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This Way Up: The Effectiveness of Mobile Vertical Video Marketing

Lana Mulier *& Hendrik Slabbinck *& Iris Vermeir *

Ghent University, Faculty of Economics and Business Administration, Department of Marketing, Innovation and Organisation, Tweekerkenstraat 2, 9000 Gent, Belgium

Abstract

The mobile environment of the 2020s is experiencing a vertical video revolution. The portrait, or vertical, screen format is replacing the traditional landscape, or horizontal, format to become the default for mobile video production and consumption. With the increasing use of vertical videos, an important, yet unanswered, question is how mobile users respond to this format. Therefore, we examine the effectiveness of mobile vertical versus horizontal video advertisements in terms of consumer interest, engagement, and processing fluency, as well as the underlying mechanism of the effort of watching the video ad on a smartphone in three studies. In a large-scale field study, we demonstrate that mobile vertical video ads increase consumer interest and engagement compared to horizontal video ads. In two experimental studies, we further show that mobile users process vertical video ads more fluently than horizontal video ads. Exploring the underlying mechanism for this effect, we find that mobile users experience less effort when watching a video ad vertically (vs. horizontally) on the smartphone in full-screen, as watching a vertical video does not require turning the phone. Importantly, we find that mobile users' age moderates this indirect effect, as younger mobile users (Generation Z) process mobile vertical video ads more fluently than older Generations X and Y. This article closes with implications for theory and suggestions for mobile marketers.

Keywords: Mobile devices; Screen format; Vertical video; Mobile video marketing; Processing fluency; Generation Z

Introduction

Do you turn your smartphone sideways to shoot or watch videos? The typical answer is *yes*, as we are used to viewing visual content horizontally (e.g., on television or the computer). However, the actual answer for many mobile users in the 2020s might be *no*. Our mobile environment is experiencing a vertical video revolution. The traditional landscape, or horizontal, format is being replaced with the portrait, or vertical, format, which is turning into the default for mobile video production and consumption (Williams, 2019). A vertical video is intended for viewing in portrait mode in full-screen, with a 9:16 aspect ratio (i.e., the relationship of screen width to screen height; Zettl, 2005), in which the vertical axis is longer than the horizontal axis (see Fig. 1). Smartphones are designed to be held vertically (Canella, 2017; Ryan, 2018). Mobile users hold their phones upright 94% of the time (ScientiaMobile, 2017). As such, the native upright or vertical screen position of smartphones is stimulating the creation of mobile vertical video content, which is attractive for mobile users because they can shoot and consume video content without having to rotate their phone 90 degrees (Corbett, 2015).

Conversely, just a few years ago, vertical videos were considered as unusual, amateur, aesthetically unpleasing, and wrong, mainly because displaying vertical videos on, for instance, YouTube, intended for traditional horizontal viewing, shows black bars to the left and right of the video. Popular video bloggers, like Glove and Boots (2012), ridiculed people

* Corresponding author at: Ghent University, Faculty of Economics and Business Administration, Department of Marketing, Innovation and Organization, Tweekerkenstraat 2, 9000 Gent, Belgium.

E-mail addresses: Lana.Mulier@UGent.be (L. Mulier), Hendrik.Slabbinck@UGent.be (H. Slabbinck), Iris.Vermeir@UGent.be (I. Vermeir).

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who shot vertical videos, satirically labeling the video trend as the *"Vertical Video Syndrome"* (Menotti, 2019; Napoli, 2016; Neal & Ross, 2018). Criticism of vertical videos is still present today, evidenced by a mobile app called Horizon, which guarantees to shoot pictures and videos in landscape mode only (Menotti, 2019). However, displaying horizontal videos on a vertically held smartphone diminishes the watching experience, as it shows black bars above and below the video (see Fig. 1). Therefore, mobile devices and applications (apps) allow aspect ratio flexibility when turning the smartphone sideways to optimize the viewing experience of horizontal videos in full-screen, but this requires effort from the mobile user. Indeed today, less than 30% of mobile users turn their smartphones to watch horizontal videos; if they do, they view only 14% of the content (Martin, 2017). Many mobile users indicate that they find it difficult or frustrating to turn their smartphone sideways to watch content (Corbett, 2015).

These changes in the mobile video environment align with mobile becoming the dominant way to consume content. Indeed, smartphones now drive the overall increase in consumers' digital time (McLean, Osei-Frimpong, Al-Nabhani, & Marriott, 2020) and mobile is the fastest growing medium within digital marketing (Smith, 2017). Further, more than 75% of all video viewing is now mobile (Facebook IQ, 2017; Martin, 2017) and by 2021 mobile video spend is expected to reach $16.2 billion (MediaRadar, 2017). People are 1.5 times more likely to watch video on a smartphone than on a computer (Facebook IQ, 2017). As such, video marketers need to rethink their online strategies to adopt video marketing more intensively in the mobile domain and follow trends, like the vertical video trend (Sedej, 2019).

Interestingly, business insights predict that mobile vertical videos could yield three times the return of horizontal videos (Martin, 2017; MediaRadar, 2017). Many companies are increasingly embracing the vertical video revolution. For instance, social media apps Facebook, Instagram, Snapchat, Twitter, and TikTok have vertical video-friendly interfaces and encourage their users to adopt the vertical format (Williams, 2019). Furthermore, the movie industry is exploring the tall screen with vertical film festivals (Canella, 2017) and music artists are releasing vertical music videos on Spotify and YouTube. Finally, Samsung launched a vertical television that can be rotated 90 degrees to watch mobile vertical videos (Dent, 2019).

With this increasing use of vertical videos, an important, yet unanswered, question is how mobile users respond to this screen format. Despite extensive research on video and mobile marketing, there is a lack of empirical research on the effectiveness of mobile vertical video marketing. As mobile user preferences for watching videos on their smartphones have evolved, we fill this research gap by examining (1) the effectiveness of mobile vertical versus horizontal video advertisements in terms of consumer interest, engagement, and processing fluency; (2) the underlying mechanism of the effort of watching the video ad on the smartphone; and (3) the moderating effect of mobile users' age. We conducted three studies to investigate the effectiveness of mobile vertical video marketing. Specifically, Study 1 explores whether mobile vertical versus horizontal video ads increase consumer interest and engagement using real Facebook user data. Study 2 investigates the effects of mobile vertical versus horizontal video ads on processing fluency and examines the underlying mechanism of the effort of watching the video ad on the smartphone in full-screen. Study 3 extends these findings in a lab setting and identifies a moderating effect of mobile users' age on the effectiveness of vertical video ads.

Our findings make important contributions to research on mobile video marketing, consumer effort, and processing fluency, as well as generational marketing. Furthermore, while many marketers use vertical video marketing, the effectiveness of this marketing technique remains largely underexplored. We provide clear managerial implications in terms of the design and target audience of mobile vertical video advertising campaigns. This article is the first to provide

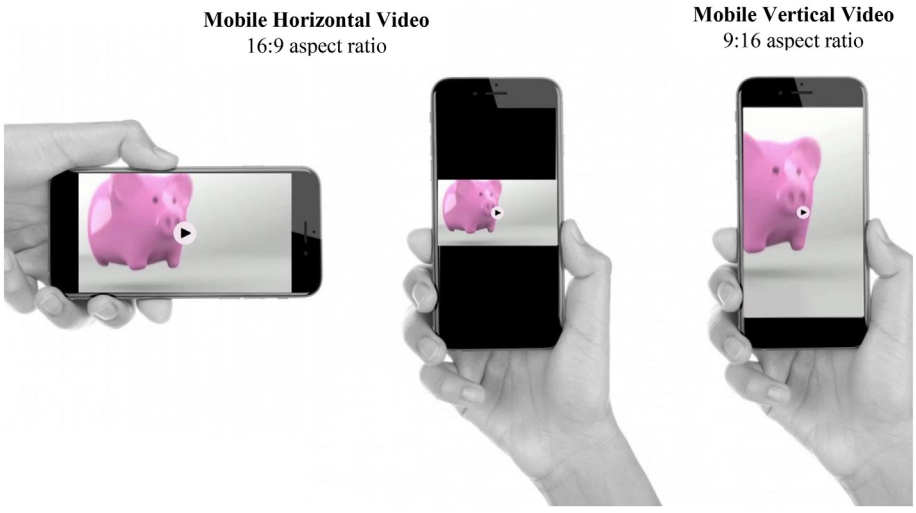


Fig. 1. Visual example of viewing a mobile horizontal versus vertical video ad.

empirical insights on the effectiveness of mobile vertical video advertising, which represents an initial step for both scholars and practitioners wishing to understand vertical video marketing and its effects on mobile user behavior.

