Made for Mobile

Exploring the effect of vertical video formats on online public television viewer experience

Student Name: Derk Molijn

Student Number: 577164

Supervisor(s):   Dr. Suzanna Opree (EUR)

Dr. Petra Tenbült (EUR)

Dr. Sarah van der Land (NPO)

Master Media Studies - Media & Business

Erasmus School of History, Culture and Communication

Erasmus University Rotterdam

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ABSTRACT

A renewed orientation on vertical content is becoming more prevalent in both the academic and social domain. With vertical content recently experiencing widespread implementation in countless of contexts, questions are raised as to how mobile users respond to this format. Consequently, this research examined the effect of vertical video formats on the viewer experience and subsequent user satisfaction of individuals exposed to news content on a mobile phone. By doing so, a first step is taken in empirically assessing how vertical video content is perceived by individuals in a context of news consumption. Through theory on Public Service Media, vertical formats and viewer experience, this research sheds light on a media production domain that aims to strike a balances between public value and digital innovation. Arriving at the hypotheses, this research aimed to uncover the impact of different video formats on the self-reported perceived enjoyment, perceived ease of use, flow state and user satisfaction of participants. A between-subject experiment was conducted with emphasis on a sample that matched the target audience of Dutch public broadcaster NPO. In total, three different video formats (horizontal format, vertical format, responsive vertical format) were developed and compared with each other. In each of the three conditions, participants were exposed to the same news item, albeit in a different format. The results show that a responsive vertical format, which is not only screen-filling but also accounts for a potential loss of information caused by cropping the original footage, results in an improved viewer experience in comparison to a horizontal format. It was found that the positive viewer experience induced by the responsive vertical video led to an increase in user satisfaction, which in its turn resulted in a continued intention to watch vertical video content. The empirical findings underwrite the potential of vertical content in successfully reaching audiences. When transforming existing horizontal content however, the success of a vertical adaptation is largely dependent on how the original footage was produced. Future research could develop on these findings by comparing horizontal video to vertical content that was originally shot and produced with vertical viewing in mind.

KEYWORDS: *Mobile content, Screen format, Vertical video, Public service media, Viewer experience*

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1. Introduction

"In the world of First World Problems, vertical videos stand a foot taller than the rest in terms of scourginess" (Zimmerman, 2012).

No longer than a decade ago vertical video was, as cited above, seen as a culture-threatening plague. Whilst the comment made on Gawker (Zimmerman, 2012) appears satirical and somewhat purposely overdone, the sentiment was shared by many others. A 2017 article from *Wired* argued that shooting video in a vertical format equates to "Violating not only the set video standard, but also the laws of nature as they pertain to human sight" (Baldwin, 2017). Many of the article's 106 commenters sympathized with this claim. Some even argued for smartphone manufacturers to adjust video settings within the device, refraining users from shooting videos in a vertical format altogether. Historically speaking, this anti-vertical movement is right – the human eye, which scans from left to right, has led to stories being laid out in a horizontal format since the dawn of mankind. From caveman drawings and Egyptian murals (Minababe, 2021) all the way to modern monitors and televisions, they all share the same traditionally oriented (16:9) aspect ratio that is wider than tall. However, in more recent years, along with the entwinement of mobile devices in our everyday lives (Ryan, 2018), vertical viewing has increased exponentially.

Between 2010 and 2015, mobile viewing in a vertical aspect ratio increased sixfold from 5% to 29% (Meeker, 2016). More recent research even found that users hold their phone vertically 94% of the time (Oentoro, 2018). The exceptional technological development of mobile devices invigorates looking at mobile video as an entirely new aesthetic. The distinct departure from horizontal composition iterates a sense of authenticity; showcasing how new media technologies can be utilized for 'capturing the moment' (Ross, 2014) and to emphasize the object under observation. Correspondingly, less than a decade after the initial Gawker statement, ambitious Oscar-winning filmmakers are entering the vertical paradigm. Damien Chazelle's short film *The Stunt Double* tries to justify professional application of a vertical aspect ratio, underscoring its potential in certain circumstances (Lee, 2020). Along with these cinema-creatives, vertical video is being embraced by other media organizations: advertising agencies, television operators and social media platforms are all examining the manner in which vertical video can potentially be implemented. The latter, having most noticeably developed dedicated infrastructures that cater to a vertical mobile environment (Canella, 2018), normalize both vertical production and consumption by its users. These current social media environments are characterised by visual content that often fills the screen in its entirety vertically. Along with intuitive browsing mechanisms, an immersive and compelling vertical

media experience is created (Perez, 2021). The potential success of vertical video is further illustrated by ByteDance's social media platform TikTok, developed in 2016. The application currently has over 800 million active users who use the vertical video-only platform on a daily basis (Moshin, 2021).

Since TikTok has proven to be tremendously successful in reaching younger audiences through video content that fits the dimensions of the mobile screen, it comes as no surprise that traditional public service media (hereinafter intermittently referred to with the abbreviation PSM) are also examining how they can enter the realm of vertical. Experimenting with contexts in which vertical video is justified, has already led to several actual productions. For example, the fact that in 2020 the BBC invested in the production of made-for-mobile news content on mobile streaming platform Quibi – which shut down a mere six months after its launch – demonstrates the willingness of PSM to engage with the vertical video format. Other PSM, such as the Dutch operator NPO, are entering the vertical domain with some content on their social media platforms Instagram and TikTok (NPOZapp, n.d.) adhering to the contemporary aspect ratio. Despite the current paucity of vertical PSM content, the process of continuous innovation in the digital and mobile era demands from PSM a critical reflection on how they can simultaneously legitimize and remodel their output (Chouikh, Ojo, & Dross, 2016).

The development of new PSM distribution strategies has been researched extensively throughout the past decades (Doyle, 2010; Lowe et al., 2018), often weighing new developments against PSM legitimacy (Bardoel & d'Haenens, 2008; Lowe & Martin, 2013). The increasing presence of PSM on social media platforms for instance, which are almost always controlled by commercial entities (van Dijck, 2013), does not seem to be in line with the sentiment shared by most PSM in that it should avoid serving commercial interests (van Dijck & Poell, 2015). As catering towards every individual in society is of importance to PSM (Nissen, 2006), entering the social media domain is often considered a trade-off to contact audiences that cannot be reached effectively on more traditional media platforms (Kimmel, 2016). The adoption and development of *vertical video* on these social media platforms further underwrites this trade-off; its shape, salience and ease of use can potentially help to reach audiences even more effectively in the mobile environment.

A distinction can be made between two types of vertical video content. First, *native* vertical content (Canella, 2018, p.76) refers to footage which has originally and purposely been shot in a vertical format (e.g. filming a news item vertically on a phone and directly streaming it to Instagram). Second, *remodelled* vertical content refers to footage which was shot in a traditional horizontal format but which is cropped accordingly to fully fit within the vertical display of our mobile devices (e.g. editing an already existing news item in order to make it fit mobile displays vertically). The latter, which will be examined in this research, could potentially serve as a tool to make the mobile audience get into contact with traditionally produced PSM content in a new guise. Analysing

remodelled vertical video simultaneously enables us to make a more adequate comparison with traditional video formats, as no changes exist within the content; only in shape.

The ways in which new technologies alter the production of news has been covered rather extensively in academic studies over the past decades (Reagan, 1989; Livingston & Bennett, 2003; Donders, 2019). However, relatively few studies have looked at more contemporary digital innovations such as vertical video (Ryan, 2018; Canella, 2018), let alone at how PSM can potentially benefit from its implementation. By building on preliminary yet solid theory regarding vertical content (Ryan, 2018), an empirical assessment of its idiosyncratic qualities can be of considerable scientific relevance. The subsequent findings would provide us with the first empirical insights into the effect of new video formats within PSM contexts. The acquired knowledge can then be used by PSM to resituate themselves in the digital domain. Furthermore, assessment of its ability to convey the message of public service media can help to develop the social debate on vertical video usefulness; showing us whether vertical videos are viewed as desirable by those individuals that PSM are trying to reach. To do so, this research – which is conducted in collaboration with Dutch public broadcaster *NPO* – will examine different video reformatting techniques for mobile viewing. In doing so, this research aims to answer the following research question: *What is the effect of different video formats on online public television viewers' experience?*

To approach this question, this research starts by outlining the theoretical framework in Chapter 2. The theoretical framework entails a tripartite analysis of the current consensus regarding public service media development, vertical format development, and viewer experience dimensions. An elaborate theoretical overview examining historical development of both PSM and screen sizes, allows for a narrower yet more precise scope from which to understand the concept of viewer experience. The final sub-chapter of the theoretical framework will use this contextual scope to arrive at the corresponding hypotheses.

Chapter 3 will discuss and underwrite the methodological design of this study. In a quantitative between-subject experiment, the impact of different video formats will be assessed through multiple hypotheses. The three experimental groups will all be exposed to the same video content by NPO on a mobile device, albeit in a different format. The first group will see the video in a traditional horizontal format. The second group is exposed to the video in a vertical format that instantaneously fills the screen of the mobile device. The third group will be exposed to the video in a 'responsive vertical format' which, albeit similar to the vertical format, is an accommodative format that reshapes automatically in order to keep saliant and relevant information visible on the vertical display of the mobile device. After being exposed to the stimuli, participants viewer experience, satisfaction, and continued intention to use the video format will be measured.

In Chapter 4, the results of the experiment will be analysed, accompanied by the outcomes of the proposed hypotheses. Chapter 5 will then elaborate on the findings from the previous chapter Here, the strengths and limitations of the study are discussed along with potential suggestions for further academic and pragmatic approaches towards vertical video in the context of PSM. Lastly, the scientific and practical implications of the research results will be linked to the existing literature and production environments regarding vertical video and PSM.

2. Theoretical Framework

The theoretical framework will go over the most prominent and relevant discussions regarding the topics of public service media, vertical formats and viewer experience. Working from cornerstone theoretical publications to more contemporary empirical findings, we arrive at the status-quo and potential opportunities for public service media in the vertical paradigm. The knowledge and opportunities derived from the first two sub-chapters will ultimately be materialized in the final part of the chapter by developing multiple hypotheses that we aim to answer in this research.

2.1 Public service media

Public service media (PSM) is generally defined as the provision of services by public broadcasters that – through multiple devices and various technologies – contribute to democratic, cultural and social objectives of society (Donders, 2019, p.1012). Although historical transitions of public service media have been researched extensively (Lowe et al, 2018; Burri, 2015; Larrondo et al., 2016), the shaping of PSM is considered a perpetual progress.

2.1.1   Origin and transition

Every decade or so, a new and reoriented view on Public Service Media (PSM) seems to be warranted. A renewed scope is crucial for PSM institutions to cope with economic, technological and societal developments (Enli, 2008). Although national PSM operators approach these developments differently, larger trends are apparent and no longer exclusively affecting public operators.

To arrive at an understanding about PSM as known today, one should acknowledge that its existence rests upon the universal right of access asserted through broadcasters (Scannell, 1989). Historically speaking, public service media is justified through both technological limitations and normative conceptions. In the early 20th century, the scarcity of radio frequencies (Steemers, 2003) meant that public operators were the only ones able to convey information through the medium. More importantly and relevant throughout the 20th and 21st century are the normative conceptions of public broadcasting. Normative values have been omnipresent in public service broadcasting; incorporating democratic ideas, including diversity, and upholding cultural identity (Bardoel & Brants, 2003).

The British Broadcasting Company (BBC), founded in the 1920's, was the first public service operator based on these normative conceptions. Not long after, a first broadcasting committee was set-up in order to define and safeguard normative values of public service operators (Sykes, 1923). The committee argued that broadcasting ought to be seen as a 'public utility'; referring to the fact that wavebands available in any country must be regarded as a form of public property (Sykes, 1923,

p.11). The very first definition of public service broadcasting that is still relevant to this day, finds its origin in an interpretation of public utility as realized by John Reith, the managing director of BBC from 1923 to 1926 (Scannell, 2000). Reith argues that public service operators should strive to inform, educate and entertain – in that particular order (Bechler, 2019). This tripartite, come to be known as the *Reithian Trinity*, has served as a cornerstone in public service productions throughout the past century (Bechler, 2019).

Throughout the decades, public service media have logically developed in line with larger social, economic and technological trends. Several researchers argue that these developments have led to balance shifts in the Reithian Trinity. When public service operators were introduced to their first competitors around 1960, the loss of their monopolistic position meant adapting to a more dynamic and competitive market (Scannell, 2000). Throughout the next three decades, competing with private operators for audience attention around prime time slots led to an increase in entertainment productions (Syvertsen, 1999). This strong emphasis on audience appeal was met with critical responses, arguing that public service operators were focusing too much on entertainment and becoming indistinguishable from their commercial counterparts (Levy, 2003; Enli, 2008).

In more recent years, researchers argued that the Reithian trinity ought to be reshaped once more. Adaptation to the digital playfield subsequently warrants reshaping of public broadcasting's core values. Putting more emphasis on connection and participation (Enli, 2008) would allow PSM to legitimize their development of multi-channel media in new, digital environments that offer distinctive affordances in regards to their approach of the public (Chouikh, Ojo & Dross, 2016; Halpern & Gibbs, 2013).

2.1.2   Mobile public service media

The actual and practical ways in which public broadcasters aim to situate themselves in the modern media market – characterized by its multi-platform nature – is still relatively undiscovered in academic research. The current media market is characterized by a dominance of private conglomerates in the digital sphere such as Facebook, Instagram and YouTube (Shearer & Mitchell, 2020). With the continuous focus on and creation of digital innovation, these private operators are becoming a dominant factor (Donders, 2019). PSM are all too often demoted to mere subordinates in the digital domain, struggling to generate audiences on their own account. As a result, PSM are at a higher risk of following directionless strategies in an incessantly changing environment (Donders, 2019). To avoid this, public broadcasters latch on to successful trends in the media industry that are often manifested on the (social) media platforms of their private counterparts (Benson et al., 2017; Sjovaag, Stavelin, & Moe, 2016). While this digitization and media convergence could undermine the

key values of PSM (Picard, 2005), finding a balance between public value and retaining audiences in the digital domain (Leurdijk & Leendertse, 2010) is crucial for PSM sustainability. Donders (2019) has taking a first crucial step by examining how several PSM develop digital distribution strategies. The core of a successful mobile approach lies in the acknowledgement of changes taking place in the audience's media consumption (Jõesaar & Kõuts-Klemm, 2019). Both public and private media operators are forced to adapt to the increasingly prominent attention economy (Davenport & Beck, 2001). Large digital platforms garner a sizeable part of the audience's attention. To retain their own audience, PSM are considering the implementation of tools and techniques similar to those of their private competitors. At the same time they must try to maintain and improve the quality and diversity of their media content (Jõesaar & Kõuts-Klemm, 2019).

Practical applications of the mobile approach of PSM can be found by looking at their activities on the preferred mobile media platforms of their target audience. According to Broughton-Micova (Donders, 2019), public operators are as of recently well-aware of platformization and adapting accordingly. The BCC for instance has been, until recently, working together with Netflix in the production of new movies and series (Harrison, 2019). Another example can be found when looking at the German ARD. Their main news broadcast 'Tagesschau' can now also be found on TikTok, where their short newscasts are generating millions of views (TikTok, n.d.). Despite some initiatives being relatively successful, one could argue that the fluidity and technological development of the media sector will prohibit PSM from ever developing a clear platform approach (Donders, 2019). This uncertainty regarding strategies is further increased by legislative measures and strict performance criteria imposed by national governments, who are often the largest financiers of PSM. The following sub-paragraph further discusses these elements and how they particularly impact the Nederlandse Publieke Omroep (hence forth also referred to with the abbreviation NPO) – the public media operator collaborated with in this research.

