

Less is Less: Fast Ad Delivery Undermines Impact

Helen Huang, *Department of Economics*
Ye Li, *Ph.D., School of Business Administration*

ABSTRACT

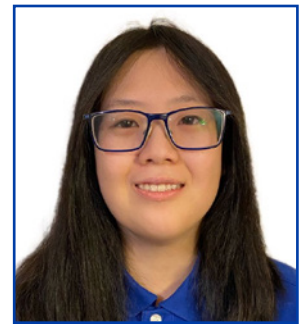
In the digital media age, video advertisements are ubiquitous, including on platforms such as YouTube and TikTok. People generally do not like advertisements, especially non-skippable ones, and may prefer to do something else while an ad plays. Following recent research suggesting that faster speeds may increase engagement with videos, we examine if speeding up video advertisements will increase people's attention when watching non-skippable ads as well as improve ad experience and memory. In two experiments, college participants were randomly assigned to watch an ad (Vrbo in Study 1, Five Star Notebooks in Study 2) at either normal or 25% faster (1.25x) speed. We did not find significant effects of playback speed in Study 1, perhaps because the ad did not have much informational content. However, in Study 2, we found that participants who watched the ad at 1.25x speed enjoyed it less, remembered it less well, and had lower brand sentiment than those who watched it at normal speed. While these findings need replication and further research to test robustness across a range of ad types and lengths, our results suggest that increase the speed of ads may not be beneficial to advertisers.

KEYWORDS: video speed, advertisements, brand sentiment

FACULTY MENTOR - Dr. Ye Li, School of Business Administration



Ye Li is an Associate Professor of Management in UCR's School of Business Administration. His research interests are in judgment and decision making and behavioral economics, with a particular interest in the role of time in decision making. His research uses a range of tools from both psychology and economics, including laboratory and online experiments, archival data analysis, and mathematical modeling. His work has been published in Proceedings of the National Academy of Sciences, Psychological Science, Journal of Marketing Research, Journal of Retailing, Journal of Experimental Psychology: General, Journal of Behavioral Decision Making, Psychology and Aging, Annual Review of Psychology, and Current Opinion in Behavioral Sciences.



Helen Huang

Helen Huang is a fourth-year Honors student majoring in Business Economics with a minor in Accounting. She is part of the research lab BEDLAB run by Professor Ye Li, Professor Michael Haselhuhn, and Professor Charles Zhang as a research assistant. Helen has plans to gain work experience after graduation in the field of her major and then may pursue a master's degree.

Less is Less: Fast Ad Delivery Undermines Impact

INTRODUCTION

In the digital media age, video advertisements are ubiquitous. They are often non-skippable and are an obstacle to endure to get to the content people are actually interested in viewing. Given recent research (e.g., Duan and Chen, 2019; Lang et al., 2020; Nagahama and Morita, 2017) suggesting that higher video speeds have a positive impact on the viewers engagement with videos, we wondered if the benefits of speeding up video playback might apply to advertisements as well. In particular, will a faster advertisement be more engaging to people, leading to greater attention toward and enjoyment of the ad, and subsequently to better memory of the ad and improved brand sentiment?

BACKGROUND

Playback Speed

The effect of playback speed on people's experience watching videos has been studied in a variety of fields as diverse as education, entertainment, and marketing. One prominent area of research is in education, where there is the natural question of the relationship between video playback speed and student learning outcomes in Massively Open Online Courses (MOOCs). For example, Lang et al., (2020) found that only one-fifth of MOOC learners ever modified video playback speed, which suggests that many users may be unaware of the option to change the playback speed or at least do not do so habitually. The median user who did change speeds tended to choose either 1.25x or 1.5x speed. In an experimental study, researchers randomly assigned learners to have their default video set to either normal speed or 1.25x speed. Although learners could change the video speed themselves, they would have to manually adjust it every time they watched a new video. The study found that the 1.25x speed group took less time to complete the MOOCs, which translated into higher course completion rates and persistence. Lang et al.'s (2020) findings are consistent with related work showing that students assigned to watch lecture