The remainder of this article is organized as follows. First, to describe our conceptual framework and research hypotheses, we provide a brief overview of relevant literature on interactive online advertising and mobile video marketing, followed by research on vertical versus horizontal formats. Then, we present the results of our three studies, which were undertaken to investigate the effectiveness of mobile vertical video ads. Finally, we discuss these results with implications for theory, suggestions for mobile marketers, as well as avenues for future research.

Theoretical Background and Hypotheses

Interactive Online Advertising and Mobile Video Marketing Research

An extensive amount of research is dedicated to various online advertising formats, ranging from static banner ads over dynamic banner ads to interactive audiovisual ads (Belanche, Flavián, & Pérez-Rueda, 2017; e.g., Kuisma, Simola, Uusitalo, & Oorni, 2010; Raney, Arpan, Pashupati, & Brill, 2003; Yoo & Kim, 2005; for an overview see Liu-Thompkins, 2019). An important conclusion from this stream of research is that, compared to more traditional or static advertising (e.g., on television or in newspapers), interactive online advertising offers substantial value due to its potential for increasing the audience's attraction to, interaction with, and control over the ads (Fortin & Dholakia, 2005; Pashkevich et al., 2012). For instance, consider skippable video ads (e.g., Belanche et al., 2017; Jeon, Son, Chung, & Drumwright, 2019; Pashkevich, Dorai-Raj, Kellar, & Zigmond, 2012) and viral video ads (e.g., Hayes, King, & Ramirez Jr., 2016; Huang, Su, Zhou, & Liu, 2013; Quesenberry & Coolsen, 2019). As such, a highly interactive marketing channel is video marketing, which is now one of the biggest opportunities to attract consumers in a real and authentic way because it is capable of engaging consumers' emotions and appealing to their needs (Sedej, 2019).

To a similar extent, mobile video marketing is moving to the center of strategic marketing planning (Sedej, 2019). Previous research on mobile marketing covers various aspects of the mobile environment (Shankar, 2016), including retailing (e.g., Shankar et al., 2016; Wang, Li, Fung, & Cheng, 2019), promotions (e.g., Andrews, Goehring, Hui, Pancras, & Thornswood, 2016; Hui, Inman, Huang, & Suher, 2013), applications (e.g., McLean et al., 2020; McLean, Al-Nabhani, & Wilson, 2018), search behavior (e.g., Goh, Chu, & Wu, 2015), and gaming (e.g., Hofacker, de Ruyter, Lurie, Manchanda, & Donaldson, 2016).

However, scholarly interest in mobile video marketing is nascent, gaining increasing attention (e.g., Alamäki, Pesonen, & Dirin, 2019; Hoeck & Spann, 2020). Moreover, to the best of our knowledge, no existing research examines the effectiveness of mobile vertical video ads. A few research articles explore the aesthetics of the vertical format from a technical or communicational perspective (Canella, 2017; Menotti, 2019; Napoli, 2016; Neal & Ross, 2018; Ryan, 2018). Building on this descriptive research, we next explore the evolution of the video format and the differences between vertical and horizontal formats.

Vertical Versus Horizontal Formats

In the history of photography, the landscape and portrait modes have always lived together. While horizontal photography is considered the most suitable to show places and landscapes, vertical photography is used to enhance portraits or landscape elements with vertical lines, such as trees or buildings. This practice is considered normal when it comes to photographic images, but this does not apply to the same extent for moving images or videos (Napoli, 2016). The shape or aspect ratio of videos is the subject of an on-going debate since it emerged, starting with film and television, moving to digital domains, going from almost square to horizontal and now to vertical in the mobile domain (Dorofte, 2019). Historically, film, television, and computers were all traditionally oriented in aspect ratios that are wider than they are tall (Ryan, 2018). From the early days of cinema up to more recent times, the only changes adopted by the motion picture industry involved increasing horizontality or widening (Napoli, 2016). These changes are mirrored in the aspect ratio changes for televisions and computers: going from 4:3 (standard television and older computer screen) to 16:9 (HDTV and laptop; Ryan, 2018). This technical standard—the landscape model—is firmly linked to cinematographic imagery (Menotti, 2019). Consequently, videos on mobile devices inherited this landscape format (Napoli, 2016).

Critics of the vertical video format argue that portrait mode video does not just violate technical video standards but also the laws of nature on human sight (Menotti, 2019). Our eyes are laid out horizontally, so we see the world in a horizontal panorama (Ryan, 2018). Widescreen formats allow viewers to use peripheral vision when viewing videos, looking at one section of the screen but seeing other areas indirectly before settling on one spot or another for deeper reflection (Zettl, 2005). In television and film, the image fills the entire screen and is all the viewer sees, which strengthens the illusion of reality and encourages the use of peripheral vision (Ryan, 2018). Accordingly, it would make sense that people favor a horizontal display over a vertical display. Indeed, studies on human eye movements show that horizontal smooth pursuit (i.e., eye movements that keep the image of a moving object close to the eye) is superior to vertical pursuit because of more extensive use in following the everyday motion of objects, which tends to be horizontal (Collewijn & Tamminga, 1984; Rottach et al., 1996). Moreover, quite intuitively, reading vertical text (upright letters arranged vertically) is shown to be slower than reading horizontal text (Byrne, 2002; Yu, Park, Gerold, & Legge, 2010). However, vertical formats are used almost exclusively in print media, mainly because of their readability. Indeed, prior studies show that people prefer to read

vertical (vs. horizontal) print media, such as newspapers (Wearden, Fidler, Schierhorn, & Schierhorn, 1999) or leaflets (Fuchs, Götze, & Voigt, 2016).

Consumer behavior research also investigates differences between vertical and horizontal displays, such as in restaurant menus (Kim, Hwang, Park, Lee, & Park, 2019) and on food plates (Szocs & Lefebvre, 2017). For instance, Deng, Kahn, Unnava, and Lee (2016) show that horizontal (vs. vertical) assortment displays are easier to process due to a match between the human binocular horizontal visual field and the dominant direction of eye movements required to process horizontal displays. However, price promotions research (Barone, Lyle, & Winterich, 2015; Feng, Suri, Chao, & Koc, 2017) argues that vertically (vs. horizontally) presented comparative price promotions are easier to process and lead to faster and more accurate computations. These contradicting findings show that the preference for a vertical or horizontal format essentially depends on the display and context in which the formats are presented.

As such, the ongoing debate between vertical and horizontal video formats is relevant in the mobile context, which is a unique consumer environment with different characteristics than cinema, television, desktop, or displays. In response to the advocates of the "Vertical Video Syndrome," we agree with Napoli (2016) and Ryan (2018) that vertical video, rather than a syndrome to be avoided, is instead a visual aesthetic that takes advantage of the mobile screen. The massive use of mobile devices is radically changing not just the production but also the consumption of videos, which can now rotate, adjust to mobile screens, change size for better viewing, etc. These technological advancements made the thought of using only one single screen format for the production of mobile video content outdated (Napoli, 2016). Consequently, this evolution has led to the rising popularity of the vertical screen format.

