

It's the End of the World and You Watch It: Media Consumption in the Time of COVID-19

Joshua H. Adams and Damian Schofield, State University of New York, Oswego, New York, USA

This paper presents the results of an experiment undertaken by the authors to capture media consumption trends during the 2020 COVID-19 outbreak. These results are correlated with the demographics, and individual situations of the experimental participants. The overall aim is to correlate the media consumption reported by the experimental participants with national viewing trends and historical data to show that there is an increased consumption of disaster themed media during times of crisis. The research intends to differentiate this increase in disaster themed media consumption by correlating it with the differing circumstances of the viewers. Specifically, whether they watch movies and/or play video games on their own and whether they currently have more free time to consume media. This paper provides evidence to support three hypotheses: Hypothesis 1: People will consume more disaster/ pandemic themed media during pandemic induced quarantine, Hypothesis 2: Individuals with more control over their media choices are more likely to choose disaster/pandemic themed media. Hypothesis 3: Individuals with more free time to consume media are more likely to choose disaster/pandemic themed media. This paper is the second in a set of two publications, a history of disaster themed media consumption can be found in the companion paper, "It's the End of the World and You Watch It: A Brief History of Disaster Themed Media."

Keywords: Disaster media, consumption, pandemic, experiment, cinema, video games, COVID-19

INTRODUCTION

A societal change that was previously unthought of, that felt impossible has become a new reality. The COVID-19 outbreak in the spring of 2020 is suggestive of how much, and how quickly, civilisation can change.

The scale of the shock to society is based on the concentration and intensity of the effect of the outbreak. Previous intense events in the United States, such as 9/11, caused shock and fear but the daily habits of the population did not change, except at airports – at the time the American President even urged citizens to keep shopping (Feaver, 2013). The COVID-19 crisis is different; it is a global biological threat. Populations around the world have had to change their behavior, many people are now dealing with extended periods of isolation and quarantine.

At the beginning of the year 2020, as the COVID-19 pandemic spread around the world, it seemed as though some people were secretly excited about the idea of a quarantine, as if it were a mock zombie apocalypse (Evrod, 2020; Kinsman, 2020). Now, heading into early summer 2020, after months of quarantine and social distancing, the mood has changed (Gordon, 2020; Nelson et al., 2020; Ko et al, 2020).

Many employees are working from home and a significant portion of the population are not in quarantine, the essential workers; nurses, emergency responders, grocery store attendants etc. Many people are bored at home, everyone has a higher level of stress; the situation is far from normal. This, in turn, will have a significant impact on media consumption.

CINEMA DURING THE TIME OF COVID-19

The COVID-19 outbreak has seen most film production come to a halt. During the pandemic the film industry has been seen as non-essential and has almost shut down completely (Kois, 2020).

The first big announcement regarding the effect of the pandemic came on February 16th, when MGM announced that the new James Bond film, *No Time To Die* would have its Chinese premiere canceled, and two weeks later, the studio made the announcement that it would be delayed from early April to November (Lang, 2020). Other major films began to follow suit, including Paramount's *Sonic the Hedgehog* movie, Sony's *Peter Rabbit* sequel, *A Quiet Place II*, *Fast and Furious 9*, and Marvel's stand-alone *Black Widow* picture. Movies in-production also began taking notice and canceling production schedules across the board, the first major tent-pole franchise to lead the charge of shutting down production occurred on February 26th, when Paramount Pictures announced that it had ceased production in Venice for the sixth sequel to the *Mission: Impossible* franchise. Paramount told The Hollywood Reporter:

Out of an abundance of caution for the safety and well-being of our cast and crew, and efforts of the local Venetian government to halt public gatherings in response to the threat of coronavirus, we are altering the production plan for our three-week shoot in Venice, the scheduled first leg of an extensive production for *Mission: Impossible 7*. During this hiatus we want to be mindful of the concerns of the crew and are allowing them to return home until production starts. We will continue to monitor this situation, and work alongside health and government officials as it evolves. (Couch, 2020).