videos as 1.5x speed scored higher on comprehension tests than those assigned to watch at 1x speed (Nagahama and Morita, 2017), although their sample size was fairly small ($n = 59$). Students in the study assigned to watch lecture videos at 2x speed did not like doing so and did not perform better in the course. Another study found that lecturers were perceived to be more credible and authoritative when speaking with a faster cadence (Simonds et al., 2006). However, not all studies show a positive benefit of faster educational videos. For example, Ritzhaupt et al., (2015) found that video speed had no effect on learners' performance and that learners were more satisfied with normal video speed than with other video speeds. Notably, this study is somewhat older than the other papers, so it is possible that students have become more used accustomed to faster video speeds in more recent years as the option has become more common, with built in settings on platforms such as EdX, Coursera, YouTube, and even Netflix.

Another study done on playback speed watching entertainment videos online explored why a viewer would choose to increase a video's speed. Duan and Chen, (2019) surveyed 242 Chinese college students who reported watching dramas on streaming platforms and found that 84.3% of participants watched streaming dramas above 1x speed. Among 12 participants selected to partake in in-depth personal interviews, reasons reported included increasing time efficiency, preference for a fast-paced lifestyle, and as a remedy for plot dragging. This is consistent with recent work by Li, (2022), which found that viewers of infotainment videos found them more enjoyable when viewed at 1.25x speed (compared to 1x speed) and reported paying more attention to them.

Advertising Effectiveness

Companies spend significant amounts of money on advertising and much of this budget goes toward video ads whether on television or the internet. Companies, therefore, are likely to be interested if people actually watch their ads and, ultimately how effective those ads are in terms of

increasing people's brand sentiments and memory of the ad content. For example, a study on advertisement effectiveness by Bellman et al., (2020) examined whether viewing time had a nonlinear relationship with ad effectiveness. It found that as the amount of time an ad is viewed increases, recall, recognition, ad liking, and purchase intention increase, but with diminishing returns.

Advertising researchers have started to examine the effects of advertisement speed. For example, Bolls et al., (2003) examined the effects of advertisement pacing on viewers' voluntary and involuntary attention to an ad and its effects on the viewers memory of the ad. Pacing refers to the number of visual cuts in the video, so not exactly speed, but a related concept. They found that while there may be some evidence that fast-paced ads have positive effects on the viewers' involuntary attention (arousal), that attention appears to be directed towards the "advertisement execution" part of the ad and not its actual message. That is, participants paid more attention to the ad but had worse recall for the ad's message. In a related study, Sundar and Kalyanaraman, (2004) also found that faster-speed animations in ads were better at holding participants' attention but also found that slower speeds seem to enhance the advertised website's appeal. These studies suggest that faster speeds may increase attention but have unintended consequences for both liking and remembering the ads.

Hypothesis

In summary, studies in a variety of domains have found that faster video speeds increase viewers' engagement and attention. Studies in education and entertainment seem to suggest that faster ads also lead to greater performance and enjoyment, respectively. However, studies on ad pacing and animation speeds seem to suggest that this increased attention may not confer benefits in terms of brand sentiments and ad memory. We therefore hypothesize that increasing the speed of the ad will increase people's attention towards non-skippable ads. However, we are less certain if faster speeds

will increase ad enjoyment and brand sentiments. Finally, we hypothesize that faster speeds will reduce ad memory.

STUDY 1: VRBO

To test the effect of playback speed on advertising effectiveness, we conducted a study in which participants watched a non-skippable advertisement at normal or 25% faster speed, and then the participants on their recollections of the ad and asked them about their experience watching the ad as well as their brand sentiments.

Methods

Participants: We recruited 174 college students from the University of California, Riverside (76 females and 98 males) to complete a series of studies in exchange for partial course credit, of which this study was one. The average age of the participants was 21.2 ($SD = 2.26$, range = 19 to 36; 55.1% Asians, 26.3% Latino/Hispanic, 8.0% White/Caucasian, 1.7% Black/African, and 6.8% other ethnicities).