Interest in and Engagement with Mobile Vertical Video Advertisements

Video professionals refer to the comfort and ease-of-use vertical video offers mobile users. Holding smartphones vertically is considered natural and is habitual for many mobile users (Canella, 2017). Compared to mobile horizontal videos, mobile vertical videos offer various benefits on a vertically held smartphone: they are immersive (filling the entire mobile screen), intimate (showing people and places close up), and immediate (easy to record and post), hence their popularity on social media apps (Coppola, 2018). As such, displaying vertical videos on the smartphone is all the mobile user sees, which can strengthen the illusion of reality and encourage the use of peripheral vision. This implies that it is not the screen orientation itself but rather the image that is important; images that use the mobile screen effectively will draw people's eyes to the action or thing itself (Ryan, 2018).

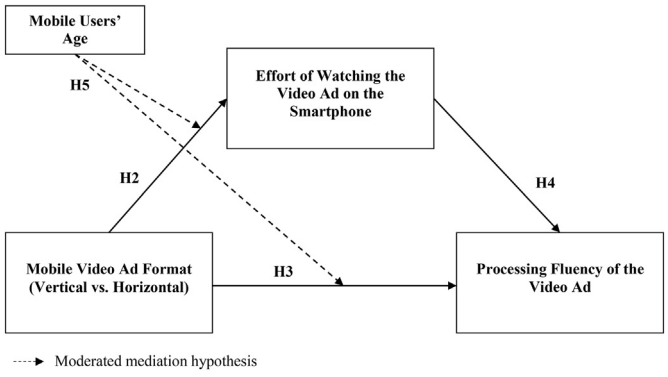


Fig. 2. Conceptual model and hypotheses H2–H5.

Following this, vertical (vs. horizontal) videos can focus the mobile user's full attention on the video. We expect that mobile users will be more interested and engaged when watching a vertical video ad, which fills the entire native vertical mobile screen, as opposed to a horizontal video ad, which does not fill the entire native vertical mobile screen. We define mobile user interest as the extent of viewing a mobile video ad, which can be large or small (viewing the full video ad or viewing only a part of the video ad). Furthermore, we follow van Doorn et al.'s (2010) definition of engagement in terms of customer engagement behaviors (CEB) being customers' behavioral manifestations or actions toward a brand, beyond purchase, resulting from motivational drivers. We define mobile user engagement as the behavioral manifestations or actions that consumers take involving the mobile video ad, which we operationalize in terms of likes, clicks, comments, and shares. We propose that:

H1. Mobile vertical video advertisements increase mobile users' (a) interest and (b) CEB compared to mobile horizontal video advertisements.

Effort of Watching and Processing Fluency of Mobile Vertical Video Advertisements

We further investigate the effectiveness of mobile vertical video ads by examining the processes of watching a vertical versus horizontal video in full-screen, in terms of the effort of watching the video ad on a smartphone and its processing fluency. These constructs form our conceptual framework (see Fig. 2), which builds on the hedonic marking hypothesis (Winkielman, Schwarz, Fazendeiro, & Reber, 2003). This theory argues that items that are processed effortlessly and fluently are judged as more positive (Winkielman & Cacioppo, 2001) and perceived as desirable (Winkielman et al., 2003). We define effort as the intensification of either cognitive or physical activity in the service of meeting a goal (Inzlicht, Shenhav, & Olivola, 2018), in this case watching a video ad on the smartphone. We define processing fluency of the video ad as the subjective feelings of ease or difficulty that people experience when processing information in the video ad (Lee & Aaker, 2004; Schwarz, 2004).

According to previous research, cognitive or physical effort is costly. People are effort aversive and, when given a choice, they tend to avoid (unnecessary) effort (Inzlicht et al., 2018; Kool, McGuire, Rosen, & Botvinick, 2010). Following this reasoning, we argue that, in a mobile context, not rotating the

smartphone to watch content can be considered as a choice to avoid effort. As smartphones are designed to be held vertically (Canella, 2017), the horizontal orientation feels odd and requires two hands to stabilize the device (Ryan, 2018). Therefore, as watching a mobile video ad in horizontal full-screen requires turning and holding the phone sideways, we expect this to be perceived as more effortful. Contrastingly, as watching a mobile video ad in vertical full-screen does not require turning and holding the phone sideways, we expect this to be perceived as less effortful. More formally:

H2. Mobile vertical video advertisements take less effort to watch on the smartphone in full-screen than mobile horizontal video advertisements.

Processing fluency research suggests that ease of reading visual information can increase processing fluency (Novemsky, Dhar, Schwarz, & Simonson, 2007), resulting in a more positive evaluation (Winkielman et al., 2003). Therefore, we argue that the perceived effort of watching a vertical (vs. horizontal) video ad on a smartphone has downstream consequences for the processing fluency of the video ad. As such, we expect mobile users to process a vertical video ad more fluently than a horizontal video ad because it takes them less effort to watch the video ad on their smartphone, so they still have enough mental capacity to process the information in the video ad. We propose that:

H3. The processing fluency of mobile video advertisements is higher when shown in a vertical full-screen format versus a horizontal full-screen format.

H4. The effect of mobile vertical versus horizontal video advertisements on processing fluency is mediated by the effort of watching the video advertisements on a smartphone in full-screen.

Moderating Role of Mobile Users' Age

We further argue that the indirect effect of mobile vertical video ads on processing fluency, through the effort of watching the video ad on a smartphone, will depend on mobile users' age. Contrasting to older generations, 75% of Generation Z consumers use their smartphones to watch videos (Canella, 2017). These Digital Natives, born between 1997 and 2012, are heavy smartphone users since they grew up with the internet and mobile devices, which makes them especially prone to viewing mobile advertising. As this generation is more experienced with watching videos on their smartphones than Generations X (birth years 1965–1980) and Y (birth years 1981–1996; Smith, 2017; Southgate, 2017), we argue that they may also be more familiar with mobile vertical video creation and consumption. In contrast, older generations have less experience with watching videos on their smartphones and, as such, may be less familiar with mobile vertical videos. Therefore, we examine the moderating influence of mobile users' age as a proxy for their experience or familiarity with viewing mobile (vertical) videos.

Accordingly, we formulate our final hypothesis, which involves a moderated mediation effect (see Fig. 2). We expect that the hypothesized positive indirect effect of vertical video ads on processing fluency, through a reduced effort of watching the video ad, will be positive for younger mobile users (Generation Z), who would consider watching mobile vertical (vs. horizontal) video ads less effortful to watch on their smartphone and, thus, would process these video ads more fluently. In contrast, we expect that this indirect effect is negative for older mobile users (Generations X and Y), who would consider watching mobile vertical (vs. horizontal) video ads more effortful to watch on the smartphone and, thus, would process these video ads less fluently. In sum:

H5. The indirect effect of mobile vertical (vs. horizontal) video advertisements on processing fluency, through the effort of watching the video advertisement on a smartphone in full-screen, is positive for younger mobile users (Generation Z) and negative for older mobile users (Generations X and Y).

Study 1: Effectiveness of Mobile Vertical Video Advertising on Facebook

To examine the effectiveness of mobile vertical video marketing in terms of consumer interest and engagement, we ran a field study on Facebook. We selected this mobile app because 65% of all Facebook video views come from mobile users (Facebook IQ, 2017) and vertical videos on Facebook are of high interest (Dorofte, 2019). Because vertical (vs. horizontal) videos fill the entire native vertical mobile screen, we expect Facebook users to be more interested and engaged when exposed to a mobile vertical (vs. horizontal) video ad (H1).