2.1.3   Retaining public value

The above sub-paragraphs have covered the emergence and shifting of the PSM scope throughout the last decades. We now focus on a national and legislative domain of public operators. This scope allows us to focus on the public operator collaborating on this research: the NPO. From a historic perspective, PSM are an important part of the Dutch media landscape. The public operator currently holds a market share of 38% (Kijkonderzoek, 2020).

The structure of the Dutch broadcasting system is relatively complex. Halfway through the 20th century, Dutch society was structured in a manner known as pillarization. The distinction of social groups based on religion, social class or political stance led to public service broadcasting entities

being based on corresponding pillars. The existence and the amount of screen time of these public operators was legitimized by their membership subscriptions (Hallin & Mancini, 2004). Although the separate broadcasting associations derived from these pillars still remain today, their distinctiveness has decreased as a result of pillarization generally becoming less pronounced (Huyse, 1987).

Overarching the individual broadcasting organisations, sits the Nederlandse Publieke Omroep (NPO). Their aim is to create a unified brand of public service media in the Netherlands (NPO, 2015). With a focus on informing, inspiring and entertaining the general public, all operations stem from the same Reithian Trinity as introduced in the beginning of this chapter (Bechler, 2019). The NPO itself does not directly produce content, but monitors the overall process and synergy of all the broadcasting associations they have responsibility over. For example, the broadcasting agency NOS is tasked with broadcasting news, sports, and events; and the NTR is tasked with offering informational and educational productions (NTR, n.d.). Through the monitoring of these broadcasting entities, the NPO safeguards the existence of their production tasks; which they are legally bound to.

Aside from NPO's role as a broadcasting supervisor, the legislation they face themselves has implications for the entire Dutch broadcasting entity including the individual broadcasting associations. The main enactment they ought to adhere to is the *Mediawet;* the media law enforced by the Dutch ministry. This law, dynamic of nature, constantly develops along with governmental perceptions of the contemporary Dutch society.

In their updated *concession policy plan 2022 – 2026*, NPO states that they aim to develop an overarching innovation strategy for all their subsidiary broadcasting operators (NPO, 2021, p.47). NPO continuously aims to innovate and rejuvenate the content of their productions to fit with present-day values and interests in society (NPO, 2021). They recently developed the *'impact-experience tool'*, which allows them to measure how audiences feel about all types of public television content. Besides focusing on innovations content-wise however, a renewed and present-day take on the *shape* of the produced content could generate further PSM possibilities. The reshaping of existing media content into new formats that fit the vertical screens of our mobile devices for instance, could prove to be an effective way to reach the mobile target audience (Canella, 2018).

2.2 Vertical formats

Screens, whether traditional paintings or digital smartwatch interfaces, provide us with a field for presenting events (Zettl, 2013). When interacting with a screen, we are able to find focus in space. No longer are we only required to cope with the large, physical, and amorphous space we exist in. The screens on mobile phones, billboards or camera viewfinders all encompass a definitive

area with fixed borders. These borders clarify the playing field of the screen, in which events and information can be presented. Zettl (2013, p.83) refers to these borders as the "lines between the internal world of the representation and the world external to the representation".

As the screens we come across in our daily lives develop and morph into different shapes and sizes, the representation within them changes accordingly. This subchapter examines how screens have developed throughout history and how the screen of our mobile phones is providing us with yet another new representational aesthetic. The theoretical and practical understandings from this sub-chapter subsequently serve as substantiation for the hypotheses that will be introduced later in this research.

2.2.1 Aspect ratio development

The size and format of digital screens is referred to as the aspect ratio, which describes the relationship between screen width and screen height (Zettl, 2013). When working on physical artefacts, an individual has the agency to reshape the frame to his or her liking. One may, for instance, purposely paint on a wide canvas to capture an entire landscape. An artist may even consider more unorthodox shapes and sizes, such as the case with Raphael's *The Alba Madonna*. Painted in 1510 on a round canvas, The Alba Madonna is able to interlock three figures in a rhythmic pattern within a circle (Jones, 2020). Another example of unconventional screen sizes can be found in the *Panorama Mesdag* by Hendrik Willem Mesdag. The cylindrical shape of the painting creates a cyclorama, in which the viewers have a 360-degree view of the canvas – evoking the experience of standing in the midst of the place depicted in the image (Lopez. 2011).

As exemplified by above paintings, a large degree of format flexibility exists in the crafting of traditional screens. This flexibility is often not easily transferrable to film, video, or computer screens in the digital domain. Within this domain, Ryan (2018, p.247) distinguishes four standard aspect ratio's (for an overview, see Figure 1) that share with each other a larger width than height: 4:3 (found in older television and computer screens); 16:9 (most laptops and modern television screens); 1.85:1 (widescreen cinema productions); and 21:9 (an even wider cinematic format). Besides their names, derived from mathematical formulas, the (justified) existence of these aspect ratios is often a result of economic and technological developments (Cossar, 2009).

Figure 1

An overview of the dimensions of the four main aspect ratios.

Although digital screens may have different aspect ratios, flexibility only really exists within the contours of its frame. Because of this internal flexibility, Lev Manovich (2001) refers to these displays in our daily lives as 'dynamic screens'. The image within it continuously moves and transforms, distinctly differentiating them from traditional screens such as paintings and photographs. The dynamic image strives for visual plenitude, asking the viewer to identify with it (Manovich, 2001). More importantly within this process of identification is that the screen functions as a filter; rendering out things that are taking place outside of the frame.

In film and television, the dynamic image almost always fills up the screen. This horizontal imagery, according to some researchers, corresponds with human nature and the way we process information. Josephson and Holmes (2002) conducted eye-tracking analyses which indicated that individuals focus first on the left side of the screen and subsequently move their eyes to the right. Other studies contradict these results, however. Besides Josephson's and Holmes's (2002) research taking place in a western environment (the Arab world reads and writes from right-to-left), film scientists argue that the action taking place on the screen is the main determinant of eye-sight drifting (Marchant et al., 2009). In addition to on-screen movements, Treuting (2006) concluded that human elements within the screen played a crucial role in eye-sight drifting. When a human face is visible on the display, it will pull the eyesight of participants towards itself regardless of its position on the screen. Results from Treuting's research and the corresponding discrepancy with previous eye-movement conceptions tell us something about what is actually important when viewing dynamic screens: not the orientation of the screen, but the image *within* it matters. This can prove to

be auspicious for new vertical formats; using the image within the screen effectively will draw eyes to the action, regardless of aspect ratios (Ryan, 2018). Before arriving at the potential opportunities of vertical formats however, a brief overview of historical aspect ratio development is given to embed and contextualize the emergence of the vertical format.

In the late nineteenth century, American inventor Thomas Edison developed the first actual video format. By printing photographs in succession on a 35mm celluloid strip, Blacksmith was created; the first film to use the 4:3 aspect ratio (McConkey, 2019). The decision to use this format was mainly made for economic reasons. The film could be produced by cutting existing film rolls in half, lowering the production costs and allowing for more cinematic experiments (Cossar, 2011). The format proved to be successful; seeing widespread use and being labelled the 'Academy Ratio' in 1932 (Monaco, 1981). Halfway through the twentieth century, televisions were developed and becoming more commonplace in western households. These also adopted the 4:3 aspect ratio for practical reasons such as its fast and affordable production process (Cossar, 2011). Using the 4:3 ratio eventually even became compulsory in the United States through the National Television Standards Committee (NTSC) (Fink, 1955). As a result. legislation now subverted unconventional and creative initiatives such as round or 'porthole' televisions.

The aforementioned aspect ratio limitations were sometimes perceived as a hinderance to filmmaking. Filmmaker Sergei Eisenstein advocated for a 'dynamic square; a screen with the same horizontal and vertical dimensions. The dynamic square would be more versatile as it could host imagery for both horizontal and vertical screens (Wasson, 2012). His plea to the Motion Picture Academy urged a renewed and critical examination of the unquestioned horizontality of the 4:3 aspect ratio, as he believed that cinematic flexibility supersedes economics (Friedberg, 2009). In spite of Eisenstein's appeal, even wider formats (i.e., 16:9 ; 1.85:1 ; 21:9) were developed in the remaining part of the century. Moving to the wider formats enabled filmmakers to explore wide landscape shooting that accentuates the capabilities of the new formats (Cossar, 2011). While enabling a larger horizontal field of view, the wider formats made it more difficult to adequately frame vertically-oriented scenes. Shots of towers, trees or human beings for instance, would end up with inordinate amounts of space around the focus subject (Zettl, 2013).

When looking at the realm of photography, institutionally-mandated spatial restrictions are not nearly as present; photographers can simply rotate their camera 90 degrees to capture the image without raising any eyebrows (Ryan, 2018). According to Henle (1974), the right angle for a photograph is the one which pictures the reality of the subject. For example, according to Henle, a stairwell is well suited for vertical photography. This orientation gives the viewer the sense of being led to the top of the stairs, which is located in the upper third part of the image. Here, the verticality serves the subject matter; the decision is driven by aesthetics.

While the above photographic sentiment is not merely bounded to the paradigm of static imagery, concrete examples of aesthetically drive dynamic screens are not quite commonplace in present-day society. Besides the incidental vertical monitor in airports or retail stores, no real vertical dynamic screen was used daily until the development of the smartphone. With the small vertical display being rather commonplace in our daily life for the last decade and users holding it vertically over 94 percent of the time (Oentoro, 2018), one could argue that the development of vertical videos that adhere to the dimensions of the new display is not all that omnipresent. Despite the relatively easy movement of tilting the screen by 90 degrees to present traditional horizontal video content, a case could be made for producing video content that fits aesthetically with the way in which we hold our device – vertically. The next sub-chapter will examine practical and scientific outputs regarding vertical content and the ways it can successfully be presented on smartphone devices.

2.2.2   New vertical aesthetic

Throughout time, the paradigm of aesthetics has seen many conceptual and philosophical debates. In popular discourse, aesthetics are often regarded as dealing with beauty and appeal. More generally however, aesthetics concern the pleasure brought about in viewing elements of an object or image (Janaway, 1995, p.14). Within the scope of media production, Zettl (2013) refers to *applied media aesthetics* as the process of examining interaction between media elements such as content and composition, and how they are perceived by individuals.

The smartphone, with its technology and vertical composition allowing for insurgent ways of presenting content, has the potential to rupture conventions of the viewing paradigm (Ryan, 2018). Especially on mobile phones and the orientation in which we use it, the device reaffirms the technological attraction offered by vertical video (Ryan, 2018). By embracing the technology through which it emerged, Ryan even argues that vertically framed videos represent an entirely new aesthetic. Baker and colleagues (2009) describe mobile video content as having a 'Keitai aesthetic'. Keitai, a Japanese concept for embracing the small and portable, transforms past standards by emphasizing on the idiosyncratic concept that is 'mobile experience'. Through this mobile experience, a new relationship can emerge between human and device. From specific physical gestures we use to cognitive stimuli we endure; all interactions become an aesthetic event in and of themselves (Manovich, 2006, p.6). Through this interaction, vertical content watched on a mobile device can potentially enable a viewer experience that establishes a unique connection between media product and audience (Mulier et al., 2021).

It thus becomes important to consider the pleasures and benefits that can be derived from consuming vertical content. Smartphones are designed to be held vertically; two hands are often

necessary to stabilize the device in a horizontal orientation (Mulier et al., 2021, p.5). To shape the vertical context and substantiate its usefulness, other instances of vertical content ought to be examined. The raison d'être of smartphones is largely based on a successful adoption and innovation of previously existing information viewing commodities. In examining these, prior studies reveal that individuals prefer to read print media such as newspapers vertically rather than horizontally (Wearden et al., 1999; Fuchs et al., 2016). Similar studies on information comprehension have been conducted for restaurant menus (Kim et al., 2019) and university classrooms (Van der Zanden, 2014), taking into consideration other contextual elements such as viewing angles and lighting. These findings in different settings tell us that vertical or horizontal preference is essentially context dependent.

Despite variances in findings, getting a clearer understanding of correct implementation within the mobile context is becoming ever so relevant. In cornerstone empirical research on vertical video, Mulier and colleagues (2021) found that vertical videos are easier to consume when it comes to digital advertisements. By vertically cropping horizontal videos and reformatting the embedded text to a vertical format, the research accounted for potential information loss due to cropping. This research revealed and reinforced the notion that besides context, the actual video content and duration are also determinants of vertical effectiveness (Mulier et al., 2021). For instance, one could imagine that cropping a 10-second Facebook advertisement is less detrimental to viewer experiences than vertically cropping a feature-length film. The tradeoff in leaving out visual information to make a vertical fit, has been covered in an in-depth discussion between news agency videographers and producers (Canella, 2018). Canella concludes that news operators should acknowledge creative opportunities stemming from vertical development, allowing for engagement with younger audiences on various platforms.

The vertical cropping of video content to inform, educate and entertain PSM audiences may undoubtedly raise concerns. Will crucial visual clues be missed due to cropping? Could it result in skewed perceptions regarding certain issues in the world? It is in public service media's best interest to mitigate the effect of contextual variables that can potentially undermine the quality of their production (Marko, 2017). Their content is adjusted for the channels it is presented on (Donders, 2019), with Dutch operator NPO stating that their digital channels are better suited for shorter, more 'catchy' content (NPO, 2021, p.20). Still, the vertical cropping of digital productions could raise concerns. Whilst the 'to-be' cropped content is digital, a literal inversion of its aspect ratio (from 16:9 to 9:16) will result in a large part of the original content not being visible. Besides producing content natively in a vertical format, a possible solution could be found in a 'responsive' video format: the ability to capture relevant and prominent content within the frame by seamlessly moving to salient parts of the content (e.g. keeping the face of a news anchor centered to retain and benefit from the

human gaze) (Achanta & Süsstrunk, 2009; Van der Wel, 2017). While responsive tools that automatically adapt the image to display relevant video content are not yet widespread in use, great potential can be found in a format that is immersive, vertical, and not compromising of the content (Van der Wel, 2017). Similar to both playful and serious initiatives such as Snapchat's 'Spectacles' and Quibi's streaming platform, a dynamic way of visualizing PSM content for mobile devices could prove prosperous in reaching audiences on mobile platforms. In doing so, the responsive video format provides the modernist tension that Eisenstein plead for in the dynamic square (Ryan, 2018, p.248).

2.3 Viewer experience

The previous two sub-chapters regarding public service media and vertical formats, have enabled us to contextualize the domain from which this research aims to operate. The acquired knowledge allows us to now build towards the hypotheses. These hypotheses, pertaining to viewer experience, enable us to assess whether using vertical video formats will truly please viewers when it comes to consuming PSM content. Before arriving at the hypothesis however, it is crucial to understand what factors actually determine whether new video formats work. In the ever-increasing literary domain on mobile video, numerous studies argue that mobile video content is able to enrich our lives. Viewer experience regarding mobile video has been examined empirically before in the past, approaching the individual's experience from different perspectives (Rigby et al., 2016). Even before the development of smartphones as they are known today, Skrebowski (2004) argued that not only content, but also the shape of and a user's interaction with mobile media determine user experiences. Other studies examined how area's such as media richness and usability of mobile devices could impact our experiences (Venkatesh & Ramesh, 2006; See-To et al., 2012; Calvo-Porral et al., 2016). Throughout both theoretical and empirical research regarding mobile video, it becomes apparent that the experience of the individual viewer is paramount when examining the effect of variables such as the shape and usability of media. When particularizing within our research domain, a general consensus also exists regarding vertical video. From theoretical introductions to in-depth and even empirical findings, an attempt is actively being made to conceptualize the vertical video experience (Canella, 2017; Ryan, 2018; Mulier et al., 2021). The abovementioned academic research illustrates that viewer experience can be considered as one of the main determinants for successful video format perception. In this research, viewer experience is referred to as the "entire set of effects that is elicited by the interaction between a user and a product, including the degree to which all our senses are gratified, the meanings we attach to the product, and the emotions that are elicited" (Hekkert, 2006, p. 160).