Video: We used a 60-second-long Vrbo advertisement from the 2022 Super Bowl hosted on YouTube. We chose Vrbo because it is a well-established company, but less known than companies like Apple or Samsung. This would help minimize participants' preconceived notions regarding the company that could reduce the impact of the ad on participants' brand sentiment.

Questionnaire: The questionnaire was designed in Qualtrics, a web-based survey platform. We created a series of questions to ask about participants' experience watching the advertisement (see **Table 1**, next page). Participants rated their agreement with statements on a Likert scale from 1 to 7, with 1 being "Strongly Disagree" and 7 being "Strongly Agree." There was also a four-item quiz about the advertisement's content to measure the participant's memory of the ad.

Less is Less: Fast Ad Delivery Undermines Impact

Variable	Statement Wording
Enjoyment	I enjoyed this video.
Entertainment	I found this video entertaining.
Bad Experience	Watching this video was a bad experience.
Informative	I found this video informative.
Attention	I paid full attention to the entire video.
Understanding	I fully understood the content of this video.
Relaxing	I found this video relaxing.
Stress	I found this video stressful to watch.
Ad Message Understanding	The ad message is understandable.
Ad Relevance	The ad's message is relevant to me.
Ad Believable	The benefits described in the ad are believable to me.
Product Usage	After viewing this ad, I would consider using the product.
Brand Sentiment	I feel positively toward the brand in this ad.
Perceived Speed	The video playback felt faster than normal.
Audio Distortion	The audio in the video seemed distorted or weird.
Video Distortion	The images in the video seemed distorted or weird.

Table 1. Likert Survey Questions (1 – 7 agreement scale)

Procedure: Participants were randomly assigned to the normal video speed group (1x) or the 25% increased speed group (1.25x). They first watched the video advertisement at the assigned speed, with no option to change the speed or to skip, pause, or rewind the video. The page automatically advanced to the next page once the video was done. Participants then answered the Likert-scale questions about their experience watching the advertisement and about their brand sentiments. Finally, they completed the four-item multiple-choice quiz to test ad memory. We also asked about participants' demographics and typical behavior towards video advertisements outside this study.

Ethics Statement

Electronic informed consent was obtained from all participants at the start of each study.

Results

We used Jamovi v.2.3 (2022) to analyze our data. Table 2 shows the results of t-tests between conditions as well as linear regressions of the effect of video speed for all dependent variables. We created scores for the memory task by totaling up the number of correct responses out of four on the multiple-choice quiz. The group mean for the normal speed group was higher than the increased speed group for all of the dependent variables listed except for enjoyment and entertainment.

Table 2 shows the results of t-tests between conditions as well as linear regressions of the

Variables	M		SD		t-stat	p	Regression		
	1x (n = 89)	1.25x (n = 92)	1x	1.25x			b	t-stat	p
Enjoyment	2.17	2.40	1.06	0.83	-1.64	.10	0.27	1.97	.05
Entertainment	0.64	0.84	1.21	0.98	-1.21	.23	0.23	1.43	.15
Bad Experience	-0.97	-1.23	1.09	0.99	1.70	.09	-0.29	-1.95	.05
Informative	-0.09	-0.23	1.14	1.08	0.84	.40	-0.10	-0.59	.56
Attention	1.38	1.35	0.87	0.84	0.27	.79	-0.03	-0.23	.82
Understanding	1.06	0.79	0.96	1.01	1.79	.08	-0.24	-1.63	.11
Relaxing	0.58	0.33	1.03	1.07	1.65	.10	-0.22	-1.39	.17
Stress	-1.31	-1.12	0.95	1.06	-1.31	.19	0.19	1.23	.22
Ad Message Understanding	0.93	0.73	1.05	1.10	1.28	.20	-0.17	-1.08	.28
Ad Relevance	0.19	0.14	1.18	1.10	0.29	.70	-0.01	-0.06	.95
Ad Believable	0.49	0.30	1.03	0.95	1.29	.20	-0.17	-1.16	.25
Product Usage	0.24	0.16	1.08	1.05	0.46	.65	-0.03	-0.20	.84
Brand Sentiment	0.57	0.44	0.98	0.86	0.97	.33	-0.12	-0.82	.42
Perceived Speed	-0.33	-0.11	1.26	1.33	-1.13	.26	0.22	1.13	.26
Audio Distortion	-1.10	-0.97	1.12	1.12	-0.80	.42	0.11	0.66	.51
Video Distortion	-1.21	-1.14	1.08	1.01	-0.46	.64	0.07	0.46	.65
Quiz Score	2.53	2.15	1.45	1.93	1.48	.14	-0.30	-1.22	.22