Method

Participants and Design

We conducted a Facebook A/B split test, which is a Facebook Ads tool to set up sponsored ads and display them to Facebook users in their newsfeed (Facebook, 2019). The split testing feature delivers valid and reliable data (compared to running a campaign without it) because it divides the Facebook audience into random, non-overlapping groups. The randomization helps to ensure that the test is conducted fairly because other factors will not skew the results of the group comparison and that each ad is given an equal chance in the test. As such, it allows for a large-scale experimental design to provide conclusive results about the preferred format to use for Facebook mobile video advertising (Facebook, 2019; Lawrance, 2018). Using the A/B split testing feature, we assigned two distinctive ads (version A: vertical format and version B: horizontal format) to two different but comparable audiences. We created two 15-s promotional video ads for participation in scientific research in our university consumer lab, which were equal except for the screen format (vertical vs. horizontal; see Appendix A). We simulated the duration of typical vertical video ads, as 70% of vertical video ads on social media are 15 s (MediaRadar, 2017). The video was embedded in a sponsored Facebook ad from the official Facebook page of the consumer lab, with a website URL to the sign-up form and a 'Sign Up' call to action button.

We selected video views as the Facebook campaign objective and the mobile Facebook newsfeed as the delivery platform (i.e., the stream of posts that Facebook users see from their friends and advertisers). For the target audience, we selected Facebook mobile users only (excluding desktop and tablet users) from a West-European country (45% women; mean age not observed; ages 18–64 years). We excluded Facebook users who had previously liked or followed the official Facebook page of the consumer lab to eliminate previous exposure to similar ads. Importantly, the A/B split test ensures that the target audience saw only one of the two video ads and not both. As such, the split test reached 2,377 unique Facebook users in total (i.e., the number of people who saw the ad at least once), who were randomly assigned to one of two between-subjects conditions: vertical video ad (n = 1,266) versus horizontal video ad (n = 1,111).

Procedure

We ran the A/B split test for five consecutive days with the same budget for each ad, with an estimated test power of more than 95% (i.e., the likelihood of detecting a difference in the ads if there is one to detect). Using an even split, we ensured that the amount spent on each ad was the same (Facebook, 2019). We assessed several interest and engagement measures used for Facebook advertising. The most important interest measure is the Facebook "results," which is the number of times the ad achieved an outcome, based on the objective and settings selected for the test. For this study, we measured ThruPlays (i.e., the number of times the video is played to completion). We also measured other interest indicators, including total video plays, 3-s video plays (i.e., the number of times the ad played for at least 3 s), and video plays at 25%, 50%, 75%, and 100% (i.e., the number of times the video was played at a percentage of its length, including plays that skipped to this point). Additionally, we assessed CEB with the video ad, by measuring post engagement, which is the total number of actions that people take involving the ads (post or page likes, post clicks, comments, and shares).

Results and Discussion

There were 2,878 total impressions of the video ads (i.e., the number of times the ads were on screen), which is higher than the reach because impressions may include multiple views of the ads by the same people. There were 1,462 impressions (51%) of the vertical ad and 1,416 impressions (49%) of the horizontal ad. Based on these ad impressions, we conducted z-tests to compare the proportions of the vertical and horizontal video ad for ThruPlays, video plays, 3-s video plays, video plays at different percentages, and post engagement (H1; see Table 1 for the total numbers and proportions; see text below for the percentages).

First, the effect of video format on ThruPlays is significant: 57% of ThruPlays were of the vertical video ad versus 43% of the horizontal video ad ($z = 6.92$, $p < .001$, $h = 0.26$). Secondly, the effect of video format on video plays is significant: 54% of video plays were of the vertical video ad, the remaining 46% of the horizontal video ad ($z = 6.63$, $p < .001$, $h = 0.25$). Thirdly, the effect of video format on 3-s video plays is significant: 55% of 3-s video plays were of the vertical video ad versus 45% of the horizontal video ad ($z = 5.25$, $p < .001$, $h = 0.20$). Fourthly, there is a significant effect of video format on each percentage of video plays (see Table 1), which we examined in more detail (see Fig. 3). To account for the repeated nature of the time interval variable, we estimated a mixed model with an autoregressive covariance structure (AR1), with video plays as dependent variable, and video format (Horizontal = 0; Vertical = 1), the different time intervals ("Watching at 25%" = 1, "Watching at 50%" = 2, "Watching at 75%" = 3, and "Watching at 100%" = 4), and the interaction between both as independent variables. There are significant differences between conditions ($F(1, 3{,}950.09) = 25.46$, $p < .001$, $\eta^2_p = 0.006$, 90% CI [0.003, 0.011]) and between time intervals ($F(1, 9{,}336.97) = 196.48$, $p < .001$, $\eta^2_p = 0.021$, 90% CI [0.016, 0.026]). More importantly, the interaction between conditions and time intervals is significant ($F(1, 9{,}336.97) = 5.95$, $p < .05$, $\eta^2_p = 0.001$, 90% CI [0.000, 0.002]), indicating that watching behavior evolved differently in both conditions. That is, the horizontal video ad was ended earlier than the vertical video ad ($B_{\text{condition X time interval}} = 0.01$, $SE = 0.003$, $p < .05$; $B_{\text{horizontal}} = -0.03$, $SE = 0.02$, $p < .001$; $B_{\text{vertical}} = -0.02$, $SE = 0.002$, $p < .001$).

Table 1
Overview of the interest and CEB results of the vertical versus horizontal video ad from the Facebook A/B split test.

Dependent measure	Total	Vertical video ad		Horizontal video ad		Comparison	
		Total	Prop.	Total	Prop.	*z*	*h*
Results (ThruPlays)	1,599	905	61.90%	694	49.01%	6.92***	0.26
Video plays	2,363	1,269	86.80%	1,094	77.26%	6.63***	0.25
3-s video plays	1,828	997	68.19%	831	58.69%	5.25***	0.20
Video plays at 25%	1,783	981	67.10%	802	56.64%	5.74***	0.22
Video plays at 50%	1,698	936	64.02%	762	53.81%	5.53***	0.21
Video plays at 75%	1,644	914	62.52%	730	51.55%	5.91***	0.22
Video plays at 100%	1,600	904	61.83%	696	49.15%	6.81***	0.26
Post engagement	1,837	1,002	68.54%	835	58.97%	5.30***	0.20

*** $p < .001$.

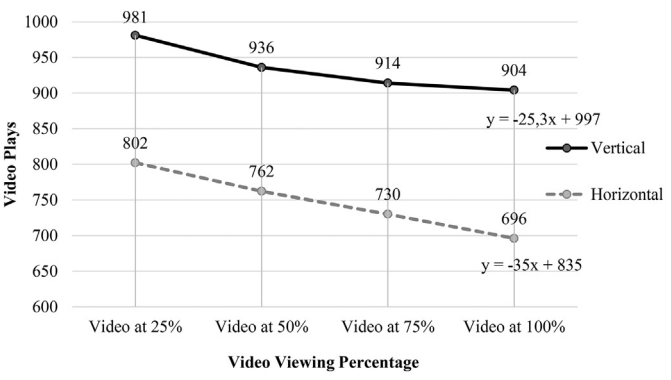


Fig. 3. Differences in Facebook video ad plays at sequential percentages depending on the video format.

Finally, there is a significant effect of video format on post engagement (post or page likes, post clicks, comments, and shares): 55% of all post engagement was toward the vertical video ad, while 45% was toward the horizontal video ad ($z = 5.30$, $p < .001$, $h = 0.20$). We further looked at the number of clicks on the advertised link, through the "Sign up" call to action button. There were only nine total clicks, of which five clicks were on the vertical ad and four on the horizontal ad. This means that, relative to the total reach and post engagement, only a few people clicked on the sign-up link. Additional results of the split test show that the average cost per click (CPC) was €2.07 for the vertical video ad, as opposed to €2.21 for the horizontal video ad, which is only a small difference in estimated CPC. The average cost per result (CPR) did not differ between the vertical and horizontal video ad, which was estimated at €0.02 for both ads.