The city and county of Los Angeles officially shut down on-location filming, also limiting all business activity and public gatherings. With the systematic shutting-down of the production side of film and television, this has caused a major shift for online and streaming release calendars. As platforms like Disney+ and Netflix attempted to make enormous shifts to their release calendars, the Disney+ side was seriously affected, due to Marvel's production halt. Hence, studios began to test the waters with theatrical Video on Demand (VOD) or Premium Video On-Demand (PVOD) releases.

On March 16th 2020, NBCUniversal announced that it would release some movies digitally the same day they would be released in movie theaters that still remained open to the public (Littleton, 2020). *Trolls World Tour* and subsequently *The Invisible Man* and *Emma* were some of the first films to take advantage of this PVID model. Under this paradigm, movies cost around \$19.99 in the United States and are available to the viewer for a 48-hour period. The financial success here, or lack thereof, is currently in flux to determine whether this rollout mechanism will be successful. There is no doubt this is a different type of filmgoing experience for the viewing public, but also has serious financial ramifications for the film industry.

Trolls World Tour was able to play at a few drive-in theaters that were still open during the COVID-19 outbreak, but the figures for box-office take are hard to find. Theatrical box office receipts range from \$1 million to \$3.2 million, quoted from a variety of online sources, while the PVID numbers are still in flux. Deadline reports an estimated \$95 million in rental fees for the film's first 19 days of digital release (D'Alessandro, 2020a). In relation to the previous *Trolls* film, this is a 21% decline from the 2017 movie's first 19 days in brick and mortar venues. Time will tell what the financial ramifications will be for the studios, but the future does not look positive for many of the exhibition houses (Shoard, 2020).

Smaller productions are popping up, mostly independent and music video related, such as Katy Perry's new video, shot at a safe distance, in nature, using long lenses and a skeleton crew (Slater, 2020). Other models are beginning to take shape in what film production may look like moving forward, but there are still so many uncertainties, with so many people affected, and so many unions overseeing and safeguarding their membership (Whiting, 2020; Banerjee, 2020).

One COVID-19 related film has appeared so far, Charles Band's aptly named film *Corona Zombies* (2020) appeared shortly after the virus became a global pandemic. The film was created in 28 days and uses primarily redubbed and repurposed footage from *Hell of the Living Dead* (1980) and *Zombies vs. Strippers* (2012), as well as clips of real-world news

footage (Heritage, 2020). SGS Entertainment has also announced that a film called 5G Zombies will be released soon, the blurb states:

In a world overtaken by a recent virus pandemic, all governments have conspired together to brainwash the remaining survivors using 5G cell service to create a new world order. Watch our world crumble from various perspectives. (Joy, 2020)

The Los Angeles box office, a key movie market and local economic backbone, fell by 20% in April 2020 compared to its 2019 figures (D'Alessandro, 2020b). Despite the state of emergency, as single screens within movie theaters do not hold more than 1,000 people, they were granted an exemption from the ban on mass public gatherings in California. A National Association of Theatre Owners representative for California and Nevada announced that theaters would stay open; historically, movie theaters have remained open during other similar emergencies (McClintock, 2020). However, a survey of Americans over the opening March weekend showed support for closing movie theaters (Whitten, 2020). On 17th March 2020, with national restrictions to social gatherings, cinemas across the United States closed (Evry, 2020). However, drive-in theaters, where customers stay in their own cars, were not closed, and have seen a resurgence in popularity (Budryk, 2020).

The opening March weekend saw a dramatically lower box office than the same weekend in 2019. The 2019 opening March weekend saw the release of *Captain Marvel*, which alone earned over US\$153 million domestically that weekend, compared to the 2020 weekend's biggest film, *Onward*, with around US\$39 million (Clark, 2020). The next weekend saw the lowest total US box office intake since the October 30–November 1, 1998 weekend, with lower percentage drops than the weekend after 9/11, at US\$55.3 million (d'Alessandro, 2020c). *Onward* itself saw the biggest weekend-to-weekend drop of any Pixar film, making \$10.5 million, though was still the weekend's biggest film and the only one to make over \$10 million (Clark, 2020).

