOVA analyses. However, participants' perception of media effects on themselves, and others did not vary upon the demographic characteristics (see entire ANCOVA analyses in Appendixes 20 and 21).

In the next step, we added participants' BMI, media consumption, body dissatisfaction, internalisation of appearance ideals, appearance pressures, self-esteem and attitudes toward the media in the ANCOVA analyses to further examine individual differences. The results were statistically significant, $F(2, 354) = 11.58$, $p < .001$, $\eta^2_p = .06$ for the first set, and $F(2, 354) = 19.76$, $p < .001$, $\eta^2_p = .10$ for the second set of ANCOVA analyses. We found that participants' body dissatisfaction, $F(2, 354) = 8.07$, $p < .005$, $\eta^2_p = .02$, and their attitudes towards the media, $F(2, 354) = 8.01$, $p < .005$, $\eta^2_p = .02$, were each related to their perception of media effects on themselves. The results also showed that participants' internalisation of appearance ideals, $F(2, 354) = 6.51$, $p < .05$, $\eta^2_p = .02$, and their attitudes towards the media, $F(2, 354) = 6.39$, $p < .05$, $\eta^2_p = .02$, were each related to their perception of media effects on others (see entire ANCOVA analyses in Appendixes 22 and 23).

Research question 3 proposed to explore an association between the self/other differential and participants' (1) media consumption and (2) attitude toward the media. Two sets of hierarchical multiple regression analyses were performed to examine the research question. The first set was performed to analyse the association between the self/other differential and participants' media consumption to take the influence of media consumption into account, along with first-person perception as the dependent variable. We included participants' age, racial or ethnic heritage, level of education, net personal monthly income, marital status, and number of children in the first block. Additionally, we entered BMI in the second block, self-esteem in the third block, while media consumption was controlled in the fourth block. We performed one more hierarchical multiple regression analysis to examine the association between the self/other differential and participants' attitudes towards the media to take the influence of attitude toward the media into account along with the first-person perception as the dependent variable. Again, we included participants' age, racial or ethnic heritage, level of education, net personal monthly income, marital status, and number of children in the first block. Additionally, we entered media consumption in the second block, BMI in the third block, self-esteem in the fourth block, while attitude towards the media was controlled in the fifth block.

The results of hierarchical multiple regression analyses showed that participants' media consumption and their attitude towards pro-social messages conveying an idealise female body image were not related to the magnitude of the first-person perception. Although, participants attitude towards the media was almost a statistically significant predictor, $p = .06$ (see entire analyses in the Appendixes 24 and 25).

Discussion

This study investigated the first-person effect in relation to females' perception of pro-social media messages. After being exposed to a news story through either PC desktop audio + text + image, PC desktop audio + video modalities, or multimodal AR, female students reported that the effects of pro-social media messages conveying an idealised body image on themselves were greater than the effects on female others or male others. As the first study that documents the first-person effect within the context of AR technologies, this study contributes new evidence to the body of research on first-person perception. Paired with AR as a predictor of the strongest first-person effects, the findings do not only broaden the theoretical scope, but also prepare the ground for further investigations.

In addition to documenting the first-person perception among female students, this study found that females' perceived effects of pro-social media messages of idealised body image were associated with their intention to engage in body image behaviour. Females who reported a larger first-person perception of media effects, showed greater intention to engage in women empowerment campaigns.

The results of the present study add to the literature on the first-person effect and provide additional evidence of the influence of AR presentations on cognitive and attitudinal outcomes. Paring the first-person perception and AR literatures may significantly contribute to understanding of both concepts and suggest new directions or interconnections to be discovered.

11.0 Implications for Future Research

The implications and possibilities of AR for storytelling are far-reaching, particularly in the context of journalism. In this study, we explored the influence of AR in relation to first-person perception of pro-social media messages. We studied the perception of media effects on self and others of news delivered through multimodal AR as compared to news delivered through

PC desktop audio + text + image, and PC desktop audio + video modalities in the context of idealised female body. We explored the direction and magnitude of the self/other differences from the pro-social messages of idealised body image. Additionally, we tested the association of the perception of media effects and the first-person differential on the self and others with their intention to engage in body image behaviour.

Our literature search revealed that the majority of earlier studies explaining the mechanisms that may account for first-person perception rely on the same ones used to explain third-person perception, mostly on an optimistic bias. Based on the assertion that first-person perception represents "a unique rather than the same phenomenon" and requires different theoretical approaches (Golan & Day, 2008, p. 549), we offered an alternative explanation that perceived effects of pro-social media content delivered though multimodal AR that allows for the sense of presence and enables users to experience the narrative from the point of view of the "I" will lead females perceive that the impact of AR-enhanced news with pro social messages of an idealised body image will be greater on themselves than on others. Our hypothesis was supported (see Chapter 10.0). Future studies may benefit from testing this explanation further. Additional research on the influence of AR on the differential of self/others would further explain first-person perception, and replication of these findings for other pro-social messages would increase confidence in the results.

Our study also indicated that females perceived that the effects of pro-social messages of idealised body images were greater for other females, including close female friends, other female students of the university and other female students attending other universities in Austria, than the effects on friends and students of the opposite gender. This finding provides support for the social distance corollary since participants of the same gender group are considered similar to the self, compared to participants of the opposite gender that are considered dissimilar to the self, and socially more distant. Future research may test the role of the female students' stereotype of the opposite gender compared to the same female students' stereotype of the same gender. It would be beneficial to investigate whether female students are inclined to believe that the same-gender peers are more likely to be influenced by pro-social messages related to body image compared to the opposite-gender peers. Moreover, it would be important to further analyse the degrees to which participants make comparisons in order to see whether participants overestimate effects on themselves or underestimate effects on others.

We also tested the association of the perception of media effects and the first-person differential on the self and others with the intention of engaging in body image behaviours. Studies of the behavioural component could be enhanced by taking into account measures on actual behaviours.

Building on this study, future research may attempt different empirical approaches to explore the relationships among perceived positive effects on oneself versus others, the magnitude of the self/other differences from the pro-social messages, first-person perception and behavioural consequences.

We focused on pro-social messages in the context of the idealised female body. It would be interesting and also necessary to include other content areas and different types of pro-social messages in future investigations (e.g., political news, advertisements, health, or cultural context).

Finally, the present study employed a quantitative analysis of an experiment to examine the first-person effect's relation to pro-social media messages of an idealised body image delivered through multimodal AR compared to those delivered through PC desktop audio + text + image, and PC desktop audio + video modalities among female students in Vienna. Future studies could conduct similar experiments with male students, as well as with samples from different cultures. Such research would enrich our understanding of both the first-person perception and the influence of AR on users' experience with news content.

SECTION III

The Effects of Immersive Technologies on the User: What We Have Learned from the Participants

In this chapter, we will outline some of the comments collected from the participants after they were exposed to experimental treatments with AR representations as stimuli to demonstrate that participants felt perceptually immersed in the stories they were presented with.

As described in Chapter 3.0, AR technologies are defined as fully immersive technologies which provide users with the sense of presence that enables the first-person perspective of a story. Our conversation with the participants of AR conditions has revealed that the majority of the participants felt the environment was "unmediated" and "real". Participant 253 who took part in the first experiment (see: Section I) described that both the real and the virtual world seemed to be "one common space":

> *"It felt very real! I know that there was a virtual world there, but I didn't feel that it didn't belong to the real environment. They simply belonged to each other… they were like one common space."*

For participant 302, the virtual layer added through AR system was an "extension of the physical space", but the participant points out that "it was like the virtual world was merged with the real-world environment". Participant 326 who took part in the second experiment that included a 3D representation of Ashely Graham (see: Section II) said:

> *"It was interesting to see how virtual person was walking around the real objects like desks and chairs in this room. I even failed to recognise that I was actually part of some separate environment. It felt like everything was happening now, here, and we belonged to the same environment. It was kinda cool!"*

A number of participants compared the experience generated through AR systems with PC desktop experiences. Participants 251 and 287 (experiment one) saw the benefits of a wider visual field, i.e., enhanced perceptual bandwidth and the possibility to walk around the space that are enabled via AR systems. As participant 251 (experiment one) puts it:

> *"When using the desktop, you have a small screen… it's something like looking at the frame, but an active one. With AR, you feel like you don't have physical barriers. I felt like I was actually there… like I walked*

into the room and there was a bomb there and I was allowed to walk around and see it. It was unexpected, but very real."

For participant 311 (experiment one), the greatest advantage of AR systems over 2D presentations lies in the possibility to explore the content from a first-person perspective, or as the participant put it "on their own":

> *"I liked that I was allowed to explore the story on my own. I had a feeling that I was able to see every detail of the bomb. When you see a story on a flat screen, you know that someone prepared it for you. This (AR story) is more real… I think it also increased my interest in the story… like, I was curious to find out and see more and more."*

The effects of immersion and the sensation of presence allowed participants to feel "the sense of freedom" in the story environment as well as perceive that they are "part of the happening". Participant 338 (experiment one) explains that:

> *"You feel that you are part of the story because you are walking in the room where the story is going on in front of yourself. You are right in the middle of the happening."*

A great number of participants emphasised that they that could not distinguish between real objects and virtual objects and agents. Participants that took part in the first experiment often pointed out that "virtual objects belonged to the real space". As participant 297 described:

> *"I knew it was a virtual object, but at certain points I felt that if I wanted to touch it, I could do it."*

Participants that took part in the second experiment accentuated the "realness" of the 3D representation of Ashley Graham. Participant 274 said:

> *"Honestly, it seemed to me like she was real. It was kinda funny – like she was walking in front of me."*

Similarly, participant 339 felt that:

> *"You can walk around together with a virtual person without even realising that she is virtual. You are so much into the story that it feels like the virtual body you are interacting with is as real as I am."*

Participant 264 emphasised that the virtual agent "seemed alive":

> *"I had a feeling that the virtual person was also aware of my presence. She seemed alive to me."*

Participants' impressions were that the characters, objects as well as stories were real and believable.

> *"I think that the story was believable and clear. I felt like I understood more."* (Participant 336, experiment one)

> *"I liked the story. The topic was unpleasant, but I still wanted to learn about it. It was well presented."* (Participant 297, experiment one)

> *"The experience made me curious. I wanted to explore more about the story after the procedure."* (Participant 258, experiment one)

> *"I enjoyed the whole experience. I found that the story was presented in a very user-friendly way."* (Participant 319, experiment two)

> *"I felt comfortable in the story and while interacting with virtual character."* (Participant 275, experiment two)

Another important point made by the participants was that they were able to recognise themselves in the environment and have complete freedom of movement. As participant 304 (experiment two) described:

> *"I was able to act in both real and virtual world and free to interact with the objects and a virtual person. If I wanted to move an object in the room, I simply did it. If I wanted to move myself to another spot, I simply did it. That's a great advantage of AR over VR, I think… having the physical."*

Several participants said that they were not distracted by the surrounding and felt completely present in the story environment. As participant 274 (experiment one) indicated:

> *"I like that I was allowed to focus on the content without getting distracted. Even if someone would walk into the room, I think you wouldn't see it as a distraction like in the case when you are watching TV for example. I guess because everything is happening in the real space and everything seems more realistic."*

Overall, participants were positive about their experience with AR stories. However, participant 327 who took part in the experiment one, pointed out that media outlets have to be cautious in their use of emerging technologies:

> *"I really felt like I was investigating the pieces of a real bomb. I think this is a great thing for storytelling. You want to explore this scene to its entirety, every detail of it. But, I think that we must be careful when using this technology because the whole situation it creates for a user is very captivating and can easily produce strong emotions. If this technology is used for delicate content, it must be used carefully."*

The evidence presented in this chapter demonstrates that most participants felt immersed in a story environment and perceived it as "natural" and "unmediated". From the participants' point of view, they were not only enabled to walk around virtual objects and have experiences from a first-person perspective, but also to feel like they belonged to the same story environment as the virtual objects and agents. Participants were satisfied with the interaction and freedom they felt while exploring the story but pointed out ethical challenges. They saw AR technology as a highly immersive tool that should be used with care for the presentation of journalistic content.

SECTION IV

The Emergence of AR as a Storytelling Medium: What We Have Learned from the Interviews

In addition to experimental research, a series of in-depth interviews with research agencies, academics and technologists at companies developing AR applications was conducted. We will report the content of our conversations with Nicholas Masterton of the research agency Forensic Architecture, commissioned by The New York Times to investigate the chemical attack in Douma, Syria (see: Section I), Andrea Rossi of the DDU Digital Design Unit – TU Darmstadt and the University of Kassel and Sergiu Ardelean of Artivive.

The goal of the interviews was to obtain information about current and future trends in the AR field, particularly in respect to AR as an emerging form of storytelling in journalism. The first two interviews were made via a combination of telephone and e-mail follow-up formats, whereas the third one was made in a face-to-face manner and e-mail follow-up. Questions were non-structured and open-ended. A discussion of the results of these interviews follows.

12.1 Interview with Nicholas Masterton (Forensic Architecture / The New York Times)

The New York Times is one of the world's most well-known examples of the news organisations that uses AR to tell stories. In June, 2018 the outlet published the news story *"One Building, One Bomb: How Assad Gassed His Own People"* used as a stimuli in our research (see: Section I). The story reported on a chemical bomb attack that occurred in Douma, a neighbourhood near Damascus, Syria on April 7, 2018. The bomb was dropped onto the balcony of a multi-storey building. The New York Times partnered with the research agency Forensic Architecture to create a virtual model of the crime scene using available images and video material previously published by the Russian media that were the first to be allowed access to the attack sites. Research agency Forensic Architecture (FA) led by Dr. Eyal Weizman of Goldsmiths, University of London, is a multidisciplinary team of architects, artists, filmmakers, journalists, software developers, scientists, lawyers, and an extended network of collaborators (www.forensic-architecture.org). Founded in 2010, FA investigates violent events and conflicts around the world by the use of modern technologies and architectural knowledge. The New York Times and FA searched for physical evidence concerning how the canisters had arrived at each scene. The investigation uncovered many pieces of evidence published by The New York Times as an augmented reality feature.

We spoke to Nicholas Masterton of the Forensic Architecture research agency, about how the usage of AR systems and architectural analyses can assist storytelling in journalism. "We combine material traces that are left behind on buildings, walls and within public and legal spaces at large with human testimonies and pattern analyses[2] to identify human rights violations”, explains Masterton, “we aim at reconstructing the scene of violations and crimes in order to uncover what really happened.” The end products merge virtual and physical reality to present the evidence. Therefore, the practice of investigative journalism which is reflected in the work of FA goes a step further – that is, through the use of emerging technologies such as VR and AR, it is put into the context of immersive journalism. The latter aims to present the truth of things by visualising the established facts in a way that “brings the facts to your home in a precise, convincing and accessible manner” which in turn might influence cognitive and psychological outcomes. As Masterton puts it, compared to PC-desktop representations, AR experiences “are less overwhelming as you don’t lose the space you are in”, which can “leave a mark in a spatial sense, but also on cognitive processes such as memorisation.”

For Masterton, AR is suitable for presentations of complex objects and events as it facilitates understanding by enabling “semi-tangible realities”, i.e., “realities we can touch”. By using AR technologies, we can experience various situations as semi-tangible – of the kind suggested by Whitling’s conceptualisation of semi-tangible as those things we can “discern with less than all of our senses” (2002, p. 46). AR coverage makes stories less abstract, comprehensible and interactive, giving users the possibility to picture the reality within their immediate surroundings. In this “ease of comprehension of the facts” that is enabled though the use of immersive technologies, Masterton sees a great potential for storytelling in journalism: “AR proves useful when reporting on events that are complex and hard to grasp”. However, he emphasises the need for “good journalism”: “We must be careful when publishing sensitive content. Newsrooms have to learn how to wisely use AR systems to tell stories, taking into account privacy and sensitivity issues.”

Forensic Architecture merges different modalities in their analyses and presentations of evidences. Using open-source data, spatial analysis, 3D design tools and multimedia sources, the team investigates the cases, reconstructs and renders spaces and situations, and delivers credible news to audiences. In the case of *”One Building, One Bomb: How Assad Gassed His Own People”*, FA combined architectural information with multiple videos of the site provided by Russian journalists in order to construct models of the buildings that showed that the damage

[2] Assemblage of a series of punctual events.

of the facility was made by the bomb dropped nose-down from above. (Figure 52) Using computer models to piece together evidence of wrongdoing "opened the door for whole new possibilities for journalism" explains Masterton. In their pioneering reporting on the mass shooting in Las Vegas in which a gunman Stephen Paddock killed 58 people, the New York Times adopted a technique developed by FA called investigative video reporting, or video forensics. The Times team reconstructed the massacre by collecting eyewitness videos from the media and social media, studying the images of before and after the shooting and using the sound profile of each video to match up with bursts of gunfire and place them on a timeline. Smartphones and social media today flood the world with images and videos that influence public debates on violence and conflicts: "If you look at social media simply, you will find a lot of videos posted online. They provide a lot of material, but not always a lot of clarity. In order to gain clarity, you need to start composing a story on when and where hard evidences were recorded. You have to combine the open-source material and tell a story," notes Masterton.

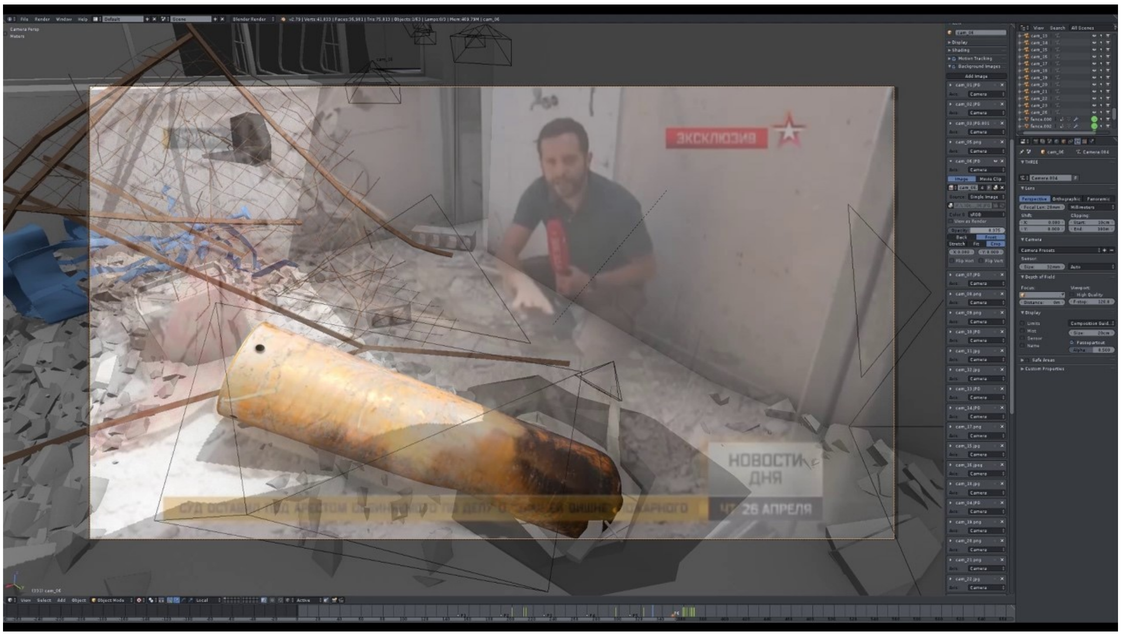


Figure 51: Still from Russian state media channel TV Zvezda, which is used in conjunction with other images as references to model the site © Forensic Architecture (FA)

To showcase the accomplishment of the investigation on a chemical attack in Douma, the New York Times in partnership with FA, designed an AR experience that allowed users to engage with the 3D model of the bomb giving them a front-row seat to the happening: "AR allows for a more experiential perspective of a story and a non-linear access to the space. The user is not standing on a one side of a story created by a director, but enjoys the freedom to choose his/her own perspective," Masterton notes. "Compared to the 2D screens which present the same material repeatedly, when we go for 3D and AR, i.e., the process of telling a story as it is, we let the user explore the limits of space, unpick the textures of 3D space and deconstruct the medium by examining the elements, glitches and imperfections of the medium in order to understand what the message is."

Masterton suggests the next step in the use of AR could be to face the growing threat of fake news: "The danger and power of misinformation online is a continuous problem. Media and technology companies have to create tools and strategies that help diminish the amount of fake news and enable users to distinguish between credible news and false content and determine the veracity of information. One way of contending with the problem would be to establish the criteria for evaluation of news sources. The Times Research & Development team is currently launching The News Provenance Project that aims to make the origins of journalistic content clearer to consumers. As a first step, the team is conducting a user research to learn whether access to more information about the photos published online helps audiences determine the veracity of photojournalism. They are testing how helpful might the information on a photo's digital history, metadata showing the time and place the photo was captured, symbols or watermarks be in establishing credibility. We may use AR apps that help discern whether the news is credible and factually correct by bringing up supporting data" (see also: Koren, 2019).

From a technological perspective, FA's Nicholas Masterton brings up one of the main hurdles of AR: "It is not equally accessible to everyone". An interview with Andrea Rossi of the DDU Digital Design Unit – TU Darmstadt and the University of Kassel shed the same light: "Adoption is a great goal for us!" (see: Chapter 12.2).

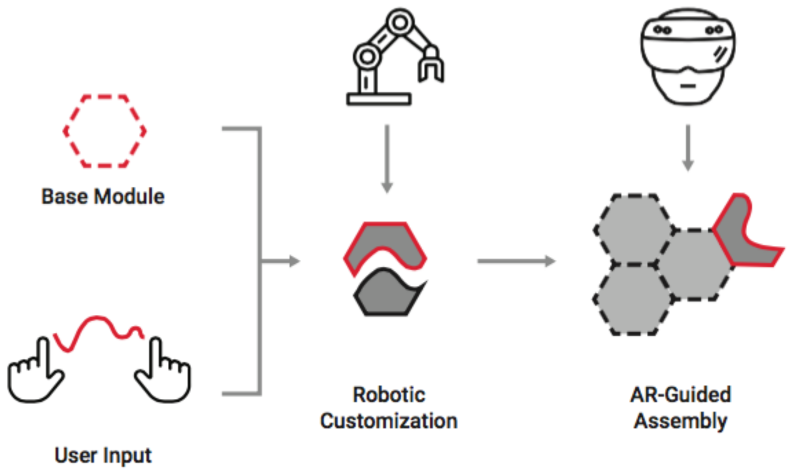
12.2 Interview with Andrea Rossi (DDU Digital Design Unit – TU Darmstadt / Experimental and Digital Design and Construction – University of Kassel)

We spoke to Rossi in order to get an understanding of how the usage of AR as a storytelling tool relates to the contemporary goals of academic research. Rossi is an architectural researcher and computational designer at the DDU Digital Design Unit – TU Darmstadt and Experimental and Digital Design and Construction chair at the University of Kassel. He is currently focusing on discrete design and modular digital fabrication strategies.