The findings from this study confirm H1. A mobile vertical video ad increases interest and CEB compared with a horizontal video ad, evidenced by more ThruPlays, (3-s) video plays, video plays at different percentages, and post engagement. However, there were no (major) differences in video format for clicks or estimated CPC and CPR. Both video formats are equally costly in reaching their target audience. Importantly, in this study, we could not assess relevant mobile user characteristics (such as age), whether Facebook users viewed the vertical video ad in full-screen, and whether or not they turned their smartphone to view the horizontal video ad. To address these issues and allow for a robust comparison of the two video formats in full-screen, we manipulated the viewing mode of the video ads in a second study.

Study 2: Effect of Mobile Vertical Video Advertising on Processing Fluency Through Effort

Building on the findings from Study 1, we conducted a second study with an experimental manipulation of the video formats to investigate whether mobile vertical (vs. horizontal) video ads would take less effort to watch on the smartphone in full-screen and would be processed more fluently (H2–H3). Moreover, Study 2 tested whether the effect of mobile vertical (vs. horizontal) video ads on processing fluency is mediated by the effort of watching the video ads on the smartphone in full-screen (H4).

Method

Participants and Design

We recruited 110 undergraduates from a large West-European university to participate in this study (54% women; $M_{age} = 20.39$, $SD = 2.44$; ages 17–29 years). They were asked by research assistants in a university campus hall to participate voluntarily in a short mobile test, which was set up on the web-based survey tool Qualtrics. Using the randomizer option in Qualtrics, participants were randomly assigned to one of two between-subjects conditions: vertical video ad (n = 57) versus horizontal video ad (n = 53). We used two existing 62-s video ads for Nike (2015), which were equal except for the screen format (vertical vs. horizontal; see Appendix B).

Procedure

Participants received a smartphone and headphones from the research assistant to use during the study and were informed that they would watch a video. Participants in the vertical [horizontal] condition received the following instruction: *"Please watch the video vertically [horizontally] in* ***full-screen on the mobile.*** *You do not have to turn the mobile. [****You will need to turn the mobile so that you can watch the video in full-screen.]"*** After watching the video ad, participants answered two questions on the smartphone. First, we assessed processing fluency of the video ad with a 2-item, 7-point bipolar scale (Lee & Aaker, 2004) by measuring the rating of the information presented in the video ad in terms of its (1) ease of processing and (2) comprehensibility (1 = Difficult to process/understand; 7 = Easy to process/understand). These two items were averaged into a processing fluency index ($M = 5.34$; $r = 0.80$, $p < .001$). Secondly, we measured effort by asking participants to indicate (1) how much effort it took and (2) how easy it was to watch the video ad on the smartphone on a 7-point Likert scale (1 = No effort at all/Not easy at all; 7 = A lot of effort/Very easy). After reversing the scores of ease, the two items were averaged into an effort index ($M = 2.08$; $r = 0.45$, $p < .001$).

To control for participants' general smartphone usage, we included the Smartphone Usage subscale from the Media and Technology Usage and Attitudes Scale (MTUAS; Rosen, Whaling, Carrier, Cheever, & Rokkum, 2013) as a control variable. This scale consists of 9 items on a 10-point frequency scale, for which participants indicated how often they do several activities on their smartphone, e.g., recording video or using apps (1 = Never; 10 = All the time; $M = 6.20$; $\alpha = 0.75$). While smartphone usage is not correlated with participants' age ($r = -0.137$, $p = .156$), the item "recording video" is negatively correlated with age ($r = -0.255$, $p = .007$).

Next, we included a manipulation check by asking participants whether they watched the video on a smartphone vertically or horizontally and whether they had to turn the phone to watch the video. All participants viewed the video ad in the intended viewing mode and all participants in the horizontal condition turned the smartphone to watch the video, so no cases were excluded from the dataset. Finally, participants indicated their age and sex and were asked about the study purpose, which no participant guessed correctly.

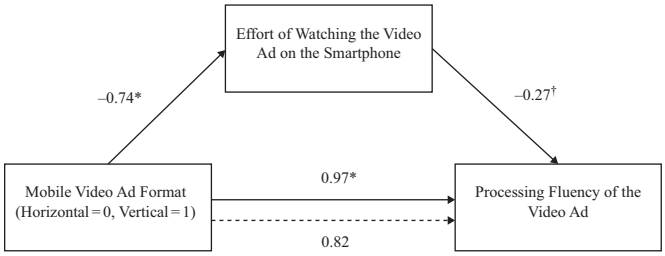
Results and Discussion

The data for the two dependent variables are piled up at the lower bound (for effort) and the higher bound (for processing fluency) of the 7-point response scales, resulting in censored data (i.e., 44 left-censored values for effort and 32 right-censored values for processing fluency; Breen, 1996; Wang & Shete, 2018; Wang & Zhang, 2011). Therefore, we conducted two Kolmogorov–Smirnov tests to assess whether these variables are normally distributed. As expected, neither effort

(D(110) = 0.30, $p < .001$) nor processing fluency (D(110) = 0.23, $p < .001$) follow a normal distribution. Given the non-normality of the distribution of these variables, ANCOVA analyses or ordinary least square (OLS) regressions are not well suited to test our hypotheses (Wooldridge, 2005). Tobit or censored regression models are commonly used to study censored data, in which the censored value occurs with a high probability (Baba, 1990; Breen, 1996). Tobit models are more powerful than other regression models, providing more consistent, reliable, and less-biased estimates than OLS regressions (Baba, 1990; Levin & Zahavi, 1998; Srivastava & Kalro, 2019). Therefore, to test H2–H3, we estimated two Tobit regression models with robust standard errors, using RStudio version 1.2.5001 (RStudio Team, 2019). We included video format as the independent variable, smartphone usage as the covariate, and effort (left-censored) and processing fluency (right-censored) as the dependent variables, respectively. We obtained similar results (1) with OLS regressions on transformed data and (2) without including the covariate smartphone usage.

First, there is a significant effect of video format on effort, after controlling for the effect of smartphone usage ($B = -0.74$, $SE = 0.37$, $z = -1.99$, $p = .047$). Participants in the vertical condition indicated that watching the video on the smartphone takes significantly less effort ($M = 1.75$, $SD = 0.84$) than participants in the horizontal condition ($M = 2.47$, $SD = 1.41$; $d = 0.626$, 95% CI [0.243, 1.009]). Smartphone usage is not significantly related to effort ($B = -0.08$, $SE = 0.16$, $z = -0.49$, $p = .624$). Confirming H2, watching a mobile vertical video ad on the smartphone in full-screen takes less effort than watching a mobile horizontal video ad. Secondly, there is a significant effect of video format on processing fluency, after controlling for the effect of smartphone usage ($B = 0.97$, $SE = 0.43$, $z = 2.27$, $p = .023$). Participants in the vertical condition indicated a significantly higher processing fluency of the video ad ($M = 5.66$, $SD = 1.39$), than those in the horizontal condition ($M = 4.99$, $SD = 1.78$; $d = -0.421$, 95% CI [−0.800, −0.043]). Smartphone usage is not significantly related to processing fluency ($B = 0.19$, $SE = 0.20$, $z = 0.97$, $p = .330$). Confirming H3, the processing fluency of a mobile video ad is higher when shown in a vertical (vs. horizontal) full-screen format.

To test the underlying mechanism hypothesized in H4, we estimated a Tobit mediation model (Wang & Shete, 2018; Wang & Zhang, 2011) with robust standard errors, using RStudio version 1.2.5001 (RStudio Team, 2019). We included video format (Horizontal = 0, Vertical = 1) as the independent variable, effort as the left-censored mediator, processing fluency as the right-censored dependent variable, and smartphone usage as the covariate (see Fig. 4). We obtained similar results (1) with OLS regressions on transformed data and (2) without including the covariate smartphone usage. A test of Tobit mediation with 10,000 bootstrap samples and 95% confidence intervals (CIs) reveals a significant indirect mediation effect of effort on processing fluency (ab = 0.20, $SE = 0.06$, 95% CI = [0.0069; 0.3603]). The remaining direct effect of video format on processing fluency turns marginally significant ($B = 0.82$, $SE = 0.45$, $z = 1.82$, $p = .070$).