On 19th March 2020, Walt Disney Studios and Universal Pictures announced that they would no longer report box office figures (Serjeant, 2020). Comscore therefore announced the next day that it would indefinitely suspend its reporting of box office estimates and charts (D'Alessandro, 2020d). This lack of reporting makes predicting media trends during the COVID-19 media outbreak unreliable and difficult.

Viewing trends during COVID-19 have fluctuated, and early results (from the limited data available) are interesting. According to Forbes, in late March, internet usage surged between 50% and 70% according to preliminary statistics; specifically, media streaming has also increased by at least 12% (Beech 2020). This isn't unexpected, as mid to late March saw larger numbers of people forced into self-isolation and into work-from-home scenarios due to the COVID-19 outbreak.

This pattern is following that seen in other countries that experienced Coronavirus outbreaks earlier. After seeing increased consumption of digital content from streaming and mobile apps early on in China and Italy, these numbers are now rising in the United States; in particular, streaming services such as Netflix and Disney+ are benefiting from this 12% growth (Barney, 2020). The downside to all of this growth in the streaming/digital sector, is that the film industry is predicted to lose \$11 billion with a 25% decline and 15% drop in television advertising which would include movie trailers, as well as promotions for concerts and live events which are no longer being scheduled (Beech, 2020).

The trends themselves pertaining to genre and selective services vary. One trend published by Comcast (2020), states that the public's viewing habits have changed, with a larger amount of media being consumed.

The average household is putting in an extra workday's worth of viewing each week ... watching 8+ hours more per week than they were in early March, going from approximately 57 hours a week per household to 66 hours.

With journalists working around the clock to keep the world informed on the pandemic, we've seen massive engagement, including a 64% increase in consumption of news programming since the start of COVID, hitting its peak the week of March 30, the week the reported number of global COVID cases topped 1 million. (Comcast, 2020)

However, news is only the second most popular genre of viewing. Dramas top the list of pandemic viewing at 30%, news at 29%, comedy 18%, reality television and action adventure at 15%. This viewing data is the same as the genre viewing breakdown data from 2019; the only thing to increase is the amount of media consumed during the quarantine. One thing that Comcast notes, is that there is an uptick in searches and viewing of new content. DVR usage is down, and VOD usage is up 50%. Comcast reports that voice commands such as "what shall I watch" or "surprise me" or being used more frequently, suggesting that customers have checked off their TV bucket lists and are seeking new shows (Comcast, 2020).

One side effect of the surge in popularity of the shutdown of the film industry during the COVID-19 outbreak is a demonstration of social responsibility on behalf of the film studios. In the author's local area (Central New York), a Syracuse production house, American High, has halted their film productions during COVID-19, and turned their attention to helping manufacture face-shields and masks for local and regional hospitals. Using 3D technology, volunteers from the local film industry (many of whom were crew on recently shut-down productions) utilized the Greater Syracuse Sound Stage to produce the much-needed medical supplies (Moreau, 2020).

VIDEO GAMES DURING THE TIME OF COVID-19

In contrast to many other economic sectors that are drastically affected by the 2020 COVID-19 outbreak, the video game industry has been generally more resilient to the pandemic. The largest impact involves concerns over travel and shipping to and from China or related to slowdowns in the manufacturing processes within China (Romano, 2020).

Most video game developers, publishers and operators have been able to maintain operations with employees working from home to sustain game development and digital releases, though as stay-at-home orders persisted, some productivity issues have arisen (Schreier, 2020). Further, with many people globally at home and unable to work, online gaming has seen record numbers of players during the pandemic as a popular activity to counter social distancing, a practice recommended by the World Health Organization (WHO) which has helped to boost revenues for many games companies (Snider, 2020).