Table 2. Descriptive Statistics for Dependent Variables, t-tests, and regressions of Normal vs. Fast Groups

effect of video speed for all dependent variables. We also included gender, age, and prior familiarity with the brand as control variables as these might impact prior preferences for

Vrbo. Although these control variables had significant effects for some dependent variables, we do not report these effects because they are not the focus of our research.

We found marginally significant effects of faster speed on enjoyment ($b = 0.269, t = 1.97, p = 0.050$) and bad experience ($b = -0.293, t = -1.96, p = 0.052$), suggesting that participants enjoyed watching the ad somewhat more at 1.25x speed than at 1x speed. However, faster speed did not have a significant effect on any of the other dependent variables that we tested. For example, faster speed did not have a significant effect on the memory quiz, but the findings were in the direction of worse memory ($b = -0.304, t = -1.220, p = 0.224$). Similarly, faster speed did not significantly impact self-reported attention for the video ($b = -0.030, t = -0.23, p = 0.816$), its informativeness ($b = -0.098, t = -0.59, p = 0.556$) stressfulness ($b = 0.186, t = 1.23, p = 0.221$), or sentiments toward the brand ($b = -0.108, t = -0.82, p = 0.415$). Although none of these effects were significant, the direction of these effects was consistent with a negative impact of faster speeds with the exception of enjoyment, entertainment, and bad experience.

Discussion

For this study, we did not find many significant differences between the normal speed and increased speed groups. Although participants marginally enjoyed the ad more, the direction of the other insignificant effects suggest negative impacts of faster speeds on the ad's stressfulness and effectiveness as well as viewers' recall of the ad content. The lack of significant effects may in part be due to the smaller than expected sample size because the class we drew participants from had fewer students than expected. It is also possible that the Vrbo ad—which consisted of relaxing music playing over videos of family vacations—perhaps had too little content or was irrelevant to student participants. Finally, the memory quiz we used may have been too blunt an instrument to distinguish between different degrees of ad

memory.

STUDY 2: FIVE-STAR NOTEBOOKS

To address the limitations of Study 1, we changed the ad to one that was more geared toward students. We also added a free-recall memory task to directly measure recall memory in addition to the cued memory that multiple-choice questions measure. Additionally, we were able to collect data from a larger sample of participants. Finally, following best practices in behavioral research, we pre-registered the methods and analyses for this study (<https://aspredicted.org/6fv8g.pdf>).

Methods

Participants: Participants were 380 college students from the University of California, Riverside (180 females, 198 males, 2 non-binary) completing a series of studies in exchange for partial course credit. The average age of the participants was 21.3 (SD= 3.04, range 18 to 44). We were able to recruit more participants for this study than for Study 1 because the class that we drew participants from had higher enrollment this quarter.

Video: We used a 42-second long Five Star Notebooks advertisement found on YouTube that was originally posted on June 1, 2019. Our participants were college students and so using an ad for a company that makes school supplies made the ad more relevant. We also deliberately chose an ad that contained much more informational content so that participants would have more to remember.