At the DDU, Rossi has provided support to the development of Project DisCo (Discrete Choreography) done in collaboration with Leibniz University Hannover, among other projects. The work is “a novel way of generating architectural aggregate structures” inside VR (see: Drude, Rossi & Becker, 2020). It allows the designer /choreographer to interactively assemble discrete modular structures within AR environments through intuitive physics simulations (Figure 53). The assembly process is developed through interaction with a field of disconnected digital building blocks that initially freely float in space. The choreographer is allowed to control the overall process, while the exact detailing of the assembly in the sequence of connections is computed by the system.

Figure 52: Project DisCo: Screenshot (Drude, Rossi & Becker, 2020)

DDU explores new types of interactions that emerge in immersive AR and VR. “For an installation at the Hellwach - TU Darmstadt open-day, we invited the visitors to explore the possibilities offered by digital fabrication, robotics and augmented reality”, recalls Rossi. “The aim was to demonstrate how the integration of these technologies might lead to a more open and participative design process”. Visitors were invited to take part in the construction of a collaboratively designed and assembled modular structure. “The base modules of the structure were produced with CNC-hotwire cut foam, and further painted on the surface. By tracking users’ hand gestures, we enabled them to design a surface cutting on the face of the modules. A robotic arm cut the surface, revealing parts of the inner foam, creating a colour contrast. After customising the module, users were equipped with a Hololens headset, which allowed them to identify, thanks to a visual overlay, the location where the module should be placed in the growing assembly. The name of the visitor was also recorded, and added to the AR visual overlay.” (Figures 54a and 54b)



Figures: 53a - Installation diagram, **53b** – AR-guided assembly (*Images courtesy of DDU*)

Rossi recognises that the use of existing tools in a collaborative and open way can effectively challenge existing forms of storytelling and news dissemination processes: “We are exploring how integration of immersive technologies might lead to more open and participatory design processes, but the same might hold true for journalism. AR technologies can change the game for journalism in many ways. Take citizen journalism as an example. It enables anyone to record and produce content using a mobile phone. AR apps have the potential to not only increase public participation and create a shared experience, but also to strengthen the dimensions of credibility of the source and content that is produced.”

However, Rossi emphasises that design of the tools and content have to move toward a common purpose: “We should not forget that AR is a powerful tool. The users benefit from high immersion in the content. They are enabled to have their own point of view which might not be the point of view of a person that has produced the material. Therefore, AR has the potential to become a forceful medium for storytelling in journalism.” In comparison to 2D presentations such as videos or text + image, Rossi notices that AR technologies enable a stronger coupling of the interface with a body: “You are part of the story, allowed to walk around and explore the story in its entirety, instead of receiving it in an abstract way”. Moreover, the users of AR benefit from an enhanced perceptual bandwidth, i.e., wider perception of situations and events presented in a story which he finds both interesting and challenging for the way storytelling is done: “When designing, we have to be mindful about the way we are presenting a story and the impact it has on users, and strike a balance between the presentation tool and the content. In other words, it is necessary to find the best way to take advantage of the technology and explore ways to tell a factual visual story that delivers legitimate and ethical information.”

We continued to discuss the potential of AR to write new logics of understanding of space: “AR challenges conventional way of thinking about space. Benjamin Bratton poses some probing questions on how AR technologies might deform traditional notions of borders.” As Bratton writes in his *Interface Layer*, new interface technologies, and especially interfaces like AR might become means by which new territories driven by the infrastructure of computing are produced, that coincide less with state borders but more with certain geographies of their own (see: Bratton, 2016). Another example of the impact of digital technologies on physical space is the performance of the artist Simon Weckert that caused a ‘virtual traffic jam’ in google maps. The artist wheeled a handcart with 99 smartphones in Berlin, turning green streets in the online navigational tool into red ones to show the power of google maps and their impact on the physical realm. Without these maps, map-based applications such as uber or bike rental would be impossible (Figure 55, see: Myers, 2020). Rossi concludes that we should nurture and explore these ideas of editing the physical world through the digital as AR technologies especially have a potential to define novel ways of perception and actuality of physical spaces that might have impact on production in journalism as well.

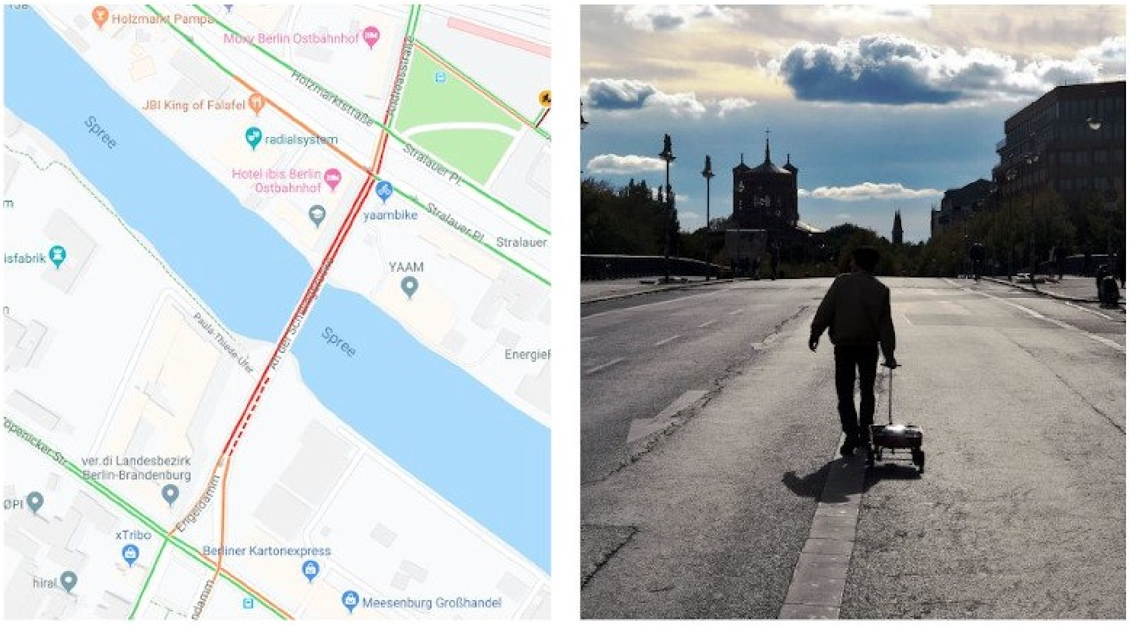


Figure 54: Simon Weckert causes a ‘virtual traffic jam’ with 99 smartphones and a handcart (Image: *designboom.com, 2020*)

Ultimately, Rossi sees unique opportunities AR presents for journalism and the media. However, he points out that AR technology needs to become accessible to all, and emphasises that the efforts to overcome obstacles are growing. “Journalism might benefit from the use of mobile and location-based technology. Something similar we see in ‘mojo’ or mobile journalism. But, AR could make the usage much more relevant and create new experiences. Moreover, WebAR is another option to watch for when it comes to utilisation of AR as a storytelling tool,” concludes Rossi.

12.3 Interview with Sergiu Ardelean (Artivive)

The final topic of the interview series was the business side of AR adoption. We spoke to Sergiu Ardelean, a co-founder of a Viennese Artivive, to gain insights into the implementation of AR solutions for the visual arts and marketing.

Artivive is an AR tool available to artists and art institutions, allowing them to blend classical with digital art in an immersive and innovative way so as to create a new dimension of experience about storytelling in a cultural setting. By using their smartphones or tablets, the audience can unlock the layer of AR that enhances exhibits with animations, narratives hidden behind the scenes, or discussions on what lies underneath. At the same time, visitors are enabled to engage and share the experience with others, and thus take part in a collective experience in art spaces.

Ardelean’s early experience with AR and marketing in the automotive industry provided him with an understanding on how users interact with the medium. He worked with large brands to enrich printed imagery with digital content and to offer users a chance to explore popular car models in an interactive way. For instance, Volkswagen seeMore app enabled customers to experience a vehicle configured in their favourite colour and wheels in their immediate surroundings (Figure 56). “AR was a user-friendly way to present a product and demonstrate some complex features of a car in a way that is understandable to everyone,” says Ardelean.

Figure 55: Volkswagen seeMore AR app (Image: *youtube.com, 2015*)

With Artivive, the idea has been to implement AR technology to tell a story in cultural settings and enhance the experience of visiting an art space such as a museum or a gallery. The goal of Artivive is to "create added-value to the experience though storytelling," explains Ardelean and continues: "Since the app is created and developed for the art world, our approach was not to offer a tool that would be used to present a content in a new way, but a tool that could add an extra dimension to the world of expression and creativity. With Artivive, museum-goers can immerse themselves into a universe where the paintings become living objects and tell their own story."

The Artivive team worked with many renowned museums in Vienna such as the Belvedere and MAK – The Austrian Museum of Applied Arts / Contemporary Art as well as many international cultural venues.

For the Albertina Museum they created digital content to tell the history of artworks, present the biographies of the artists, and to explain the process of the painting for the exhibition "Film Stills" and the permanent collection "Monet to Picasso". For instance, by using Artivive, visitors can see Monet's famous water lilies transform into a video of his original flower garden in Giverny that served as an inspiration for the series of paintings (see: *"Albertina – Monet to Picasso In Augmented Reality"*, 2019).

At the Austrian Belvedere Museum, the app reveals the painting underneath the painting in a kind of sci-fi archaeology of the artwork (Figure 57: see also: *"Egon Schiele In Augmented Reality – Belvedere Museum"*, 2018).

Figure 56: Artivive/Belvedere "Egon Schiele. The Making of a Collection" © Artivive

Ardelean notes that mobile AR has an immense potential for the traditional spaces of art and history in their efforts to involve and inspire people by art: "AR can make art more accessible as it provides a way to reach out to people who might have reservations towards art because of its complexity. When we connect AR with art, we are able to bring the exhibit to life and offer experiences that are engaging to everyone via devices such as smartphones or tablets with which many people are familiar and comfortable."

In light of the current COVID-19 pandemic, when many cultural institutions have been placed in a tough position, he points out that AR has the potential to reconnect venues with local communities: "Considering that international tourism will take a long time to recover, the local community is important for museums and galleries more than ever. I believe that AR can help these institutions attract first-time visitors and young people from the local community, and overcome their old image as pretentious institutions for the few. Visitors can walk in an exhibition without prior knowledge, enter a dialogue with artworks, make their own interpretations, and leave with an enhanced total experience."

Apart from creating an added value to the overall experience of visiting a cultural venue, a story told through AR also opens up commercial opportunities as an effective marketing tool: "Since visitors are more engaged with exhibits, they also spend more time in a museum and its gift shop where they can purchase AR posters and postcards with the artworks. It's a great return of investment for museums and galleries," concludes Ardelean.

At Artivive, they believe that the integration of new technologies can revitalise creative industry: "Many artists are looking for opportunities to connect the realms of analogue and digital media. AR provides a way for artists and technology to come together and empower each other through a dialogue of new and old. We are still stuck with audio guides, an almost seventy-year-old solution with a ton of words to describe the content. With smartphones, one can explain cultural material in a much more efficient way, while also enhancing the interaction between the users and the exhibits." Ardelean notes that in the same fashion, AR can be used in education or journalism to make complex material easy to understand and memorise through interaction. However, he explains that for AR to be adopted, it is important to meet the needs and expectations of the intended users: "Anyone hoping to incorporate AR into their work has to determine key elements that influence users' engagement and interest in AR. We make regular surveys with our users in museums that evaluate their opinions on the overall museum experience after using the Artivive and investigate the influence the experience had on cognitive processes. These findings provide valuable information on the expectations and needs of the users and help us better meet them."

Like Rossi (see Chapter 12.2), Ardelean believes that the future of AR implementation in journalism lies in WebAR that embeds AR experiences directly inside existing websites: "It will provide a user-friendly reading flow that incorporates AR into the text so that users can experience AR without leaving a webpage and making an extra effort to download the app." He adds that AR technology can change the way we create and deliver news stories and concludes that "it can reconcile the print and the digital": "Similar to Artivive that is bringing together artists and technology, AR tools in journalism can blur the line between traditional and digital storytelling, extracting the best of both."

13.0 Final Thoughts on Future Research Directions

As AR evolves toward a simpler, easy-to-use technology, it has already attracted both journalists and consumers on an international scale. AR as a new medium of presenting news content has the potential to become a powerful tool for journalism and therefore provides fertile ground for future research.

We examined the emergence of AR as a storytelling form for journalism and its influence on the users. However, AR is transforming journalism on a variety of levels. It actively engages users in news content by enabling immersive and interactive access to information through various modalities, including audio, video, and 3D graphics. AR also allows users to access content via social media, as well as to add comments to create and share their own story. An emerging area in the web space is WebAR, which will allow users to access AR experiences simply by logging on to AR-enabled websites (Makarov, 2019). The implementation of WebAR is already in development. Chrome AR is a highly anticipated product, while other companies such as Mozilla are also engaged in bringing AR solutions to browsers (Makarov, 2019). Thus, research will need to examine the effectiveness of different content-sharing platforms in determining attitudes and intentions among AR users, and explore the relationship between social media usage and perceptual and behavioural consequences.

The mobile and social media create new paths for storytelling creativity and transform traditional methods of storytelling in the realm of journalism. As we stated throughout our study, the social nature of interactive AR enables "persistent connections between people and information" (Margolis, p. 159, in: Geroimenko, 2014), and allows users to collaboratively experience stories in real time and at any location. Journalists can connect their content via social media to worldwide audience which can comment and experience events instantaneously. We encourage future media scholars to investigate collaborative opportunities enabled though the relationship between AR, mobile and social media.

Current ongoing discussions of the influence of AR in the field of journalism suggest that the use of AR technology might lead to the democratisation of spatial journalism. AR technology offers opportunities for citizen journalists who work independently and often report on the unique events happening in their local community. As many of them are experienced in using technology for their reporting, they are expected to be in a prime position to include AR technology in their work. As a result, AR could lead to an increased engagement of local citizen journalists in covering their communities with "geographically connected reporting" and thus further the local democratic process (Pavlik & Bridges, 2013, p. 49).

Moreover, further ideas for the use of mobile AR include the possible use of geo-tagging content for a variety of purposes such as adding a GPS stamp or digital watermark. These would be important for authenticating news photos, videos, and audio material, as well as for protecting copyrights (Pavlik & Bridges, 2013; Masterton, see the interview in Chapter 12.1). A number of new technologies that would further support the adoption and utilisation of AR technologies for journalism and communication purposes, allowing reginal sources to use this new trend are being actively explored. As Cadoux (2019) explains, "spatial journalism will only make news and journalism more impactful as your memory and empathy are better served by spatially-centred experiences." Further exploration of the opportunities of democratisation of spatial journalism through AR would be beneficial for the field.

As we noted, AR technology acts as "a natural extension" of the place-based traditions of news reporting and offers new opportunities for presenting and experiencing place-based content (Pavlik & Bridges, 2013, p. 21). Different AR apps available on smartphones offer a variety of geo-located news stories and information important to visitors of a particular location. Such

AR-based journalism enables users to learn about data-based place and events. Future media studies may see potential in exploring this extensive collection of material.

Social media and smartphones have already proved to have high rates of widespread adoption among outlets experimenting with AR. On the one hand, journalists are widely using social media and already existing apps such as Snapchat to showcase AR experiences as in the case of *"Selfie Journalism"* that started with the news reporting of Yusuf Omar (see: Chapter 2.0) or The Economist that run its *Future of Food* story using Snapchat filters to show different kinds of food we might be using in 2050, right on users' kitchen table (*"Insects, algae or artificial meat?", 2018*). On the other hand, some outlets like The New York Times are offering content directly on the mobile web. In this study, we used two examples of AR experiences developed by The New York Times for their users to access news via smartphones, including the interview with the model and activist Ashley Graham on the topic of doctoring women's bodies and faces, and the story on a chemical bomb attack in Syria for which The New York Times was honoured with the News and Documentary Emmy in 2019 in the category of New Approaches: Current News (*"The New York Times Wins Two News and Documentary Emmys", 2019*).

Due to the continuous development of AR technology, new forms of AR-enhanced storytelling in journalism are difficult to predict. Therefore, we encourage media scholars to keep an open mind, embrace innovation and collaborative endeavours between academic researchers, media companies and technological specialists that may produce possibilities for production, distribution and research of new storytelling forms.

Lastly, we recommend additional research to identify the new challenges AR journalism brings from an ethical point of view. Immersion, sensation of presence and a first-person perspective of the story create new ways for users to engage with the story and have the potential to challenge established ethical journalism norms. Ethical AR journalism needs transparency regarding journalistic methods that the producers of immersive and interactive AR experiences should apply.

Appendix 1

Section I: Material Quality Assurance

<u>**Questionnaire A**</u>**: Demographic Characteristics**

Let us please ask you a few questions about yourself. Please fill out the following questions honestly.

1. **What is your gender?**
   - Male
   - Female
   - Other
2. **Which age group are you in?**
   - 18-25
   - 26-35
   - 36-45
   - 46-55
   - 55 +
3. **What is your marital status?**
   - Single (never married)
   - Married
   - In a domestic partnership
   - Widowed
   - Divorced
   - Separated
4. **Do you have any children? If yes, indicate number ____**

5. **Which of the following best represents your racial or ethnic heritage? Choose all that apply.**

- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Middle Eastern or Arab
- Other

6. **What is the highest level of education you received?**

- Elementary school
- Middle school
- High school
- Bachelor's degree or comparable qualification
- Master's degree or comparable qualification
- Doctorate or post doctorate
- None of the above

7. **What is your current employment status?**

- Student
- Employed
- Self-employed
- Retired
- Unemployed (seeking employment)
- Unemployed (not seeking employment)
- Other

8. **What is your net personal monthly income?**
    - 0 - 999€
    - 1000 - 2000€
    - 2001 - 4000€
    - 4001 - 6000€
    - More than 6000€

9. **How much time per week do you spend watching TV news programmes about politics?**
    - Never
    - Rarely
    - Occasionally
    - Once a week
    - Twice a week
    - Three days in a week
    - Four days in a week
    - Five days in a week
    - Six days in a week
    - All seven days of the week

10. **How much time per week do you spend reading news about politics in print media (magazines, newspapers, etc.)?**
    - Never
    - Rarely
    - Occasionally
    - Once a week
    - Twice a week
    - Three days in a week
    - Four days in a week
    - Five days in a week
    - Six days in a week
    - All seven days of the week

11. How much time per week do you spend accessing online news sites about politics on the Web?

- Never
- Rarely
- Occasionally
- Once a week
- Twice a week
- Three days in a week
- Four days in a week
- Five days in a week
- Six days in a week
- All seven days of the week

<u>Questionnaire B</u>: Material Quality

To help in assessing the quality of our questionnaires and data for this study, please fill out the following questions. Remember, all answers are anonymised and there is no right or wrong answer.

I <u>Audio Material</u>

Q-1. How understandable did you find the <u>recording</u> of the article on Douma chemical attack? (Circle one number on the following scale)

Very Clear	Clear	Moderate	Unclear	Very Unclear
2	1	0	-1	-2

II <u>Video Material</u>

Now that you watched the films, we would like to know your opinion. Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Q-2. The film about Douma chemical attack has the right <u>length</u>.

1 – Yes (If you answered "Yes", please <u>move to the next question</u>)

2 – No (If you answered "No", please <u>explain and give suggestions on the length</u>)

____

____

____

____

____

Q-3. The film about Douma chemical attack has a good visual quality.

1 – Yes (If you answered "Yes", please move to the next question)

2 – No (If you answered "No", please explain and give suggestions on the visual quality)

____

____

____

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____

III Questionnaires

Q-4. Overall, how understandable did you find the wording of the questions? (Circle one number on the following scale)

Very Clear	Clear	Moderate	Unclear	Very Unclear
2	1	0	-1	-2

Q-5. Overall, how understandable did you find the scales in the questionnaires? (Circle one number on the following scale)

Very Clear	Clear	Moderate	Unclear	Very Unclear
2	1	0	-1	-2

Thank you for your participation!

Do you have any other comments or suggestions you would like to make? Feel free to write below or on the back of this questionnaire booklet.

Appendix 2

Section I: Sense of Presence Questionnaire

Now that you tried the app, we would like to know your opinion. Please read the items carefully and indicate the number that best reflects your agreement with the statement.

Q-1. There was a real world environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-2. There was a virtual environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-3. There were real objects.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-4. There were virtual objects.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-5. The [real objects] and I were in the same environment. (I felt I could have touched the [real objects]).

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-6. The [virtual objects] and I were in the same environment. (I felt I could have touched the [virtual objects]).

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-7. I could not distinguish between [real objects] and [virtual objects].

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-8. The [real objects] belonged to the [virtual environments].

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Appendix 3

Section I: Questionnaire I - Demographic Characteristics

Let us please ask you a few questions about yourself. Please fill out the following questions honestly.