A number of high anticipated games have been delayed (Schreier, 2020):

- Sony said that it would be delaying the much-anticipated *The Last of Us: Part II*. Naughty Dog, the studio behind the game, said the delay was because of the current challenges of printing, shipping and selling physical copies of video games.
- Amazon recently delayed its multiplayer game *New World*.
- Square Enix has delayed a big new update for its online game *Final Fantasy XIV*.
- Microsoft delayed the post-apocalyptic role-playing game *Wasteland 3* due to ‘new logistical challenges’

The large number of people in quarantine, or under stay-at-home orders, has led to a significant increase in video game playing, and Internet use has also multiplied. Steam, the main digital storefront for personal computer video games, saw over 23 million concurrent players during March 2020, surpassing all previous records (Robinson, 2020a). The streaming service, Twitch, saw over three billion hours of content watched over the first quarter of 2020, a 20% increase from the previous year's (Gurwin, 2020). Microsoft reported a substantial increase in users of its Xbox Game Pass service in the months of March and April 2020 bringing it to over 10 million subscribers (Stewart, 2020).

The additional bandwidth from video games and other Internet services has created concerns that critical bandwidth would not be available for medical and other key infrastructure elements necessary to mitigate the spread of COVID-19 (Kang et al, 2020). Many game

companies who offer content delivery systems for their video games and multiplayer options are currently capping their delivery speeds (Kastrenakes, 2020; McWhertor, 2020; Warren, 2020). The World Health Organization (WHO) and the video game industry have teamed up on #PlayApartTogether, a promotional campaign that encourages healthy physical distancing by bringing special events, exclusives, activities, rewards, and inspiration to some of the most popular games in the world. Some of the industry's biggest and most powerful companies (from Activision and Blizzard to Zynga) are participating, with billions of users represented (Takahashi, 2020).

Generally, sales of video games have increased as a result of stay-at-home and lockdown orders from the pandemic, as people turn to video games as a pastime (Schreier, 2020). The NPD Group reported that video game sales in North America in March 2020 were up 34% from those in March 2019, video game hardware was up by 63%. Net spending across the first quarter of 2020 in the United States reached US\$10.9 billion, up 9% in 2020 compared to 2019 according to NPD. Such an increase at this point, near the planned end of the eighth generation of video game consoles, is unusual and attributed to the COVID-19 pandemic (Edwards, 2020).

Coupled with lowered hardware production, the Nintendo Switch has become a high-selling commodity during the COVID-19 pandemic, particularly with the release of *Animal Crossing: New Horizons*. Nintendo sales figures show a 100% increase in Switch console sales from this time last year (Edwards, 2020). The popularity of the new *Animal Crossing* game during the COVID-19 pandemic cannot be underestimated, it is a huge phenomenon.

We've all seen how *Animal Crossing: New Horizons* has taken over. While the series has always been popular, it feels like it's struck a chord with more people than ever before, and it makes sense. In the game, you're essentially creating a safe space and taking care of yourself. Maintaining an island and watching it grow is a peaceful experience. There are no stakes – nothing to lose and everything to gain. Visiting friend's islands is a way to

socialize and get an intimate look at how they've created their own safe haven. It's a calming presence in my day. (Wallace, 2020)

Some mobile games, however, have run into some unique challenges. Niantic's *Pokémon Go* (2016) and Harry Potter-themed *Wizards Unite* (2019) operate through augmented reality software are designed for players who are out and about in the world and interacting with the game. Because of the COVID-19 outbreak, and many players being in quarantine around the world, these games have seen a rapid decline in popularity (Romano, 2020; Takahashi, 2020).

Exercise games, such as *Ring Fit Adventure* (2019), which involves physical activity by using special accessories, have seen an increase in demand as a result of the quarantine. Players, who are stuck in their homes are looking for ways to undertake some form of physical activity. This led to shortages of these games online, and price gouging, as the COVID-19 pandemic spread (Olsen, 2020; Sarkar, 2020).