Questionnaire: The survey was made on Qualtrics and was similar to the survey used in the first study. The main differences were the inclusion of a free recall memory task and changes to the multiple-choice quiz questions to reflect the new ad. The free recall memory task asked participants to list up to 10 things from the ad “that come to mind (product attributes, benefits, brand name, price, etc.)” with 10 blank text boxes. Participants were told they did not have to fill in

Less is Less: Fast Ad Delivery Undermines Impact

Variables	<i>M</i>		<i>SD</i>		<i>t-stat</i>	<i>p</i>	<i>Regression</i>		
	1x (<i>n</i> = 195)	1.25x (<i>n</i> = 185)	1x	1.25x			<i>b</i>	<i>t-stat</i>	<i>p</i>
Enjoyment	5.14	4.81	1.33	1.51	-2.07	.02	-0.30	2.32	.04
Entertainment	4.94	4.56	1.48	1.46	-2.19	.01	-0.33	2.54	.02
Bad Experience	2.35	2.59	1.44	1.52	-1.59	.11	0.20	-1.59	.11
Informative	5.51	5.30	1.26	1.24	-1.69	.09	-0.19	1.69	.09
Attention	5.70	5.50	1.38	1.59	-0.85	.19	-0.13	1.31	.39
Understanding	6.35	6.06	0.85	1.12	-2.62	.005	-0.26	2.84	.01
Relaxing	4.15	3.63	1.55	1.53	-3.31	.001	-0.5	3.31	.001
Stress	2.55	2.83	1.53	1.66	1.58	.09	0.26	-1.70	.12
Ad Message Understanding	6.12	5.85	1.10	1.24	-2.25	.03	-0.25	2.25	.03
Ad Relevance	5.37	5.16	1.47	1.36	-1.46	.15	-0.14	1.46	.15
Ad Believable	5.72	5.44	1.11	1.11	-2.50	.01	-0.26	2.50	.01
Product Usage	5.37	5.08	1.35	1.46	-2.07	.04	-0.25	2.07	.04
Brand Sentiment	5.53	5.25	1.09	1.23	-2.00	.02	-0.22	2.40	.05
Perceived Speed	4.08	4.69	1.59	1.53	3.84	<.001	0.67	-3.84	<.001
Audio Distortion	2.93	3.45	1.51	1.75	3.08	.002	0.50	-3.08	.002
Video Distortion	2.35	2.70	1.23	1.38	2.65	.09	0.32	-2.65	.009
Quiz Score	3.35	3.28	0.97	0.99	-0.52	.53	-0.05	0.64	.60
Items Recalled	5.39	4.82	2.13	2.05	-2.39	.01	-0.51	2.64	.02

Table 3. Descriptive Statistics for Dependent Variables, regressions, and t-tests of Normal vs. Fast Groups

all the blanks.

Procedure: The participants first watched the video advertisement at normal or 1.25x speed, then answered questions about their experiences watching the advertisement on a 7-point Likert scale. Participants then completed the free-response recall memory task and the five-item multiple-choice memory quiz. Finally, we asked about participants' demographics, prior familiarity and usage of the brand, and typical behavior towards video advertisements outside this study.

Results

Similar to **Table 2**, **Table 3** shows descriptive statistics for all of the dependent variables we measured. We created scores for the memory tasks by simply counting the number of items recalled in the free recall task and by totaling up the

number of correct responses out of five on the multiple-choice quiz. The group mean for the normal speed group was higher than the increased-speed group for all the dependent variables listed above except for stress, perceived speed, and audio/video distortion.

In addition to the *t*-tests in **Table 3**, we also ran linear regressions for the dependent variables as a function of speed while controlling for individual differences in age, gender, and prior brand familiarity and usage. We do not report the effects of the control variables since they are not the focus of our research.

Relative to the normal speeds, faster speed made for a less enjoyable ($b = -0.30, t = -2.07, p = 0.039$), less entertaining ($b = -0.33, t = -2.19, p = 0.020$), and less relaxing video ($b = -0.490, t = 3.31, p = .001$). Faster speeds also reduced self-reported understanding of the video ($b = -0.261, t = -2.62, p = 0.009$) and of the ad's message ($b = -0.252, t = 2.25, p = 0.025$). This reduced understanding was supported by the finding that faster speeds reduced the number of facts recalled about the ad ($b = -0.501, t = -2.39, p = 0.017$), although there was no difference in performance on the multiple-choice quiz ($b = -0.05, t = -0.52, p = 0.603$). Perhaps more importantly, participants in the faster speed condition also found the ad to be less believable ($b = -0.260, t = 2.50, p = 0.013$), were less likely to want to use the product advertised ($b = -0.247, t = 2.07, p = 0.039$), and felt worse brand sentiments toward Five Star Notebooks ($b = -0.22, t = -2.00, p = 0.047$).