Note. Smartphone usage: $B = 0.16$ ($SE = 0.19$), $z = 0.84$, $p = .404$; †$p < .10$, *$p < .05$.

Fig. 4. The effect of mobile vertical (vs. horizontal) video ads on processing fluency of the video ad is mediated by the effort to watch the video ad on the smartphone in full-screen.

Smartphone usage is not significantly related to processing fluency ($B = 0.16$, $SE = 0.19$, $z = 0.84$, $p = .404$). Confirming H4, the effect of mobile vertical (vs. horizontal) video ads on the processing fluency of the video ad is mediated by the effort of watching the video ad on the smartphone in full-screen.

The findings from Study 2 confirm that mobile users experience less effort when watching a vertical video ad as opposed to a horizontal video ad, as watching a vertical (vs. horizontal) video ad on the smartphone in full-screen does not require turning and holding the phone sideways. We further find that mobile users process the vertical video ad more fluently than the horizontal video ad. Moreover, this study provides initial evidence of the underlying mechanism of the effectiveness of mobile vertical video ads on processing fluency, as we find a mediating effect of the perceived effort of watching the video ad on the smartphone in full-screen. However, a limitation of this study is that it only examines the responses of undergraduates with an average age of 20. These Generation Z consumers are heavy users of mobile devices, as evidenced by their high average smartphone usage in this study. However, older mobile users (Generations X and Y) have less experience with smartphones for (vertical) video consumption. Therefore, we conducted a third study to examine whether there is a moderating effect of mobile users' age on the effectiveness of mobile vertical video ads.

Study 3: Moderating Effect of Mobile Users' Age

Using a similar manipulation of the video formats as in Study 2, this lab study extended the previous findings by examining whether the indirect effect of mobile vertical (vs. horizontal) video ads on processing fluency through the effort of watching the video ad, depends on mobile users' age (H5). To test this moderated mediation hypothesis, we expanded the experimental sample in age compared to Study 2 to allow for a maximal age variation.

Method

Participants and Design

We recruited 118 participants (52% women; $M_{age} = 23.37$, $SD = 6.49$; ages 18–65 years) from the consumer panel of our

university for this lab study, which was set up on Qualtrics and included in a 50-minute session of multiple unrelated studies. All participants gave their informed consent for inclusion and received 8 euros for completing the session. They were randomly assigned to one of two between-subjects conditions using the randomizer option in Qualtrics: vertical video ad (n = 60) versus horizontal video ad (n = 58). We used two existing 77-s video ads on gender stereotypes from the video animation software website Animaker (2017), which were equal except for the screen format (vertical vs. horizontal; see Appendix C).

Procedure

Participants entered the lab with their smartphone and head- or earphones, then sat in front of a desktop computer in an individual lab cubicle. They first viewed an introduction on the desktop, stating that they would watch a video about gender stereotypes on their smartphone. Participants in the vertical [horizontal] condition received the following instruction: *"Please watch the video vertically [horizontally] in* ***full-screen on your mobile.*** *You do not have to turn your mobile. [****You will need to turn your mobile so that you can watch the video in full-screen. You may first need to change your screen setting to be able to rotate your screen.]"*** After watching the video ad, participants returned to the desktop to answer two questions. First, we assessed processing fluency of the video ad with the same scale as in Study 2, i.e., a 2-item, 7-point bipolar scale (Lee & Aaker, 2004), by measuring the information in the video ad in terms of its (1) ease of processing and (2) comprehensibility (1 = Difficult to process/understand; 7 = Easy to process/understand). These two items were averaged into a processing fluency index (M = 5.99; r > 0.65, p < .001). Secondly, we measured how much effort it took participants to watch the video ad on the smartphone, on a 7-point Likert scale (1 = No effort at all; 7 = A lot of effort).

Next, we included a manipulation check, similar to Study 2, by asking participants whether they watched the video on their smartphone vertically or horizontally and whether they had to turn their smartphone to watch the video. Seven participants in the horizontal condition who indicated that they did not turn their phones to watch the video were excluded from the dataset. Additionally, two participants in the vertical condition indicated that they turned their smartphone to watch the video, so we excluded these participants as well. After removing these cases, our final sample comprises 109 participants (vertical condition: n = 58; horizontal condition: n = 51). Finally, participants indicated their age and sex and were asked about the study purpose, which no participant guessed correctly.

Results and Discussion

To test H5, we estimated a moderated mediation model (Preacher, Rucker, & Hayes, 2007) as visualized in Fig. 2, using RStudio version 1.2.5001 (RStudio Team, 2019). The moderated mediation model included video format (Horizontal = 0, Vertical = 1) as the independent variable, age as the moderator, effort as the mediator, and processing fluency as the dependent variable. We examined age as a moderator of the relationship between video format and effort as well as between video format and processing fluency. Similar to Study 2, the data for the mediator and the dependent variable are piled up at the lower bound (for effort) and the higher bound (for processing fluency) of the 7-point response scales, resulting in censored data (i.e., 52 left-censored values for effort and 38 right-censored values for processing fluency). We conducted two Kolmogorov–Smirnov tests to assess whether these variables are normally distributed. As expected, both effort (D(109) = 0.30, p < .001) and processing fluency (D(109) = 0.25, p < .001) do not follow a normal distribution. Given the non-normality of the distribution of these variables, we applied a Tobit moderated mediation model with robust standard errors, including a left-censored mediator and a right-censored dependent variable (see Fig. 5). We obtained similar results with OLS regressions on transformed data.

A test of Tobit moderated mediation with 10,000 bootstrap samples and 95% CIs reveals a significant index of moderated mediation through effort on processing fluency (ab = −0.17, SE = 0.01, 95% CI = [−0.1798; −0.0150]). Both interaction effects of video format and age are significant, i.e., the interaction effect on effort (B = 0.42, SE = 0.17, z = 2.44, p = .015) and the interaction effect on processing fluency (B = −0.09, SE = 0.04, z = −2.21, p = .027). Furthermore, the effect of effort on processing fluency is significant (B = −0.41, SE = 0.07, z = −5.90, p < .001). The remaining direct effect of video format on processing fluency turns marginally significant (B = 1.97, SE = 1.03, z = 1.91, p = .057). As such, the indirect effect of mobile vertical (vs. horizontal) video ads on processing fluency, through the effort of watching the video ad on the smartphone in full-screen, is moderated by mobile users' age.

To study the nature of these interactions, we mean-centered the moderator age to test simple-slopes for three different mobile user ages (see Fig. 5; simple-slopes analysis or spotlight analysis; Spiller, Fitzsimons, Lynch, & McClelland, 2013). Specifically, we explicated the interactions for (1) younger participants with an age of 16.87 years (M_{age} − 1 SD), (2) participants with an average age of 23.37 years (M_{age}), and (3) older participants with an age of 29.86 years (M_{age} + 1 SD).