Within this viewer experience framework, an expositive ternary exists consisting of the perceived enjoyment, perceived ease of use, and the flow state of individuals. These concepts all fall under the umbrella of viewer experience. When findings from previous empirical analyses are compiled, these three concepts seem to be most often mentioned as being the fundamental components of viewer experience in the domain of (digital) media (See-To et al., 2012; Calvo-Porral et al., 2016; Park, 2020). Although these concepts will be examined more elaborately in the paragraphs below, a concise definition is now provided. First, *perceived enjoyment* is described as the extent to which the usage of the device is perceived to be enjoyable regardless of any performance consequences that may be anticipated (Griffin, 2006). Second, an individual's *perceived ease of use* concerns the perceived intensification of cognitive activity when working towards a goal (Inzlicht, Shenhav, & Olivola 2018). Thirdly, the *flow state* is defined as a certain state of consciousness in which individuals experience a holistic and immersive sensation when involved in an activity (Czikszentmihalyi, 1990). Accordingly, it is believed that a positive viewer experience with new video technologies – formalized through the interaction of the above concepts – determines the subsequent user satisfaction (Kim et al., 2010; Calvo-Porral et al., 2016; Park, 2020). The degree of *user satisfaction* – defined as the overall experience when interacting with digital outlets (Calvo-Porral et al., 2016) – is thereafter also a potential indicator for an individual's *continued intention to use* the media product (Kwon et al., 2014; Park, 2020). For an overview of the viewer experience model, please see the research model in Figure 2. In the paragraphs below, each hypothesis from the research model is introduced.

Figure 2

Framework for studying the effect of different video formats on viewer experience and user satisfaction
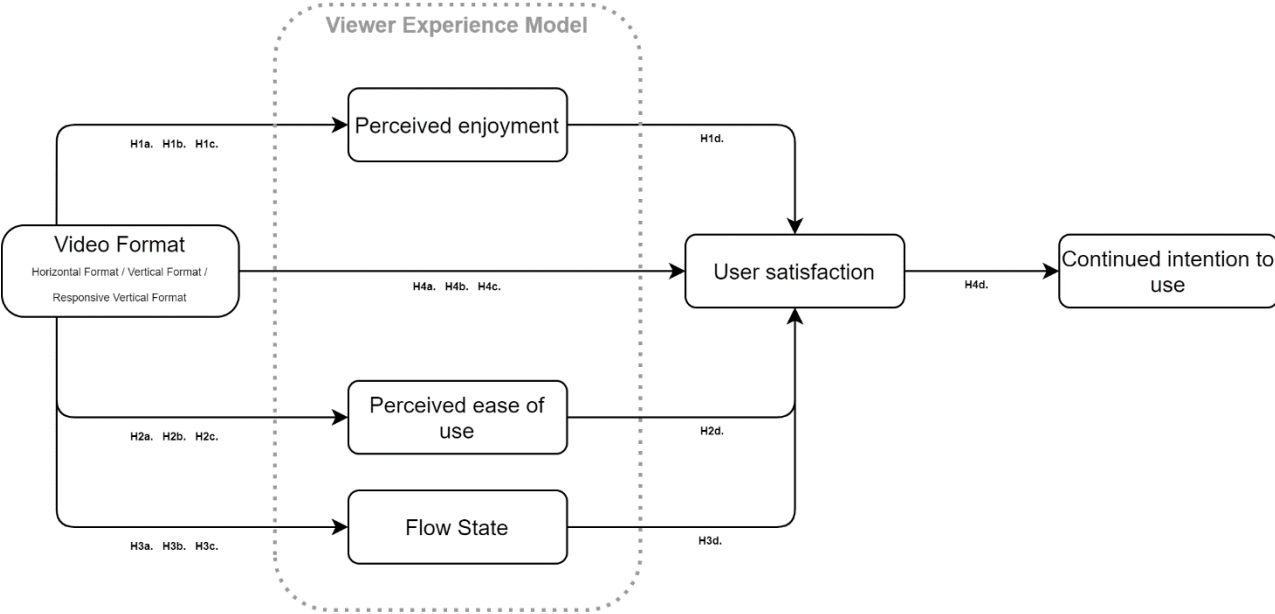
In line with findings by Rigby and colleagues (2016) concluding that different screen sizes impact how individuals experience the displayed content, this research makes a distinction between three different video format conditions for which the viewer experience is to be examined: *horizontally formatted video*, *vertically formatted video*, and *responsive vertically formatted video*. The horizontally formatted video will be presented in its original 16:9 aspect ratio. The vertically formatted video consists of the same content, albeit cropped to a ratio that is closer to 9:16; making it more suitable for vertical viewing on a mobile device (Mulier et al., 2021). The responsive vertically formatted video starts from the same premise as the vertically formatted video. In addition however, it is adaptive of nature and able to reshape its aspect ratio in order to capture saliant information within the aspect ratio borders.

2.3.1 Effects on and of Perceived Enjoyment

Previous studies have found that usage of technology is affected both by intrinsic motivation (i.e., perceived enjoyment) and extrinsic motivation (i.e., perceived effort) (Zhou & Feng, 2017). Building on the first, some researchers state that enjoyment is becoming the most basic motivation to watch any form of communication media and subsequent satisfaction with it (Zhou & Feng, 2017; Griffin, 2006). Concretizing above understandings, the immediateness and (for now) unconventionality of vertical videos can hold various benefits (Coppola, 2018) and potentially lead to a higher perceived enjoyment. In line with Coppola (2018) and more recent empirical findings by Mulier and colleagues (2021), It is expected that users feel more enjoyed by vertical video content as opposed to horizontal video content that does not automatically fill the entire mobile display. Furthermore, a responsive vertical format is expected to be even more enjoyable through its added unconventionality. This leads to the following hypotheses:

H1a. Respondents who have been exposed to a responsive vertically formatted video report higher levels of perceived enjoyment than respondents who have been exposed to a horizontally formatted video.

H1b. Respondents who have been exposed to a vertically formatted video report higher levels of perceived enjoyment than respondents who have been exposed to a horizontally formatted video**.**

H1c. The reported levels of perceived enjoyment will be higher for responsive vertically formatted video format than vertically formatted video.

H1d. Respondents' perceived enjoyment of a video is positively related to their perceived user satisfaction.

2.3.2 Effects on and of Perceived Ease of Use

As a second component of viewer experience, we further investigate the perceived effort in watching the video content. According to research on processing fluency by Winkielman and colleagues (2003), elements and items surrounding us are judged to be more positive when we are able to process them effortlessly, leaving individuals more satisfied (Venkatesh & Ramesh, 2006). Individuals often tend to avoid effort if possible (Kool et al., 2010). The low levels of effort to consume and produce content on TikTok for example, is a large part of the reason as to why the app is able to hold the attention of young smartphone users (Tolentino, 2019). In this specific case, effort is examined regarding the process of watching video content on a smartphone either vertically or horizontally. Professionals in the media sector argue that vertical videos on mobile devices offer more comfort and ease-of-use due to the vertical orientation of the device being considered as natural and habitual (Canella, 2017). When the content on the display also adheres to the habit of holding a mobile phone vertically (Oentoro, 2018), we expect the perceived effort to be lower. When the format is both vertically oriented and responsive to the original content, the perceived effort could potentially be even lower as viewers may potentially feel that, through its constant reshaping, the screen is 'doing the work' for them in ensuring that all relevant information is visible. In sum:

H2a. Respondents who have been exposed to a responsive vertically formatted video report higher levels of perceived ease of use than respondents who have been exposed to a horizontally formatted video.

H2b. Respondents who have been exposed to a vertically formatted video report higher levels of perceived ease of use than respondents who have been exposed to a horizontally formatted video**.**

H2c. The reported levels of perceived ease of use will be higher for responsive vertically formatted video format than vertically formatted video.

H2d. Respondents' perceived ease of use in watching a video is positively related to their perceived user satisfaction.

2.3.3   Effects on and of Flow State

Within the bounds of viewer experience, an individual's *flow state* is often used as an explanatory measurement. The concept of flow was first developed and researched by Czikszentmihalyi, who was intrigued by the way artists were able to get lost in their work, disregarding their primal needs (Czikszentmihalyi, 1990). Subsequently, nothing else seems to matter due to a narrowed focus and loss of self-consciousness (Calvo-Porral et al., 2016). When individuals do not experience the flow state however, they tend to become disinterested and try to escape the unfulfilling experience (See-to et al., 2012). In line with this notion, academic research in digital contexts has increasingly emphasized the importance of flow. Interaction with digital technologies that realize this flow state supports inquiring behavior. According to Kim and colleagues (2010), effectuating a state of flow within individuals is crucial for establishing long-term relationships between users and digital outlets. Accordingly, the experience of flow by digital users likely leads to higher degrees of user satisfaction and further use of said technology in the future (Calvo-Porral et al., 2016).

The implications of the flow state have not yet been examined empirically in relation to video formats. Because viewers need to tilt their screen from a vertical to a horizontal position for a horizontally format video to be screen filling, we expect individuals who may keep their phone in the same vertical position (i.e., as would be the case in both the vertical and responsive vertical format) to experience higher levels of flow. Combining these assumptions with the above findings leads us to the following hypotheses:

H3a. Respondents who have been exposed to a responsive vertically formatted video report higher levels of flow state than respondents who have been exposed to a horizontally formatted video.

H3b. Respondents who have been exposed to a vertically formatted video report higher levels of flow state than respondents who have been exposed to a horizontally formatted video.

H3c. The reported levels of flow state will be higher for responsive vertically formatted video format than vertically formatted video.

H3d. Respondents' flow state is positively related to their perceived user satisfaction.

2.3.4 *Effects on and of User Satisfaction*

User satisfaction is one of the psychological concepts that follows directly from a positive viewer experience. In line with this research's goal of assessing the effectivity of vertical video formats, user satisfaction is a solid measurement as it measures if overall expectations are fulfilled or exceeded (Johnson & Fornell, 1991). As satisfaction generally concerns a post-evaluation process of the overall experience (Bhattacherjee, 2001), perceived user satisfaction is often considered a core determinant in predicting the continued intention to use or engage with information technologies (Bhattacherjee, 2001; Roca et al., 2006). In accordance with expectations of vertical video and responsive vertical video resulting in better viewer experiences through enjoyment, effort and flow (i.e., H1 to H3), the following hypotheses designate the impact of these new video formats on smartphones:

H4a. Respondents who have been exposed to a responsive vertically formatted video report higher levels of user satisfaction than respondents who have been exposed to a horizontally formatted video.

H4b. Respondents who have been exposed to a vertically formatted video report higher levels of user satisfaction than respondents who have been exposed to a horizontally formatted video**.**

H4c. The reported levels of user satisfaction will be higher for the responsive vertically formatted video format than the vertically formatted video.

H4d. Respondents' user satisfaction is positively related to their continued intention to use.

3. Methodology

This chapter will elaborate on the methodology used and how it enables us to provide an answer to the research question at hand. The first sub-chapter in this methodology section rationalizes the decision for a between-subject experiment. Subsequently, the chapter covers how this research design has been implemented and how implications of its design can be overcome. After the research design has been established, the data collection and subsequent sample will be discussed. Next, the procedure of the experiment will be touched upon. A comprehensive understanding of how the different conditions have been manipulated is crucial for a sufficient understanding of the experiment. Lastly, the measurements that helped to generate valid and reliable responses will be described.

3.1 Research design

To answer the research our hypotheses and research question (*What is the effect of different video formats on online public television viewers' experience?*), an experimental research design was used. A quantitative approach to this question was deemed more suitable as it enabled the generation of data that allows for a statistical assessment of the hypotheses (Matthews & Ross, 2010). More specifically, a between-subject experiment was conducted consisting of three groups. Each of these groups was exposed to a different condition. These three conditions represent three different types of video format: a traditional, a vertical, and a responsive vertical format (Appendix A). The experiment involved assessing participant experience after getting exposed to their assigned condition treatment (Charness, Gneezy, & Kuhn, 2012). Through this assessment, it becomes possible to measure the effects of the different video format types, which can subsequently be compared to each other.

Through a quantitative approach, this study complements previous research on technological innovation within the public service media domain (Donders, 2019; Canella, 2018). An experimental design was best suited for the research question, as it is able to uncover causal relationships (Neuman, 2014). A great benefit of experiments is that they are artificial. Through a purposive simplification, it becomes possible to control the study situation and remove variables that do not have a causal importance for the hypothesis (Webster & Sell, 2007; Neuman, 2014). Thus, this research design has been chosen as it enables us to test the effect of different video formats.

Within this experimental research design, it is crucial to consider and account for several ethical areas that enable participants to receive a fair treatment (Smith & Leigh, 1997). In the recruitment process, explicit consideration is ought to be given to the participant. They are to be given an informed consent form, which gives further information about the experiment and how the

researcher can be contacted. Here, it was also clarified that the participants can withdraw from the experiment and that their data is being kept confidential. After entering their age, participants aged 17 or lower were directed to a page stating that they were not able to partake in the research as their individual consent was not sufficient. In addition to these more general ethical considerations, the fact that the experiment is conducted online also brings along several implications. When conducting an online survey, a single individual respondent is able to participate multiple times. In order to combat this, one could exclude additional responses being submitted from the same IP-address (Bryant, 2004). However, as some individuals (e.g., husband and wife) may participate from the same device, this decision was not made. Lastly, conducting the experiment online can lead to a higher number of participants dropping out. A clear and coherent structure was given to the questionnaire, with different question blocks making sure the interface did not become cluttered. Through forcing a response, participants were required to answer a certain question block before moving to the next one; ensuring that less items would be left unanswered. For the online experiment, the digital questionnaire tool *Qualtrics* was chosen as it allowed individuals to participate in their own time.

3.2 Data Collection

To conduct the experiment, a questionnaire was developed in Qualtrics. The survey was created in the Dutch language as this research collaborated with Dutch organizations NPO and NOS (Appendix B). Despite this research focusing primarily on the impact of video formats (i.e., the shape of media), a discrepancy between the content and the viewer on the basis of language could impact results. By conducting the survey in the same language as the content at hand, the language barrier was removed. The target audience therefore consisted of Dutch-speaking individuals that are in possession of a mobile phone and, for ethical reasons, are over the age of 18. Ideally, the research collaboration would have used NPO's expansive network of audience panels to spread the questionnaire. This would have resulted in fewer methodological complications that arrive with other sampling methods. However, as this was not deemed feasible and favorable by NPO, alternative sampling techniques were used.

Participants were reached through a combination of purposive sampling and snowball sampling. This specific combination allowed for a clear staring point among people that fit the target group. These potential participants where then approached personally or through social media networks. From there on, snowballing allowed for feathering out to others that were deemed qualified by individually approached participants (Matthews & Ross, 2010), allowing for the potential sample size to increase. In congruence with the increased sample size, snowball sampling also effectuates a

higher sample variation as demographic properties of an acquaintance's social network can differ substantially (Ritter & Sue, 2007). In addition to the benefits of snowball sampling in reaching participants, virtual snowball sampling allows for even further advantages regarding survey attractiveness. According to Baltar and Brunet (2012), the digital approach is more likely to generate improved response rate and quality. Distribution of the survey link by others on platforms such as LinkedIn and Facebook proved especially effective. One disadvantage of this larger reach also became apparent, as this type of distribution made it impossible to send reminder messages to all potential participants that one had no direct contact with. Despite this, the combination of these sampling techniques eventually resulted in a large enough sample size to conduct meaningful analyses.