6. **What is your gender?**
    - Male
    - Female
    - Other
7. **Which age group are you in?**
    - 18-25
    - 26-35
    - 36-45
    - 46-55
    - 55 +
8. **What is your marital status?**
    - Single (never married)
    - Married
    - In a domestic partnership
    - Widowed
    - Divorced
    - Separated
9. **Do you have any children? If yes, indicate number ____**

10. **Which of the following best represents your racial or ethnic heritage? Choose all that apply.**

- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Middle Eastern or Arab
- Other

6. **What is the highest level of education you received?**

- Elementary school
- Middle school
- High school
- Bachelor’s degree or comparable qualification
- Master’s degree or comparable qualification
- Doctorate or post doctorate
- None of the above

7. **What is your current employment status?**

- Student
- Employed
- Self-employed
- Retired
- Unemployed (seeking employment)
- Unemployed (not seeking employment)
- Other

8. **What is your net personal monthly income?**
    - 0 - 999€
    - 1000 - 2000€
    - 2001 - 4000€
    - 4001 - 6000€
    - More than 6000€

9. **How much time per week do you spend watching TV news programmes about politics?**
    - Never
    - Rarely
    - Occasionally
    - Once a week
    - Twice a week
    - Three days in a week
    - Four days in a week
    - Five days in a week
    - Six days in a week
    - All seven days of the week

10. **How much time per week do you spend reading news about politics in print media (magazines, newspapers, etc.)?**
    - Never
    - Rarely
    - Occasionally
    - Once a week
    - Twice a week
    - Three days in a week
    - Four days in a week
    - Five days in a week
    - Six days in a week
    - All seven days of the week

11. How much time per week do you spend accessing online news sites about politics on the Web?

- Never
- Rarely
- Occasionally
- Once a week
- Twice a week
- Three days in a week
- Four days in a week
- Five days in a week
- Six days in a week
- All seven days of the week

Appendix 4

Section I: Questionnaire II – Information Recall and News Evaluation

Now that you were presented the story, please answer the following questions to the best of your ability. Remember, all answers are anonymized and there is no right or wrong answer.

1. How many people were killed according to the leaked U.N. report?

____

2. Explain chlorine gas in as many details as you can.

____

____

____

____

____

____

3. What evidence indicated the dent on the front of the bomb?

____

____

____

____

____

____

4. What evidence was found on the front of the casing?

5. What evidence provided the grid pattern imprinted on the underside of the bomb?

6. What does the twisted metal found in the rubble correspond to?

For each word below, please CIRCLE THE DOT to indicate how well the word describes the news story you were presented with.

Accurate

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Believable

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Biased

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Clear

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Comprehensive

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Factual

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Fair

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Important

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Informative

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10
Describes Very Poorly									Describes Very Well

Objective

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10

Describes Very Poorly — **Describes Very Well**

Persuasive

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10

Describes Very Poorly — **Describes Very Well**

Sensationalistic

● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ● ------ ●

1	2	3	4	5	6	7	8	9	10

Describes Very Poorly — **Describes Very Well**

Appendix 5

Section I: Credibility – Item-Intercorrelations

Case Processing Summary

		N	%
Cases	Valid	358	100.0
	Excluded[a]	0	.0
	Total	358	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.72	.72	4

Item Statistics

	Mean	Std. Deviation	N
Informative	6.55	1.99	358
Factual	6.24	1.99	358
Objective	5.96	2.30	358
Fair	6.03	1.73	358

Inter-Item Correlation Matrix

	Informative	Factual	Objective	Fair
Informative	1.00	.37	.55	.37
Factual	.37	1.00	.30	.35
Objective	.55	.30	1.00	.41
Fair	.37	.35	.41	1.00

Inter-Item Covariance Matrix

	Informative	Factual	Objective	Fair
Informative	3.94	1.45	2.50	1.28
Factual	1.45	3.95	1.36	1.22
Objective	2.50	1.36	5.28	1.62
Fair	1.28	1.22	1.62	3.00

Summary Item Statistics

	Mean	Min.	Max.	Range	Max. / Min.	Variance	N of Items
Item Means	6.20	5.96	6.55	.58	1.10	.70	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Informative	18.24	20.62	.58	.36	.61
Factual	18.54	23.03	.42	.19	.70
Objective	18.82	18.79	.55	.35	.63
Fair	18.75	23.80	.49	.24	.67

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
24.78	35.03	5.92	4

Appendix 6

Section I: ANCOVA – Information Recall

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	118
	3	Audio + AR	120

Descriptive Statistics

Dependent Variable: Information Recall

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	.37	.26	120
Audio + Video	.46	.22	118
Audio + AR	.63	.22	120
Total	.49	.26	358

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Information Recall

F	df1	df2	Sig.
3.346	2	355	.036

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Gender + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Employment + Income + Media_Consumption + Group

Tests of Between-Subjects Effects

Dependent Variable: Information Recall

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5.46[a]	11	.50	9.382	.000	.23
Intercept	.74	1	.74	14.022	.000	.04
Gender	.10	1	.10	1.831	.177	.01
Age	.02	1	.02	.285	.593	.00
Marital_Status	.26	1	.26	4.940	.027	.01
Child	.02	1	.02	.290	.591	.00
Racial_Ethnic_Heritage	.18	1	.18	3.375	.067	.01
Education	.01	1	.01	.146	.703	.00
Employment	.01	1	.01	.113	.737	.00
Income	.03	1	.03	.505	.478	.00
Media_Consumption	.42	1	.42	7.867	.005	.02
Group	3.41	2	1.70	32.189	.000	.16
Error	18.31	346	.05			
Total	108.67	358				
Corrected Total	23.77	357				

a. R Squared = .230 (Adjusted R Squared = .205)

Appendix 7

Section I: ANCOVA – News Credibility

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	118
	3	Audio + AR	120

Descriptive Statistics

Dependent Variable: Credibility

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	.02	1.08	120
Audio + Video	-.47	1.00	118
Audio + AR	.45	.65	120
Total	.00	1.00	358

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Credibility

F	df1	df2	Sig.
11.101	2	355	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Gender + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Employment + Income + Media_Consumption + Group

Tests of Between-Subjects Effects

Dependent Variable: Credibility

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	60.68[a]	11	5.52	6.44	.000	.17
Intercept	1.17	1	1.17	1.36	.244	.00
Gender	.02	1	.02	.02	.878	.00
Age	.09	1	.09	.10	.750	.00
Marital_Status	.03	1	.03	.03	.855	.00
Child	3.92	1	3.92	4.58	.033	.01
Racial_Ethnic_Heritage	.33	1	.33	.39	.534	.00
Education	3.06	1	3.06	3.57	.060	.01
Employment	.55	1	.55	.65	.422	.00
Income	.04	1	.04	.05	.825	.00
Media_Consumption	.65	1	.65	.75	.386	.00
Group	44.13	2	22.06	25.76	.000	.13
Error	296.32	346	.86			
Total	357.00	358				
Corrected Total	357.00	357				

a. R Squared = .170 (Adjusted R Squared = .144)

Appendix 8

Section I: ANCOVA – News Quality

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	118
	3	Audio + AR	120

Descriptive Statistics

Dependent Variable: Quality

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	-.25	1.19	120
Audio + Video	.09	.87	118
Audio + AR	.16	.86	120
Total	.00	1.00	358

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Quality

F	df1	df2	Sig.
5.817	2	355	.003

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Gender + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Employment + Income + Media_Consumption + Group

Tests of Between-Subjects Effects

Dependent Variable: Quality

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	27.56[a]	11	2.51	2.631	.003	.08
Intercept	.69	1	.69	.721	.396	.00
Gender	1.14	1	1.14	1.197	.275	.00
Age	6.36	1	6.36	6.676	.010	.02
Marital_Status	.25	1	.25	.264	.608	.00
Child	3.47	1	3.47	3.649	.057	.01
Racial_Ethnic_Heritage	1.03	1	1.03	1.086	.298	.00
Education	2.55	1	2.55	2.678	.103	.01
Employment	3.11	1	3.11	3.266	.072	.01
Income	.90	1	.90	.944	.332	.00
Media_Consumption	.16	1	.16	.167	.683	.00
Group	7.85	2	3.93	4.124	.017	.02
Error	329.44	346	.95			
Total	357.00	358				
Corrected Total	357.00	357				

a. R Squared = .077 (Adjusted R Squared = .048)

Appendix 9

Section I: ANCOVA – Likeability

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	118
	3	Audio + AR	120

Descriptive Statistics

Dependent Variable: Likeability

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	.22	1.01	120
Audio + Video	.29	.80	118
Audio + AR	-.51	.98	120
Total	.00	1.00	358

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Likeability

F	df1	df2	Sig.
3.792	2	355	.023

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Gender + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Employment + Income + Media_Consumption + Group

Tests of Between-Subjects Effects

Dependent Variable: Likeability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	58.00[a]	11	5.27	6.101	.000	.16
Intercept	.08	1	.08	.089	.765	.00
Gender	.07	1	.07	.083	.773	.00
Age	.11	1	.11	.122	.727	.00
Marital_Status	3.70	1	3.70	4.286	.039	.01
Child	.02	1	.02	.028	.867	.00
Racial_Ethnic_Heritage	.51	1	.51	.588	.444	.00
Education	.03	1	.03	.034	.854	.00
Employment	.23	1	.23	.268	.605	.00
Income	.01	1	.01	.015	.904	.00
Media_Consumption	5.04	1	5.04	5.834	.016	.02
Group	42.10	2	21.05	24.357	.000	.12
Error	299.00	346	.86			
Total	357.00	358				
Corrected Total	357.00	357				

a. R Squared = .162 (Adjusted R Squared = .136)

Appendix 10

Section II: Material Quality Assurance

<u>Questionnaire A</u>: Demographic Characteristics

Let us please ask you a few questions about yourself. Please fill out the following questions honestly.

11. What is your gender?

- Male
- Female
- Other

12. Which age group are you in?

- 18-25
- 26-35
- 36-45
- 46-55
- 55 +

13. What is your marital status?

- Single (never married)
- Married
- In a domestic partnership
- Widowed
- Divorced
- Separated

14. Do you have any children? If yes, indicate number ____

15. **Which of the following best represents your racial or ethnic heritage? Choose all that apply.**

- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Middle Eastern or Arab
- Other

6. **What is the highest level of education you received?**

- Elementary school
- Middle school
- High school
- Bachelor’s degree or comparable qualification
- Master’s degree or comparable qualification
- Doctorate or post doctorate
- None of the above

7. **What is your current employment status?**

- Student
- Employed
- Self-employed
- Retired
- Unemployed (seeking employment)
- Unemployed (not seeking employment)
- Other

8. **What is your net personal monthly income?**
   - 0 - 999€
   - 1000 - 2000€
   - 2001 - 4000€
   - 4001 - 6000€
   - More than 6000€

9. **How much time per week do you spend watching TV news programmes?**
   - Never
   - Rarely
   - Occasionally
   - Once a week
   - Twice a week
   - Three days in a week
   - Four days in a week
   - Five days in a week
   - Six days in a week
   - All seven days of the week

10. **How much time per week do you spend reading news in print media (magazines, newspapers, etc.)?**
    - Never
    - Rarely
    - Occasionally
    - Once a week
    - Twice a week
    - Three days in a week
    - Four days in a week
    - Five days in a week
    - Six days in a week
    - All seven days of the week

11. How much time per week do you spend accessing online news sites on the Web?

- Never
- Rarely
- Occasionally
- Once a week
- Twice a week
- Three days in a week
- Four days in a week
- Five days in a week
- Six days in a week
- All seven days of the week

Questionnaire B: Material Quality

To help in assessing the quality of our questionnaires and data for this study, please fill out the following questions. Remember, all answers are anonymised and there is no right or wrong answer.

I Audio Material

Q-1. How understandable did you find the recording of the interview with Ashley Graham? (Circle one number on the following scale)

Very Clear	Clear	Moderate	Unclear	Very Unclear
2	1	0	-1	-2

II Video Material

Now that you watched the films, we would like to know your opinion. Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Q-2. The film with Ashley Graham has the right length.

1 – Yes (If you answered "Yes", please move to the next question)

2 – No (If you answered "No", please explain and give suggestions on the length)

____

____

____

____

____

Q-3. The film with Ashley Graham has a good visual quality.

1 – Yes (If you answered "Yes", please move to the next question)

2 – No (If you answered "No", please explain and give suggestions on the visual quality)

____

____

____

____

____

III Questionnaires

Q-4. Overall, how understandable did you find the wording of the questions? (Circle one number on the following scale)

Very Clear	Clear	Moderate	Unclear	Very Unclear
2	1	0	-1	-2

Q-5. Overall, how understandable did you find the scales in the questionnaires? (Circle one number on the following scale)

Very Clear	Clear	Moderate	Unclear	Very Unclear
2	1	0	-1	-2

Thank you for your participation!

Do you have any other comments or suggestions you would like to make? Feel free to write below or on the back of this questionnaire booklet.

Appendix 11

Section II: Sense of Presence Questionnaire

Now that you tried the app, we would like to know your opinion. Please read the items carefully and indicate the number that best reflects your agreement with the statement.

Q-1. There was a real world environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-2. There was a virtual environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-3. There were other (real) agents.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-4. There were virtual representations of other agents.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-5. [Other agents] and I were in the same room.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-6. The [other virtually presented agents] and I were in the same environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-7. The [agents] belonged to the virtual environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-8. The virtually presented [agents] belonged to the [virtual environment].

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-9. [Virtual and real environments] formed one, common space.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-10. The [agents] were in the real environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-11. The [virtually presented agents] belonged to the real environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Q-12. The [virtually presented agents] and [real objects] were in the same environment.

1 – Disagree Very Strongly
2 – Disagree Strongly
3 – Disagree
4 – Mostly Disagree
5 – Slightly Disagree
6 – Slightly Agree
7 – Mostly Agree
8 – Agree
9 – Agree Strongly
10 – Agree Very Strongly

Appendix 12

Section II: Questionnaire I - Demographic Characteristics

Let us please ask you a few questions about yourself. Please fill out the following questions honestly.

16. What is your gender?

- Male
- Female
- Other

17. Which age group are you in?

- 18-25
- 26-35
- 36-45
- 46-55
- 55 +

18. What is your marital status?

- Single (never married)
- Married
- In a domestic partnership
- Widowed
- Divorced
- Separated

19. Do you have any children? If yes, indicate number ____

20. Which of the following best represents your racial or ethnic heritage? Choose all that apply.

- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Middle Eastern or Arab
- Other

6. What is the highest level of education you received?

- Elementary school
- Middle school
- High school
- Bachelor’s degree or comparable qualification
- Master’s degree or comparable qualification
- Doctorate or post doctorate
- None of the above

7. What is your current employment status?

- Student
- Employed
- Self-employed
- Retired
- Unemployed (seeking employment)
- Unemployed (not seeking employment)
- Other

8. What is your net personal monthly income?

- 0 - 999€
- 1000 - 2000€
- 2001 - 4000€
- 4001 - 6000€
- More than 6000€

9. How much time per week do you spend watching TV news programmes about health/fitness?

- Never
- Rarely
- Occasionally
- Once a week
- Twice a week
- Three days in a week
- Four days in a week
- Five days in a week
- Six days in a week
- All seven days of the week

10. How much time per week do you spend reading news about health/fitness in print media (magazines, newspapers, etc.)?

- Never
- Rarely
- Occasionally
- Once a week
- Twice a week
- Three days in a week
- Four days in a week
- Five days in a week
- Six days in a week
- All seven days of the week

11. How much time per week do you spend surfing the Internet for health/fitness news?

- Never
- Rarely
- Occasionally
- Once a week
- Twice a week
- Three days in a week
- Four days in a week
- Five days in a week
- Six days in a week
- All seven days of the week

Please fill out the following questions honestly.

1. How tall are you? _____ cm

2. How much do you weight? ____ kg

Appendix 13

Section II: Questionnaire II – First-person Perception

We should like to know how you have been feeling about your appearance over the PAST FOUR WEEKS. Please read each question and circle the appropriate number to the right. Please answer all the questions.

1 Have you been so worried about your shape that you have been feeling you ought to diet?

- **Never = 1**
- **Almost Never = 2**
- **Very Rarely = 3**
- **Rarely = 4**
- **Occasionally = 5**
- **Often = 6**
- **Very Often = 7**
- **Usually = 8**
- **Almost Always = 9**
- **Always = 10**

2 Have you been worried that you might become fat (or fatter)?

- **Never = 1**
- **Almost Never = 2**
- **Very Rarely = 3**
- **Rarely = 4**
- **Occasionally = 5**
- **Often = 6**
- **Very Often = 7**
- **Usually = 8**
- **Almost Always = 9**
- **Always = 10**

3 Has feeling full (e.g., after eating a large meal) made you feel fat?

- **Never = 1**
- **Almost Never = 2**
- **Very Rarely = 3**
- **Rarely = 4**

	• **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
4	Have you noticed the shape of other women and felt that your own shape compared unfavorably? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
5	Has thinking about your shape interfered with your ability to concentrate (e.g., while watching television, reading, listening to conversations)? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
6	Has being naked, such as when taking a bath, made you feel fat? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5**

	• **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
7	Have you imagined cutting off fleshy areas of your body? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
8	Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
9	Have you felt excessively large and rounded? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7**

	• **Usually = 8** • **Almost Always = 9** • **Always = 10**
10	Have you thought that you are the shape you are because you lack self-control? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
11	Have you worried about other people seeing rolls of flesh around your waist or stomach? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
12	When in company have you worried about taking up too much room (e.g., sitting on the sofa or a bus seat)? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9**

	• **Always = 10**
13	Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
14	Have you pinched areas of your body to see how much fat there is? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**
15	Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming baths)? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**

16	Have you been particularly self-conscious about your shape when in the company of other people? • **Never = 1** • **Almost Never = 2** • **Very Rarely = 3** • **Rarely = 4** • **Occasionally = 5** • **Often = 6** • **Very Often = 7** • **Usually = 8** • **Almost Always = 9** • **Always = 10**

Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Disagree Very Strongly = 1
Disagree Strongly = 2
Disagree = 3
Mostly Disagree = 4
Slightly Disagree = 5
Slightly Agree = 6
Mostly Agree = 7
Agree = 8
Agree Strongly = 9
Agree Very Strongly = 10

1. It is important for me to look muscular.

   1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

2. It is important for me to look good in the clothes I wear.

   1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

3. I want my body to look very thin.

   1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

4. I think a lot about looking muscular.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

5. I think a lot about my appearance.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

6. I think a lot about looking thin.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

7. I want to be good looking.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

8. I want my body to look muscular.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

9. I don't really think much about my appearance.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

10. I don't want my body to look muscular.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

11. I want my body to look very lean.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

12. It is important to me to be attractive.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

13. I think a lot about having very little body fat.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

14. I don't think much about how I look.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

15. I would like to have a body that looks very muscular.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Answer the following questions with relevance to your FAMILY
(include parents, brothers, sisters, relatives):

16. I feel pressure from family members to look thinner.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

17. I feel pressure from family members to improve my appearance.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

18. Family members encouraged me to decrease my level of body fat.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

19. Family members encourage me to get in better shape.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Answer the following questions with relevance to your PEERS
(include close friends, classmates, and other social contacts):

20. My peers encourage me to get thinner.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

21. I feel pressure from my peers to improve my appearance.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

22. I feel pressure from my peers to look in better shape.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

23. I get pressure from my peers to decrease my level of body fat.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Answer the following questions with relevance to your SIGNIFICANT OTHERS:

24. Significant others encourage me to get thinner.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

25. I feel pressure from significant others to improve my appearance.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

26. I feel pressure from significant others to look in better shape.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

27. I get pressure from significant others to decrease my level of body fat.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Answer the following questions with relevance to the MEDIA
(include television, magazines, the internet, movies, billboards, and advertisements):

28. I feel pressure from the media to look in better shape.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

29. I feel pressure from the media to look thinner.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

30. I feel pressure from the media to improve my appearance.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

31. I feel pressure from the media to decrease my level of body fat.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Please answer the following questions on the scale from 1 – dislike extremely to 10 – like extremely. Remember, all answers are anonymised and there is no right or wrong answer.

Dislike Extremely = 1
Dislike Very Much = 2
Dislike = 3
Dislike Moderately = 4
Dislike Slightly = 5
Like Slightly = 6
Like Moderately = 7
Like = 8
Like Very Much = 9
Like Extremely = 10

1. How much do you like messages like the one you were presented with in a story?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

2. How much do you trust messages like the one you presented with in a story?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement. Remember, all answers are anonymised and there is no right or wrong answer.

Disagree Very Strongly = 1
Disagree Strongly = 2
Disagree = 3
Mostly Disagree = 4
Slightly Disagree = 5
Slightly Agree = 6
Mostly Agree = 7
Agree = 8
Agree Strongly = 9
Agree Very Strongly = 10

1. On the whole, I am satisfied with myself.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

2. At times I think I am no good at all.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

3. I feel that I have a number of good qualities.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

4. I am able to do things as well as most other people.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

5. I feel I do not have much to be proud of.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

6. I certainly feel useless at times.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

7. I feel that I'm a person of worth, at least on an equal plane with others.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

8. I wish I could have more respect for myself.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

9. All in all, I am inclined to feel that I am a failure.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

10. I take a positive attitude toward myself.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Please focus on the model interviewed in the story you were presented with and answer the following questions on the scale from 1 – no influence at all to 10 – extreme influence. Remember, all answers are anonymised and there is no right or wrong answer.

No influence at all = 1
Almost no influence = 2
Very little influence = 3
A little influence = 4
Some influence = 5
Moderate influence = 6
Considerable influence = 7
High influence = 8
Very high influence = 9
Extreme influence = 10

1. How much influence do you think the model interviewed in the story you were presented with has on your perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

2. How much influence do you think the model interviewed in the story you were presented with has on your perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

3. How much influence do you think the model interviewed in the story you were presented with may have on your close female friends' perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

4. How much influence do you think the model interviewed in the story you were presented with may have on your close female friends' perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

5. How much influence do you think the model interviewed in the story you were presented with may have on other female students of this university in their perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

6. How much influence do you think the model interviewed in the story you were presented with may have on other female students of this university in their perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

7. How much influence do you think the model interviewed in the story you were presented with may have on other female students attending other universities in Austria in their perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

8. How much influence do you think the model interviewed in the story you were presented with may have on other female students attending other universities in Austria in their perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

9. How much influence do you think the model interviewed in the story you were presented with may have on your close male friends' perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

10. How much influence do you think the model interviewed in the story you were presented with may have on your close male friends' perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

11. How much influence do you think the model interviewed in the story you were presented with may have on male students of this university in their perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

12. How much influence do you think the model interviewed in the story you were presented with may have on male students of this university in their perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

13. How much influence do you think the model interviewed in the story you were presented with may have on male students attending other universities in Austria in their perception of ideal body weight?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

14. How much influence do you think the model interviewed in the story you were presented with may have on male students attending other universities in Austria in their perception of ideal body shape?