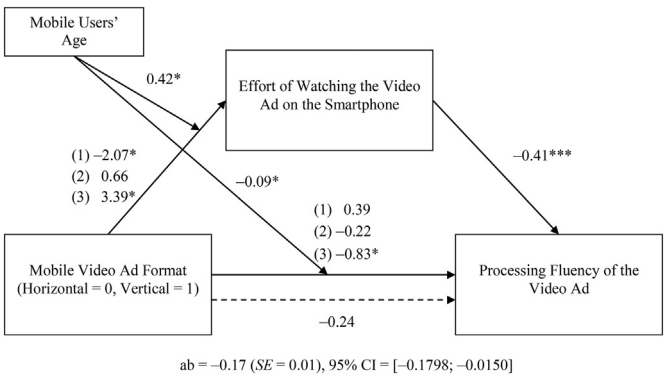
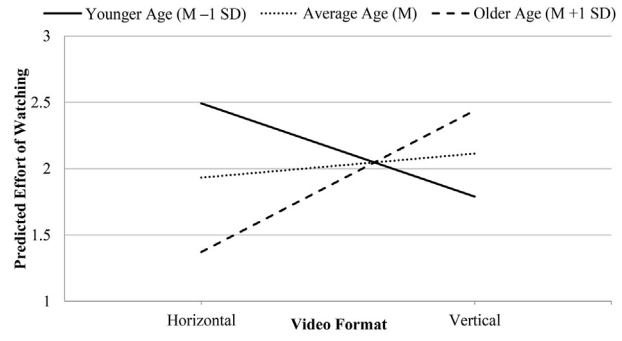


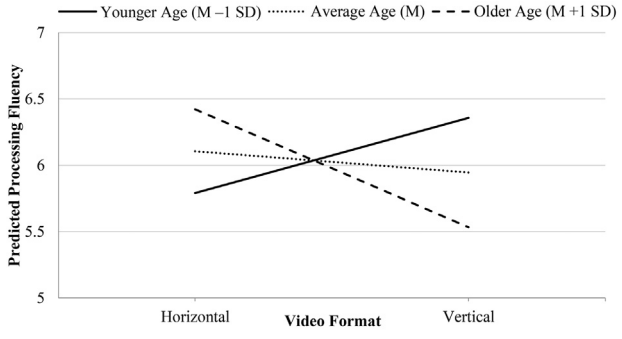
Fig. 5. The indirect effect of mobile vertical (vs. horizontal) video ads on processing fluency, through the effort of watching the video ad on the smartphone in full-screen, is moderated by mobile users' age.

Fig. 6 plots these three simple slopes for the interaction effect of video format and age on effort (panel A) and processing fluency (panel B).

First, for participants with 16.87 years of age (M_{age} − 1 *SD*), the conditional effect of video format on effort is significant ($B = -2.07$, $SE = 1.04$, $z = -1.98$, $p = .048$), but the conditional effect of video format on processing fluency is not significant ($B = 0.39$, $SE = 0.43$, $z = 1.02$, $p = .308$). A test of Tobit moderated mediation reveals a significant positive indirect effect (95% CI = [0.0009; 0.6619]). This means that younger participants indicate less effort to watch the mobile vertical (vs. horizontal) video ad, and, consequently, they process the mobile vertical (vs. horizontal) video ad more fluently. Secondly, for participants with an age of 23.37 years (M_{age}), the conditional effect of video format on effort is not significant ($B = 0.66$, $SE = 0.54$, $z = 1.23$ $p = .219$); the conditional effect of video format on processing fluency is also not significant ($B = -0.22$, $SE = 0.25$, $z = -0.88$, $p = .377$). A test of Tobit moderated mediation does not reveal a significant indirect effect (95% CI = [−0.2235; 0.0689]), meaning that participants with an average age of 23.37 years show no difference in effort and processing fluency between mobile vertical and horizontal video ads. Thirdly, for participants with 29.86 years of age (M_{age} + 1 *SD*), the conditional effect of video format on effort is significant ($B = 3.39$, $SE = 1.42$, $z = 2.40$, $p = .017$), as is the conditional effect of video format on processing fluency ($B = -0.83$, $SE = 0.36$, $z = -2.29$, $p = .022$). A test of Tobit moderated mediation reveals a significant negative indirect effect (95% CI = [−0.9019; −0.1152]). This means that older participants indicate more effort to watch the mobile vertical (vs. horizontal) video ad and, consequently, they process the mobile vertical (vs. horizontal) video ad less fluently.



Panel A. Relationship between video format and effort for three mobile user age conditions.



Panel B. Relationship between video format and processing fluency for three mobile user age conditions.

Fig. 6. Simple-slopes analyses from the moderated mediation model for three different mobile user ages: (1) Younger age (*M* –1 *SD*) = 16.87 years; (2) Average age (*M*) = 23.37 years; (3) Older age (*M* + 1 *SD*) = 29.86 years. **Panel A.** Relationship between video format and effort for three mobile user age conditions. **Panel B.** Relationship between video format and processing fluency for three mobile user age conditions.

Taken together, the indirect effect of mobile vertical (vs. horizontal) video ads on processing fluency through the effort of watching the video ad on the smartphone in full-screen is positive for younger mobile users (Generation Z) but negative for older mobile users (Generations X and Y). However, there is no positive indirect effect for participants with an average age of 23 years, even though these participants are part of Generation Z. This confirms H5 only partly. These findings provide evidence of the role of mobile users' age in the effectiveness of vertical video ads. The effect of mobile vertical (vs. horizontal) video ads on processing fluency, through the effort of watching the video ad, depends on mobile users' age.

General Discussion

This article sheds light on the significant ongoing changes regarding video production and consumption in the mobile consumer context. The current research is the first to investigate the effectiveness of mobile vertical video advertising. We use different videos, contexts, samples, and mobile user responses for the robustness and generalizability of our findings. Moreover, we use real video advertisements to enhance external validity. A large-scale field study with Facebook user data reveals that mobile vertical video ads increase interest and CEB compared to horizontal video ads. In two experimental studies, we further show that mobile users process vertical video ads more fluently than horizontal video ads. Exploring the underlying mechanism for this effect, we find that mobile users experience less effort to watch a video ad vertically (vs. horizontally) on the smartphone in full-screen, as watching a vertical video does not require turning the phone. Importantly, we find that this indirect effect is moderated by mobile users' age. Younger mobile users (Generation Z) process vertical video ads more fluently than horizontal video ads because it takes them less effort to watch the vertical video ad on their smartphone in full-screen. In contrast, older mobile users (Generations X and Y) process vertical video ads less fluently than horizontal video ads because it takes them more effort to watch the vertical video ad on their smartphone in full-screen.

Theoretical Contributions

Our findings contribute to research on mobile video marketing by examining mobile user interest and CEB toward mobile vertical video ads. While existing research extensively investigates video marketing and mobile marketing domains separately, research combining these two domains is scarce, although it is gaining scholarly interest. Relying on the hedonic marking hypothesis (Winkielman et al., 2003), we further

investigate the effects of mobile vertical video ads on processing fluency, which is a commonly observed construct in advertising research (e.g., Chae & Hoegg, 2013; Storme, Myszkowski, Davila, & Bournois, 2015), and on perceived effort, which is investigated in relationship with processing fluency (e.g., Dreisbach & Fischer, 2011; Song & Schwarz, 2008).

As such, we further contribute to the existing stream of research on processing fluency. While previous research argues that horizontal assortment displays are easier to process than vertical assortment displays (Deng et al., 2016), we show that this does not hold to the same extent for mobile displays. Because smartphones are designed vertically (Canella, 2017; Ryan, 2018), we are used to processing visual information (such as videos or images) on a mobile screen vertically. Consequently, we show that vertical (vs. horizontal) visual information on a smartphone is processed more fluently, thereby extending previous research showing that reading visual information can increase processing fluency (Novemsky et al., 2007).

Moreover, we find that the effort of watching the visual information underlies this effect. Thus, our findings add to the literature on consumer effort by demonstrating that, depending on the format in which visual information is presented, consumers perceive that information as taking more or less effort to watch. Since effort is considered costly, people tend to avoid effort (Inzlicht et al., 2018; Kool et al., 2010). As such, because smartphones are mostly held in their native vertical format (Canella, 2017), viewing visual information horizontally in full-screen requires turning the smartphone. While previous research argues that horizontal displays are more viewer-friendly (Byrne, 2002; Deng et al., 2016; Yu et al., 2010), we add nuance to this finding, showing that vertical displays are perceived as more mobile-friendly.