Gaming trends during the COVID-19 outbreak are difficult to interpret, mainly because the pandemic is still relatively new, and data is only just becoming available. In May 2020, the games that one would expect to be at the top of the charts are still the most popular, *Minecraft* (2011-2020), *Fortnite* (2017), *League of Legends* (2009), *Grand Theft Auto 5* (2013), and the latest titles from the *Call of Duty* (2003-2019) and *Counter-Strike* (2000-2014) franchises (Brown, 2020). The popularity of some of these titles has been enhanced by games companies giving away free digital copies of popular game titles during the pandemic (Gilbert, 2020).

Currently, the most eagerly anticipated games, based on pre-orders are *The Last of Us: Part II* (2020) and *Resident Evil 3: Remake* (2020). Both are survival horror games, set in post-apocalyptic worlds where players fight off hordes of zombies/mutants. However, it is hard to read too much into this, as both of these games were scheduled for release long before the pandemic hit (Brown, 2020).

However, during the COVID-19 outbreak, popular media channels have been saturated with articles and videos providing advice on games to play during a pandemic. These range from articles providing advice on how to navigate anxiety using simulation games (Wallace, 2020) to lists of the best virus games to play (GeekNesis, 2020).

It is worth mentioning a few video games that have seen an increase in levels of popularity during the COVID-19 pandemic. Steam is reporting above average activity on two games *Outbreak: Epidemic* (2020), a survival horror game, and *Quarantine* (2017), a turn-based strategy game based around fighting a pandemic disease. This definitely seems to support the hypothesis that players look to relevant disaster themed media during times of crisis.

The game *Plague Inc.* (2012) by Ndemic Creations has seen an enormous boost in sales as a result of the COVID-19 pandemic. As of May 2020, *Plague Inc.* has been downloaded over 120 million times, up from the last peak of 85 million downloads during the 2014–16 Ebola outbreak (Mitchell and Hamilton, 2018; Mamiit, 2020; Orland, 2020).

The mobile *Plague Inc* game is ranked as the top-paid app in several countries, beating out the perennial bestseller *Minecraft* (2011-2020). A number of commentators have reported that players worried about the pandemic are using the game to understand more about the spread of the virus as a means to placate their fears. While the game was based on scientific models of the spread of contagious diseases, Ndemic has had to issue statements reminding players that the game was not meant to be taken as an accurate model for transmission and spread (Duffy, 2020; Orland, 2020).

The cooperative board game, *Pandemic* (2008) is based on the premise that four diseases have broken out in the world, each threatening to wipe out a region. The board game has seen an enormous surge in popularity during the COVID-19 outbreak, the game is becoming increasingly difficult to find as demand has outstripped production. This is part of a national trend among people in quarantine purchasing more board games to relieve the boredom, with some companies reporting 2000% increases in sales (Pardo, 2020; Schelle, 2020). An online

version of the *Pandemic* board game that appeared on Steam in 2018 is currently also experiencing an unprecedented rise in popularity (Noack and Pitrelli, 2020; Tolito, 2020).

An interesting side effect of the surge in popularity of pandemic based games during the COVID-19 outbreak is a demonstration of social responsibility on behalf of the game developers. Z-Man Games, the developers of the *Pandemic* board game and online equivalent recently issued a press statement:

Since the COVID-19 countermeasures encourage social distancing, we've had lots of gamers with Pandemic on their mind reach out to us on social media: posting photos of playing games, tagging us, and asking specific questions about upcoming Pandemic releases. Out of respect for those affected by the current situation, we are choosing to wait for a more appropriate time to share details. For now, our focus is on standing united with the global community against this threat. To do our part to contribute to the humanitarian efforts, we have chosen to donate to an organization currently supporting COVID-19 relief. If you would like to join us in donating, we encourage you to research relief organizations and make whatever contribution you can." (Kimball, 2020).

Further, Ndeminc Creations (the developers of *Plague Inc.*) recently donated US\$250,000 to the Coalition of Epidemic Preparedness Innovations and the WHO COVID-19 Solidarity Response Fund to help fight the pandemic and encouraged the players of the game to do the same (Orland, 2020).