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Please answer the following questions on the scale from 1 – extremely unlikely to 10 – extremely likely. Remember, all answers are anonymised and there is no right or wrong answer.

Extremely Unlikely = 1
Very Unlikely = 2
Unlikely = 3
Moderately Unlikely = 4
Somewhat Unlikely = 5
Somewhat Likely = 6
Moderately Likely = 7
Likely = 8
Very Likely = 9
Extremely Likely = 10

1. I am likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

2. My close female friends are likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

3. Other female students of this university are likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

4. Other female students attending other universities in Austria are likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

5. My close male friends are likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

6. Male students of this university are likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

7. Male students attending other universities in Austria are likely to engage in women's empowerment campaigns.

1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9 ------ 10

Appendix 14

Section II: Body Dissatisfaction – Item-Intercorrelations

Case Processing Summary

		N	%
Cases	Valid	357	100.0
	Excluded[a]	0	.0
	Total	357	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.678	.678	16

Item Statistics

	Mean	Std. Deviation	N
Have you been so worried about your shape that you have been feeling you ought to diet?	6.01	2.02	357
Have you been worried that you might become fat (or fatter)?	6.07	2.06	357
Has feeling full (e.g., after eating a large meal) made you feel fat?	6.15	2.03	357
Have you noticed the shape of other women and felt that your own shape compared unfavorably?	6.21	1.99	357
Has thinking about your shape interfered with your ability to concentrate (e.g., while watching television, reading, listening to conversations)?	5.79	2.13	357
Has being naked, such as when taking a bath, made you feel fat?	5.77	2.09	357
Have you imagined cutting off fleshy areas of your body?	5.57	2.15	357
Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?	5.84	2.01	357
Have you felt excessively large and rounded?	5.46	2.18	357
Have you thought that you are the shape you are because you lack self-control?	5.71	1.94	357
Have you worried about other people seeing rolls of flesh around your waist or stomach?	6.10	1.92	357
When in company have you worried about taking up too much room (e.g., sitting on the sofa or a bus seat)?	5.64	2.06	357
Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?	5.65	1.89	357
Have you pinched areas of your body to see how much fat there is?	5.86	1.95	357
Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming baths)?	5.77	2.00	357
Have you been particularly self-conscious about your shape when in the company of other people?	5.71	2.07	357

*Inter-Item Correlation Matrix**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.00	.10	.16	.17	.17	.02	.13	.09	.08	.11	.10	.14	.11	.17	.03	.06
2	.10	1.00	.13	.22	.18	.07	.26	.22	.12	.19	.09	.05	.06	.13	.11	.11
3	.16	.13	1.00	.16	.16	.13	.10	.22	.16	.16	.15	.18	.14	.14	.07	.08
4	.17	.22	.16	1.00	.08	.07	.15	.10	-.01	.15	.11	.10	.01	.16	.12	.06
5	.17	.18	.16	.08	1.00	.11	.27	.19	.16	.13	.24	.12	.05	.14	.11	.18
6	.02	.07	.13	.07	.11	1.00	.10	.18	.04	.09	.16	.07	.06	.13	.09	-.04
7	.13	.26	.10	.15	.27	.10	1.00	.19	.21	.22	.08	.07	.01	.07	.08	.09
8	.09	.22	.22	.10	.19	.18	.19	1.00	.17	.17	.22	.15	.09	.16	.12	.12
9	.08	.12	.16	-.01	.16	.04	.21	.17	1.00	.12	.13	.13	.07	.09	.04	.15
10	.11	.19	.16	.15	.13	.09	.22	.17	.12	1.00	.10	.03	.14	.08	.02	.10
11	.10	.09	.15	.11	.24	.16	.08	.22	.13	.10	1.00	.09	.04	.19	.12	.16
12	.14	.05	.18	.10	.12	.07	.07	.15	.13	.03	.09	1.00	.17	-.02	.00	.13
13	.11	.06	.14	.01	.05	.06	.01	.09	.07	.14	.04	.17	1.00	.07	.07	-.03
14	.17	.13	.14	.16	.14	.13	.07	.16	.09	.08	.19	-.02	.07	1.00	.05	.17
15	.03	.11	.07	.12	.11	.09	.08	.12	.04	.02	.12	.00	.07	.05	1.00	.17
16	.06	.11	.08	.06	.18	-.04	.09	.12	.15	.10	.16	.13	-.03	.17	.17	1.00

* **Item Legend**:

1 - Have you been so worried about your shape that you have been feeling you ought to diet?

2 - Have you been worried that you might become fat (or fatter)?

3 - Has feeling full (e.g., after eating a large meal) made you feel fat?

4 - Have you noticed the shape of other women and felt that your own shape compared unfavorably?

5 - Has thinking about your shape interfered with your ability to concentrate (e.g., while watching television, reading, listening to conversations)?

6 - Has being naked, such as when taking a bath, made you feel fat?

7 - Have you imagined cutting off fleshy areas of your body?

8 - Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?

9 - Have you felt excessively large and rounded?

10 - Have you thought that you are the shape you are because you lack self-control?

11 - Have you worried about other people seeing rolls of flesh around your waist or stomach?

12 - When in company have you worried about taking up too much room (e.g., sitting on the sofa or a bus seat)?

13 - Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?

14 - Have you pinched areas of your body to see how much fat there is?

15 - Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming baths)?

16 - Have you been particularly self-conscious about your shape when in the company of other people?

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Have you been so worried about your shape that you have been feeling you ought to diet?	87.31	163.783	.26	.10	.667
Have you been worried that you might become fat (or fatter)?	87.26	159.849	.33	.15	.658
Has feeling full (e.g., after eating a large meal) made you feel fat?	87.18	159.425	.34	.14	.656
Have you noticed the shape of other women and felt that your own shape compared unfavorably?	87.12	163.879	.26	.13	.666
Has thinking about your shape interfered with your ability to concentrate (e.g., while watching television, reading, listening to conversations)?	87.54	156.143	.38	.19	.650
Has being naked, such as when taking a bath, made you feel fat?	87.56	166.113	.20	.08	.674
Have you imagined cutting off fleshy areas of your body?	87.76	158.803	.33	.18	.658
Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?	87.48	157.554	.39	.17	.650
Have you felt excessively large and rounded?	87.87	161.783	.26	.11	.666
Have you thought that you are the shape you are because you lack self-control?	87.62	163.074	.29	.12	.663
Have you worried about other people seeing rolls of flesh around your waist or stomach?	87.23	161.981	.32	.14	.660

When in company have you worried about taking up too much room (e.g., sitting on the sofa or a bus seat)?	87.68	165.307	.22	.11	.671
Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?	87.68	169.551	.16	.08	.677
Have you pinched areas of your body to see how much fat there is?	87.47	163.710	.27	.13	.665
Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming baths)?	87.56	166.646	.20	.09	.673
Have you been particularly self-conscious about your shape when in the company of other people?	87.61	164.272	.24	.12	.669

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
93.33	181.137	13.46	16

Appendix 15

Section II: Internalisation of Appearance Ideals and Appearance Pressures – Item-Intercorrelations

Internalisation of Appearance Ideals

Case Processing Summary

		N	%
Cases	Valid	357	100.0
	Excluded[a]	0	.0
	Total	357	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.657	.656	15

Item Statistics

	Mean	Std. Deviation	N
It is important for me to look muscular.	4.83	2.15	357
It is important for me to look good in the clothes I wear.	5.09	2.34	357
I want my body to look very thin.	4.91	2.46	357
I think a lot about looking muscular.	5.45	2.49	357
I think a lot about my appearance.	5.52	2.56	357
I think a lot about looking thin.	5.56	2.25	357
I want to be good looking.	4.97	2.16	357
I want my body to look muscular.	5.06	2.11	357
I don’t really think much about my appearance.	5.48	2.26	357
I don’t want my body to look muscular.	4.92	2.48	357
I want my body to look very lean.	4.89	2.81	357
It is important to me to be attractive.	5.04	2.62	357
I think a lot about having very little body fat.	4.50	2.16	357
I don’t think much about how I look.	4.85	2.23	357
I would like to have a body that looks very muscular.	4.73	2.05	357

*Inter-Item Correlation Matrix **

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.00	.18	.34	.09	.05	.16	-.00	.07	-.10	-.19	.12	-.04	-.00	-.13	.17
2	.18	1.00	.23	.15	.22	.24	.07	.28	.17	-.01	.08	.13	-.01	-.05	.17
3	.34	.23	1.00	.09	-.01	.11	.14	.18	.08	-.07	.37	.13	.16	-.02	.15
4	.09	.15	.09	1.00	.26	.39	.19	.14	.23	.01	.06	.11	-.05	.10	.22
5	.05	.22	-.01	.26	1.00	.34	.13	.23	.28	.02	-.05	.07	-.05	.11	.08
6	.16	.24	.11	.39	.34	1.00	.21	.29	.39	.14	.04	.08	-.01	.19	.19
7	-.00	.07	.14	.19	.13	.21	1.00	.25	.15	.07	-.08	-.05	-.00	.07	.18
8	.07	.28	.18	.14	.23	.29	.25	1.00	.15	.04	.12	.15	.05	.01	.08
9	-.10	.17	.08	.23	.28	.39	.15	.15	1.00	.28	.17	.25	.03	.28	-.00
10	-.19	-.01	-.07	.01	.02	.14	.07	.04	.28	1.00	.10	.24	.04	.11	.09
11	.12	.08	.37	.06	-.05	.04	-.08	.12	.17	.10	1.00	.41	.20	.12	.09
12	-.04	.13	.13	.11	.07	.08	-.05	.15	.25	.24	.41	1.00	.21	.15	-.04
13	-.00	-.01	.16	-.05	-.05	-.01	-.00	.05	.03	.04	.20	.21	1.00	.05	-.07
14	-.13	-.05	-.02	.10	.11	.19	.07	.00	.28	.11	.12	.15	.05	1.00	.01
15	.17	.17	.15	.22	.08	.19	.18	.08	-.00	.02	.09	-.04	-.07	.01	1.00

* **Item Legend**:

1 - It is important for me to look muscular.

2 - It is important for me to look good in the clothes I wear.

3 - I want my body to look very thin.

4 - I think a lot about looking muscular.

5 - I think a lot about my appearance.

6 - I think a lot about looking thin.

7 - I want to be good looking.

8 - I want my body to look muscular.

9 - I don't really think much about my appearance.

10 - I don't want my body to look muscular.

11 - I want my body to look very lean.

12 - It is important to me to be attractive.

13 - I think a lot about having very little body fat.

14 - I don't think much about how I look.

15 - I would like to have a body that looks very muscular.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
It is important for me to look muscular.	70.97	202.657	.12	.22	.661
It is important for me to look good in the clothes I wear.	70.71	189.064	.31	.19	.636
I want my body to look very thin.	70.89	187.079	.32	.30	.634
I think a lot about looking muscular.	70.35	185.694	.34	.22	.632
I think a lot about my appearance	70.29	188.665	.28	.21	.641
I think a lot about looking thin.	70.24	180.654	.48	.36	.613
I want to be good looking.	70.83	197.189	.21	.17	.649
I want my body to look muscular.	70.75	189.932	.35	.21	.632
I don't really think much about my appearance.	70.32	183.892	.42	.32	.621
I don't want my body to look muscular.	70.89	198.821	.14	.16	.661
I want my body to look very lean.	70.91	183.759	.30	.32	.637
It is important to me to be attractive.	70.76	184.983	.32	.27	.634
I think a lot about having very little body fat.	71.30	203.777	.10	.09	.663
I don't think much about how I look.	70.95	198.809	.17	.13	.655
I would like to have a body that looks very muscular.	71.08	198.553	.21	.14	.650

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
75.80	214.660	14.65	15

Appearance Pressures

Case Processing Summary

		N	%
Cases	Valid	357	100.0
	Excluded[a]	0	.0
	Total	357	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.651	.650	16

Item Statistics

	Mean	Std. Deviation	N
I feel pressure from family members to look thinner.	4.53	1.95	357
I feel pressure from family members to improve my appearance.	4.80	2.07	357
Family members encouraged me to decrease my level of body fat.	4.96	2.09	357
Family members encourage me to get in better shape.	4.57	1.99	357
My peers encourage me to get thinner.	4.73	2.05	357
I feel pressure from my peers to improve my appearance.	4.97	2.15	357
I feel pressure from my peers to look in better shape.	5.17	2.15	357
I get pressure from my peers to decrease my level of body fat.	4.81	2.49	357
Significant others encourage me to get thinner.	5.36	2.11	357
I feel pressure from significant others to improve my appearance.	4.69	2.28	357
I feel pressure from significant others to look in better shape.	5.45	2.21	357
I get pressure from significant others to decrease my level of body fat.	4.36	2.18	357
I feel pressure from the media to look in better shape.	5.13	2.08	357
I feel pressure from the media to look thinner.	4.26	2.26	357
I feel pressure from the media to improve my appearance.	4.87	2.16	357
I feel pressure from the media to decrease my level of body fat.	5.21	2.24	357

*Inter-Item Correlation Matrix **

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.00	.09	.07	.13	-.02	.16	.06	.04	.07	.17	.10	.00	.13	.08	-.05	.10
2	.09	1.00	.11	-.01	.09	.09	.17	.03	.19	.21	.18	-.09	.18	.06	.19	.12
3	.07	.11	1.00	-.02	.10	.09	.06	.15	.20	.09	.09	.07	.06	.07	.14	.14
4	.13	-.01	-.02	1.00	.07	.06	.21	.07	.01	.01	.09	.01	.05	.08	.08	.20
5	-.02	.09	.10	.07	1.00	.07	.08	.21	.14	.10	.16	.04	.13	.01	.11	.06
6	.16	.09	.09	.06	.07	1.00	.23	.05	.13	.10	.09	.14	.18	.09	.09	.13
7	.06	.17	.06	.21	.08	.23	1.00	.13	.26	.16	.23	.09	.13	.05	.16	.17
8	.04	.03	.15	.07	.21	.05	.13	1.00	.27	.16	.26	.14	.13	.09	.11	.14
9	.07	.19	.20	.01	.14	.13	.26	.27	1.00	.18	.19	-.06	.28	.00	.26	.17
10	.17	.21	.09	.01	.10	.10	.16	.16	.18	1.00	.15	-.05	.15	.22	.05	.11
11	.10	.18	.09	.09	.16	.09	.23	.26	.19	.15	1.00	-.00	.33	-.13	.15	.18
12	.00	-.09	.07	.01	.04	.14	.09	.14	-.06	-.05	-.00	1.00	-.01	.08	.06	.06
13	.13	.18	.06	.05	.13	.18	.13	.13	.28	.15	.33	-.01	1.00	-.01	.03	.12
14	.08	.06	.07	.07	.01	.09	.05	.09	.00	.22	-.13	.08	-.01	1.00	.04	.05
15	-.05	.19	.14	.08	.19	.09	.16	.11	.26	.05	.15	.06	.03	.04	1.00	.07
16	.10	.12	.14	.20	.06	.13	.17	.14	.17	.11	.18	.06	.12	.05	.07	1.00

* **<u>Item Legend</u>:**

1 - I feel pressure from family members to look thinner.

2 - I feel pressure from family members to improve my appearance.

3 - Family members encouraged me to decrease my level of body fat.

4 - Family members encourage me to get in better shape.

5 - My peers encourage me to get thinner.

6 - I feel pressure from my peers to improve my appearance.

7 - I feel pressure from my peers to look in better shape.

8 - I get pressure from my peers to decrease my level of body fat.

9 - Significant others encourage me to get thinner.

10 - I feel pressure from significant others to improve my appearance.

11 - I feel pressure from significant others to look in better shape.

12 - I get pressure from significant others to decrease my level of body fat.

13 - I feel pressure from the media to look in better shape.

14 - I feel pressure from the media to look thinner.

15 - I feel pressure from the media to improve my appearance.

16 - I feel pressure from the media to decrease my level of body fat.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I feel pressure from family members to look thinner.	73.32	177.793	.18	.09	.65
I feel pressure from family members to improve my appearance.	73.06	172.514	.26	.14	.64
Family members encouraged me to decrease my level of body fat.	72.90	173.540	.23	.09	.64
Family members encourage me to get in better shape.	73.29	178.402	.16	.11	.65
My peers encourage me to get thinner.	73.13	174.764	.22	.08	.64
I feel pressure from my peers to improve my appearance.	72.88	170.947	.28	.12	.63
I feel pressure from my peers to look in better shape.	72.69	166.310	.37	.19	.62
I get pressure from my peers to decrease my level of body fat.	73.05	163.742	.33	.19	.63
Significant others encourage me to get thinner.	72.50	165.734	.39	.26	.62
I feel pressure from significant others to improve my appearance.	73.16	168.354	.30	.16	.63
I feel pressure from significant others to look in better shape.	72.41	166.478	.35	.25	.62
I get pressure from significant others to decrease my level of body fat.	73.50	181.610	.08	.09	.66

I feel pressure from the media to look in better shape.	72.72	169.831	.31	.20	.63
I feel pressure from the media to look thinner.	73.59	178.299	.13	.11	.66
I feel pressure from the media to improve my appearance.	72.98	172.531	.25	.14	.64
I feel pressure from the media to decrease my level of body fat.	72.64	168.691	.30	.12	.63

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
77.85	191.080	13.82	16

Appendix 16

Section II: Hierarchical Multiple Regression Analysis Predicting Body Dissatisfaction

Descriptive Statistics

	Mean	Std. Deviation	N
Body Dissatisfaction	5.83	.84	357
Age Group	1.48	.63	357
Marital status	1.28	.66	357
Number of children	.06	.34	357
Racial or ethnic heritage	1.51	1.33	357
Level of education	3.37	.49	357
Net personal monthly income	1.06	.24	357
Media Consumption	3.35	1.41	357
Body Mass Index	22.61	2.42	357
Self-esteem	5.26	1.09	357
Perception_Self	7.82	2.26	357
Perception_Others	4.39	.92	357

Correlations

		1	2	3	4	5	6	7	8	9	10	11	12
Pearson Correlation	1	1.00	-.06	.04	.01	.01	-.21	-.05	-.05	.12	-.03	-.17	-.34
	2	-.06	1.00	.02	.15	-.01	.04	.25	.06	-.07	-.01	.08	.08
	3	.04	.02	1.00	.19	-.04	-.00	.23	-.02	-.01	.00	-.02	-.03
	4	.01	.15	.19	1.00	-.05	.12	.33	-.01	-.02	-.05	-.00	-.04
	5	.01	-.01	-.04	-.05	1.00	-.01	.09	.13	.02	-.07	-.01	-.01
	6	-.21	.04	-.00	.12	-.01	1.00	.24	-.01	-.10	-.07	.06	.03
	7	-.05	.25	.23	.33	.09	.24	1.00	.01	-.10	-.07	.12	.01
	8	-.05	.06	-.02	-.01	.13	-.01	.01	1.00	-.05	-.01	.00	.00
	9	.12	-.07	-.01	-.02	.02	-.10	-.10	-.05	1.00	.12	.01	-.02
	10	-.03	-.01	.00	-.05	-.07	-.07	-.07	-.01	.12	1.00	.04	.07
	11	-.17	.08	-.02	-.00	-.01	.06	.12	.00	.01	.04	1.00	.08
	12	-.34	.08	-.03	-.04	-.01	.03	.01	.00	-.02	.07	.08	1.00
Sig. (1-tailed)	1	.	.112	.255	.444	.448	.000	.167	.174	.010	.307	.001	.000
	2	.112	.	.323	.002	.434	.234	.000	.127	.088	.443	.075	.059
	3	.255	.323	.	.000	.221	.496	.000	.339	.415	.486	.341	.304
	4	.444	.002	.000	.	.155	.010	.000	.424	.382	.190	.493	.247
	5	.448	.434	.221	.155	.	.463	.054	.007	.355	.104	.400	.418
	6	.000	.234	.496	.010	.463	.	.000	.432	.026	.087	.148	.259
	7	.167	.000	.000	.000	.054	.000	.	.404	.029	.089	.013	.413
	8	.174	.127	.339	.424	.007	.432	.404	.	.197	.438	.486	.479
	9	.010	.088	.415	.382	.355	.026	.029	.197	.	.010	.393	.365
	10	.307	.443	.486	.190	.104	.087	.089	.438	.010	.	.203	.109
	11	.001	.075	.341	.493	.400	.148	.013	.486	.393	.203	.	.076
	12	.000	.059	.304	.247	.418	.259	.413	.479	.365	.109	.076	.

N	1	357	357	357	357	357	357	357	357	357	357	357	357
	2	357	357	357	357	357	357	357	357	357	357	357	357
	3	357	357	357	357	357	357	357	357	357	357	357	357
	4	357	357	357	357	357	357	357	357	357	357	357	357
	5	357	357	357	357	357	357	357	357	357	357	357	357
	6	357	357	357	357	357	357	357	357	357	357	357	357
	7	357	357	357	357	357	357	357	357	357	357	357	357
	8	357	357	357	357	357	357	357	357	357	357	357	357
	9	357	357	357	357	357	357	357	357	357	357	357	357
	10	357	357	357	357	357	357	357	357	357	357	357	357
	11	357	357	357	357	357	357	357	357	357	357	357	357
	12	357	357	357	357	357	357	357	357	357	357	357	357

* **Item Legend**:

1 – Body Dissatisfaction

2 – Age group

3 – Marital status

4 – Number of children

5 – Racial or ethnic heritage

6 – Level of education

7 – Net personal monthly income

8 – Media consumption

9 – Body Mass Index

10 – Self-esteem

11 – Perception of media effects on self

12 – Perception of media effects on others

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children[b]	.	Enter
2	Media Consumption[b]	.	Enter
3	Body Mass Index[b]	.	Enter
4	Self-esteem[b]	.	Enter
5	Perception_Others, Perception_Self[b]	.	Enter

a. Dependent Variable: Body Dissatisfaction

b. All requested variables entered.