3.3 Sample

The questionnaire was distributed online in the period between April 6th and April 22th 2021. Distribution through a combination of purposive sampling and snowball sampling mostly took place on social media networks. This was done on the three platforms WhatsApp, Instagram and LinkedIn. Whilst a majority of participants were requited this way, several individuals were also approached in person. Through the distribution process, a total of 109 people were reached that started the questionnaire. Almost all participants were over the age of 18. Only one participant was redirect to the end of the survey through the survey flow due to being 17 or younger. After the data was cleaned, it appeared that 102 out of the 109 participants had completed the survey in full (i.e., a completion rate of 94.5%.). Therefore, our valid sample consisted of N = 102 participants.

For the valid sample, the age range of participants was between 17 and 67 (M = 28.79, SD = 12.56). Of the 102 participants, 45.1% identified as male, and 54.9% as female. None of the participants indicated 'other' or 'prefer not to say' when asked about their gender. The participants were generally highly educated, with 70.9% of the participants having completed a 'WO Bachelor' or 'WO Master' degree (i.e., a University level degree). Another frequently mentioned educational level was 'HBO' (i.e., a University of applied science), with 17.6% of participants in possession of a degree on that level.

In total, 21.5% of the participants filled in the survey on their computer, and 78.5% filled in the survey on their mobile phone. For the 80 participants that took part on their mobile device, an additional question was asked regarding the orientation in which they held their phone when watching the video. This could prove insightful as macro-test on the preferred phone orientation when watching short videos. Of the 80 participants that took part on their mobile device, 91.3% held their phone vertically when watching the video. All off the 102 participants (whether they partook on

their computer or mobile device) had a mobile phone in their possession. Of the 102 participants, 67.6% used their mobile phone daily to read the news. Also from the total sample of 102 participants, 65.3% used their mobile phone several times a week to watch news videos. Participants were also asked about their familiarity with NOS, NOSop3 and this particular explainer video. Of the 102 participants, 99% was familiar with NOS. Regarding familiarity with NOSop3, 71.6% was familiar with their content, 15.7% was not, and 11.8% was unsure. When answering the same question for this specific explainer video, 5.9% was familiar, 89.2% was not, and 3.9% was unsure.

3.4 Procedure

As part of the research design and to examine the impact of different video formats, the three conditions have been created manually. All three groups in this experiment were exposed to the same video content: a one-minute-long explainer video made by Dutch broadcasting organisation NOS. Before the different conditions and their operationalizations are examined, a further description of NPO and its subservient broadcasting agencies is warranted.

3.4.1   About NPO

This research has been developed in collaboration with Dutch public broadcaster NPO. NPO's main aim is to create a unified brand of public service media in the Netherlands (NPO, 2015) with a focus on informing, inspiring, and entertaining the general public; showcasing content that evokes curiosity, mutual understanding and open-mindedness, while being detached from political or commercial ties (NPO, n.d.). More specifically, the research was conducted in alliance with one of NPO's research divisions; *NPO Innovation*. The innovation department of NPO aims to generate impact and reach audiences by examining the possibilities of new formats and technologies (NPO, n.d.). Their projects are often conducted through a cooperative effort, combining their expertise with external start-ups, educational institutions, or their subservient broadcasting agencies.

The NPO operates as an overarching organization that supports and monitors its subservient broadcasting agencies. Because of their role, the NPO itself does not actually produce content. As NPO Innovation holds a similar position regarding the development of new formats and technology, they are required to collaborate with the broadcasting agencies to generate actual output. Hence, in order to explore the content possibilities for this research, one or more of the subordinate broadcasting agencies had to be approached. By using NPO Innovation's extensive media-network, an innovation project was set up with broadcasting agency NOS. The NOS is the only sub-organisation that has a statutory obligation to develop news and sport productions. NPO requires from NOS that their programming is of a public service nature, consisting most noticeably of

impartial news and sports coverage (NOS, n.d.). NOS was specifically chosen as a collaboration partner for this project as its content and goals correspond more strongly with what is considered as PSM in both traditional and contemporary academic literature (Donders, 2019). News content fits strongly within the Reithian trinity (Bechler, 2019). NOS content is also watched frequently, with the eight o'clock news averaging around 2.5 million viewers every evening (Kijkonderzoek, 2020).

In order to retain their public service identity in the digital era, the NOS is actively targeting younger audiences online. Different online platforms have been set up to accommodate this. Most noteworthy are their channels *NOS Stories* and *NOSop3*. These online-only news accounts are present on almost all social media platforms (i.e., YouTube, Instagram, Facebook, and Twitter). Here, they collectively reach over 1.5 million followers and subscribers (NOS, n.d.). As these channels only operate online and produce their content accordingly, a cooperation with either seemed most sensible. After discussing potential courses of action with both NPO Innovation and NOS, an experiment in conjunction with NOSop3 was deemed most feasible. The main argument being that the productions of NOS Stories are targeted mainly at an audience aged between 13 and 18, whereas the target audience for NOSop3 consists of any Dutch speaking individual that has access so social media.

NOSop3 focuses on the development of so-called *explainer videos*. In these videos, they aim to explain a certain newsworthy item in approximately ten minutes. The personal manner in which the topic is presented, aims to contextualize the issue at hand and make it accessible . In this research, an existing explainer video has been manipulated in order to be more suitable for our assessment of short-form content in different video formats. The below paragraphs will elaborate further on why a decision has been made to use existing content and how it has been edited.

3.4.2   Content

One decision that could prove to have a substantial impact on the research design, was the chosen content. On a macro-level, a distinction can be made between two different types of vertical content. First, *native* vertical content (Canella, 2018, p.76) refers to footage which was originally and intentionally produced in a vertical format (e.g., filming a news item or recreational video vertically on a mobile device and uploading it directly to Instagram). As most content made by NOS is made to suit different channels and devices (e.g., both television and mobile), they mostly refrain from producing video content natively in a vertical format. Secondly, *remodelled* vertical content refers to footage that was originally shot in a traditional horizontal format, but which is cropped to fit within the vertical display of our mobile devices (e.g., editing an already existing news item to make it fit

mobile displays vertically). The research will focus on the latter. The twofold reasoning for this decision will now be discussed.

One of the two main reasons for focusing on remodelled vertical content finds its origin in the academic implications of quantitative research. As mentioned by (Neuman, 2014), control is crucial in experimental research. It is in the best interest of a researcher to control the experimental situation as good as he or she can. Therefore, in order to conduct a reliable and valid experiment, the treatments should be isolated and alternative explanations should be eliminated. As this research is examining how the *shape* of media impacts viewer experiences, it is important to account for any changes in experience brough about by the *content* within the video format. If one were to compare a native vertical video to a traditional horizontal video, a researcher could never tell to what extent differences in viewer experience could be addressed to the format of the video; as its contents were different to begin with. Remodelling traditional horizontal footage enables us to retain the content to a large degree. Understandably, a vertical crop disables viewers from seeing the full original image, yet examining this could also give us insights into whether a loss of visual information is potentially detrimental to the viewer experience. The effect of information-loss because of this crop is then mitigated in the third responsive condition; allowing us to deduct whether the lack of visual information is actually a causal factor for different viewer experience results.

A second and more practically oriented reason for experimenting with remodelled vertical content, lies in its potential for developing a future-proof production process in which one single production is suitable for viewing in the natural orientation (Oentoro, 2018) of both mobile and static devices. A positive reception of the vertical video formats could inspire production teams of PSM to not focus on the non-mobile and mobile domains as two separate entities. Instead, one production could be made for both. Here, the post-production edit would only have to digitally crop the content to vertically fit the mobile device.

For the experiment, the content was presented on a mobile phone that is embedded in a video template (see Appendix A). The only difference between the groups is the video format in which the content is presented. The first group was exposed to the traditional format condition, in which the content was displayed in its original 16:9 format on a phone that is held vertically (Figure A1). The second group was exposed to the vertically formatted video, in which the original content had been cropped so that it fits on the screen vertically (Figure A2). The third and final group was exposed to the responsive vertically formatted video, in which the original content had been cropped so that it fits vertically. In addition, the footage within the frame moves on a horizontal scale, capturing elements of the content that are most salient (Achanta & Süsstrunk, 2009) (Figure A3). As this research tries to examine the strengths of vertical video formats on devices that we hold vertically, content was selected in which most important events are portrayed in the centre of the screen so

that less amount of valuable information is lost. Although this is not representative of all traditional video content, a positive reception of vertical content can potentially spark debate about whether some future video content should be produced and filmed with the vertical orientation in mind, capturing most of the relevant information directly in the middle of the frame.

The final content output consisted of an explainer video by NOS Op 3 that was cropped so that it would last 45 seconds. The decision for a short video was made as the vertical format has been implemented much more frequently in short-form content (Storyly, 2021; Sweatt, 2020). Furthermore, an explainer-video was chosen regarding a more light-hearted topic. NOSop3 also produces content regarding certain socio-economic issues and national elections. These topics were avoided as sentiments and opinions of individuals regarding these topics could potentially influence their response, even if the questions were only related to the shape of the video formats. In consultation with the digital coordinator of NOS, we decided on picking the explainer video *"Waarom er zo veel lucht in je pakketje zit"* (*"Why there is so much air inside your package"*); cropping it so that only the 45-second introduction is being shown and no in-depth material is being discussed. The 45-second video shows a news-presenter raising the question as to why packaging is often filled with so much air and what the potential consequences of large amounts of package shipping may be.

3.4.3 Questionnaire structure

As mentioned in the research design, an online experiment was conducted using Qualtrics. The data from Qualtrics was afterwards imported into SPSS to conduct multiple statistical analyses. When participants opened the questionnaire, they were asked for their consent to participate in the survey. The intentions of the research were then mentioned along with the ethical boundaries within which the research operates. Although there was no explicit cover story put into place, the participants were not told about the experimental set-up of the study, what the different conditions consisted of, and which one they were placed into. In general, it took participants approximately five minutes to complete the questionnaire.

After going through the consent page, several demographic questions were asked. In addition, a few extra control questions were displayed that asked participants about the device on which they were conducting the survey and how often they used their mobile device to consume news content. Following on these control variables, the participants were randomly assigned to one of the three conditions. Each group then got exposed to its corresponding version (horizontal, vertical, or responsive vertical) of the NOSop3 explainer video. Here, it was explicitly mentioned in bold lettering that the participants should watch the video as if he or she were the one actually holding the phone in the embedded video. After watching the full video (a timer was installed so that participants could

only click 'next' after 45 seconds), a manipulation check was done to conclude whether participants were able to correctly see the video. If participants answered the question of the manipulation check incorrectly, they were forwarded to the end of the survey as their answers were of no particular use if they did not see the video. If participants indicated that they were unable to see the video, they were met with a message telling them that they could try to conduct the survey on another device where the video might be visible. All of the 102 participants who completed the survey indicated that they could see the video and answered the manipulation check correctly. When participating in the survey on a mobile device, individuals were also asked if they rotated their screen when watching the video. 91,3% of the individuals who partook on their mobile phone kept it in a vertical horizontal orientation whilst watching the video. This subtly provided us insights on a macro-level concerning how individuals consumed embedded videos on their mobile device.

The last questions revolved around the perceived enjoyment, perceived ease of use, flow state, satisfaction and continued intention of use of participants. Here, it was once again expressed explicitly and in bold lettering that the questions should be answered as if the individual partaking in the survey were the one that was holding the phone in the embedded video. Furthermore, the concepts and corresponding items that participants gave answers too were translated into Dutch. Chang and colleagues (1999) have mentioned that translating questionnaire items to a different language can have negative implications for the structural validity of the research. To minimize these threats, careful consideration was put into the translation and culturally specific expressions were accounted for. For instance, the words 'fully engaged' are not unambiguously translatable. A proper translation and additional reliability test allowed us to see whether the translated items remained reliable and valid. How the concepts were operationalized will be explained in the below sub-section on measurements.

3.5 Measurements

In all three of the experimental conditions, the same five variables were measured in order to test our hypotheses. These consisted of (1) perceived enjoyment, (2) perceived ease of use, (3) flow state, (4) user satisfaction, and (5) continued intention to use. The below paragraphs will discuss these five concepts and how they were developed. In addition, the control variables and their potential implications will be discussed. The complete survey that incorporates all above elements can be found in Appendix C.

3.5.1   Perceived enjoyment

Perceived enjoyment was measured using a 4-item, 5-point Likert scale. The scale was adapted from research by See-To and colleagues (2012), where it had a high reliability (α= .96). This scale measures the extent to which viewing the content in a certain video format is perceived to be enjoyable by participants. The four items that perceived enjoyment is comprised of are as followed: (1) "The way the video is presented was interesting", (2) "The way the video is presented was fun", (3) "The way the video is presented was exciting", and (4) "The way the video is presented was enjoyable". Participants had to indicate whether the statements applied to their own experience on a Likert scale ranging from 1 "Strongly disagree" to 5 "Strongly agree". The four items, which were Likert-scale based, were entered into factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues, KMO = .84, χ2 (N = 102, 6) = 270.56, p < .001. The resultant model explained 79.0% of the variance in perceived enjoyment. A reliability analysis showed a Cronbach's alpha score of .91, meaning it was a reliable measurement. As a result of this high reliability, a new variable was created using the average scores on the four items, which was used for further analysis of the hypotheses. The scores of these items ranged from 1.00 to 5.00 (M = 3.49, SD = 0.89).

3.5.2   Perceived ease of use

Perceived ease of use was measured using a 3-item, 5-point Likert scale. The scale was adapted from research by Park (2016), where it had a high reliability (α= .91). This scale measures an individual's perceived intensification of cognitive activity when working towards a goal. The three items that perceived ease of use is comprised of are as followed: (1) "The screen format of the video was clear and understandable", (2) "Watching videos in this screen format is easy for me", and (3) "Watching videos in this screen format did not require mental effort". Participants had to indicate whether the statements applied to their own experience on a Likert scale ranging from 1 "Strongly disagree" to 5 "Strongly agree". The three items, which were Likert-scale based, were entered into factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues, KMO = .67, χ2 (N = 102, 3) = 114.18, p < .001. The resultant model explained 72.9% of the variance in perceived ease of use A reliability analysis showed a Cronbach's alpha score of .81, meaning it was a reliable measurement. As a result of this reliability, a new variable was created using the average scores on the three items, which was used for further analysis of the hypotheses. The scores of these items ranged from 1.00 to 5.00 (M = 3.25, SD = 0.94).

3.5.3 Flow state

The participant's flow state was measured using a 4-item, 5-point Likert scale. The scale was adapted from research by Park (2016), where it had a high reliability (α= .94). This scale measures the mental and cognitive state to what degree individuals enter a mental and cognitive state in which they are totally immersed in what they are doing. The four items that flow state is comprised of are as followed: (1) "I am fully involved when I watch videos in this screen format", (2) "I am fully engaged when I watch videos in this screen format", (3) "I feel that time passes quickly when I watch videos in this screen format", and (4) "I am fully concentrated when I watch videos in this screen format". Participants had to indicate whether the statements applied to their own experience on a Likert scale ranging from 1 "Strongly disagree" to 5 "Strongly agree". The four items, which were Likert-scale based, were entered into factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues, KMO = .78, χ^2 (N = 102, 6) = 160.78, p < .001. The resultant model explained 74.2% of the variance in flow state. A reliability analysis showed a Cronbach's alpha score of .84, meaning it was a reliable measurement. As a result of this reliability, a new variable was created using the average scores on the four items, which was used for further analysis of the hypotheses. The scores of these items ranged from 1.00 to 5.00 (M = 2.91, SD = 0.78).