A SURVEY OF MEDIA CONSUMED DURING A GLOBAL PANDEMIC

During previous periods of natural catastrophes, media companies produced an increasing amount of disaster themed media. The movies produced during these periods were immensely popular with the public, this was discussed extensively by the authors in the first paper of this two-part publication set. This speaks to an idea that the public gains some

degree of reassurance watching a disaster play out on the screen, while watching from the safety of a movie theatre or while sitting on their own sofa.

Research was undertaken with the aims of investigating this phenomenon and proving that a correlation exists by collecting data on the movie watching and game playing habits of a large sample of participants. Any increase in understanding of this phenomena is likely to have an economic impact in the worlds of entertainment and advertising.

During the 2020 COVID-19 pandemic, the authors undertook a research project aimed at collecting data to show that media consumers gravitate towards media choices that reflect their particular environment. Specifically, media consumers will increase their consumption of disaster and pandemic themed media during a global pandemic.

- Hypothesis 1: People will consume more disaster/ pandemic themed media during pandemic induced quarantine.

The research also hopes to differentiate this increase in disaster themed media consumption by correlating it with the differing circumstances of the viewers. Specifically, whether they watch movies and/or play video games on their own and whether they currently have more free time to consume media.

- Hypothesis 2: Individuals with more control over their media choices are more likely to choose disaster/pandemic themed media.
- Hypothesis 3: Individuals with more free time to consume media are more likely to choose disaster/pandemic themed media.

Participants were recruited by email and social media, they were provided with a web link and asked to complete an online survey. This research was approved by the State University of New York's Human Subjects Committee. All participants gave their consent at the start of the survey and were debriefed at the end of the survey. There were no specific tasks for the

participants to complete, they were only expected to complete a survey divulging their viewing habits.

SURVEY RESULTS

During the month of May 2020 an experiment was carried out by the authors involving an online survey. At this time the COVID-19 pandemic had been underway for a few months, and the majority of participants were under some form of quarantine or stay-at-home restrictions.

Data was collected from 282 participants, recruited by the authors using email and social media. The participants were predominantly from New York state, where social distancing restrictions were strongly enforced. The rest of the participants came from other parts of the United States with only a handful of overseas participants.

The participant gender split was uneven with slightly more females (52.5%) than males (44.0%) completing the online survey (Figure 1). The participant age range was fairly evenly distributed with the larger set of respondents being in the 18-24 age range (23%). Participation reduced among the older age ranges with only 18.8% of participants being above 55 years of age (Figure 2).

The levels of participant education were skewed with respect to the general population. The majority of participants (48.8%) indicated that they had achieved an undergraduate level of education, followed by 24.2% reporting that achieved a masters level of education. In our sample more participants reported completing a PhD (14.6%) than having a high school level of education (12.5%). This is an obvious mismatch with the general population of the United States. This incongruity is due to the academic networks of friends and colleagues that were used by the authors to recruit participants for this study.