Model Summaryf

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.225[a]	.051	.034	.83	.051	3.12	6	350	.005
2	.230[b]	.053	.034	.83	.002	.87	1	349	.353
3	.249[c]	.062	.041	.82	.009	3.39	1	348	.066
4	.255[d]	.065	.041	.82	.003	1.02	1	347	.314
5	.434[e]	.189	.163	.77	.124	26.31	2	345	.000

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

f. Dependent Variable: Body Dissatisfaction

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.74	6	2.12	3.117	.005[b]
	Residual	238.40	350	.68		
	Total	251.14	356			
2	Regression	13.33	7	1.90	2.794	.008[c]
	Residual	237.81	349	.68		
	Total	251.14	356			
3	Regression	15.62	8	1.95	2.886	.004[d]
	Residual	235.52	348	.68		
	Total	251.14	356			
4	Regression	16.31	9	1.81	2.678	.005[e]
	Residual	234.83	347	.68		
	Total	251.14	356			
5	Regression	47.39	11	4.31	7.294	.000[f]
	Residual	203.76	345	.59		
	Total	251.14	356			

a. Dependent Variable: Body Dissatisfaction

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

Coefficients[a]

Model		Unstandardised Coefficients B	Unstandardised Coefficients Std. Error	Standardised Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	7.14	.35		20.22	.000					
	Age Group	-.08	.07	-.06	-1.14	.256	-.06	-.06	-.06	.93	1.08
	Marital status	.04	.07	.03	.57	.570	.04	.03	.03	.93	1.08
	Number of children	.10	.14	.04	.71	.477	.01	.04	.04	.86	1.16
	Racial or ethnic heritage	.01	.03	.01	.18	.859	.01	.01	.01	.98	1.02
	Level of education	-.37	.09	-.21	-3.95	.000	-.21	-.21	-.21	.94	1.07
	Net personal monthly income	-.02	.21	-.01	-.11	.910	-.05	-.01	-.01	.77	1.30
2	(Constant)	7.23	.37		19.74	.000					
	Age Group	-.08	.07	-.06	-1.08	.283	-.06	-.06	-.06	.93	1.08
	Marital status	.04	.07	.03	.55	.580	.04	.03	.03	.93	1.08
	Number of children	.10	.14	.04	.71	.481	.01	.04	.04	.86	1.16
	Racial or ethnic heritage	.01	.03	.02	.30	.767	.01	.02	.02	.97	1.04
	Level of education	-.37	.09	-.21	-3.96	.000	-.21	-.21	-.21	.94	1.07
	Net personal monthly income	-.02	.21	-.01	-.12	.906	-.05	-.01	-.01	.77	1.30
	Media Consumption	-.03	.03	-.05	-.93	.353	-.05	-.05	-.05	.98	1.02
3	(Constant)	6.38	.59		10.85	.000					
	Age Group	-.07	.07	-.05	-.99	.323	-.06	-.05	-.05	.92	1.08
	Marital status	.04	.07	.03	.55	.582	.04	.03	.03	.93	1.08

	Number of children	.09	.14	.04	.66	.512	.01	.04	.03	.86	1.16
	Racial or ethnic heritage	.01	.03	.01	.24	.814	.01	.01	.01	.96	1.04
	Level of education	-.35	.09	-.21	-3.80	.000	-.21	-.20	-.20	.93	1.08
	Net personal monthly income	.00	.21	.00	.01	.990	-.05	.00	.00	.76	1.30
	Media Consumption	-.03	.03	-.05	-.85	.397	-.05	-.05	-.04	.98	1.02
	Body Mass Index	.03	.02	.10	1.84	.066	.12	.10	.10	.98	1.02
4	(Constant)	6.57	.62		10.65	.000					
	Age Group	-.07	.07	-.05	-.97	.331	-.06	-.05	-.05	.92	1.08
	Marital status	.04	.07	.03	.57	.572	.04	.03	.03	.93	1.08
	Number of children	.09	.14	.04	.62	.534	.01	.03	.03	.86	1.16
	Racial or ethnic heritage	.01	.03	.01	.17	.867	.01	.01	.01	.96	1.04
	Level of education	-.36	.09	-.21	-3.84	.000	-.21	-.20	-.20	.93	1.08
	Net personal monthly income	-.00	.21	-.00	-.02	.983	-.05	-.00	-.00	.77	1.30
	Media Consumption	-.03	.03	-.04	-.84	.400	-.05	-.05	-.04	.98	1.02
	Body Mass Index	.04	.02	.10	1.95	.053	.12	.10	.10	.96	1.04
	Self-esteem	-.04	.04	-.05	-1.01	.314	-.03	-.05	-.05	.97	1.03
5	(Constant)	7.93	.61		13.08	.000					
	Age Group	-.02	.07	-.02	-.35	.730	-.06	-.02	-.02	.92	1.09
	Marital status	.02	.06	.02	.35	.728	.04	.02	.02	.92	1.08
	Number of children	.03	.13	.01	.24	.811	.01	.01	.01	.86	1.17

Racial or ethnic heritage	.00	.03	.00	.05	.959	.01	.00	.00	.96	1.04
Level of education	-.33	.09	-.19	-3.77	.000	-.21	-.20	-.18	.93	1.08
Net personal monthly income	.06	.19	.02	.32	.746	-.05	.02	.02	.76	1.32
Media Consumption	-.03	.03	-.05	-.92	.360	-.05	-.05	-.04	.98	1.02
Body Mass Index	.04	.02	.10	2.05	.041	.12	.11	.10	.96	1.04
Self-esteem	-.02	.04	-.03	-.50	.618	-.03	-.03	-.02	.97	1.03
Perception_Self	-.05	.02	-.13	-2.68	.008	-.17	-.14	-.13	.97	1.03
Perception_Others	-.29	.05	-.32	-6.56	.000	-.34	-.33	-.32	.98	1.02

a. Dependent Variable: Body Dissatisfaction

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	VIF	Minimum Tolerance
1	Media Consumption	-.05[b]	-.93	.353	-.05	.98	1.02	.77
	Body Mass Index	.10[b]	1.88	.061	.10	.98	1.02	.77
	Self-esteem	-.04[b]	-.79	.433	-.04	.99	1.01	.77
	Perception_Self	-.15[b]	-2.91	.004	-.15	.98	1.02	.76
	Perception_Others	-.33[b]	-6.74	.000	-.34	.99	1.01	.77
2	Body Mass Index	.10[c]	1.84	.066	.10	.98	1.02	.77
	Self-esteem	-.04[c]	-.79	.433	-.04	.99	1.01	.77
	Perception_Self	-.15[c]	-2.91	.004	-.15	.98	1.02	.76
	Perception_Others	-.33[c]	-6.74	.000	-.34	.99	1.01	.77
3	Self-esteem	-.05[d]	-1.01	.314	-.05	.97	1.03	.77
	Perception_Self	-.16[d]	-2.98	.003	-.16	.98	1.02	.76
	Perception_Others	-.33[d]	-6.75	.000	-.34	.99	1.01	.77
4	Perception_Self	-.15[e]	-2.94	.004	-.16	.98	1.03	.76
	Perception_Others	-.33[e]	-6.68	.000	-.34	.98	1.02	.77

a. Dependent Variable: Body Dissatisfaction

b. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

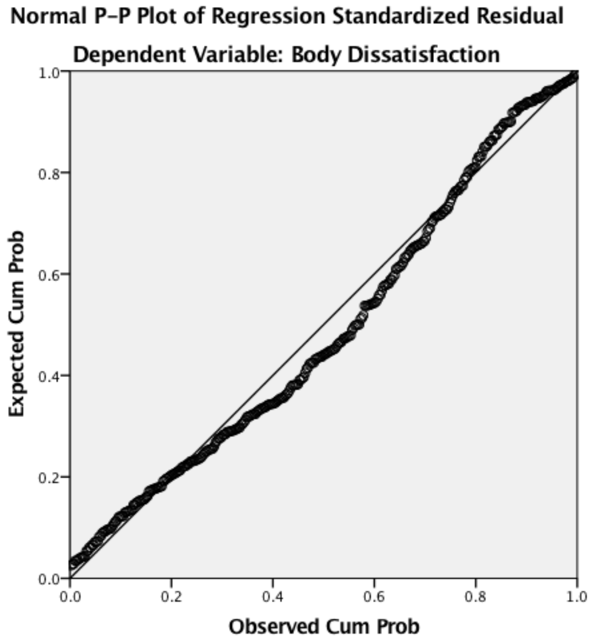
d. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

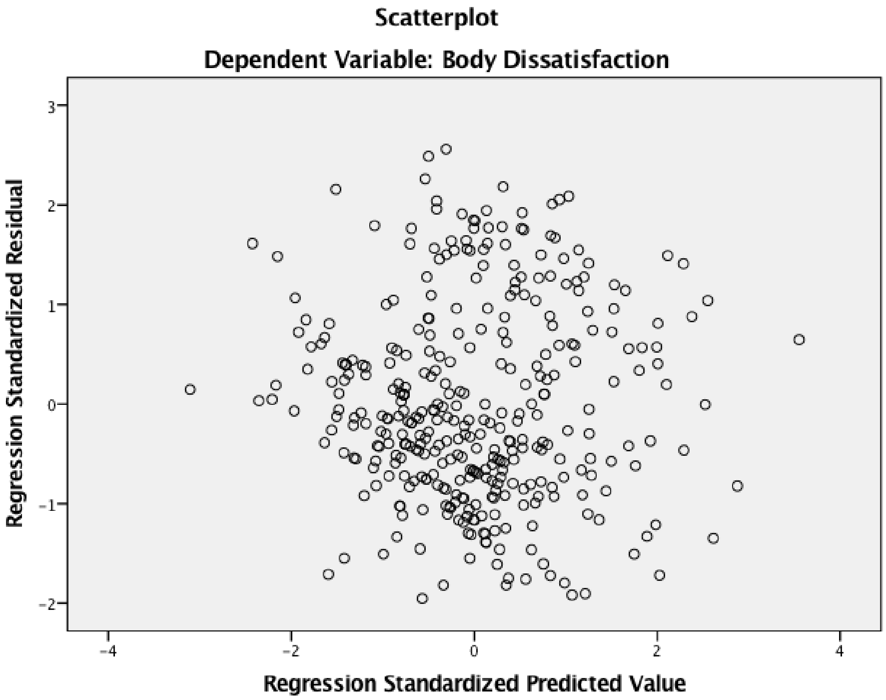
e. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.70	7.13	5.83	.36	357
Residual	-1.50	1.97	.00	.76	357
Std. Predicted Value	-3.10	3.55	.00	1.00	357
Std. Residual	-1.95	2.56	.00	.98	357

a. Dependent Variable: Body Dissatisfaction





Appendix 17

Section II: Hierarchical Multiple Regression Analysis Predicting Internalisation of Appearance Ideals

Descriptive Statistics

	Mean	Std. Deviation	N
Internalisation of Appearance Ideals	5.05	.98	357
Age Group	1.48	.63	357
Marital status	1.28	.66	357
Number of children	.06	.34	357
Racial or ethnic heritage	1.51	1.33	357
Level of education	3.37	.49	357
Net personal monthly income	1.06	.24	357
Media Consumption	3.35	1.41	357
Body Mass Index	22.61	2.42	357
Self-esteem	5.26	1.09	357
Perception_Self	7.82	2.26	357
Perception_Others	4.39	.92	357

Correlations

		1	2	3	4	5	6	7	8	9	10	11	12
Pearson Correlation	1	1.00	-.11	.02	.06	.01	-.07	-.08	-.01	.08	-.10	-.32	-.07
	2	-.11	1.00	.02	.15	-.01	.04	.25	.06	-.07	-.01	.08	.08
	3	.02	.02	1.00	.19	-.04	-.00	.23	-.02	-.01	.00	-.02	-.03
	4	.06	.15	.19	1.00	-.05	.12	.33	-.01	-.02	-.05	-.00	-.04
	5	.01	-.01	-.04	-.05	1.00	-.01	.09	.13	.02	-.07	-.01	-.01
	6	-.07	.04	-.00	.12	-.01	1.00	.24	-.01	-.10	-.07	.06	.03
	7	-.08	.25	.23	.33	.09	.24	1.00	.01	-.10	-.07	.12	.01
	8	-.01	.06	-.02	-.01	.13	-.01	.01	1.00	-.05	-.01	.00	.00
	9	.08	-.07	-.01	-.02	.02	-.10	-.10	-.05	1.00	.12	.01	-.02
	10	-.10	-.01	.00	-.05	-.07	-.07	-.07	-.01	.12	1.00	.04	.07
	11	-.32	.08	-.02	-.00	-.01	.06	.12	.00	.01	.04	1.00	.08
	12	-.07	.08	-.03	-.04	-.01	.03	.01	.00	-.02	.07	.08	1.00
Sig. (1-tailed)	1	.	.017	.365	.129	.456	.104	.073	.453	.066	.029	.000	.106
	2	.017	.	.323	.002	.434	.234	.000	.127	.088	.443	.075	.059
	3	.365	.323	.	.000	.221	.496	.000	.339	.415	.486	.341	.304
	4	.129	.002	.000	.	.155	.010	.000	.424	.382	.190	.493	.247
	5	.456	.434	.221	.155	.	.463	.054	.007	.355	.104	.400	.418
	6	.104	.234	.496	.010	.463	.	.000	.432	.026	.087	.148	.259
	7	.073	.000	.000	.000	.054	.000	.	.404	.029	.089	.013	.413
	8	.453	.127	.339	.424	.007	.432	.404	.	.197	.438	.486	.479
	9	.066	.088	.415	.382	.355	.026	.029	.197	.	.010	.393	.365
	10	.029	.443	.486	.190	.104	.087	.089	.438	.010	.	.203	.109
	11	.000	.075	.341	.493	.400	.148	.013	.486	.393	.203	.	.076
	12	.106	.059	.304	.247	.418	.259	.413	.479	.365	.109	.076	.

N	1	357	357	357	357	357	357	357	357	357	357	357	357
	2	357	357	357	357	357	357	357	357	357	357	357	357
	3	357	357	357	357	357	357	357	357	357	357	357	357
	4	357	357	357	357	357	357	357	357	357	357	357	357
	5	357	357	357	357	357	357	357	357	357	357	357	357
	6	357	357	357	357	357	357	357	357	357	357	357	357
	7	357	357	357	357	357	357	357	357	357	357	357	357
	8	357	357	357	357	357	357	357	357	357	357	357	357
	9	357	357	357	357	357	357	357	357	357	357	357	357
	10	357	357	357	357	357	357	357	357	357	357	357	357
	11	357	357	357	357	357	357	357	357	357	357	357	357
	12	357	357	357	357	357	357	357	357	357	357	357	357

* **<u>Item Legend</u>**:

1 – Internalisation of Appearance Ideals

2 – Age group

3 – Marital status

4 – Number of children

5 – Racial or ethnic heritage

6 – Level of education

7 – Net personal monthly income

8 – Media consumption

9 – Body Mass Index

10 – Self-esteem

11 - Perception of media effects on self

12 – Perception of media effects on others

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children[b]	.	Enter
2	Media Consumption[b]	.	Enter
3	Body Mass Index[b]	.	Enter
4	Self-esteem[b]	.	Enter
5	Perception_Others, Perception_Self[b]	.	Enter

a. Dependent Variable: Internalisation of Appearance Ideals

b. All requested variables entered.

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.170[a]	.029	.012	.97	.029	1.73	6	350	.112
2	.170[b]	.029	.009	.97	.000	.00	1	349	.999
3	.180[c]	.033	.010	.97	.004	1.34	1	348	.249
4	.213[d]	.045	.021	.97	.013	4.65	1	347	.032
5	.366[e]	.134	.107	.92	.089	17.70	2	345	.000

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self
f. Dependent Variable: Internalisation of Appearance Ideals

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.80	6	1.63	1.733	.112[b]
	Residual	329.84	350	.94		
	Total	339.64	356			
2	Regression	9.80	7	1.40	1.481	.173[c]
	Residual	329.84	349	.95		
	Total	339.64	356			
3	Regression	11.06	8	1.38	1.464	.169[d]
	Residual	328.58	348	.94		
	Total	339.64	356			
4	Regression	15.40	9	1.71	1.832	.062[e]
	Residual	324.24	347	.93		
	Total	339.64	356			
5	Regression	45.58	11	4.14	4.861	.000[f]
	Residual	294.06	345	.85		
	Total	339.64	356			

a. Dependent Variable: Internalisation of Appearance Ideals

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

Coefficients[a]

Model		Unstandardised Coefficients B	Unstandardised Coefficients Std. Error	Standardised Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	5.95	.42		14.31	.000					
	Age Group	-.17	.08	-.11	-1.98	.049	-.11	-.11	-.10	.93	1.08
	Marital status	.03	.08	.02	.35	.725	.02	.02	.02	.93	1.08
	Number of children	.30	.16	.11	1.88	.061	.06	.10	.10	.86	1.16
	Racial or ethnic heritage	.01	.04	.02	.33	.739	.01	.02	.02	.98	1.02
	Level of education	-.11	.11	-.06	-1.05	.295	-.07	-.06	-.06	.94	1.07
	Net personal monthly income	-.32	.24	-.08	-1.30	.196	-.08	-.07	-.07	.77	1.30
2	(Constant)	5.95	.43		13.78	.000					
	Age Group	-.17	.08	-.11	-1.97	.049	-.11	-.11	-.10	.93	1.08
	Marital status	.03	.08	.02	.35	.725	.02	.02	.02	.93	1.08
	Number of children	.30	.16	.11	1.88	.061	.06	.10	.10	.86	1.16
	Racial or ethnic heritage	.01	.04	.02	.33	.741	.01	.02	.02	.97	1.04
	Level of education	-.11	.11	-.06	-1.05	.296	-.07	-.06	-.06	.94	1.07
	Net personal monthly income	-.32	.24	-.08	-1.30	.196	-.08	-.07	-.07	.77	1.30
	Media Consumption	.00	.04	.00	-.00	.999	-.01	.00	.00	.98	1.02
3	(Constant)	5.32	.70		7.65	.000					
	Age Group	-.16	.09	-.11	-1.92	.056	-.11	-.10	-.10	.92	1.08
	Marital status	.03	.08	.02	.35	.728	.02	.02	.02	.93	1.08

	Number of children	.30	.16	.11	1.85	.065	.06	.10	.10	.86	1.16
	Racial or ethnic heritage	.01	.04	.02	.29	.771	.01	.02	.02	.96	1.04
	Level of education	-.10	.11	-.05	-.95	.344	-.07	-.05	-.05	.93	1.08
	Net personal monthly income	-.30	.24	-.07	-1.21	.227	-.08	-.07	-.06	.77	1.30
	Media Consumption	.00	.04	.00	.05	.959	-.01	.00	.00	.98	1.02
	Body Mass Index	.03	.02	.06	1.16	.249	.08	.06	.06	.98	1.02
4	(Constant)	5.79	.73		7.98	.000					
	Age Group	-.16	.08	-.10	-1.89	.060	-.11	-.10	-.10	.92	1.08
	Marital status	.03	.08	.02	.38	.702	.02	.02	.02	.93	1.08
	Number of children	.29	.16	.10	1.79	.075	.06	.10	.09	.86	1.16
	Racial or ethnic heritage	.01	.04	.01	.15	.883	.01	.01	.01	.96	1.04
	Level of education	-.11	.11	-.06	-1.05	.294	-.07	-.06	-.06	.93	1.08
	Net personal monthly income	-.31	.24	-.08	-1.29	.198	-.08	-.07	-.07	.77	1.30
	Media Consumption	.00	.04	.00	.06	.950	-.01	.00	.00	.98	1.02
	Body Mass Index	.03	.02	.08	1.40	.162	.08	.08	.07	.96	1.04
	Self-esteem	-.10	.05	-.12	-2.16	.032	-.10	-.12	-.11	.97	1.03
5	(Constant)	6.51	.73		8.94	.000					
	Age Group	-.13	.08	-.09	-1.63	.104	-.11	-.09	-.08	.92	1.09
	Marital status	.01	.08	.01	.13	.893	.02	.01	.01	.92	1.08
	Number of children	.24	.15	.09	1.58	.114	.06	.09	.08	.86	1.17
	Racial or ethnic heritage	.00	.04	.00	.00	1.00	.01	.00	.00	.96	1.04
	Level of education	-.09	.10	-.05	-.88	.377	-.07	-.05	-.04	.93	1.08

Net personal monthly income	-.15	.23	-.04	-.66	.511	-.08	-.04	-.03	.76	1.32
Media Consumption	.00	.04	.00	.07	.945	-.01	.00	.00	.98	1.02
Body Mass Index	.03	.02	.08	1.63	.105	.08	.09	.08	.96	1.04
Self-esteem	-.09	.05	-.10	-1.93	.054	-.10	-.10	-.10	.97	1.03
Perception_Self	-.13	.02	-.30	-5.89	.000	-.32	-.30	-.30	.97	1.03
Perception_Others	-.02	.05	-.02	-.46	.649	-.07	-.02	-.02	.98	1.02

a. Dependent Variable: Internalisation of Appearance Ideals

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	VIF	Minimum Tolerance
1	Media Consumption	.00[b]	-.00	.999	.00	.98	1.02	.77
	Body Mass Index	.06[b]	1.16	.249	.06	.98	1.02	.77
	Self-esteem	-.11[b]	-2.01	.045	-.11	.99	1.01	.77
	Perception_Self	-.30[b]	-5.97	.000	-.31	.98	1.02	.76
	Perception_Others	-.05[b]	-.95	.344	-.05	.99	1.01	.77
2	Body Mass Index	.06[c]	1.16	.249	.06	.98	1.02	.77
	Self-esteem	-.11[c]	-2.01	.046	-.11	.99	1.01	.77
	Perception_Self	-.30[c]	-5.97	.000	-.31	.98	1.02	.76
	Perception_Others	-.05[c]	-.95	.344	-.05	.99	1.01	.77
3	Self-esteem	-.12[d]	-2.16	.032	-.12	.97	1.03	.77
	Perception_Self	-.31[d]	-6.02	.000	-.31	.98	1.02	.76
	Perception_Others	-.05[d]	-.94	.349	-.05	.99	1.01	.77
4	Perception_Self	-.30[e]	-5.94	.000	-.30	.98	1.03	.76
	Perception_Others	-.04[e]	-.80	.426	-.04	.98	1.02	.77

a. Dependent Variable: Internalisation of Appearance Ideals

b. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

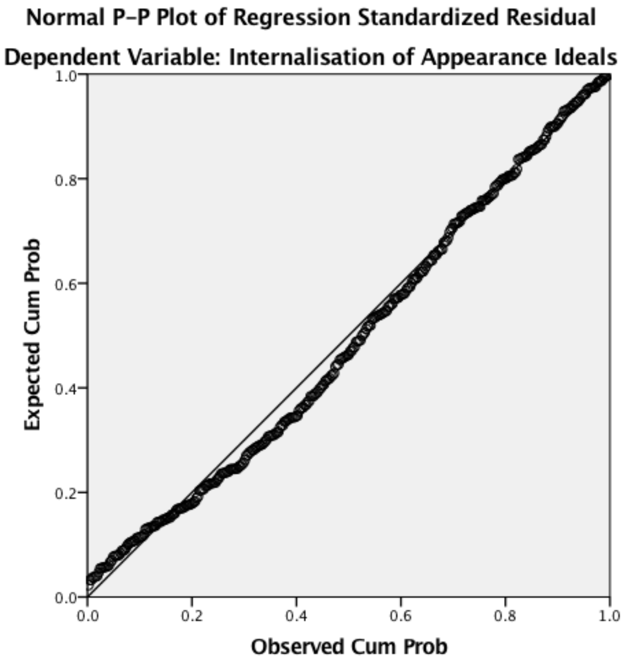
d. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