In addition to the above factor analyses of the individual constructs, another factor analysis is required to examine how these constructs are situated within the viewer experience framework. The three concepts of perceived enjoyment, perceived ease of use, and flow state, were entered into a factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues (> 1.00), KMO = .87, χ^2 (N = 102, 55) = 657.15, p < .001. The resultant model explained 74.2% of the variance in viewer experience. A different factor was found for all three concepts underlying viewer experience. This illustrates that the three concepts are indeed distinguishable from each other and in trinity work towards the assessment of viewer experience. Table 1.1 provides an overview of the factor loading and reliability scores of all three concepts within the viewer experience framework.

Table 1.1

Factor and reliability analyses for scales for viewer experience (N = 102)

Item	Perceived enjoyment	Perceived ease of use	Flow State
The way the video is presented was interesting	.80	-	-
The way the video is presented was fun	.89	-	-
The way the video is presented was exciting	.88	-	-
The way the video is presented was enjoyable	.92	-	-
The screen format of the video was clear and understandable	-	.68	-
Watching videos in this screen format is easy for me	-	.76	-
Watching videos in this screen format did not require mental effort	-	.87	-
I am fully involved when I watch videos in this screen format	-	-	.75
I am fully engaged when I watch videos in this screen format	-	-	.81
I feel that time passes quickly when I watch videos in this screen format	-	-	.81
I am fully concentrated when I watch videos in this screen format	-	-	.83
M	3.49	3.25	2.91
SD	0.89	0.94	0.78
Cronbach's α	.91	.81	.84

3.5.4 User satisfaction

The user satisfaction state was measured using a 3-item, 5-point Likert scale. The scale was adapted from research by Park (2016), where it had a high reliability (α= .87). This scale measures the overall experience when interacting with the video. The three items that user satisfaction is comprised of are as followed: (1) "I am satisfied with the way the video is presented", (2) "The presentation of the video meets my expectations", and (3) "I am pleased with my experience in watching this video". Participants had to indicate whether the statements applied to their own experience on a Likert scale ranging from 1 "Strongly disagree" to 5 "Strongly agree". The three items, which were Likert-scale based, were entered into factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues, KMO = .72, χ2 (N = 102, 3) = 148.08, p < .001. The resultant model explained 79.1% of the variance in user satisfaction. A reliability analysis showed a Cronbach's alpha score of .86, meaning it was a reliable measurement. As a result of this high reliability, a new variable was created using the average scores on the three items, which was used for further analysis of the hypotheses. The scores of these items ranged from 1.00 to 5.00 (M = 3.49, SD = 0.85).

3.5.5   Continued intention to use

The individual's continued intention to use the media-output was measured using a 3-item, 5-point Likert scale. The scale was adapted from research by Park (2016), where it had a high reliability (α= .94). This scale measures whether individuals are willing to engage with products with a similar screen format in the future. The three items that continued intention to use is comprised of are as followed: (1) "I am likely to continue watching videos with this screen format", (2) "I intend to watch videos in this screen format as much as possible", and (3) "I intend to continue watching videos in this format rather than discontinue watching them". Participants had to indicate whether the statements applied to their own experience on a Likert scale ranging from 1 "Strongly disagree" to 5 "Strongly agree". The three items, which were Likert-scale based, were entered into factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues, KMO = .70, $\chi2$ (N = 102, 3) = 95.91, p < .001. The resultant model explained 71.8% of the variance in continued intention to use. A reliability analysis showed a Cronbach's alpha score of .80, meaning it was a reliable measurement. As a result of this reliability, a new variable was created using the average scores on the three items, which was used for further analysis of the hypotheses. The scores of these items ranged from 1.00 to 5.00 (M = 2.79, SD = 0.82).

In addition to the above factor analyses of the two individual constructs, another factor analysis is required to examine how these constructs are situated as two consequential factors that are potentially impacted by viewer experience. The two concepts of user satisfaction and continued intention to use, were entered into a factor analysis using Principal Components extraction with Varimax rotation based on Eigenvalues (> 1.00), KMO = .87, $\chi2$ (N = 102, 55) = 657.15, p < .001. The resultant model explained 74.2% of the variance in viewer experience. A different factor was found for both concepts that are potentially impacted by viewer experience. This illustrates that the two concepts are indeed distinguishable from each other and can both be used to analyse the effect of viewer experience. Table 1.2 provides an overview of the factor loading and reliability scores of the two concepts.

Table 1.2

Factor and reliability analyses for scales potentially impacted by viewer experience (N = 102)

Item	User satisfaction	Continued intention to use
I am satisfied with the way the video is presented	.85	-
The presentation of the video meets my expectations	.93	-
I am pleased with my experience in watching this video	.89	-
I am likely to continue watching videos with this screen format	-	.92
I intend to watch videos in this screen format as much as possible	-	.74
I intend to continue watching videos in this format rather than discontinue watching them	-	.87
M	3.49	2.79
SD	0.85	0.82
Cronbach's α	.86	.80

3.5.6. Control variables

In addition to the central concepts that have been discussed in the above paragraphs, several additional control variables also deserve to be elaborated on. These extraneous variables allow for a further examination of certain effects without directly interfering with the hypotheses that are tested. Control variables are often included in quantitative studies. Their presence should be justified however, as control variables are often included without further elaboration (Spector et al., 2011); leaving the reading guessing to their relevance. In this study, examination of the control variables helps to deduct whether research results can be fully addressed to the differences between the conditions, or whether other factors such as familiarity or digital literacy mediate the results.

Besides additional sample variables that have been mentioned earlier in the methodology, three other control variables have been used in the analysis of the hypotheses. First '*NOSop3 Familiarity'* examines whether participants were already familiar with NOS Op 3 before watching the video. Using a 3-item scale consisting of 1 "yes", 2 "no" and 3 "unsure", the control variable enabled one to see individual familiarity with the program and whether resulting viewer experiences may deviate as a result of already being acquainted with NOSop3. Of the 102 participants, 74 were familiar with NOSop3, 16 participants were not, and 12 participants were unsure. For the analyses however, NOSop3 familiarity was recoded into a dummy variable in which the "unsure" option was recoded

into a missing value. This made the variable more suited as a control variable in subsequent ANCOVA or hierarchical regression analyses. Secondly, '*News reading frequency'* examines how often participants use their mobile device to read information that they consider to be news. By using a 6-item scale that ranged from 1 "Every day" to 6 "Never", the control variable gave insights into whether individuals already consumed news information frequently on their mobile device. This could then potentially impact how they experienced the video within the questionnaire. Of the 102 participants, 70 read news on their phone every day, 25 participants did so once a week or more, 4 participants did so only a few times a month, and only 3 participants read news on their phone fewer than once a month or never at all. Third and lastly, '*News video frequency'* examines how often participants use their mobile device to watch videos that they consider to be news. By using a 6-item scale that ranged from 1 "Every day" to 6 "Never", the control variable gave insights into whether individuals already watched news videos frequently on their mobile device. This could, similar to the above control variable, impact their perception of the experimental news video. Of the 102 participants, 26 watched news videos on their phone every day, 55 participants did so once a week or more, 8 participants did so only a few times a month, and 13 participants watched news videos fewer than once a month or never at all.

Examining for these specific control variables is of particular relevance to PSM operators. As their public service nature requires them to make content relatively accessible for every individual in their territorial scope (Donders, 2019), examining whether more contemporary digital content is perceived as satisfactory by individuals both familiar and unfamiliar with vertical content could help in evaluating whether the results of the experiment at hand cater to the goal of reaching a widespread audience.

4. Results

This chapter identifies whether any relationships and causal effects occured between the concepts of interest. Analyses of the variances between the different conditions help to examine whether the different video formats result in different viewer experiences and different levels of user satisfaction (i.e., H1a, H1b, H1c, H2a, H2b, H2c, H3a, H3b, H3c, H4a, H4b, H4c.). Here, attention is also paid to the impact that different control variables may have. The multiple variance analyses are sequentially followed up by a regression analysis to see whether any causal relationships exist between underlying viewer experience factors and the user satisfaction of participants (i.e., H1d, H2d, H3d, H4d).

4.1 Hypotheses testing

The hypotheses were assessed by conducting a data analysis using the IBM SPSS Statistics software, version 26. For the 'a', 'b' and 'c' sub-hypotheses of H1 to H4 (i.e., H1a, H1b, H1c, H2a etc.), several one-way ANOVA were conducted. The ANOVA was chosen for testing these sub-hypotheses as the three conditions formed a categorical variable and all dependent variables were continuous. To assess the extent of the test outcome, the effect size was determined by looking at the eta square ($\eta2$). Using the criteria of negligible (< .01), small (.01 up to .06), moderate (.06 up to .14), or large (> .14) (Pallant, 2001), the size of the effect was determined. After the one-way ANOVAs, one-way ANCOVAs were conducted to examine whether any of the control variables were determinant in the potential differences between conditions.

As for all 'd' sub-hypotheses of H1 to H4 (i.e., H1d, H2d etc.), hierarchical regression analyses were conducted. This allowed for an assessment of the relationship between all concepts, which were all continuous variables. Using a hierarchical regression analysis also offered insights into whether any control variables affect the relationship between the dependent and independent variable. The predictability strength of one variable on the other was determined with the use of beta (β).

4.1.1   Effects on and of perceived enjoyment (H1a, H1b, H1c, H1d)

The first hypothesis (H1) concerns the concept of perceived enjoyment and the extent to which the different video formats impact whether the NOSop3 video was perceived as enjoyable. Perceived enjoyment is one of the three components of the viewer experience framework and the first to be approached in this results section. To test the relationship between video condition and perceived enjoyment, a univariate ANOVA has been conducted. Video format, a categorical variable, was the independent variable. Perceived enjoyment, a continuous variable, was the dependent variable. The ANOVA revealed a marginal significant effect for video format on perceived enjoyment, F (2, 98) = 2.60, p = .079, partial η2 = .05. Bonferroni post-hoc comparisons revealed that participants exposed to the responsive vertical video format (M = 3.72, SD = 0.94) scored marginally significantly higher on perceived enjoyment than respondents exposed to the horizontal video format (M = 3.23, SD = 0.86), with p = .079. It revealed no significant difference between participants exposed to the vertical video format (M = 3.49, SD = 0.80) and respondents exposed to the horizontal video format (M = 3.23, SD = 0.86), with p = .663. There was also no significant difference between the vertical video format and responsive vertical video format, with p = .784. The results of the post-hoc test resulted in H1a being accepted. Both H1b and H1c are rejected. Although not all results were significant, the pattern in the data regarding the mean scores for each condition were in line with the hypotheses H1a, H1b and H1c: Respondents in the horizontal format group (M = 3.23, SD = 0.86) had a lower mean score on perceived enjoyment than respondents in the vertical format group (M = 3.49, SD = 0.80), with p = .663. Respondents in the horizontal format group also had a lower mean score on perceived enjoyment than respondents in the responsive vertical format (M = 3.73, SD = .94), with p = .074. The responsive vertical format group also had a higher mean score compared to the vertical format group, with p = .784. Although not part of the hypotheses, a one-way analysis of covariance (ANCOVA) was conducted to examine whether controlling for the three control variables of NOSop3 familiarity, news reading frequency, and news video frequency, would generate different results. When controlling for the three control variables, the adjusted model was also not significant, F (2, 89) = 1.32, p = .263, partial η2 = .07. The ANCOVA also showed no significant effect of video format on perceived enjoyment after controlling for the three control variables, F (2, 89) = 1.94, p = .150.

To examine whether perceived enjoyment was a predictor for user satisfaction, a hierarchical regression analysis was conducted with user satisfaction as the criterion. Perceived enjoyment was included in the first block, and the three control variables NOSop3 familiarity, news reading frequency, and news video frequency were added in the second block. When perceived enjoyment (β = .73, p < .001) was used as a single predictor the model reached significance, R^2 = .53, F (1, 87) = 98.67, p < .001. In this model, perceived enjoyment explained 53.1% of the variances in score of user satisfaction, with an effect size of β = .73 with p < .001. When adding NOSop3 familiarity (β = -.07, p

=.392), news reading frequency (β = -.15, *p* = .079) and news video frequency (β = -.02, *p* = .819) however, the model's predictive value did not increase, ΔR^2 = .03, *F* (3, 84) = 26.37, *p* = .197. However, perceived enjoyment remained significant (β = .72, *p* < .001). In sum, as both models shows that perceived enjoyment significantly predicted user satisfaction, H1d is accepted.

4.1.2 Effects on and of perceived ease of use (H2a, H2b, H2c, H2d)

The second hypothesis (H2) concerned the concept of flow state and the extent to which the different video formats impact whether the NOSop3 video was perceived as enjoyable. To test the relationship between video condition and perceived ease of use, a univariate ANOVA was conducted. Video format, a categorical variable, is the independent variable. Perceived ease of use, a continuous variable, is the dependent variable. The ANOVA revealed a significant effect for video format on perceived ease of use, *F* (2, 98) = 4.42, *p* = .015, partial η2 = .08. Bonferroni post-hoc comparisons revealed that participants exposed to the responsive vertical video format (*M* = 3.56, *SD* = 0.84) scored significantly higher on perceived ease of use than respondents exposed to the horizontal video format (*M* = 2.88, *SD* = 0.90), with *p* = .005. It revealed no significant difference between participants exposed to the vertical video format (*M* = 3.29, *SD* = 0.98) and respondents exposed to the horizontal video format (*M* = 2.88, *SD* = 0.90), with *p* = .210. There was also no significant difference between the vertical video format and responsive vertical video format, with *p* = .671. The results of the post-hoc test resulted in H2a being accepted. Both H2b and H2c are rejected. Although not all results were significant, the pattern in the data regarding the mean scores for each condition were in line with the rejected hypotheses H2b and H2c: Respondents in the horizontal format group (*M* = 2.88, *SD* = 0.90) had a lower mean score on perceived ease of use than both the respondents in the vertical format group (*M* = 3.29, *SD* = 0.95) and respondents in the responsive vertical format (*M* = 3.56, *SD* = .84). The responsive vertical format group had a higher mean score compared to the vertical format group. Although not part of the hypotheses, a one-way analysis of covariance (ANCOVA) was conducted to examine whether controlling for the three control variables of NOSop3 familiarity, news reading frequency, and news video frequency, would generate different results. When controlling for the three control variables, the adjusted model was also significant, *F* (2, 89) = 2.34, *p* = .048, partial η2 = .12. The ANCOVA however only showed a marginal significant effect of video format on perceived ease of use after controlling for the three control variables, *F* (2,89) = 2.89, *p* = .061.

To examine whether perceived ease of use is a predictor for user satisfaction, a hierarchical regression analysis was conducted with user satisfaction as the criterion. Perceived ease of use was included in the first block, and the three control variables NOSop3 familiarity, news reading

frequency, and news video frequency were added in the second block. When perceived ease of use (β = .67, p < .001) was used as a single predictor the model reached significance, R^2 = .45, F (1, 87) = 70.49, p < .001. In this model, perceived ease of use explained 44.8% of the variances in score of user satisfaction, with an effect size of β = .67 with p < .001. When adding NOSop3 familiarity (β = .05, p =.589), news reading frequency (β = -.15, p = .110) and news video frequency (β = -.03, p = .783) however, the model's predictive value did not increase, ΔR^2 = .03, F (3, 84) = 19.35, p = .168. In this model, perceived ease of use remains significant (β = .68, p < .001). In sum, as both models show that perceived ease of use did significantly predict user satisfaction, H2d is accepted.