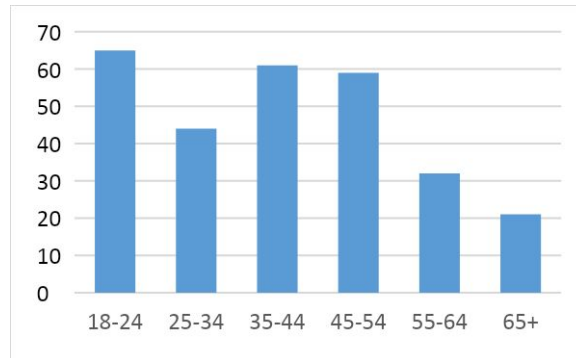


Figure 2. Survey Participant Age

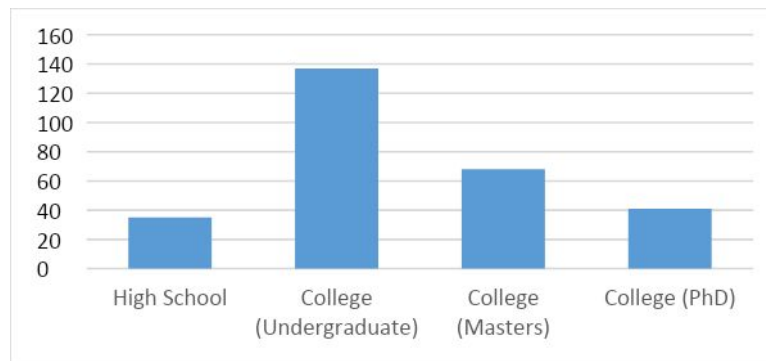


Figure 3. Survey Participant Education

Participants were asked to report on the number of hours (on average) that they spent watching movies and TV each day. The majority of participants watched between one and four hours of media per day (71.0%). Another 23.5% consumed between five and eight hours of media. Ignoring the few outliers who watch large numbers of hours of media each day, it was quite surprising to discover that 8.8% of the participants watch 8 hours and above of media per day (Figure 4).

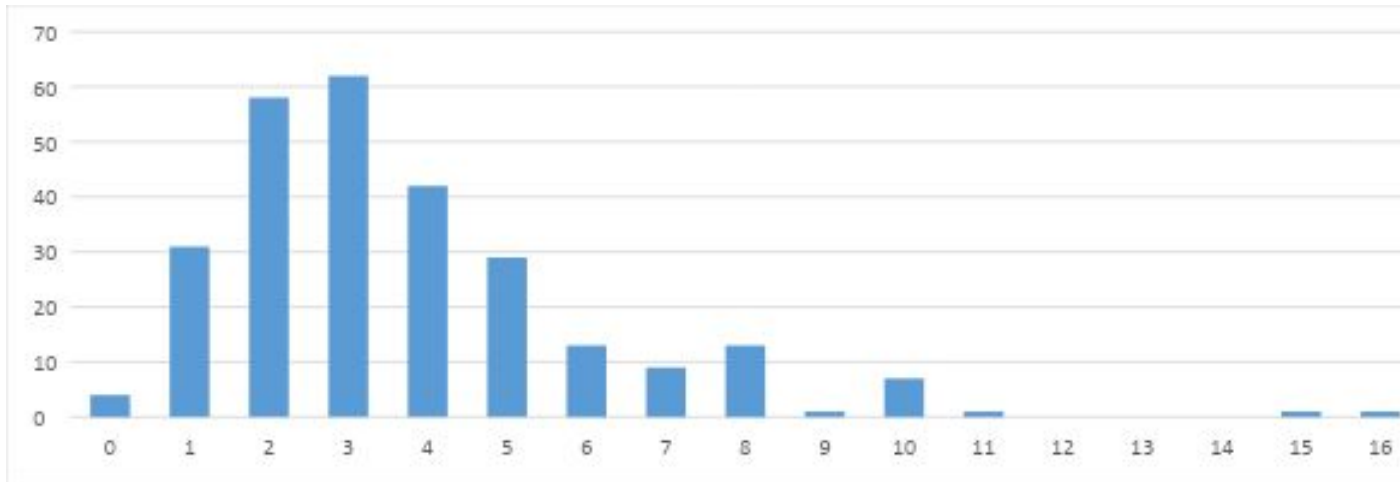


Figure 4. Average Number of Hours of Media Watched Each Day

Participants also reported on the media format that they use to watch movies and TV. The survey allowed multiple responses to this question, since many participants are likely to use more than one media format. Netflix (83.7%) and Amazon (63.5%) dominated the responses. There was still a strong attachment to Cable TV (35.5%) and relative newcomers Disney (30.9% and Hulu (44.7%) also performed relatively well (Table 1).

Most of the participants watched movies and TV both individually and with others in their household. Only a limited number of participants always consumed media alone or always with others (Table 2).