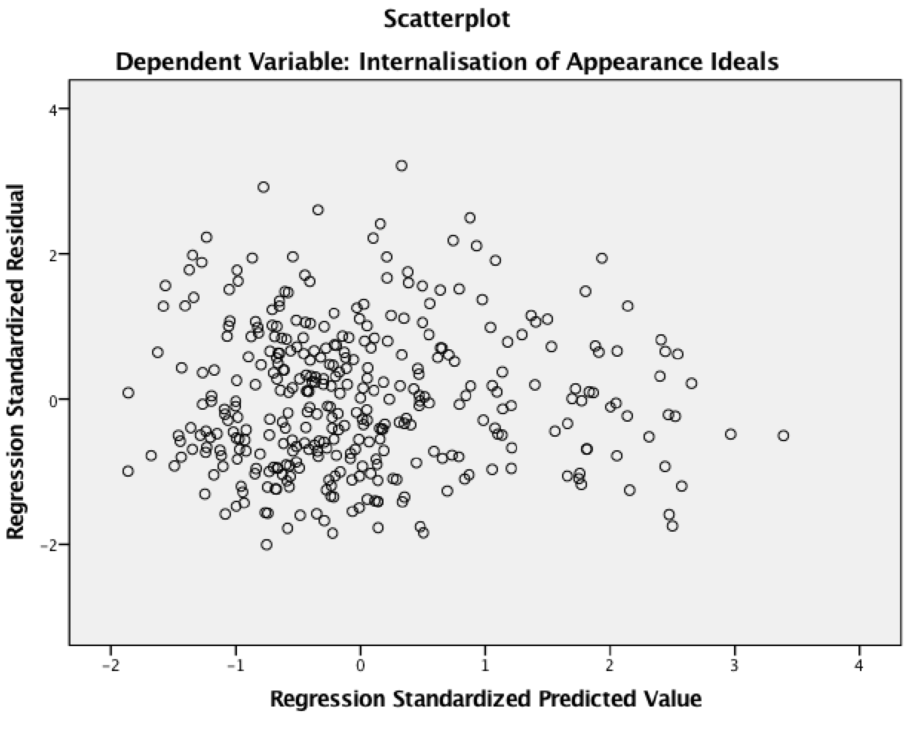
e. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.39	6.27	5.05	.36	357
Residual	-1.85	2.96	.00	.91	357
Std. Predicted Value	-1.86	3.39	.00	1.00	357
Std. Residual	-2.01	3.21	.00	.98	357

a. Dependent Variable: Internalisation of Appearance Ideals





Appendix 18

Section II: Hierarchical Multiple Regression Analysis Predicting Awareness of Appearance Pressures

Descriptive Statistics

	Mean	Std. Deviation	N
Appearance Pressures	4.87	.86	357
Age Group	1.48	.63	357
Marital status	1.28	.66	357
Number of children	.06	.34	357
Racial or ethnic heritage	1.51	1.33	357
Level of education	3.37	.49	357
Net personal monthly income	1.06	.24	357
Media Consumption	3.35	1.41	357
Body Mass Index	22.61	2.42	357
Self-esteem	5.26	1.09	357
Perception_Self	7.82	2.26	357
Perception_Others	4.39	.92	357

Correlations

		1	2	3	4	5	6	7	8	9	10	11	12
Pearson Correlation	1	1.00	-.19	-.02	.02	-.02	-.10	-.10	-.08	.05	.07	-.32	-.02
	2	-.19	1.00	.02	.15	-.01	.04	.25	.06	-.07	-.01	.08	.08
	3	-.02	.02	1.00	.19	-.04	-.00	.23	-.02	-.01	.00	-.02	-.03
	4	.02	.15	.19	1.00	-.05	.12	.33	-.01	-.02	-.05	-.00	-.04
	5	-.02	-.01	-.04	-.05	1.00	-.01	.09	.13	.02	-.07	-.01	-.01
	6	-.10	.04	-.00	.12	-.01	1.00	.24	-.01	-.10	-.07	.06	.03
	7	-.10	.25	.23	.33	.09	.24	1.00	.01	-.10	-.07	.12	.01
	8	-.08	.06	-.02	-.01	.13	-.01	.01	1.00	-.05	-.01	.00	.00
	9	.05	-.07	-.01	-.02	.02	-.10	-.10	-.05	1.00	.12	.01	-.02
	10	.07	-.01	.00	-.05	-.07	-.07	-.07	-.01	.12	1.00	.04	.07
	11	-.32	.08	-.02	-.00	-.01	.06	.12	.00	.01	.04	1.00	.08
	12	-.02	.08	-.03	-.04	-.01	.03	.01	.00	-.02	.07	.08	1.00
Sig. (1-tailed)	1	.	.000	.357	.364	.355	.026	.029	.072	.154	.099	.000	.326
	2	.000	.	.323	.002	.434	.234	.000	.127	.088	.443	.075	.059
	3	.357	.323	.	.000	.221	.496	.000	.339	.415	.486	.341	.304
	4	.364	.002	.000	.	.155	.010	.000	.424	.382	.190	.493	.247
	5	.355	.434	.221	.155	.	.463	.054	.007	.355	.104	.400	.418
	6	.026	.234	.496	.010	.463	.	.000	.432	.026	.087	.148	.259
	7	.029	.000	.000	.000	.054	.000	.	.404	.029	.089	.013	.413
	8	.072	.127	.339	.424	.007	.432	.404	.	.197	.438	.486	.479
	9	.154	.088	.415	.382	.355	.026	.029	.197	.	.010	.393	.365
	10	.099	.443	.486	.190	.104	.087	.089	.438	.010	.	.203	.109
	11	.000	.075	.341	.493	.400	.148	.013	.486	.393	.203	.	.076
	12	.326	.059	.304	.247	.418	.259	.413	.479	.365	.109	.076	.

N	1	357	357	357	357	357	357	357	357	357	357	357	357
	2	357	357	357	357	357	357	357	357	357	357	357	357
	3	357	357	357	357	357	357	357	357	357	357	357	357
	4	357	357	357	357	357	357	357	357	357	357	357	357
	5	357	357	357	357	357	357	357	357	357	357	357	357
	6	357	357	357	357	357	357	357	357	357	357	357	357
	7	357	357	357	357	357	357	357	357	357	357	357	357
	8	357	357	357	357	357	357	357	357	357	357	357	357
	9	357	357	357	357	357	357	357	357	357	357	357	357
	10	357	357	357	357	357	357	357	357	357	357	357	357
	11	357	357	357	357	357	357	357	357	357	357	357	357
	12	357	357	357	357	357	357	357	357	357	357	357	357

* **<u>Item Legend</u>:**

1 – Appearance Pressures

2 – Age group

3 – Marital status

4 – Number of children

5 – Racial or ethnic heritage

6 – Level of education

7 – Net personal monthly income

8 – Media consumption

9 – Body Mass Index

10 – Self-esteem

11 – Perception of media effects on self

12 – Perception of media effects on others

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children[b]	.	Enter
2	Media Consumption[b]	.	Enter
3	Body Mass Index[b]	.	Enter
4	Self-esteem[b]	.	Enter
5	Perception_Others, Perception_Self[b]	.	Enter

a. Dependent Variable: Appearance Pressures

b. All requested variables entered.

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.225[a]	.051	.035	.85	.051	3.12	6	350	.005
2	.235[b]	.055	.036	.85	.004	1.56	1	349	.212
3	.236[c]	.056	.034	.85	.001	.23	1	348	.634
4	.243[d]	.059	.035	.85	.003	1.20	1	347	.275
5	.390[e]	.152	.125	.81	.093	18.93	2	345	.000

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self
f. Dependent Variable: Appearance Pressures

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.51	6	2.25	3.124	.005[b]
	Residual	252.21	350	.72		
	Total	265.72	356			
2	Regression	14.63	7	2.09	2.905	.006[c]
	Residual	251.09	349	.72		
	Total	265.72	356			
3	Regression	14.80	8	1.85	2.565	.010[d]
	Residual	250.93	348	.72		
	Total	265.72	356			
4	Regression	15.66	9	1.74	2.414	.011[e]
	Residual	250.06	347	.72		
	Total	265.72	356			
5	Regression	40.39	11	3.67	5.621	.000[f]
	Residual	225.34	345	.65		
	Total	265.72	356			

a. Dependent Variable: Appearance Pressures

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Perception_Others, Perception_Self

Coefficients[a]

Model		Unstandardised Coefficients B	Unstandardised Coefficients Std. Error	Standardised Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	6.02	.36		16.57	.000					
	Age Group	-.25	.07	-.18	-3.36	.001	-.19	-.18	-.18	.93	1.08
	Marital status	-.02	.07	-.02	-.34	.737	-.02	-.02	-.02	.93	1.08
	Number of children	.20	.14	.08	1.40	.163	.02	.07	.07	.86	1.16
	Racial or ethnic heritage	-.01	.03	-.01	-.26	.795	-.02	-.01	-.01	.98	1.02
	Level of education	-.16	.10	-.09	-1.72	.086	-.10	-.09	-.09	.94	1.07
	Net personal monthly income	-.19	.21	-.05	-.91	.363	-.10	-.05	-.05	.77	1.30
2	(Constant)	6.15	.38		16.32	.000					
	Age Group	-.24	.07	-.18	-3.28	.001	-.19	-.17	-.17	.93	1.08
	Marital status	-.03	.07	-.02	-.36	.723	-.02	-.02	-.02	.93	1.08
	Number of children	.20	.14	.08	1.39	.166	.02	.07	.07	.86	1.16
	Racial or ethnic heritage	-.00	.03	-.01	-.10	.922	-.02	-.01	-.01	.97	1.04
	Level of education	-.17	.10	-.09	-1.73	.084	-.10	-.09	-.09	.94	1.07
	Net personal monthly income	-.20	.21	-.05	-.92	.359	-.10	-.05	-.05	.77	1.30
	Media Consumption	-.04	.03	-.07	-1.25	.212	-.08	-.07	-.07	.98	1.02
3	(Constant)	5.92	.61		9.75	.000					
	Age Group	-.24	.07	-.18	-3.25	.001	-.19	-.17	-.17	.92	1.08
	Marital status	-.03	.07	-.02	-.36	.722	-.02	-.02	-.02	.93	1.08

	Number of children	.19	.14	.08	1.37	.170	.02	.07	.07	.86	1.16
	Racial or ethnic heritage	-.00	.03	-.01	-.11	.909	-.02	-.01	-.01	.96	1.04
	Level of education	-.16	.10	-.09	-1.69	.093	-.10	-.09	-.09	.93	1.08
	Net personal monthly income	-.19	.21	-.05	-.88	.379	-.10	-.05	-.05	.77	1.30
	Media Consumption	-.04	.03	-.07	-1.23	.222	-.08	-.07	-.06	.98	1.02
	Body Mass Index	.01	.02	.03	.48	.634	.05	.03	.03	.98	1.02
4	(Constant)	5.71	.64		8.96	.000					
	Age Group	-.24	.07	-.18	-3.26	.001	-.19	-.17	-.17	.92	1.08
	Marital status	-.03	.07	-.02	-.37	.710	-.02	-.02	-.02	.93	1.08
	Number of children	.20	.14	.08	1.41	.159	.02	.08	.07	.86	1.16
	Racial or ethnic heritage	-.00	.03	-.00	-.04	.968	-.02	-.00	-.00	.96	1.04
	Level of education	-.16	.10	-.09	-1.63	.103	-.10	-.09	-.09	.93	1.08
	Net personal monthly income	-.18	.21	-.05	-.84	.400	-.10	-.05	-.04	.77	1.30
	Media Consumption	-.04	.03	-.07	-1.23	.219	-.08	-.07	-.06	.98	1.02
	Body Mass Index	.01	.02	.02	.35	.728	.05	.02	.02	.96	1.04
	Self-esteem	.05	.04	.06	1.09	.275	.07	.06	.06	.97	1.03
5	(Constant)	6.23	.64		9.77	.000					
	Age Group	-.22	.07	-.16	-3.12	.002	-.19	-.17	-.16	.92	1.09
	Marital status	-.04	.07	-.03	-.65	.514	-.02	-.04	-.03	.92	1.08
	Number of children	.17	.14	.07	1.22	.224	.02	.07	.06	.86	1.17
	Racial or ethnic heritage	-.01	.03	-.01	-.20	.844	-.02	-.01	-.01	.96	1.04
	Level of education	-.14	.09	-.08	-1.52	.130	-.10	-.08	-.08	.93	1.08

Net personal monthly income	-.04	.20	-.01	-.17	.865	-.10	-.01	-.01	.76	1.32
Media Consumption	-.04	.03	-.07	-1.29	.199	-.08	-.07	-.06	.98	1.02
Body Mass Index	.01	.02	.03	.54	.588	.05	.03	.03	.96	1.04
Self-esteem	.06	.04	.07	1.43	.154	.07	.08	.07	.97	1.03
Perception of Media Effects on the Self	-.12	.02	-.31	-6.15	.000	-.32	-.31	-.31	.97	1.03
FPP_Others	.01	.05	.01	.26	.793	-.02	.01	.01	.98	1.02

a. Dependent Variable: Appearance Pressures

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	VIF	Minimum Tolerance
1	Media Consumption	-.07[b]	-1.25	.212	-.07	.98	1.02	.77
	Body Mass Index	.03[b]	.53	.594	.03	.98	1.02	.77
	Self-esteem	.06[b]	1.14	.254	.06	.99	1.01	.77
	Perception_Self	-.30[b]	-6.06	.000	-.31	.98	1.02	.76
	Perception_Others	-.00[b]	-.06	.956	-.00	.99	1.01	.77
2	Body Mass Index	.03[c]	.48	.634	.03	.98	1.02	.77
	Self-esteem	.06[c]	1.14	.254	.06	.99	1.01	.77
	Perception_Self	-.30[c]	-6.07	.000	-.31	.98	1.02	.76
	Perception_Others	-.00[c]	-.06	.955	-.00	.99	1.01	.77
3	Self-esteem	.06[d]	1.09	.275	.06	.97	1.03	.77
	Perception_Self	-.31[d]	-6.08	.000	-.31	.98	1.02	.76
	Perception_Others	-.00[d]	-.05	.958	-.00	.99	1.01	.77
4	Perception_Self	-.31[e]	-6.16	.000	-.31	.98	1.03	.76
	Perception_Others	-.01[e]	-.13	.899	-.01	.98	1.02	.77

a. Dependent Variable: Appearance Pressures

b. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

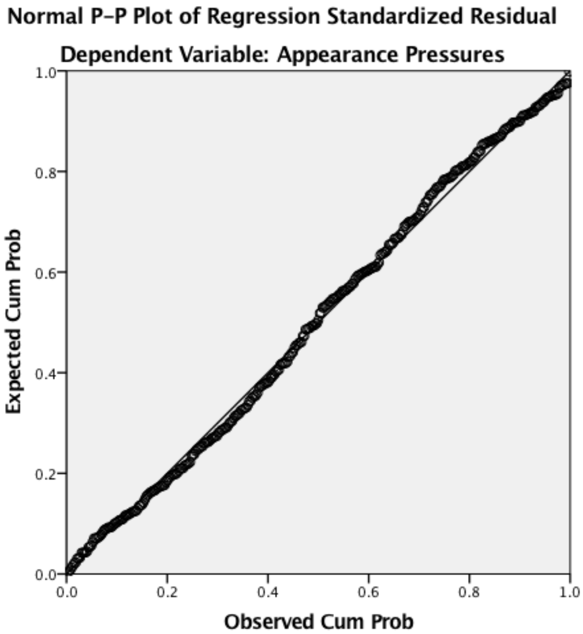
d. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

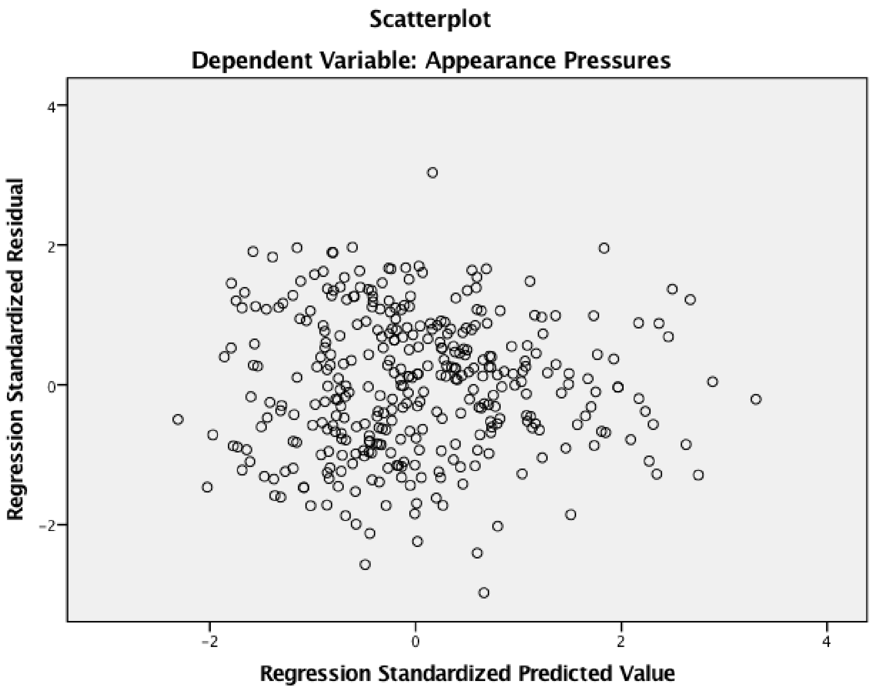
e. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.09	5.98	4.87	.34	357
Residual	-2.40	2.45	.00	.80	357
Std. Predicted Value	-2.31	3.31	.00	1.00	357
Std. Residual	-2.97	3.04	.00	.98	357

a. Dependent Variable: Appearance Pressures





Appendix 19

Section II: Hierarchical Multiple Regression Analysis Predicting Perceived Intention of Self to Engage in Socially Desirable Action

Descriptive Statistics

	Mean	Std. Deviation	N
Perceived Intention_Self	7.78	2.52	357
Age Group	1.48	.63	357
Marital status	1.28	.66	357
Number of children	.06	.34	357
Racial or ethnic heritage	1.51	1.33	357
Level of education	3.37	.49	357
Net personal monthly income	1.06	.24	357
Media Consumption	3.35	1.41	357
Body Mass Index	22.61	2.42	357
Self-esteem	5.26	1.09	357
First-person Perception	3.43	2.38	357

Correlations

		1	2	3	4	5	6	7	8	9	10	11
Pearson Correlation	1	1.00	.09	.05	-.08	.06	.01	.04	.01	-.07	-.05	.18
	2	.09	1.00	.02	.15	-.01	.04	.25	.06	-.07	-.01	.04
	3	.05	.02	1.00	.19	-.04	-.00	.23	-.02	-.01	.00	-.01
	4	-.08	.15	.19	1.00	-.05	.12	.33	-.01	-.02	-.05	.01
	5	.06	-.01	-.04	-.05	1.00	-.01	.09	.13	.02	-.07	-.01
	6	.01	.04	-.00	.12	-.01	1.00	.24	-.01	-.10	-.07	.04
	7	.04	.25	.23	.33	.09	.24	1.00	.01	-.10	-.07	.11
	8	.01	.06	-.02	-.01	.13	-.01	.01	1.00	-.05	-.01	.00
	9	-.07	-.07	-.01	-.02	.02	-.10	-.10	-.05	1.00	.12	.02
	10	-.05	-.01	.00	-.05	-.07	-.07	-.07	-.01	.12	1.00	.02
	11	.18	.04	-.01	.01	-.01	.04	.11	.00	.02	.02	1.00
Sig. (1-tailed)	1	.	.048	.161	.076	.113	.405	.221	.456	.110	.194	.000
	2	.048	.	.323	.002	.434	.234	.000	.127	.088	.443	.224
	3	.161	.323	.	.000	.221	.496	.000	.339	.415	.486	.425
	4	.076	.002	.000	.	.155	.010	.000	.424	.382	.190	.402
	5	.113	.434	.221	.155	.	.463	.054	.007	.355	.104	.436
	6	.405	.234	.496	.010	.463	.	.000	.432	.026	.087	.229
	7	.221	.000	.000	.000	.054	.000	.	.404	.029	.089	.021
	8	.456	.127	.339	.424	.007	.432	.404	.	.197	.438	.495
	9	.110	.088	.415	.382	.355	.026	.029	.197	.	.010	.348
	10	.194	.443	.486	.190	.104	.087	.089	.438	.010	.	.377
	11	.000	.224	.425	.402	.436	.229	.021	.495	.348	.377	.