Finally, we contribute to research on generational marketing and Generation Z in particular, which is still rather scarce compared to research on Generations X and Y, as Digital Natives are relatively new to the marketplace (Smith, 2017; Southgate, 2017). Our findings reveal that the processing of mobile visual information differs between mobile user generations; Generation Z processes mobile vertical visual information more fluently than Generations X and Y, most likely because this generation is more experienced with smartphones and vertical videos.

Managerial Implications

Mobile vertical video advertising is a relevant trend in interactive online advertising with direct implications for management. First, our findings reveal that mobile vertical advertising increases interest, CEB, and processing fluency compared to traditional horizontal video advertising. We further find that mobile vertical video ads have a higher completion rate than horizontal video ads, as Facebook users stopped watching the horizontal (vs. vertical) video ad more quickly. This finding is in line with data from MediaBrix, a mobile ad platform, which shows that vertical videos see a 90% higher completion rate compared to horizontal videos (Schiff, 2016). This increased engagement potential has financial implications for the advertising opportunities of vertically oriented mobile video content (Canella, 2017). As the Facebook split test reached a large target audience, it generated large-scale statistics on the relative level of interest in and CEB with mobile video ads in a real situation, which is a crowded social media landscape full of many different video ads competing for attention (Lawrance, 2018). Following our findings, we argue that video advertising in mobile apps should be adjusted to the native vertical screen format of the smartphone to increase mobile user interest, engagement, and processing fluency of the video advertising.

Based on our two experimental studies, we further identify mobile users' age as a moderator for the effectiveness of vertical video marketing, which is a relevant demographic segmentation variable. Younger audiences watch videos on their smartphones more than any other type of content on any other type of device (Wibbitz, 2018), so creating videos optimized for mobile is essential to reach Generation Z. Popular social media apps like Snapchat and TikTok, which strongly appeal to this young and mobile audience, use vertical video almost exclusively. Our findings suggest that Generation Z consumers will mostly drive the vertical video trend. As this generation uses their smartphones to connect with the world and make purchases (Smith, 2017), we argue that marketers should embrace the creative possibilities of vertical video to engage these new and younger audiences (Canella, 2017). A 2020 mobile video campaign by Starburst does exactly that, showing "Best Enjoyed Vertically" ads optimized for viewing on the mobile vertical screen. The video ads show scenes that look strange unless they are viewed vertically, targeting a younger audience that consumes video on mobile devices more often than older generations (Williams, 2020). Certain consumption categories, such as luxury fashion, are increasingly active on mobile. For these kinds of brands, mobile vertical videos can present opportunities to reach new audiences (MediaRadar, 2017), especially Generation Z consumers, who are highly fashion conscious (Jain, Vatsa, & Jagani, 2014).

Following this, it is important to note that vertical formats will not automatically guarantee success. Our findings suggest that Generations X and Y prefer watching horizontal (vs. vertical) videos on their smartphones. Moreover, not everyone watches videos on mobile devices, especially the oldest generations. Therefore, to reach a broad audience (i.e., not specifically targeted at a generation or a specific population segment), we would advise creating two versions of a video ad or marketing message: one for mobile vertical viewing, to reach younger audiences, and another for traditional horizontal viewing, to reach older audiences (Martin, 2017).

Limitations and Future Research Directions

The implications of our findings are somewhat constrained by certain limitations, some of which suggest directions for future research. First, while the field study shows higher consumer interest and CEB toward the mobile vertical (vs.

horizontal) video ad, the two screen formats are equally effective in terms of link clicks and CPR, although these metrics are often seen as key indicators for Facebook advertising (Facebook, 2019). Possibly, Facebook users did not click on the advertised link because they did not want to sign up. Most likely, a Facebook ad of more direct relevance to the target audience could have led to higher click rates. As business insights predict that vertical videos could yield three times the return of horizontal videos (Martin, 2017; MediaRadar, 2017), more research on real mobile user behavior on diverse mobile apps is necessary to be able to confirm these marketing predictions and replicate our findings.

Further, the experimental studies generated initial evidence for the underlying mechanism of the effectiveness of mobile vertical video ads on processing fluency in terms of the effort of watching the video ad on the smartphone. However, additional explanatory variables might be at play. Specifically, because vertical videos fill the entire native vertical mobile screen, they are more intimate and immediate than horizontal videos (Coppola, 2018). Kim, Ahn, Kwon, and Reid (2017) find that TV advertising engagement can lead to a state of immersion and presence. To a similar extent, mobile vertical (vs. horizontal) video ads could lead to more flow, immersion, or presence. Future research should investigate these alternative accounts.

Moreover, besides mobile users' age, their personal experience and familiarity with viewing mobile (vertical) videos might have moderating effects on the processing fluency of mobile vertical (vs. horizontal) videos. As we find a negative correlation between mobile users' age and their frequency of recording mobile videos in Study 2, we can reasonably expect that age is associated with experience and familiarity with processing vertical displays. Importantly, however, Collewijn and Tamminga (1984) suggest that, while vertical smooth pursuit may be inferior to horizontal pursuit, it might improve with practice. Similarly, we argue that the processing fluency of mobile vertical videos can improve with practice. For example, by viewing videos on vertical video-friendly social media apps on the smartphone rather than on the computer, consumers might be able to (further) develop vertical pursuit and become more fluent in processing mobile vertical videos.

Additionally, following previous research in the (mobile) advertising domain, we can expect that the effort of watching and the processing fluency of mobile vertical (vs. horizontal) video ads are contingent upon the interaction with advertising type (e.g., informative vs. persuasive; Chitturi, Raghunathan, & Mahajan, 2007), consumer goals (e.g., lower-level goals in terms of product benefits and features vs. higher-level values or life goals; Huffman, Ratneshwar, & Mick, 2000), video duration (e.g., short-form vs. long-form; Bercovici, 2017), and product or service type (e.g., high-involvement vs. low-involvement or hedonic vs. utilitarian; Bart, Stephen, & Sarvary, 2014; Drossos, Kokkinaki, Giaglis, & Fouskas, 2014). These moderating variables are worthy of future investigation.

Another potential limitation concerns the manipulation of the viewing mode of the video ads in Studies 2 and 3. We instructed participants to watch the mobile video ad in the vertical or horizontal viewing mode in full-screen. However, future studies could assess mobile users' preferred viewing mode to watch a video, which then automatically adjusts to the screen orientation of their choice. This experimental design can measure how many people naturally opt for the native vertical format compared to the horizontal format, and how they respond to the video ads accordingly in terms of interest, engagement, effort, and processing fluency.

Furthermore, according to the hedonic marking hypothesis (Winkielman et al., 2003), high processing fluency is associated with positive affect and results in more favorable evaluations (Winkielman & Cacioppo, 2001), such as increased advertising attitudes and purchase intention (Storme et al., 2015). As such, a higher processing fluency toward mobile vertical video ads could result in increased attitudes toward the ads. Likewise, consumer engagement is shown to increase advertising effectiveness (Calder, Malthouse, & Schadel, 2009). Thus, future studies could investigate attitudes toward mobile vertical video ads and their interaction with interest, engagement, and processing fluency.

Finally, although we only examine the effectiveness of vertical video formats on mobile screens, the preference for vertical formats might extend beyond the mobile context. For instance, people might prefer a horizontal viewing mode on large screens (e.g., cinema and television), but prefer a vertical viewing mode on small screens, such as smartphones or smartwatches. Further, in the real mobile world, there are other video formats next to vertical and horizontal formats, such as square video, 360° views, etc. Considering the increasing use of different screen formats only suited for a mobile context, more research on their effects is certainly called for.

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Declaration of Competing Interest

None.

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