4.1.3   Effects on and of flow state (H3a, H3b, H3c, H3d)

The third hypothesis (H3) concerns the concept of flow state and the extent to which the different video formats impact whether the NOSop3 video was perceived as enjoyable. To test the relationship between video condition and flow state, a univariate ANOVA has been conducted. Video format, a categorical variable, is the independent variable. Flow state, a continuous variable, is the dependent variable. The ANOVA revealed a significant effect for video format on flow state, F (2, 98) = 6.23, p = .003, partial η2 = .11. Bonferroni post-hoc comparisons revealed that participants exposed to the vertical video format (M = 3.10, SD = 0.80) scored significantly higher on flow state than respondents exposed to the horizontal video format (M = 2.51, SD = 0.50), with p = .005. It furthermore revealed that participants exposed to the responsive vertical video format (M = 3.05, SD = 0.85) also scored significantly higher on flow state than respondents exposed to the horizontal video format (M = 2.51, SD = 0.50), with p = .014. There was no significant difference between the vertical video format and responsive vertical video format, with p = .999. The results of the post-hoc test indicate that both H3a and H3b may be accepted and that H3c is rejected. Although not part of the hypotheses, a one-way analysis of covariance (ANCOVA) was conducted to examine whether controlling for the three control variables of NOSop3 familiarity, news reading frequency, and news video frequency, would generate different results. When controlling for the three control variables, the adjusted model was also significant, F (2, 89) = 2.47, p = .039, partial η2 = .13. Similar to the above ANOVA analysis, the ANCOVA showed a significant effect of video format on flow state after controlling for the three control variables, F (2,89) = 4.74, p = .011.

To examine whether flow state is a predictor for user satisfaction, a hierarchical regression analysis was conducted with user satisfaction as the criterion. Flow state was included in the first block, and the three control variables NOSop3 familiarity, news reading frequency, and news video frequency were added in the second block. When flow state (β = .48, p < .001) was used as a single predictor the model reached significance, R^2 = .23, F (1, 87) = 26.64, p < .001. In this model, flow state

explained 23.4% of the variances in score of user satisfaction, with an effect size of β = .48 with *p* < .001. When adding NOSop3 familiarity (β = -.07, *p* =.478), news reading frequency (β = -.07, *p* = .526) and news video frequency (β = -.10, *p* = .382), however, the model's predictive value did not increase, Δ R^2 = .02, *F* (3, 84) = 7.18, *p* = .520. In this model, flow state remains significant (β = .46, *p* < .001). In sum, as both models show that flow state did significantly predict user satisfaction, H3d is accepted.

4.1.4   *Effects on and of user satisfaction (H4a, H4b, H4c, H4d)*

The fourth and final hypothesis (H4) concerns the concept of user satisfaction. More specifically, sub-hypotheses H4a, H4b and H4c examine whether exposure to the video formats directly result in different feelings of satisfaction. The viewer experience model is thus not taken into account. To test the relationship between video condition and user satisfaction, a univariate analysis of variance (ANOVA) has been conducted. Video format, a categorical variable, is the independent variable. User satisfaction, a continuous variable, is the dependent variable. The ANOVA revealed only a marginally significant effect for video format on user satisfaction, *F* (2, 98) = 2.54, *p* = .084, partial η2 = .05. Bonferroni post-hoc comparisons revealed that there were no significant differences in scores for the three conditions. This means that all three of H4a, H4b and H4c are rejected. Although not significant, the pattern in the data regarding the mean scores for each condition were in line with the hypotheses H4a, H4b and H4c: Respondents in the horizontal format group (*M* = 3.32, *SD* = 0.82) had a lower mean score on user satisfaction than the respondents in the vertical format group (*M* = 3.40, *SD* = 0.88), with *p* = .999. The score for respondents in the horizontal format group was also lower than that of respondents in the responsive vertical format (*M* = 3.76, *SD* = 0.79), with *p* = .121. The responsive vertical format group also averaged a higher mean score compared to the vertical format group, with *p* = .223. To examine how the viewer experience framework (i.e., perceived enjoyment, perceived ease of use, flow state) impact the direct relationship as examined in the above ANOVA, a one-way analysis of covariance (ANCOVA) was conducted. When controlling for the components of the viewer experience framework however, the effect of video format condition on user satisfaction was not significant, *F* (2, 95) = 1.42, *p* < .247, partial η2 = .03. In this model

Although not part of the hypotheses, a one-way analysis of covariance (ANCOVA) was conducted to examine whether controlling for the three control variables of NOSop3 familiarity, news reading frequency, and news video frequency, would generate different results. When controlling for the three control variables, the adjusted model was also only marginally significant, *F* (2, 89) = 2.04, *p* = .082, partial η2 = .11. Similar to the above ANOVA analysis, the ANCOVA showed a marginally

significant effect of video format on user satisfaction after controlling for the three control variables, F (2,89) = 2.80, p = .067.

To examine whether user satisfaction is a predictor for continued intention to use a media product and test H4d, a hierarchical regression analysis was conducted with continued intention to use as the criterion. User satisfaction was included in the first block, and the three control variables NOSop3 familiarity, news reading frequency, and news video frequency were added in the second block. When user satisfaction (β = .49, p < .001) was used as a single predictor the model reached significance, R^2 = .24, F (1, 87) = 26.88, p < .001. In this model, user satisfaction explained 23.6% of the variances in score of continued intention to use, with an effect size of β = .49 with p < .001. When adding NOSop3 familiarity (β = -.16, p =.112), news reading frequency (β = .01, p = .913) and news video frequency (β = -.15, p = 0.167), however, the model's predictive value did not increase, Δ R^2 = .04, F (4, 84) = 7.82, p = .260. In this model, user satisfaction remains significant (β = .45, p < .001). In sum, as both models show that user satisfaction did significantly predict continued intention to use, H4d is accepted.

4.2 Summary of results

This chapter covered how all hypotheses have been analysed and whether they were accepted or not. For all main hypotheses, that covered the effects on and of a certain construct, multiple sub-hypotheses were conducted. First, multiple one-way ANOVA's were conducted for the 'a', 'b' and 'c' sub-hypotheses of H1 to H4. These were performed to test whether the video format conditions actually led to different results among participants. For the hypotheses regarding perceived enjoyment (H1), scores were only (marginally) significantly higher for the responsive vertical video format in comparison to the horizontal video format. As a result, H1a was accepted and both H1b and H1c were rejected. Similarly for the hypotheses regarding perceived ease of use (H2), scores were only significantly higher for the responsive vertical video format in comparison to the horizontal video format. As a result, H2a was accepted and both H2b and H2c were rejected. For the hypotheses regarding flow state, both the vertical video format *and* the responsive vertical video format scored significantly higher than the horizontal video format. As a result, both H3a and H3b were accepted. As there was no difference between the vertical format and the responsive vertical format, H3c was rejected. After assessing the first three hypothesis concerning the viewer experience framework (i.e., perceived enjoyment, perceived ease of use, flow state), H4 examined the direct relationship between video formats and user satisfaction. As no significant differences were found between any of the conditions regarding user satisfaction, all of H4a, H4b and H4c were rejected.

Next, for hypotheses H1d, H2d, H3d and H4d, hierarchical regression analyses were performed to test the relationship between viewer experience, user satisfaction and continued intention to use. H1d, H2d and H3d respectively showed that higher reported scores on perceived enjoyment, perceived ease of use and flow state all led to significantly higher reported scores on user satisfaction. Finally, for H4d it was found that user satisfaction was a significant predictor for an individual's continued intention to use and interact with the content in question. In sum, all hierarchical regression analyses were found to be significant, with the addition of control variables not providing additional predictive value to the relationship. Table 2 provides an overview of the mean scores and standard deviations for each condition regarding the measured constructs. Table 3 provides an overview of all hypotheses and whether they were accepted or not. The next chapter will draw a conclusion on the findings in the results chapter and offer an answer to the research question. The discussion will subsequently elaborate further on the hypotheses and how the results can be explained in relation to both theory and research design. Next, I will reflect on the current study and how the theory and methodology were put into practice, providing the reader with limitations, strengths and suggestions for future research. Finally, both the scientific and social implications of the study will be elaborated on.

Table 2

Overview of the mean scores and standard deviations of each condition regarding the individual constructs

	Condition					
	Horizontal format		Vertical Format		Responsive Vertical Format	
Construct	*M*	*SD*	*M*	*SD*	*M*	*SD*
Perceived enjoyment	3.23	0.86	3.49	0.80	3.72	0.94
Perceived ease of use	2.88	0.90	3.29	0.98	3.56	0.84
Flow State	2.51	0.50	3.10	0.80	3.05	0.85
User satisfaction	3.32	0.82	3.40	0.88	3.76	0.79

Table 3

Overview of the Hypotheses outcomes

Hypothesis	Analysis	Independent Variable	Dependent Variable	Accepted	Rejected
H1a	ANOVA	Video Format	Perceived Enjoyment	X*	
H1b	ANOVA	Video Format	Perceived Enjoyment		X
H1c	ANOVA	Video Format	Perceived Enjoyment		X
H1d	Regression	Perceived Enjoyment	User Satisfaction	X	
H2a	ANOVA	Video Format	Perceived Ease of Use	X	
H2b	ANOVA	Video Format	Perceived Ease of Use		X
H2c	ANOVA	Video Format	Perceived Ease of Use		X
H2d	Regression	Perceived Ease of Use	User Satisfaction	X	
H3a	ANOVA	Video Format	Flow State	X	
H3b	ANOVA	Video Format	Flow State	X	
H3c	ANOVA	Video Format	Flow State		X
H3d	Regression	Flow State	User Satisfaction	X	
H4a	ANOVA	Video Format	User Satisfaction		X
H4b	ANOVA	Video Format	User Satisfaction		X
H4c	ANOVA	Video Format	User Satisfaction		X
H4d	Regression	User Satisfaction	Continued Intention to Use	X	

*Note: * indicates that the result was only marginally significant*

5. Conclusion & Discussion

The final chapter of this research offers an in-depth explanation and interpretation of the results presented in the previous chapter. By linking the results to the theory and methodology as discussed in chapter 2 and 3, the conclusion and discussion in this chapter recapitulate on the thesis' main empirical findings. To do so, the chapter is built up in the following order. First, the conclusion encapsulates the empirical findings and subsequently formulates an answer to the research question. After the research question has been addressed, a more substantiated reflection on the research findings is offered in the discussion. Here, possible explanations for both expected and unexpected results are approached through a new-fangled perspective on the theory and method used. These findings are thereafter extrapolated to offer more insights on a macro-perspective regarding the limitations and strengths of the research. Finally, the study rounds off by offering suggestions for future research and stating the scientific and social relevance its findings have brought about.

5.1 Conclusion

Through an analysis of the hypotheses, an attempt was made to answer the study's main research question: *What is the effect of different video formats on online public television viewers' experience?* Of the 16 sub-hypotheses that were developed, eight proved to be significant and were thus accepted. The other eight hypotheses had to be rejected as the outcomes were not significant. Figure 3 below uses the previously presented research model to illustrate which hypotheses were accepted (black lines) and which were rejected (grey dotted lines).

Figure 3

Significant effects found after studying the effects of different video formats on viewer experience and user satisfaction
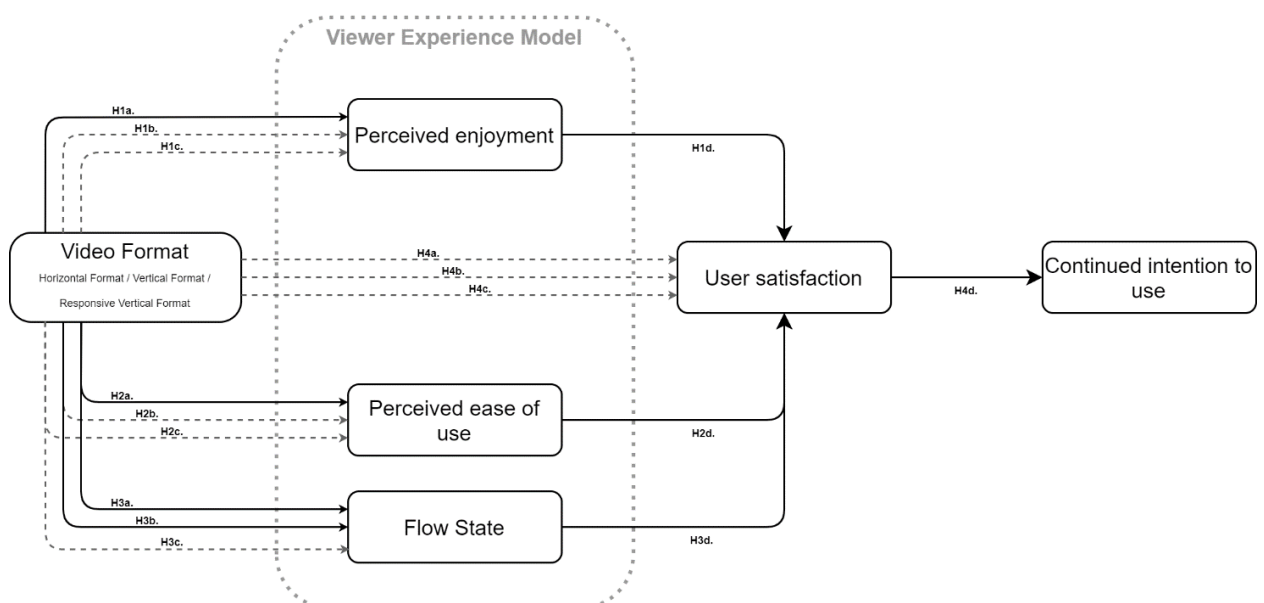
The outcomes as reported in the result section show that not all assumptions regarding the hypotheses were correct. Most consistently in line with the expectations were some of the results regarding responsive vertical video content. When examining viewer experience (i.e., perceived enjoyment, perceived ease of use and flow state) the responsive vertical format consistently scored significantly higher than the horizontal format. From these results it can be concluded that responsive vertical video content, in which a screen-filling aspect ratio constantly reshapes to accommodate the content, does lead to an improved viewer experience in comparison to horizontal video content. Users report higher degrees of enjoyment, ease of use and flow state in regard to their user experience. For these same viewer experience elements however, the reported scores for the vertical format are mostly the same as in the other two conditions. Only concerning flow state did the vertical format score significantly higher than the horizontal format.

When directly examining the effect of the video format conditions on user satisfaction, there seem to be no significant differences between the groups. Although there may not be a direct link between the video formats user satisfaction, the regression analyses showed that higher scores on the individual concepts within the viewer experience framework (i.e., perceived enjoyment, perceived use of use, and flow state) do lead to improved user satisfaction. Additionally, user satisfaction is also positively related to continued intention to use. Importantly, through the higher degrees of enjoyment, easiness and flow state that are brought about, viewing responsive vertical video content elicits an improved viewing experience, leaves users more satisfied, and encourages a further interaction with its contemporary and compelling way of mobile video presentation.

5.2 Discussion

5.2.1 Effects on and of perceived enjoyment

The aim of this study was to examine whether the individual viewer experience of participants was determined by the video format condition they were exposed to. As a sub-component to the tripartite concept of viewer experience, an individual's perceived enjoyment was the first concept to be assessed. As became apparent in the results section, a significant difference only occurred between the horizontal video format and the responsive vertical video format (H1a). The results can be interpreted in different ways, which will now be touched upon.