N	1	357	357	357	357	357	357	357	357	357	357	357
	2	357	357	357	357	357	357	357	357	357	357	357
	3	357	357	357	357	357	357	357	357	357	357	357
	4	357	357	357	357	357	357	357	357	357	357	357
	5	357	357	357	357	357	357	357	357	357	357	357
	6	357	357	357	357	357	357	357	357	357	357	357
	7	357	357	357	357	357	357	357	357	357	357	357
	8	357	357	357	357	357	357	357	357	357	357	357
	9	357	357	357	357	357	357	357	357	357	357	357
	10	357	357	357	357	357	357	357	357	357	357	357
	11	357	357	357	357	357	357	357	357	357	357	357

* **<u>Item Legend</u>:**

1 – Perceived intention of self to engage in women empowerment campaigns

2 – Age group

3 – Marital status

4 – Number of children

5 – Racial or ethnic heritage

6 – Level of education

7 – Net personal monthly income

8 – Media consumption

9 – Body Mass Index

10 – Self-esteem

11 – First-person Perception

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children[b]	.	Enter
2	Media Consumption[b]	.	Enter
3	Body Mass Index[b]	.	Enter
4	Self-esteem[b]	.	Enter
5	First-person Perception[b]	.	Enter

a. Dependent Variable: Perceived Intention_Self

b. All requested variables entered.

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.161[a]	.026	.009	2.51	.026	1.55	6	350	.162
2	.161[b]	.026	.006	2.51	.000	.02	1	349	.886
3	.171[c]	.029	.007	2.51	.003	1.15	1	348	.285
4	.175[d]	.030	.005	2.52	.001	.50	1	347	.482
5	.250[e]	.026	.035	2.48	.032	11.75	1	346	.001

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, First-person Perception

f. Dependent Variable: Perceived Intention_Self

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.55	6	9.76	1.548	.162[b]
	Residual	2206.41	350	6.30		
	Total	2264.99	356			
2	Regression	58.68	7	8.38	1.326	.237[c]
	Residual	2206.28	349	6.32		
	Total	2264.96	356			
3	Regression	65.94	8	8.24	1.304	.240[d]
	Residual	2199.02	348	6.32		
	Total	2264.96	356			
4	Regression	69.07	9	7.68	1.213	.286[e]
	Residual	2195.88	347	6.33		
	Total	2264.96	356			
5	Regression	141.18	10	14.12	2.300	.013[f]
	Residual	2123.78	346	6.14		
	Total	2264.96	356			

a. Dependent Variable: Perceived Intention_Self

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, First-person Perception

Coefficients[a]

Model		Unstandardised Coefficients B	Unstandardised Coefficients Std. Error	Standardised Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	6.15	1.08		5.72	.000					
	Age Group	.39	.22	.10	1.77	.078	.09	.09	.09	.93	1.08
	Marital status	.26	.21	.07	1.22	.223	.05	.07	.06	.93	1.08
	Number of children	-.83	.42	-.11	-1.98	.049	-.08	-.11	-.10	.86	1.16
	Racial or ethnic heritage	.11	.10	.06	1.11	.266	.06	.06	.06	.98	1.02
	Level of education	.08	.28	.02	.30	.768	.01	.02	.02	.94	1.07
	Net personal monthly income	.31	.63	.03	.50	.619	.04	.03	.03	.77	1.30
2	(Constant)	6.19	1.12		5.55	.000					
	Age Group	.39	.22	.10	1.77	.078	.09	.09	.09	.93	1.08
	Marital status	.26	.21	.07	1.22	.225	.05	.07	.06	.93	1.08
	Number of children	-.83	.42	-.11	-1.98	.049	-.08	-.11	-.10	.86	1.16
	Racial or ethnic heritage	.11	.10	.06	1.12	.263	.06	.06	.06	.97	1.04
	Level of education	.08	.28	.02	.29	.769	.01	.02	.02	.94	1.07
	Net personal monthly income	.31	.63	.03	.50	.620	.04	.03	.03	.77	1.30
	Media Consumption	-.01	.10	-.01	-.14	.886	.01	-.01	-.01	.98	1.02
3	(Constant)	7.70	1.80		4.29	.000					
	Age Group	.38	.22	.09	1.72	.087	.09	.09	.09	.92	1.08

	Marital status	.26	.21	.07	1.22	.224	.05	.07	.06	.93	1.08
	Number of children	-.82	.42	-.11	-1.95	.053	-.08	-.10	-.10	.86	1.16
	Racial or ethnic heritage	.12	.10	.06	1.16	.248	.06	.06	.06	.96	1.04
	Level of education	.06	.28	.01	.20	.840	.01	.01	.01	.93	1.08
	Net personal monthly income	.26	.63	.03	.42	.676	.04	.02	.02	.77	1.30
	Media Consumption	-.02	.10	-.01	-.19	.848	.01	-.01	-.01	.98	1.02
	Body Mass Index	-.06	.06	-.06	-1.07	.285	-.07	-.06	-.06	.98	1.02
4	(Constant)	8.11	1.89		4.29	.000					
	Age Group	.38	.22	.10	1.73	.085	.09	.09	.09	.92	1.08
	Marital status	.26	.21	.07	1.23	.220	.05	.07	.07	.93	1.08
	Number of children	-.82	.42	-.11	-1.97	.050	-.08	-.11	-.10	.86	1.16
	Racial or ethnic heritage	.11	.10	.06	1.11	.269	.06	.06	.06	.96	1.04
	Level of education	.05	.28	.01	.17	.865	.01	.01	.01	.93	1.08
	Net personal monthly income	.25	.63	.02	.39	.694	.04	.02	.02	.77	1.30
	Media Consumption	-.02	.10	-.01	-.19	.850	.01	-.01	-.01	.98	1.02
	Body Mass Index	-.06	.06	-.05	-.98	.326	-.07	-.05	-.05	.96	1.04
	Self-esteem	-.09	.12	-.04	-.70	.482	-.05	-.04	-.04	.97	1.03
5	(Constant)	7.91	1.86		4.25	.000					
	Age Group	.37	.22	.09	1.70	.090	.09	.09	.09	.92	1.08
	Marital status	.28	.21	.07	1.36	.175	.05	.07	.07	.93	1.08
	Number of children	-.79	.41	-.11	-1.92	.056	-.08	-.10	-.10	.86	1.16

Racial or ethnic heritage	.12	.10	.06	1.19	.233	.06	.06	.06	.96	1.04
Level of education	.03	.28	.01	.11	.910	.01	.01	.01	.93	1.08
Net personal monthly income	.02	.63	.00	.03	.976	.04	.00	.00	.76	1.32
Media Consumption	-.02	.09	-.01	-.20	.844	.01	-.01	-.01	.98	1.02
Body Mass Index	-.06	.06	-.06	-1.11	.268	-.07	-.06	-.06	.96	1.04
Self-esteem	-.10	.12	-.04	-.78	.434	-.05	-.04	-.04	.97	1.03
First-person Perception	.19	.06	.18	3.43	.001	.18	.18	.18	.98	1.02

a. Dependent Variable: Perceived Intention_Self

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	VIF	Minimum Tolerance
1	Media Consumption	-.008[b]	-.14	.886	-.01	.98	1.02	.77
	Body Mass Index	-.057[b]	-1.07	.287	-.06	.98	1.02	.77
	Self-esteem	-.044[b]	-.82	.410	-.04	.99	1.01	.77
	First-person Perception	.177[b]	3.38	.001	.18	.99	1.01	.76
2	Body Mass Index	-.057[c]	-1.07	.285	-.06	.98	1.02	.77
	Self-esteem	-.044[c]	-.82	.411	-.04	.99	1.01	.77
	First-person Perception	.177[c]	3.37	.001	.18	.99	1.01	.76
3	Self-esteem	-.038[d]	-.70	.482	-.04	.97	1.03	.77
	First-person Perception	.179[d]	3.41	.001	.18	.99	1.02	.76
4	First-person Perception	.180[e]	3.43	.001	.18	.98	1.02	.76

a. Dependent Variable: Perceived Intention_Self

b. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

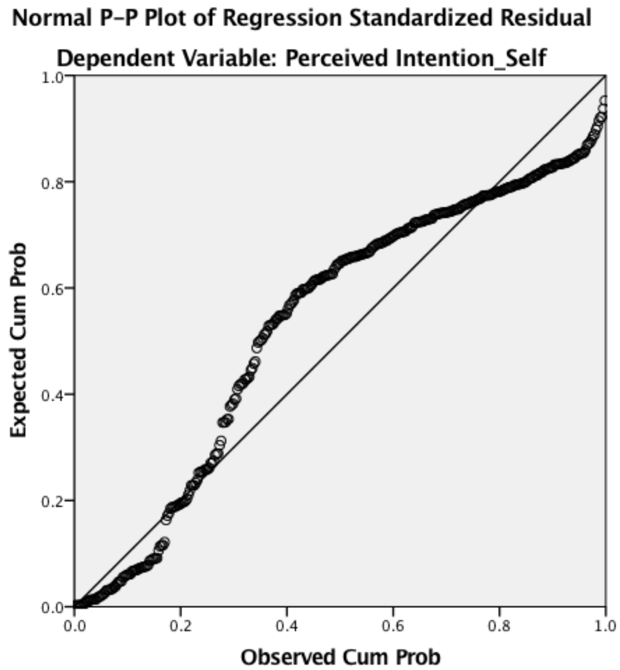
d. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

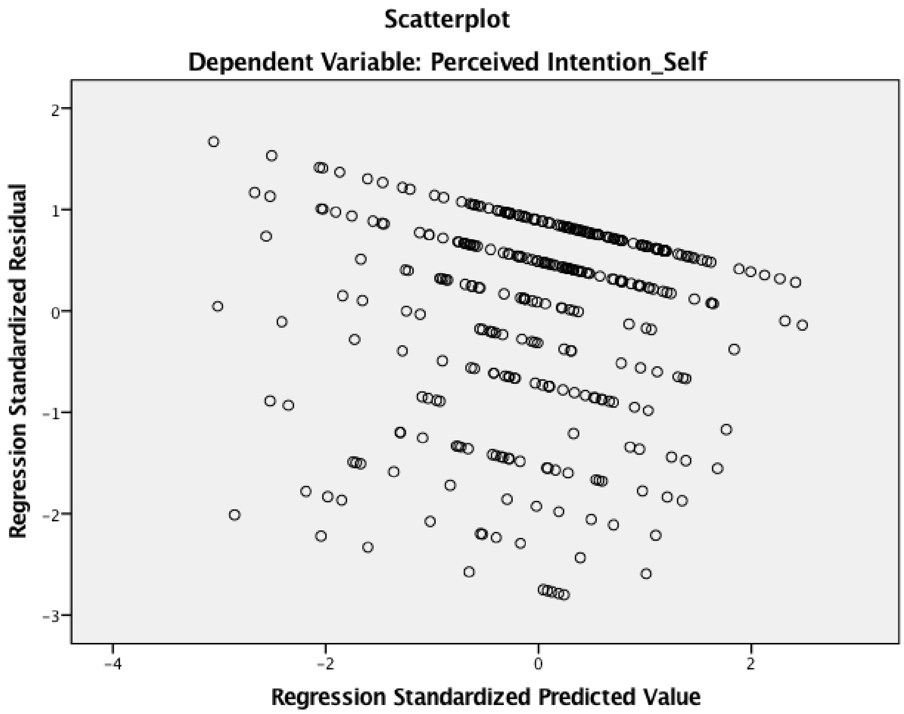
e. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.86	9.34	7.78	.63	357
Residual	-6.93	4.14	.00	2.44	357
Std. Predicted Value	-3.05	2.48	.00	1.00	357
Std. Residual	-2.80	1.67	.00	.99	357

a. Dependent Variable: Perceived Intention_Self





Appendix 20

Section II: ANCOVA (A) – Perception of Media Effects on Self

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	119
	3	Audio + AR	118

Descriptive Statistics

Dependent Variable: Perception of Media Effects on Self

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	6.89	2.70	120
Audio + Video	7.66	2.05	119
Audio + AR	8.94	1.33	118
Total	7.82	2.26	357

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Perception of Media Effects on Self

F	df1	df2	Sig.
36.63	2	354	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Income + Group

Tests of Between-Subjects Effects

Dependent Variable: Perception of Media Effects on Self

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	268.96[a]	8	33.62	7.529	.000	.15
Intercept	284.85	1	284.85	63.788	.000	.16
Age	.08	1	.01	.001	.970	.00
Marital_Status	2.47	1	2.47	.552	.458	.00
Child	.00	1	.00	.000	.986	.00
Racial_Ethnic_Heritage	.13	1	.13	.028	.867	.00
Education	.90	1	.90	.202	.654	.00
Income	12.80	1	12.80	2.867	.091	.01
Group	229.09	2	114.54	25.651	.000	.13
Error	1554.00	348	4.47			
Total	23666.25	357				
Corrected Total	1822.96	356				

a. R Squared = .148 (Adjusted R Squared = .128)

Appendix 21

Section II: ANCOVA (A) – Perception of Media Effects on Others

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	119
	3	Audio + AR	118

Descriptive Statistics

Dependent Variable: Perception of Media Effects on Others

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	3.88	.95	120
Audio + Video	4.88	.90	119
Audio + AR	4.42	.60	118
Total	4.39	.92	357

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Perception of Media Effects on Others

F	df1	df2	Sig.
14.26	2	354	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Income + Group

Tests of Between-Subjects Effects

Dependent Variable: Perception of Media Effects on Others

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	63.85[a]	8	7.98	11.559	.000	.21
Intercept	111.37	1	111.37	161.283	.000	.32
Age	1.43	1	1.43	2.064	.152	.01
Marital_Status	.21	1	.21	.299	.585	.00
Child	1.20	1	1.20	1.732	.189	.01
Racial_Ethnic_Heritage	.00	1	.00	.005	.941	.00
Education	1.46	1	1.46	2.113	.147	.01
Income	.01	1	.01	.015	.904	.00
Group	60.41	2	30.20	43.742	.000	.20
Error	240.30	348	.69			
Total	7195.44	357				
Corrected Total	304.15	356				

a. R Squared = .210 (Adjusted R Squared = .192)

Appendix 22

Section II: ANCOVA (B) – Perception of Media Effects on Self

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	119
	3	Audio + AR	118

Descriptive Statistics

Dependent Variable: Perception of Media Effects on Self

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	6.89	2.70	120
Audio + Video	7.66	2.05	119
Audio + AR	8.94	1.33	118
Total	7.82	2.26	357

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Perception of Media Effects on Self

F	df1	df2	Sig.
32.123	2	354	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Income + Media_Consumption + BMI + Body_Dissatisfaction + Internalisation_Appearance_Ideals + Appearance_Pressures + Self_esteem + Media_Attitude + Group

Tests of Between-Subjects Effects

Dependent Variable: Perception of Media Effects on Self

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	362.29[a]	15	24.15	5.639	.000	.20
Intercept	17.07	1	17.07	3.985	.047	.01
Age	.24	1	.24	.056	.814	.00
Marital_Status	1.38	1	1.38	.323	.570	.00
Child	.00	1	.00	.000	.989	.00
Racial_Ethnic_Heritage	.51	1	.51	.119	.730	.00
Education	.60	1	.60	.140	.709	.00
Income	10.60	1	10.60	2.474	.117	.01
Media_Consumption	.03	1	.03	.006	.939	.00
BMI	12.37	1	12.37	2.889	.090	.01
Body_Dissatisfaction	34.57	1	34.57	8.070	.005	.02
Internalisation_Appearance_Ideals	5.51	1	5.51	1.285	.258	.00
Appearance_Pressures	3.81	1	3.81	.890	.346	.00
Self_esteem	.30	1	.30	.069	.793	.00
Media_Attitude	34.33	1	34.33	8.014	.005	.02
Group	99.21	2	49.61	11.581	.000	.06
Error	1460.67	341	4.28			
Total	23666.25	357				
Corrected Total	1822.96	356				

a. R Squared = .199 (Adjusted R Squared = .163)

Appendix 23

Section II: ANCOVA (B) – Perception of Media Effects on Others

Between-Subjects Factors

		Value Label	N
Experimental Treatment	1	Audio + Text + Image	120
	2	Audio + Video	119
	3	Audio + AR	118

Descriptive Statistics

Dependent Variable: Perception of Media Effects on Others

Experimental Treatment	Mean	Std. Deviation	N
Audio + Text + Image	3.88	.95	120
Audio + Video	4.88	.90	119
Audio + AR	4.42	.60	118
Total	4.39	.92	357

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Perception of Media Effects on Others

F	df1	df2	Sig.
13.05	2	354	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Age + Marital_Status + Child + Racial_Ethnic_Heritage + Education + Income + Media_Consumption + BMI + Body_Dissatisfaction + Internalisation_Appearance_Ideals + Appearance_Pressures + Self_esteem + Media_Attitude + Group

Tests of Between-Subjects Effects

Dependent Variable: Perception of Media Effects on Others

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	75.07[a]	15	5.01	7.450	.000	.25
Intercept	14.51	1	14.51	21.599	.000	.06
Age	1.58	1	1.58	2.351	.126	.01
Marital_Status	.10	1	.10	.147	.702	.00
Child	1.53	1	1.53	2.283	.132	.01
Racial_Ethnic_Heritage	.07	1	.07	.099	.753	.00
Education	1.69	1	1.69	2.509	.114	.01
Income	.15	1	.15	.220	.639	.00
Media_Consumption	.47	1	.47	.699	.404	.00
BMI	.02	1	.02	.029	.866	.00
Body_Dissatisfaction	2.16	1	2.16	3.214	.074	.01
Internalisation_Appearance_Ideals	4.37	1	4.37	6.507	.011	.02
Appearance_Pressures	.88	1	.88	1.314	.253	.00
Self_esteem	.72	1	.72	1.075	.301	.00
Media_Attitude	4.29	1	4.29	6.391	.012	.02
Group	26.55	2	13.27	19.760	.000	.10
Error	229.08	341	.67			
Total	7195.44	357				
Corrected Total	304.15	356				

a. R Squared = .247 (Adjusted R Squared = .214)

Appendix 24

Section II: Hierarchical Multiple Regression Analysis Predicting Perceived Effects of Media Consumption on the First-person Perception

Descriptive Statistics

	Mean	Std. Deviation	N
First-person Perception	3.43	2.38	357
Age Group	1.48	.63	357
Marital status	1.28	.66	357
Number of children	.06	.34	357
Racial or ethnic heritage	1.51	1.33	357
Level of education	3.37	.49	357
Net personal monthly income	1.06	.24	357
Body Mass Index	22.61	2.42	357
Self-esteem	5.26	1.09	357
Media Consumption	3.35	1.41	357

Correlations

		1	2	3	4	5	6	7	8	9	10
Pearson Correlation	1	1.00	.04	-.01	.01	-.01	.04	.11	.02	.02	.00
	2	.04	1.00	.02	.15	-.01	.04	.25	-.07	-.01	.06
	3	-.01	.02	1.00	.19	-.04	-.00	.23	-.01	.00	-.02
	4	.01	.15	.19	1.00	-.05	.12	.33	-.02	-.05	-.01
	5	-.01	-.01	-.04	-.05	1.00	-.01	.09	.02	-.07	.13
	6	.04	.04	-.00	.12	-.01	1.00	.24	-.10	-.07	-.01
	7	.11	.25	.23	.33	.09	.24	1.00	-.10	-.07	.01
	8	.02	-.07	-.01	-.02	.02	-.10	-.10	1.00	.12	-.05
	9	.02	-.01	.00	-.05	-.07	-.07	-.07	.12	1.00	-.01
	10	.00	.06	-.02	-.01	.13	-.01	.01	-.05	-.01	1.00
Sig. (1-tailed)	1	.	.224	.425	.402	.436	.229	.021	.348	.377	.495
	2	.224	.	.323	.002	.434	.234	.000	.088	.443	.127
	3	.425	.323	.	.000	.221	.496	.000	.415	.486	.339
	4	.402	.002	.000	.	.155	.010	.000	.382	.190	.424
	5	.436	.434	.221	.155	.	.463	.054	.355	.104	.007
	6	.229	.234	.496	.010	.463	.	.000	.026	.087	.432
	7	.021	.000	.000	.000	.054	.000	.	.029	.089	.404
	8	.348	.088	.415	.382	.355	.026	.029	.	.010	.197
	9	.377	.443	.486	.190	.104	.087	.089	.010	.	.438
	10	.495	.127	.339	.424	.007	.432	.404	.197	.438	.
N	1	357	357	357	357	357	357	357	357	357	357
	2	357	357	357	357	357	357	357	357	357	357
	3	357	357	357	357	357	357	357	357	357	357
	4	357	357	357	357	357	357	357	357	357	357

5	357	357	357	357	357	357	357	357	357	357
6	357	357	357	357	357	357	357	357	357	357
7	357	357	357	357	357	357	357	357	357	357
8	357	357	357	357	357	357	357	357	357	357
9	357	357	357	357	357	357	357	357	357	357
10	357	357	357	357	357	357	357	357	357	357

*** Item Legend:**

1 – First-person Perception

2 – Age group

3 – Marital status

4 – Number of children

5 – Racial or ethnic heritage

6 – Level of education

7 – Net personal monthly income

8 – Body Mass Index

9 – Self-esteem

10 – Media Consumption

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children[b]	.	Enter
2	Body Mass Index[b]	.	Enter
3	Self-esteem[b]	.	Enter
4	Media Consumption[b]	.	Enter

a. Dependent Variable: First-person Perception

b. All requested variables entered.