Regressions also found that faster speeds did not have a significant impact on participants' attention ($b = -0.13$, $t = -0.85$, $p = 0.394$), stress ($b = 0.26$, $t = 1.58$, $p = 0.116$), perceived ad relevance ($b = -0.138$, $t = 1.46$, $p = 0.145$) and informativeness ($b = -0.186$, $t = 1.69$, $p = 0.093$), or if the ad was a bad experience ($b = 0.204$, $t = -1.59$, $p = 0.113$). However, the direction of these effects is also consistent with a negative impact of faster speeds as well.

The negative impacts of faster speeds could be at least in part due to the fact that the 1.25x speed video seemed faster to participants ($b = 0.669$, $t = -3.84$, $p < 0.001$) and had significantly increased audio ($b = 0.497$, $t = -3.08$, $p = 0.002$) and video ($b = 0.317$, $t = -2.65$, $p = 0.009$) distortions. We did not anticipate such distortions since the way videos are sped up on YouTube usually does not impact audio/video fidelity on a modern device (especially for 1.25x speed). Since participants completed the study on their own devices, it is possible that they did not have sufficiently fast processors or internet speeds to accommodate the faster speed video.

We also analyzed participants' self-reported behaviors regarding their usual ad watching practices. In our college student sample, participants reported that they most frequently encountered advertisements on YouTube (75.7%), social media sites such as Facebook and Instagram (18.3%), and only a small portion on more traditional media on Hulu (2.4%) and television (1.8%). More importantly, only 16.8% of participants report watching ads when they are unskippable; instead, most participants do something else while the ad plays (72.8%) or even switch to a different app or video entirely (10.5%). This suggests that companies have an uphill battle to capture consumer attention during ads. Simply using skippable ads is not the answer; 93% of participants reported that they always skip ads and the remaining 7% sometimes do.

Discussion

Unlike for the Vrbo ad in Study 1, we found many significant

effects of video speed for the Five Star Notebook ad. We hypothesized that speeding up the ad will increase people's attention towards the ad but that faster speeds will also reduce ad memory. While we did find the hypothesized negative effects on ad memory, we also found many other negative impacts of faster speeds on viewers' experience watching the ad and their brand sentiments. We also did not find our hypothesized positive effect on attention, although our attention measure was based on a single self-reported item.

GENERAL DISCUSSION

Two studies tested if speeding up playback would affect people's experience watching a non-skippable ad, as well as their brand sentiments and ad memory. The results were different from what we expected. We had thought that since people generally dislike video ads that play before and during their chosen video, speeding up the ad might make the experience more tolerable. The results show the exact opposite. Not only did the participants enjoy the increased speed ad significantly less than the normal speed ad, but they also understood it less. One potential explanation for results is that ads on YouTube and other social media/streaming platforms are much shorter than they are on live television. Most of the non-skippable ads on YouTube are no longer than thirty seconds and some are as short as five seconds. If the speed is increased for an ad that already is very short, then the ad may be over before viewers even realize what was being advertised. This can greatly decrease the effectiveness of these ads and the viewers' engagement.

Limitations

There are limitations to this study. This study was conducted with college students with an average age of 21.3 years and results could be different for older people, not only due to differences in patience but also because younger people may have grown less accustomed to watching

Less is Less: Fast Ad Delivery Undermines Impact

advertisements having grown up with YouTube instead of broadcast television. The video we chose was 42 seconds long and geared toward students, so it also does not accurately represent ad lengths and content for the general ad population. This study also focused on video ads likely to be seen on places like YouTube. Ads on live television are generally longer and so this study may not accurately represent live television ads.