Contrary to expectations before conducting the analysis, scores for the vertical video format group did not differ from either of the other conditions (H1b and H1c). This could potentially imply that it is not the mere video format itself that makes watching news content more enjoyable, but that additional factors play a role. A palpable cause as to why the vertical video format was not

perceived as more enjoyable compared to the horizontal condition, lies in the loss of visual information. As the original footage was cropped straight down the middle, participants were not able to see visual and textual information that existed on the left and right side of the original video. This can be explained by looking at arguments made by Shafer and colleagues (2011); stating that seeing less of a spatial environment (i.e., the video) leads to a decrease in perceived enjoyment. Claiming that the loss of information is the main detrimental factor to viewer experience regarding the vertical video format however, does not align with the fact that there is also no significant difference between vertical video and responsive vertical video on the basis of perceived enjoyment (H1c). An answer to the lack of significant findings regarding differences between vertical video format and the other two conditions (i.e., H1b and H1c) therefore most likely has to do with the advantages and disadvantages of the vertical video format cancelling each other out. This study therefore argues that the explanation as to why only responsive vertical video was received more positively, most likely resides in the fact that it has two positive aspects; both the retention of information and the attractive viewing surface are present. The latter being a positive element on a mobile device, is found in the argument by Coppola (2018) who states that screen-filling content is likely to be perceived as more enjoyable. While the non-responsive vertical video was screen-filling, it made no active attempt to retain all visual information; leading to the detrimental consequences for perceived enjoyment as stated earlier by Shafer and colleagues (2011). Thus, when the video format on a mobile device is both screen-filling and information-aware, it becomes more enjoyable to consume news content on it. When it is not information-aware, as is the case for the vertical format, benefits of screen-filling are cancelled out by the lack of information, leading to no significant results for H1b and H1c.

5.2.2 Effects on and of perceived ease of use

The second concept within the viewer experience framework to be assessed, was the individual's perceived ease of use. Chapter 4 showed that results for perceived ease of use were similar to perceived enjoyment; again, the responsive vertical format scored significantly higher in comparison to the horizontal format (H2a). Contrary to expectations before conducting the analysis, scores for the vertical video format group did not differ from either of the other conditions (i.e., H2b and H2c). A possible explanation for this lack of significance is potentially embedded more strongly in research regarding processing fluency as mentioned in the theoretical framework. Kool and colleagues (2010) argue that individuals consuming media content, often tend to avoid effort as much as possible. To examine why results between the conditions are the way they are, an explanation can most likely be found in the condition-specific differences of the three formats.

Similar to the underlying factors mentioned in the above section on perceived enjoyment, theoretical findings would imply that the degrees of screen-filling and information retention impact the extent to which content in a certain video format is easy to interact with. Similar to the reasoning for perceived enjoyment, it is likely that the accumulated 'easiness' from the screen format being both vertical and responsive to its content, led to only the responsive vertical format being significantly easier in its use (H1a). Again, as the vertical video format was not actively trying to retain all information within its frame, positive effects brought about by its screen-filling footage were most likely nullified. This lack of congruity between screen-format and visual information led to the vertical format not being significantly better than the horizontal format (H2b) and simultaneously not being significantly worse than the responsive vertical format (H2c). More concretely put; for H2b, the increased ease of use gained by the vertical format (Canella, 2017) was likely toned down by the lack of congruity between screen-size and visual information. For H2c, although the mere difference of active format reshaping led to a higher score for the responsive condition, it was not enough to warrant a significantly easier user experience.

5.2.2   Effects on and of flow state

The third concept in the viewer experience framework is that of flow state. Described by Csikszentmihalyi (1990) as the most optimal experience on a personal level, the construct is particularly relevant within this framework. Flow state is the only concept within the viewer experience framework for which both vertical format and responsive vertical format scored significantly higher than horizontal format (i.e., H3a and H3b). The results for H3a and H3b are in line with the arguments made regarding flow state in the theoretical framework. It seems that a format that instantaneously fills the screen and leaves not a single pixel of the surface area unused, leads to a more narrowed and attentive focus (Calvo-Porral et al., 2016). Contrary to the above discussions on perceived enjoyment and perceived ease of use, it seems that a lack of information-awareness in the vertical format condition was not detrimental (or not at all relevant) to the self-reported immersion that viewers underwent. It is probable that the psychological state of absorption brought upon by the fact that the content was appealing in its 'screen-fillingness' was strong enough in and of itself to warrant a significant result for H3b. Especially for footage that contains motion (which the responsive footage actively accounts for), a large and filled screen leads to a higher degrees of self-reported immersion in viewing the footage (IJsselsteijn et al., 2001).

Surprisingly there were no significant difference between the vertical format and responsive vertical format (H3c). In fact, flow state was the only concept in which the vertical format actually had a higher average score (Table 2). The reason for this occurrence is most likely embedded in the

way that flow works. Csikszentmihalyi (1990) describes a plethora of characteristics that determine the degree of flow one experiences. Whereas all elements have their effect and could possibly add to the explanation as to why no significant results were found for H3c, some characteristics are more prominent and relevant. Most noticeably, it is the *exclusion of distractions* that contributes considerably to a person entering a flow state (Csikszentmihalyi, 1990). Interpreting this as a causal factor is paradoxical however. Whereas not all information being visible in the vertical format could be seen as a distraction, the active attempt to account for this distraction in the responsive vertical format (i.e., by the constant reshaping) is perhaps also distracting by its very nature. As the responsive video format actively reshapes, the visual boundaries alter. Since the surface area on which the information is offered is not consistent, this could lead to participants snapping out of their flow state. This effect possibly cancels out an increase in reported flow state that is brought about by the responsive screen format catering to our information-seeking needs by actively reshaping. As a result, the degree of flow state for the vertical format and responsive vertical format is quite the same.

5.2.2   Effects on and of user satisfaction

Whilst the analyses already proved that the viewer experience constructs were adequate predictors of user satisfaction (i.e., H1d, H2d and H3d), it was still relevant to examine the direct effect of video formats on a user's satisfaction. As user satisfaction is the main psychological concept that follows directly as a post-evaluation process of the overall experience (Bhattacherjee, 2001), the reported scores were of particular interest. Contrary to the previously discussed constructs however, no significant results were found in the direct relationship between the different video formats and user satisfaction (i.e., H4a, H4b and H4c). As the average scores of the conditions showed similar variances for user satisfaction as was the case for perceived enjoyment and perceived ease of use, It seems logical that the lack of significance arises from the same interaction between screen-filling and information awareness as mentioned in the beginning of the discussion. Besides this underlying theoretical assumption however, two methodological implications are also of particular relevance.

Before examining the post-hoc differences, it was found that the relationship between the combined video formats and user satisfaction was marginally significant. Though perceptions on what marginally significant entails range from 'a trend towards significance' to 'non-significant results in disguise' (Otte et al., 2021), the result deserves further mentioning. Lakens (2015) mentions that p-values that that are closely above or below .05 could sway into a more convincing direction if the sample size had been larger. As the sample size of this research was only slightly larger than the required amount (i.e., 90 participants) for conducting an analysis with three experimental groups,

results could have been more conclusive. Another explanation for the unexpected results, most noticeably for hypothesis H4a, stems from the fact that user satisfaction is not always considered to be a result of viewer experience. Some researchers argue that more constructs such as personality, audio quality and time availability (Skrebowski, 2004; Jumisko et al., 2005) underly user satisfaction in a video context. Thus the results for the three viewer experience constructs (i.e., perceived enjoyment, perceived ease of use, flow state) likely do not provide an absolute explanation for the user satisfaction results. Future studies could more firmly assess user satisfaction by considering the impact of additional variables.

5.3 Limitations, Strengths, and suggestions for future research

In addition to the discussion on the results regarding the individual constructs, some more substantial and overarching methodological implications will be discussed below. The most prominent limitation resides in the fact that the stimulus material had to be embedded in Qualtrics. Although conducting the research in person with actual mobile devices was not possible with the available resources and the implications of the COVID-19 pandemic, remarks should still be placed alongside the outcomes. As Qualtrics ironically did not allow for videos to be uploaded in a video format other than 16:9, the video of the mobile device being held (Appendix A) had to be embedded in another video. As a result, the final material became smaller in size and was subsequently more awkward to consume when conducting the survey on a mobile device. Although the exact implications are unknown, the video formats being difficult to consume could be detrimental for results regarding all of the assessed constructs. Still, some of this occurring confusion was mitigated by the fact that the videos were produced successfully, clearly showing a hand holding a phone with the content being played on it.

A second research limitation has to do with the incongruence between the target population and final sample size. As the research concerns news production by public service media, the targeted audiences consists of all individuals that are part of the Dutch society. The final sample however did not completely reflect the characteristics of this broad audience. In the study, the sample was relatively young and highly educated, which accounts for only a small percentage of individuals in the Netherlands. It could thus be argued that the sample is not completely representative of NPO and NOS their target audience; thus compromising the external validity. The consequences are likely not too destructive, as the study focused on NPO and NOS's mobile media environment. Lagger and colleagues (2017) show that young adults largely move away more from cable television and look up the same content online. Based on this knowledge the sample does not defer that much from the

online target group of NPO and NOS, which consists largely of individuals aged between 13 and 35 (NPO, 2021).

One of the main strengths of this research stems from the different conditions being rather reliable. As the content across the three conditions is the same and only small yet important alterations have been made, the impact of external factors on the individual conditions is limited (see Appendix A). This way, the differences in the results can almost exclusively be addressed to the viewer experience and user satisfaction brought about by the different video formats. There is however one element which could impact only the second and third condition (i.e., the vertical format and responsive vertical format): the chosen video content. How the original video has been shot (e.g., with the presenter either in the middle or more to the side of the screen) has strong implications for how the other conditions will look like. When important elements are not centered, the vertical format condition would look off. When important elements move around a lot or are presented on both sides of the screen, the responsive vertical format would reshape uncomfortably frequently. This essentially shows that traditional 16:9 format video productions are frequently not suitable for a straight vertical crop. The responsive vertical format generating higher results regarding viewer experience is exemplary for the fact that production teams can not get away with just simply cropping existing footage to show it in a vertical format. Whilst this will be discussed more in the section on societal relevance, a final important recommendation for future research can be made. To build on the knowledge gathered in this experiment, a future study could compare the traditional horizontal footage with an actual dedicated vertical production on the very same topic. In practice, this could be done by having both a traditional and 'vertical' production team shoot the same news content, and evaluate the viewer experience afterwards. Here, future studies could also examine different types of content such as advertisements or film to see whether the subject matter and duration (Mulier et al., 2021; Goodrich et al., 2015) is crucial for a positive vertical video receptance. Besides adjusting these contextual factors in future research to assess the reliability of the viewer experience framework used in this study, forthcoming studies can also work on improving the content validity. While this study worked from the assumption that viewer experience consist of three main concepts, future studies could incorporate other factors such as outside interruption and cognitive sensory experience to give further embodiment to the relationship between viewer experience and vertical video satisfaction. After evaluating this study and pondering on these future research suggestions, conducting more empirical research could even help to develop and substantiate an actual new research paradigm that examines how (future) video formats relate to one another.

5.4 Scientific and practical implications

This research was written on a topic that is empirically still quite a novelty. Together with the fact that it was written in collaboration with actual Dutch media producers, this research is able to offer some substantial scientific and practical implications.

By means of this study, a first step was taken to empirically assess the effect of vertical video formats on user experience. Despite Mulier and colleagues (2021) recently rounding off an experiment on vertical advertisements, the field is still rather unexplored. The results from this study show that when executed correctly (i.e., all relevant content is displayed within the vertical frame), vertical video does have considerable potential. Now that the empirical groundwork has been put into place regarding both public service media and mobile advertising (Mulier et al., 2021), future studies will be able to readjust and refine their scope to get a more comprehensive understanding about the potential of vertical video. For example, present findings on flow state pave the way for future research on mobile media immersion that could see fruitful use of eye-tracking software in assessing the attention of individuals to different formats. Using different research methods such as eye-tracking could also aid in comparing viewer experiences for both vertical and horizontal orientation of mobile devices.

As stated by Ryan (2018), the vertical video format represents a new aesthetic that transforms past standards of media consumption. This research established that such a transformation actually enabled a new way of connecting audiences to a media product. The dynamic capabilities of the responsive format also give further embodiment to the viewer experience framework and illustrates how a suitable (and perhaps cross-platform) format is desirable in a contemporary digital society. Here, the results are reminiscent of the theorem held by Eisentstein (Wasson, 2012) regarding the dynamic square and the responsive format's ability to be well functioning on different screen sizes, The research findings are also of particular interest to research development on public service media. Having been continuously redefined over the past decades (Enli, 2008; Donders, 2019), this practical assessment underwriters another innovative way in which public service media can stay relevant in a digital environment. It can subsequently be of considerable relevance to examine how an innovative concept such as vertical content is situated within a public value framework that public service media often to adhere to.

By concretizing on a sound theoretical foundation by Ryan (2018) and Donders (2019), this study has expanded the knowledge on both the vertical video paradigm and digital public service media. Especially the combination of the two had not been researched before. With the research being practice-based, some rather meaningful insights emerge for public service media operators. Evidence from the analyses gives further embodiment to the debate around vertical video implementation and

could fuel its partisans to examine how to maximize vertical video capabilities. Dutch public operator NOS has recently embraced the format in their mobile applications and can now substantiate their reason for going vertical by this research's findings.

In the decade that has passed since the original Gawker quote on vertical videos, the vertical format has exerted influence and become prevalent in both amateur and professional media contexts. Where square video footage was used at a certain mid-way point in time because it looked relatively alright in both horizontal and vertical orientations, it seems that the aesthetic of vertical video is efficacious enough for it to stay. By not completely leaving the underlying philosophy of the dynamic square behind, dedicated vertical video content could open up a whole new paradigm much like cinema and home television have done before.

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Appendix A – Stimulus material

Figure A1 *Condition 1 – Horizontally formatted video*

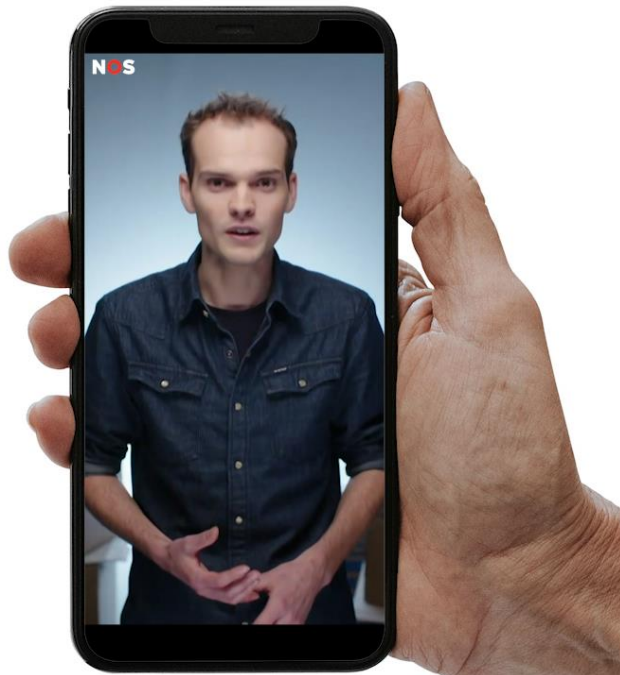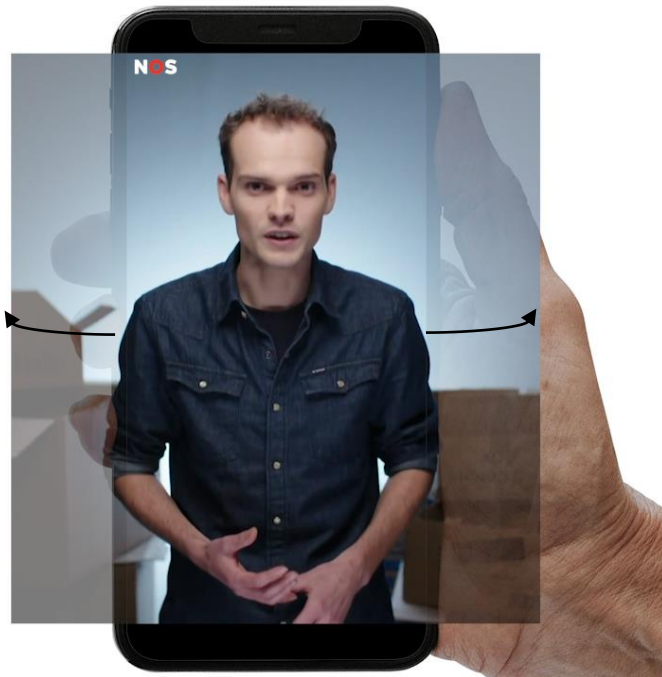**Figure A2** *Condition 2 - Vertically formatted video*

Figure A3 *Condition 3 - Responsive vertically formatted video*

Appendix B – Thesis survey Dutch

Beste deelnemer, Bedankt dat u wilt bijdragen aan dit onderzoek.