Model Summary[e]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.119[a]	.014	-.003	2.38	.014	.83	6	350	.544
2	.124[b]	.015	-.004	2.38	.001	.44	1	349	.509
3	.125[c]	.016	-.007	2.39	.000	.14	1	348	.709
4	.125[d]	.016	-.010	2.39	.000	.00	1	347	.976

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index, Self-esteem

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index, Self-esteem, Media Consumption

e. Dependent Variable: First-person Perception

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.40	6	4.73	.834	.544[b]
	Residual	1985.56	350	5.67		
	Total	2013.96	356			
2	Regression	30.89	7	4.41	.776	.607[c]
	Residual	983.07	349	5.68		
	Total	2013.96	356			
3	Regression	31.68	8	3.96	.695	.696[d]
	Residual	1982.28	348	5.70		
	Total	2013.96	356			
4	Regression	31.69	9	3.52	.616	.783[e]
	Residual	1982.27	347	5.71		
	Total	2013.96	356			

a. Dependent Variable: First-person Perception

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index, Self-esteem

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index, Self-esteem, Media Consumption

Coefficients[a]

Model		Unstandardised Coefficients B	Std. Error	Standardised Coefficients Beta	t	Sig.	Correlations Zero-order	Partial	Part	Collinearity Statistics Tolerance	VIF
1	(Constant)	2.10	1.02		2.06	.040					
	Age Group	.06	.21	.02	.27	.787	.04	.01	.01	.93	1.08
	Marital status	-.12	.20	-.03	-.61	.545	-.01	-.03	-.03	.93	1.08
	Number of children	-.17	.40	-.03	-.43	.665	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.39	.694	-.01	-.02	-.02	.98	1.02
	Level of education	.07	.27	.01	.25	.804	.04	.01	.01	.94	1.07
	Net personal monthly income	1.17	.60	.12	1.96	.051	.11	.10	.10	.77	1.30
2	(Constant)	1.23	1.67		.74	.463					
	Age Group	.06	.21	.02	.30	.761	.04	.02	.02	.93	1.08
	Marital status	-.12	.20	-.03	-.61	.543	-.01	-.03	-.03	.93	1.08
	Number of children	-.18	.40	-.03	-.45	.652	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.41	.681	-.01	-.02	-.02	.98	1.02
	Level of education	.08	.27	.02	.30	.763	.04	.02	.02	.93	1.08
	Net personal monthly income	1.20	.60	.12	2.00	.046	.11	.11	.11	.77	1.30
	Body Mass Index	.04	.05	.04	.66	.509	.02	.04	.04	.98	1.02
3	(Constant)	1.02	1.76		.58	.561					
	Age Group	.06	.21	.02	.30	.766	.04	.02	.02	.93	1.08
	Marital status	-.12	.20	-.03	-.61	.540	-.01	-.03	-.03	.93	1.08

	Number of children	-.17	.40	-.03	-.44	.661	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.38	.701	-.01	-.02	-.02	.98	1.03
	Level of education	.09	.27	.02	.32	.750	.04	.02	.02	.93	1.08
	Net personal monthly income	1.21	.60	.12	2.01	.045	.11	.11	.11	.77	1.30
	Body Mass Index	.03	.05	.03	.61	.540	.02	.03	.03	.97	1.04
	Self-esteem	.04	.12	.02	.37	.709	.02	.02	.02	.97	1.03
4	(Constant)	1.01	1.79		.57	.572					
	Age Group	.06	.21	.02	.30	.768	.04	.02	.02	.92	1.08
	Marital status	-.12	.20	-.03	-.61	.541	-.01	-.03	-.03	.93	1.08
	Number of children	-.17	.40	-.03	-.44	.662	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.39	.701	-.01	-.02	-.02	.96	1.04
	Level of education	.09	.27	.02	.32	.750	.04	.02	.02	.93	1.08
	Net personal monthly income	1.21	.60	.12	2.01	.045	.11	.11	.11	.77	1.30
	Body Mass Index	.03	.05	.03	.61	.540	.02	.03	.03	.96	1.04
	Self-esteem	.04	.12	.02	.37	.709	.02	.02	.02	.97	1.03
	Media Consumption	.00	.09	.00	.03	.976	.00	.00	.00	.98	1.02

a. Dependent Variable: First-person Perception

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance	VIF	Minimum Tolerance
1	Body Mass Index	.036[b]	.66	.509	.04	.98	1.02	.77
	Self-esteem	.024[b]	.45	.655	.02	.99	1.01	.77
	Media Consumption	.000[b]	.02	.999	.00	.98	1.02	.77
2	Self-esteem	.020[c]	37	.709	.02	.97	1.03	.77
	Media Consumption	.002[c]	.03	.974	.00	.98	1.02	.77
3	Media Consumption	.002[d]	.03	.976	.00	.98	1.02	.77

a. Dependent Variable: First-person Perception

b. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

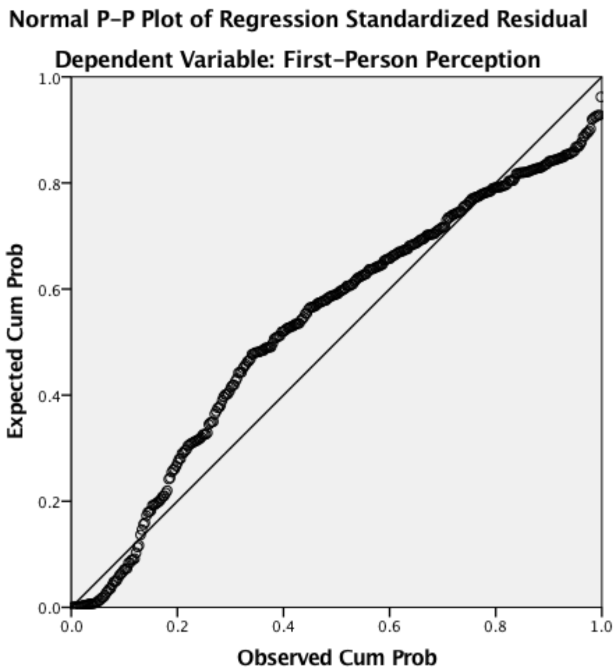
c. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index

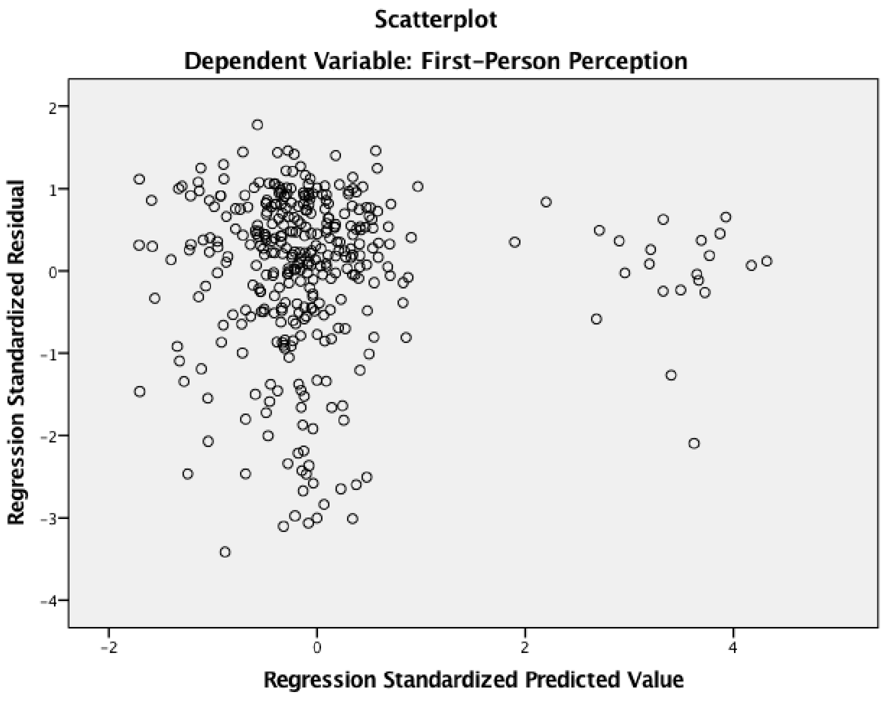
d. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Body Mass Index, Self-esteem

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.92	4.72	3.43	.30	357
Residual	-8.16	4.24	.00	2.36	357
Std. Predicted Value	-1.71	4.32	.00	1.00	357
Std. Residual	-3.42	1.78	.00	.99	357

a. Dependent Variable: First-person Perception





Appendix 25

Section II: Hierarchical Multiple Regression Analysis Predicting Perceived Effects of Attitude Toward the Media on the First-person Perception

Descriptive Statistics

	Mean	Std. Deviation	N
First-person Perception	3.43	2.38	357
Age Group	1.48	.63	357
Marital status	1.28	.66	357
Number of children	.06	.34	357
Racial or ethnic heritage	1.51	1.33	357
Level of education	3.37	.49	357
Net personal monthly income	1.06	.24	357
Media Consumption	3.35	1.41	357
Body Mass Index	22.61	2.42	357
Self-esteem	5.26	1.09	357
Attitude toward the media	5.97	2.52	357

Correlations

		1	2	3	4	5	6	7	8	9	10	11
Pearson Correlation	1	1.00	.04	-.01	.01	-.01	.04	.11	.00	.02	.02	.11
	2	.04	1.00	.02	.15	-.01	.04	.25	.06	-.07	-.01	.08
	3	-.01	.02	1.00	.19	-.04	-.00	.23	-.02	-.01	.00	.00
	4	.01	.15	.19	1.00	-.05	.12	.33	-.01	-.02	-.05	-.05
	5	-.01	-.01	-.04	-.05	1.00	-.01	.09	.13	.02	-.07	-.08
	6	.04	.04	-.00	.12	-.01	1.00	.24	-.01	-.10	-.07	.06
	7	.11	.25	.23	.33	.09	.24	1.00	.01	-.10	-.07	.03
	8	.00	.06	-.02	-.01	.13	-.01	.01	1.00	-.05	-.01	.07
	9	.02	-.07	-.01	-.02	.02	-.10	-.10	-.05	1.00	.12	.06
	10	.02	-.01	.00	-.05	-.07	-.07	-.07	-.01	.12	1.00	.09
	11	.11	.08	.00	-.05	-.08	.06	.03	.07	.06	.09	1.00
Sig. (1-tailed)	1	.	.224	.425	.402	.436	.229	.021	.495	.348	.377	.017
	2	.224	.	.323	.002	.434	.234	.000	.127	.088	.443	.067
	3	.425	.323	.	.000	.221	.496	.000	.339	.415	.486	.483
	4	.402	.002	.000	.	.155	.010	.000	.424	.382	.190	.173
	5	.436	.434	.221	.155	.	.463	.054	.007	.355	.104	.064
	6	.229	.234	.496	.010	.463	.	.000	.432	.026	.087	.149
	7	.021	.000	.000	.000	.054	.000	.	.404	.029	.089	.282
	8	.495	.127	.339	.424	.007	.432	.404	.	.197	.438	.099
	9	.348	.088	.415	.382	.355	.026	.029	.197	.	.010	.149
	10	.377	.443	.486	.190	.104	.087	.089	.438	.010	.	.053
	11	.017	.067	.483	.173	.064	.149	.282	.099	.149	.053	.
N	1	357	357	357	357	357	357	357	357	357	357	357
	2	357	357	357	357	357	357	357	357	357	357	357

3	357	357	357	357	357	357	357	357	357	357	357
4	357	357	357	357	357	357	357	357	357	357	357
5	357	357	357	357	357	357	357	357	357	357	357
6	357	357	357	357	357	357	357	357	357	357	357
7	357	357	357	357	357	357	357	357	357	357	357
8	357	357	357	357	357	357	357	357	357	357	357
9	357	357	357	357	357	357	357	357	357	357	357
10	357	357	357	357	357	357	357	357	357	357	357
11	357	357	357	357	357	357	357	357	357	357	357

*** Item Legend:**

1 – First-person Perception

2 – Age group

3 – Marital status

4 – Number of children

5 – Racial or ethnic heritage

6 – Level of education

7 – Net personal monthly income

8 – Media Consumption

9 – Body Mass Index

10 – Self-esteem

11 – Attitude toward the Media

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children[b]	.	Enter
2	Media Consumption[b]	.	Enter
3	Body Mass Index[b]	.	Enter
4	Self-esteem[b]	.	Enter
5	Attitude toward the media[b]	.	Enter

a. Dependent Variable: First-person Perception
b. All requested variables entered.

Model Summary[f]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.119[a]	.014	-.003	2.38	.01	.83	6	350	.544
2	.119[b]	.014	-.006	2.39	.00	.00	1	349	.999
3	.124[c]	.015	-.007	2.39	.00	.44	1	348	.509
4	.125[d]	.016	-.010	2.39	.00	.14	1	347	.709
5	.161[e]	.026	-.002	2.38	.01	3.67	1	346	.056

a. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children
b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption
c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index
d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem
e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Attitude toward the media
f. Dependent Variable: First-person Perception

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.40	6	4.73	.834	.544[b]
	Residual	1985.56	350	5.67		
	Total	2013.96	356			
2	Regression	28.40	7	4.01	.713	.661[c]
	Residual	1985.56	349	5.69		
	Total	2013.96	356			
3	Regression	30.89	8	3.86	.678	.711[d]
	Residual	1983.07	348	5.70		
	Total	2013.96	356			
4	Regression	31.69	9	3.52	.616	.783[e]
	Residual	1982.27	347	5.71		
	Total	2013.96	356			
5	Regression	52.50	10	5.25	.926	.509[f]
	Residual	1961.46	346	5.67		
	Total	2013.96	356			

a. Dependent Variable: First-person Perception

b. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

d. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

e. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

f. Predictors: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem, Attitude toward the media

Coefficients[a]

Model		Unstandardised Coefficients B	Std. Error	Standardised Coefficients Beta	t	Sig.	Correlations Zero-order	Partial	Part	Collinearity Statistics Tolerance	VIF
1	(Constant)	2.10	1.02		2.06	.040					
	Age Group	.06	.21	.02	.27	.787	.04	.01	.01	.93	1.08
	Marital status	-.12	.20	-.03	-.61	.545	-.01	-.03	-.03	.93	1.08
	Number of children	-.17	.40	-.03	-.43	.665	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.39	.694	-.01	-.02	-.02	.98	1.02
	Level of education	.07	.27	.01	.25	.804	.04	.01	.01	.94	1.07
	Net personal monthly income	1.17	.60	.12	1.96	.051	.11	.10	.10	.77	1.30
2	(Constant)	2.10	1.06		1.99	.048					
	Age Group	.06	.21	.02	.27	.788	.04	.01	.01	.93	1.08
	Marital status	-.12	.20	-.03	-.61	.545	-.01	-.03	-.03	.93	1.08
	Number of children	-.17	.40	-.03	-.43	.665	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.39	.697	-.01	-.02	-.02	.97	1.04
	Level of education	.07	.27	.01	.25	.805	.04	.01	.01	.94	1.07
	Net personal monthly income	1.17	.60	.12	1.96	.051	.11	.10	.10	.77	1.30
	Media Consumption	.00	.09	.00	.00	.999	.00	.00	.00	.98	1.02
3	(Constant)	1.22	1.71		.71	.477					
	Age Group	.06	.21	.02	.30	.764	.04	.02	.02	.92	1.08

	Marital status	-.12	.20	-.03	-.61	.544	-.01	-.03	-.03	.93	1.08
	Number of children	-.18	.40	-.03	-.45	.652	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.41	.681	-.01	-.02	-.02	.96	1.04
	Level of education	.08	.27	.02	.30	.763	.04	.02	.02	.93	1.08
	Net personal monthly income	1.20	.60	.12	2.00	.046	.11	.11	.11	.77	1.30
	Media Consumption	.00	.09	.00	.03	.974	.00	.00	.00	.98	1.02
	Body Mass Index	.04	.05	.04	.66	.509	.02	.04	.04	.98	1.02
4	(Constant)	1.01	1.79		.57	.572					
	Age Group	.06	.21	.02	.30	.768	.04	.02	.02	.92	1.08
	Marital status	-.12	.20	-.03	-.61	.541	-.01	-.03	-.03	.93	1.08
	Number of children	-.17	.40	-.03	-.44	.662	.01	-.02	-.02	.86	1.16
	Racial or ethnic heritage	-.04	.10	-.02	-.39	.701	-.01	-.02	-.02	.96	1.04
	Level of education	.09	.27	.02	.32	.750	.04	.02	.02	.93	1.08
	Net personal monthly income	1.21	.60	.12	2.01	.045	.11	.11	.11	.77	1.30
	Media Consumption	.00	.09	.00	.03	.976	.00	.00	.00	.98	1.02
	Body Mass Index	.03	.05	.03	.61	.540	.02	.03	.03	.96	1.04
	Self-esteem	.04	.12	.02	.37	.709	.02	.02	.02	.97	1.03
5	(Constant)	.89	1.79		.50	.618					
	Age Group	.03	.21	.01	.15	.884	.04	.01	.01	.92	1.09
	Marital status	-.12	.20	-.03	-.62	.533	-.01	-.03	-.03	.93	1.08
	Number of children	-.11	.40	-.02	-.29	.776	.01	-.02	-.02	.86	1.17

Racial or ethnic heritage	-.02	.10	-.01	-.21	.837	-.01	-.01	-.01	.95	1.05
Level of education	.05	.27	.01	.20	.844	.04	.01	.01	.92	1.08
Net personal monthly income	1.16	.60	.12	1.94	.053	.11	.10	.10	.77	1.31
Media Consumption	-.01	.09	-.01	-.12	.904	.00	-.01	-.01	.97	1.03
Body Mass Index	.03	.05	.03	.49	.626	.02	.03	.03	.96	1.04
Self-esteem	.03	.12	.01	.23	.820	.02	.01	.01	.97	1.03
Attitude toward the media	.10	.05	.10	1.92	.056	.11	.10	.10	.96	1.04

a. Dependent Variable: First-person Perception

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	Media Consumption	.000[b]	.00	.999	.00	.98	1.02	.77
	Body Mass Index	.036[b]	.66	.509	.04	.98	1.02	.77
	Self-esteem	.024[b]	.45	.655	.03	.99	1.01	.77
	Attitude toward the media	.106[b]	1.99	.048	.11	.98	1.02	.77
2	Body Mass Index	.036[c]	.66	.509	.04	.98	1.02	.77
	Self-esteem	.024[c]	.45	.655	.02	.99	1.01	.77
	Attitude toward the media	.107[c]	1.99	.048	.11	.97	1.03	.77
3	Self-esteem	.020[d]	.37	.709	.02	.97	1.03	.77
	Attitude toward the media	.105[d]	1.94	.053	.10	.97	1.03	.77
4	Attitude toward the media	.104[e]	1.92	.056	.10	.96	1.04	.77

a. Dependent Variable: First-person Perception

b. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children

c. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption

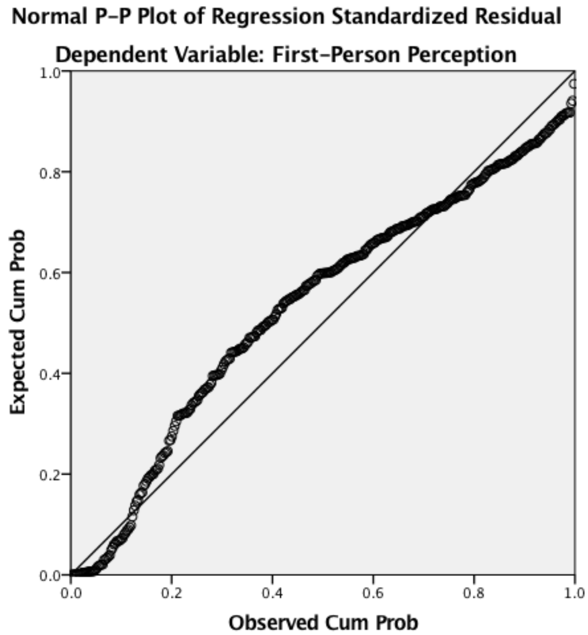
d. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index

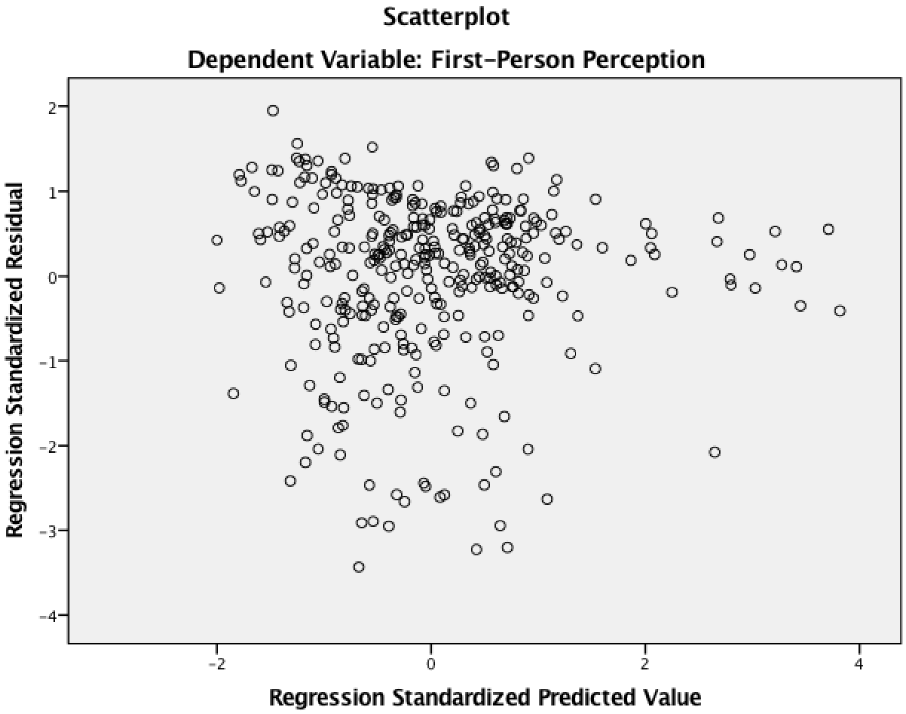
e. Predictors in the Model: (Constant), Net personal monthly income, Racial or ethnic heritage, Marital status, Level of education, Age Group, Number of children, Media Consumption, Body Mass Index, Self-esteem

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.66	4.89	3.43	.38	357
Residual	-8.17	4.64	.00	2.35	357
Std. Predicted Value	-2.00	3.82	.00	1.00	357
Std. Residual	-3.43	1.95	.00	.99	357

a. Dependent Variable: First-person Perception





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