FUTURE DIRECTIONS

Future studies should include older people from diverse backgrounds using ads relevant to their age range. Adults of various ages may have similar or entirely different reactions to sped-up ads than people in their twenties. In the age of data analytics, people are now shown more ads that are relevant to their activities on the internet, so different age groups will likely receive different ads. Given this, it is not too far-fetched to think different age groups may also respond differently to changes in playback speed. Future research could also focus viewers' responses to ads that play during live television. Ads of varying lengths should also be studied to see if people's responses to sped-up ads change with the length of ads. Another direction could be to ask participants to predict how they will react to a sped-up ad versus a normal ad before they watch the ad. Afterward, researchers could ask participants about their experience watching the ad, test them on retention of ad content, and ask them if they were correct about their prediction. Although our study found faster ads to be worse experiences, it is possible that people still choose to watch sped-up ads. Finally, using eye-tracking methods to objectively measure attention to the video would provide a more accurate study of if attention increases for faster video speeds as past studies suggest.

CONCLUSION

This study still needs replication and further research to

confirm the generalizability of its findings, but its results found that speeding up ads did not improve people's enjoyment, retention, understanding, or brand sentiments. It did the opposite. The results of this study could help further the development of effective advertising by showing there is a limit to how fast ads can be shown to ensure ad effectiveness. It also points to a need for advertisers to find different methods of getting consumers' attention in the digital media age.

ACKNOWLEDGMENTS

I would first like to thank University Honors for giving me the opportunity to do this research project. Thank you to Professor Ye Li, for giving me the inspiration for this topic, for guiding me throughout the data collection and writing process for this capstone, and for taking the time to meet with me and answer all my questions. I greatly appreciate it. Thank you to Alyssa Wicker, a graduate student from Anderson's School of Business Marketing department, for taking the time to meet with me and helping me with Qualtrics and Jamovi. I greatly appreciate it.

REFERENCES

- Bellman, S., Beal, V., Wooley, B., & Varan, D. (2020). Viewing time as a cross-media metric: Comparing viewing time for video advertising on television and online. *Journal of Business Research*, 120, 103-113. <http://dx.doi.org/10.1016/j.jbusres.2020.07.034>
- Bolls, P. D., Muehling, D. D., & Yoon, K. (2003). The effects of television commercial pacing on viewers' attention and memory. *Journal of Marketing Communications*, 9(1), 17-28. <https://doi.org/10.1080/1352726032000068032>
- Duan, S., & Chen, X.. (2019) Why College Students Watch Streaming Drama at Higher Playback Speed: the Uses and Gratifications Perspective. *International Joint Conference on Information, Media and Engineering (IJCIME)* <https://doi.org/10.1109/ijcime49369.2019.00087>.
- Lang, D., Chen, G., Mirzaei, K., & Paepcke, A. (2020). "Is Faster Better?" *Proceedings of the Tenth International Conference on Learning Analytics & Knowledge*, 260-269 <https://doi.org/10.1145/3375462.3375466>.
- Li, Y. (2022). Consequences of faster playback of video and audio. *University of California, Riverside Working Paper*.
- Nagahama, T. & Morita, Y. (2017). Effect Analysis of Playback Speed for Lecture Video Including Instructor Images. *Technical Report 1*. 50-58 http://jaems.jp/contents/icomelj/vol11/06_Nagahama.pdf
- Ritzhaupt, A. D., Pastore, R., & Davis, R. (2015). Effects of captions and time-compressed video on learner performance and satisfaction. *Computers in Human Behavior*, 45, 222-227. <https://doi.org/10.1016/j.chb.2014.12.020>
- Simonds, B.K., Meyer, K.R., Quinlan, M.M., & Hunt, S.K. (2006). Effects of Instructor Speech Rate on Student Affective Learning, Recall, and Perceptions of Nonverbal Immediacy, Credibility, and Clarity. *Communication Research Reports*, 23(2), 187-197.
- Sundar, S. S., & Kalyanaraman, S. (2004). Arousal, memory, and impression-formation effects of animation speed in web advertising. *Journal of Advertising*, 33(1), 7-17.
- Yoon, S., Bang, H., Choi, D., & Kim, K. (2020). Slow versus fast: How speed-induced construal affects perceptions of advertising messages. *International Journal of Advertising*, 40(2), 225-245. <https://doi.org/10.1080/02650487.2020.1766233>