Dit experiment wordt uitgevoerd ten behoeve van een afstudeerproject voor de master 'Media & Business' aan de Erasmus Universiteit Rotterdam. In het onderzoek krijgt u een vragenlijst te zien die uw mening vraagt over een korte video van 45 seconden, gemaakt door de NOS. De NOS produceert wekelijks een 'explainer video' voor het digitale kanaal 'NOS Op 3'. We zijn in dit onderzoek benieuwd naar uw mening over het beeldformaat waarin deze video wordt gepresenteerd.

Om de video van NOS op3 te kunnen zien, heb je een werkend beeldscherm en geluid nodig. Check alsjeblieft of het volume van je apparaat aanstaat, of gebruik een koptelefoon als je in een publieke ruimte aan het experiment wilt deelnemen.

De deelname aan het onderzoek is compleet vrijwillig. U kunt op elk moment volledig vrijblijvend besluiten om het onderzoek af te breken. Verder wordt alle informatie vertrouwelijk bewaard en enkel gebruikt voor dit studieonderzoek. Uw annonimeit is ten allen tijde gegarandeerd. Het voltooien van de vragen duurt ongeveer 5 minuten. Mochten er vragen zijn tijdens of na het onderzoek, schroom niet om mij te benaderen: Derk Molijn (dmolijn@gmail.com)

○   Ik begrijp het bovenstaande en ga akkoord met de deelname aan dit onderzoek.

Op welk apparaat bent u deze enquête aan het invullen?

○   Computer / Laptop

○   Mobiele telefoon

○   Anders, namelijk: _____

Voordat u de video te zien krijgt, zouden we graag wat willen weten over uw achtergrond

Wat is uw leeftijd?

▼ 17 of jonger ... 99

Wat is uw geslacht?

○ Man

○ Vrouw

○ Anders

○ Zeg ik liever niet

Q9 Wat is uw hoogst genoten opleiding?

○ Basischool

○ VMBO

○ HAVO

○ VWO

○ MBO

○ HBO

○ HBO Master

○ WO Bachelor

○ WO Master

○ Anders, namelijk… _____

Helaas kun je deze enquete alleen invullen als je 18 jaar of ouder bent. Desondanks bedankt voor je interesse!

Heeft u een mobiele telefoon?

○   Ja

○   Nee

Helaas kunt u alleen aan deze enquete deelnemen als u een mobiele telefoon in uw bezit heeft. Desondanks bedankt voor uw interesse!

Hoe vaak gebruikt u uw mobiele telefoon om nieuws te <u>lezen</u>?

○   Elke dag

○   Meerdere keren per week

○   Eén keer per week

○   Meerdere keren per maand

○   Eén keer per maand of minder

○   Nooit

Hoe vaak gebruikt u uw mobiele telefoon om nieuwsvideo's te <u>kijken</u>?

○   Elke dag

○   Meerdere keren per week

○   Eén keer per week

○   Meerdere keren per maand

○   Eén keer per maand of minder

○   Nooit

Welke platforms gebruikt u om op uw mobiele telefoon het nieuws te volgen?

☐ Nieuws websites (b.v. nu.nl)

☐ Nieuws applicaties (b.v. NOS app)

☐ Instagram

☐ Facebook

☐ TikTok

☐ Reddit

☐ Anders, namelijk _____

Bedankt voor uw antwoorden. Nu willen we graag een korte video van NOSop3 aan u laten zien. In de video ziet u een hand die een telefoon vasthoudt.

We vragen u om te video te kijken alsof u zelf degene bent die de telefoon vasthoudt.

Start de video alstublieft zelf, kijk deze helemaal af (45 seconden), en ga dan door met de rest van de vragen.

[Video wordt gepresenteerd: Conditie 1 (zie appendix A1)]

Nogmaals: We vragen u om de video te kijken alsof u zelf degene bent die de telefoon vasthoudt

Let op: na 40 seconden zal er automatisch een 'doorgaan' knop verschijnen.

[Video wordt gepresenteerd: Conditie 2 (zie appendix A2)]

Nogmaals: We vragen u om de video te kijken alsof u zelf degene bent die de telefoon vasthoudt

Let op: na 40 seconden zal er automatisch een 'doorgaan' knop verschijnen.

[Video wordt gepresenteerd: Conditie 3 (zie appendix A3)]

Nogmaals: We vragen u om de video te kijken alsof u zelf degene bent die de telefoon vasthoudt

Let op: na 40 seconden zal er automatisch een 'doorgaan' knop verschijnen.

   ○   Image: Horizontal condition   fake 1

   ○   Image: Horizontal condition   real

   ○   Image: Horizontal condition   fake 2

   ○   Ik heb de video niet kunnen zien.

Het lijkt erop dat u de video niet heeft kunnen afspelen. Mocht u tijd hebben kunt u proberen om de survey via een computer/laptop in te vullen. Desondanks bedankt voor uw interesse om deel te nemen aan de enquête!

Heeft u de video kunnen zien? Waar ging de video over?
kies hieronder de afbeelding die overeenkomt met de video die u zojuist heeft bekeken.

   ○   Image: Vertical condition   fake 1

   ○   Image: Vertical condition   real

   ○   Image: Vertical condition   fake 2

   ○   Ik heb de video niet kunnen zien.

Het lijkt erop dat u de video niet heeft kunnen afspelen. Mocht u tijd hebben kunt u proberen om de survey via een computer/laptop in te vullen. Desondanks bedankt voor uw interesse om deel te nemen aan de enquête!

Heeft u de video kunnen zien? Waar ging de video over?

kies hieronder de afbeelding die overeenkomt met de video die u zojuist heeft bekeken.

○ Image: Responsive vertical condition   fake 1

○ Image: Responsive vertical condition   real

○ Image: Responsive vertical condition   fake 2

○ Ik heb de video niet kunnen zien.

Het lijkt erop dat u de video niet heeft kunnen afspelen. Mocht u tijd hebben kunt u proberen om de survey via een computer/laptop in te vullen. Desondanks bedankt voor uw interesse om deel te nemen aan de enquête!

Hoe hield u uw mobiele telefoon vast tijdens het kijken van het filmpje?

○ Verticaal

○ Horizontaal

○ Weet ik niet meer

Nu volgen enkele vragen over uw bekendheid met de NOS.

Bent u reeds bekend met de NOS?

○ Ja

○ Nee

○ Onzeker

Bent u reeds bekend met de NOSop3? Heeft u bijvoorbeeld deze soort video's eerder gezien op YouTube of Instagram?

○ Ja

○ Nee

○ Onzeker

Heeft u deze specifieke video van NOSop3 eerder gezien?

○ Ja

○ Nee

○ Onzeker

We zouden nu graag uw mening willen over hoe de NOSop3 video die u zojuist heeft bekeken, werd gepresenteerd.

De vragen gaan dus over het beeldformaat van de video op de telefoon die u zojuist zag.

In hoeverre bent u het eens met de volgende stellingen?

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Ik ben tevreden met de manier waarop de video wordt gepresenteerd	○	○	○	○	○
De presentatie van de video voldoet aan mijn verwachtingen	○	○	○	○	○
Het bekijken van de video was een prettige ervaring	○	○	○	○	○

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
De manier waarop de video werd getoond was interessant	○	○	○	○	○
De manier waarop de video werd getoond was leuk	○	○	○	○	○
De manier waarop de video werd getoond was pakkend	○	○	○	○	○
De manier waarop de video werd getoond was vermakelijk	○	○	○	○	○

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Het beeldformaat van de video was helder en begrijpelijk	○	○	○	○	○
Het kijken van de video in dit beeldformaat is handig	○	○	○	○	○
Het kijken van de video in dit beeldformaat vergde geen mentale inspanning	○	○	○	○	○

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Ik word er volledig ingezogen als ik video's in dit beeldformaat bekijk	○	○	○	○	○
Ik voel me betrokken als ik video's in dit beeldformaat bekijk	○	○	○	○	○
Ik heb het gevoel dat de tijd snel voorbij gaat als ik video's in dit beeldformaat bekijk	○	○	○	○	○
Ik ben volledig geconcentreerd als ik een video in dit beeldformaat bekijk	○	○	○	○	○

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Ik zal waarschijnlijk vaker video's willen bekijken als ze dit beeldformaat hebben	○	○	○	○	○
Ik ben van plan om zo veel mogelijk video's in dit beeldformaat te bekijken	○	○	○	○	○
Ik zou video's in dit beeldformaat eerder wél dan niet willen zien in de toekomst	○	○	○	○	○

U bent bij het einde van de vragenlijst aangekomen. Bedankt voor uw tijd en moeite, uw deelname wordt gewaardeerd! Mocht u nog vragen of opmerkingen hebben over het onderzoek, kunt u ze hieronder stellen.

DRUK OP DE ONDERSTAANDE KNOP OM UW ANTWOORDEN TE VERSTUREN.

Appendix C – Thesis survey English

Dear participant, thank you for partaking in this research.

This experiment is conducted for a Master's thesis in the Media & Business programme at Erasmus University Rotterdam. In this research, you will get to answer certain questions concerning a short 45-second video made by Dutch broadcaster NOS. NOS produces weekly explainer videos for their digital channel 'NOSop3'. In this survey we are interested in your opinion concerning the screen format in which the video is presented.

In order to properly see the NOSop3 video, you will need a working screen and sound. Please check whether the volume of your device is on, or use a headphone when filling in the survey in a public space.

Participation in this research is completely voluntary. You are able to withdraw from the research at any point in time without consequences. Furthermore, all information will be handled with the strictest confidentiality and it will only be used for this particular study. Your anonymity is guaranteed at all times. The survey takes approximately five minutes to complete. If you have any questions before, during or after the research please feel free to contact me: Derk Molijn (dmolijn@gmail.com)

○ I understand the above and agree to partaking in this research.

On what device are you filling in this survey?

○ Computer / Laptop

○ Mobiele phone

○ Other, namely: _____

Before you will get to see the video, we would like to know something more about your personal background.

Wat is your age?

▼ 17 or younger … 99

What is your gender?

- ○ Male

- ○ Female

- ○ Other

- ○ Prefer not to say

Q9 What is your highest level of education?

- ○ Elementary school

- ○ VMBO

- ○ HAVO

- ○ VWO

- ○ MBO

- ○ HBO

- ○ HBO Master

- ○ WO Bachelor

- ○ WO Master

- ○ Other, namely… _____

Unfortunately you are only able to partake in this study if you are over the age of 18. Nevertheless we would like to thank you for your interest!

Do you own a mobile phone?

○ Ja

○ Nee

Unfortunately you are only able to partake in this study when you are in possession of mobile phone. Nevertheless we would like to thank you for your interest!

How often do you use your mobile phone to <u>read</u> the news?

○ Every day

○ Several times a week

○ Once a week

○ Several times a month

○ Once a month or less

○ Never

How often do you use your mobile phone to <u>watch news videos</u>?

○ Every day

○ Several times a week

○ Once a week

○ Several times a month

○ Once a month or less

○ Never

Which platform do you use on your mobile phone to follow the news?

☐ News websites (e.g. nu.nl)

☐ News apps (e.g. NOS app)

☐ Instagram

☐ Facebook

☐ TikTok

☐ Reddit

☐ Other, namely _____

Thank you for your responses. We would now like to show you a short video by NOSop3. In this video, you will see a hand holding a phone.

We ask you to watch the video as if you were the one holding the phone.

Please start the video yourself and watch it till the end (45 seconds), then continue with the remaining questions.

[Video is being presented: Conditon 1 (see appendix A1)]

Again: We ask you to watch the video as if you yourself were holding the phone.

Note: after 40 seconds the 'continue' button will automatically appear.

[Video is being presented: Conditon 1 (see appendix A1)]

Again: We ask you to watch the video as if you yourself were holding the phone.

Note: after 40 seconds the 'continue' button will automatically appear.

[Video is being presented: Conditon 1 (see appendix A1)]

Again: We ask you to watch the video as if you yourself were holding the phone.

Note: after 40 seconds the 'continue' button will automatically appear.

Were you able to see the video? What was ita bout? Pick the image below that corresponds with the video you've just watched.

○   Image: Horizontal condition   fake 1

○   Image: Horizontal condition   real

○   Image: Horizontal condition   fake 2

○   I was not able to see the video.

It seems like you were not able to see the video. If you have time left you could try to fill in the survey on a laptop or personal computer. Nevertheless we would like to thank you for your interest and participation!

Were you able to see the video? What was ita bout? Pick the image below that corresponds with the video you've just watched.

○   Image: Vertical condition   fake 1

○   Image: Vertical condition   real

○   Image: Vertical condition   fake 2

○   I was not able to see the video.

It seems like you were not able to see the video. If you have time left you could try to fill in the survey on a laptop or personal computer. Nevertheless we would like to thank you for your interest and participation!

Were you able to see the video? What was ita bout? Pick the image below that corresponds with the video you've just watched.

○   Image: Responsive vertical condition   fake 1

○   Image: Responsive vertical condition   real

○   Image: Responsive vertical condition   fake 2

○   I was not able to see the video.

It seems like you were not able to see the video. If you have time left you could try to fill in the survey on a laptop or personal computer. Nevertheless we would like to thank you for your interest and participation!

In what orientation did you hold your phone while watching the video.

○   Vertically

○   Horizontally

○   I don't remember

Now we will ask you several questions regarding your familiarity with NOS.

Are you familiar with NOS?

○   Yes

○   No

○   Unsure

Are you familiar with NOSop3? Have you for example come across their videos on YouTube or Instagram?

○ Yes

○ No

○ Unsure

Have you seen this specific video by NOSop3 before?

○ Yes

○ No

○ Unsure

We would now like to ask for your opinion concerning the NOSop3 video you have just watched and ho wit was presented.

The questions concern the screen fromat of the video on the phone you just saw.

To what extent do you agree with the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am satisfied with the way the video was presented	○	○	○	○	○
De presentation of the video met my expectations	○	○	○	○	○
Watching the video was a pleasant experience	○	○	○	○	○

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The way the video was presented is interesting	○	○	○	○	○
The way the video was presented is fun	○	○	○	○	○
The way the video was presented is appealing	○	○	○	○	○
The way the video was presented is enjoyable	○	○	○	○	○

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The screen format of the video was clear and understandable	○	○	○	○	○
Watching a video in this screen format is easy	○	○	○	○	○
Watching a video in this screen format did not require any mental effort	○	○	○	○	○

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am fully immersed when watching videos in this screen format	○	○	○	○	○
I feel engaged when watching videos in this screen format	○	○	○	○	○
I feel as if time passes quickly when watching videos in this screen format	○	○	○	○	○
I am fully concentrated when watching videos in this screen format	○	○	○	○	○

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am likely to continue watching videos in this screen format	○	○	○	○	○
I aim to watch as many videos as I can in this screen format	○	○	○	○	○
I would rather continue watching videos in this screen format than discontinue watching them	○	○	○	○	○

You have reached the end of this survey. Thank you for your time and effort, it is greatly appreciated! If you have any qestions or remarks, you can put them in the box below.

CLICK THE BELOW BUTTON TO SAVE AND SEND YOUR RESPONSES.