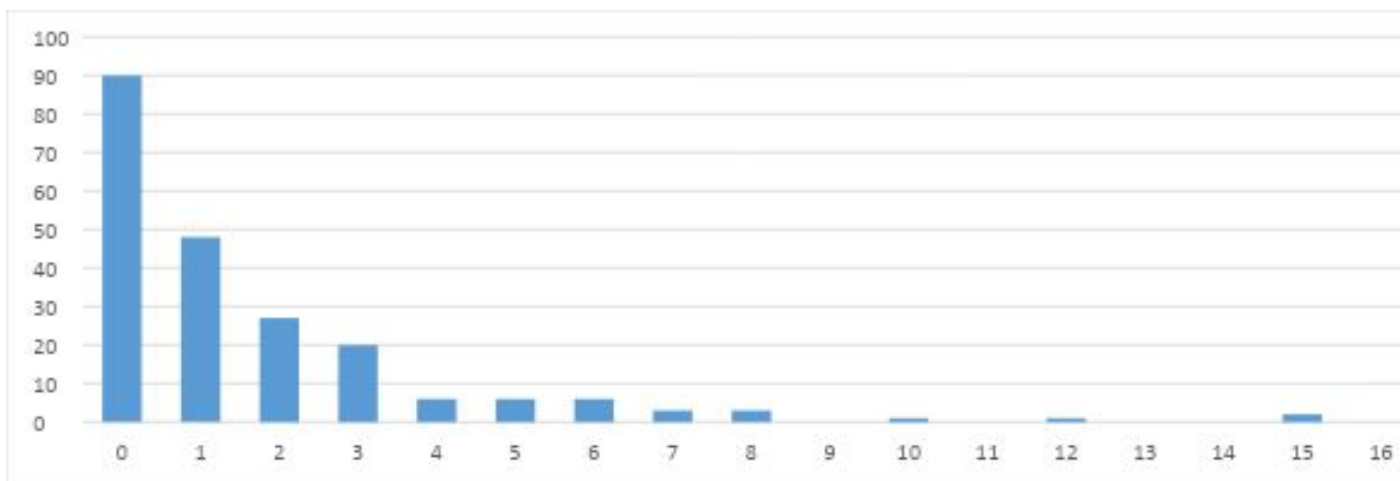


Figure 5. Average Number of Hours of Game Play Each Day

Participants were asked to report on the number of hours (on average) that they spent playing games each day. A large number of participants (56.4%) reported that they did not play games. The majority of participants who reported playing games played for between one and two hours per day (60.1%). Ignoring the few outliers who played for a large number of hours each day, it was quite surprising to discover that 13.0% of the participants who played games, played for over 6 hours per day (Figure 5).

Participants also reported on the gaming device that they use to play games. The survey allowed multiple responses to this question, since many participants are likely to use more than one gaming format. PC gaming (24.8%) and Cell Phone game apps (26.6%) dominated the responses, being used twice as much as the Playstation and Xbox consoles (Table 3).

Over 50% of the participants played games individually. With the popularity of online multiplayer games, it can be assumed that the majority of other participants play online with others sometimes (Table 4).

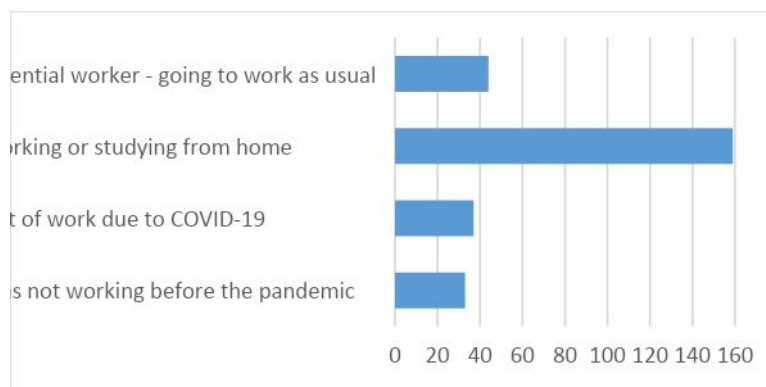


Figure 6. Participant Current Situation

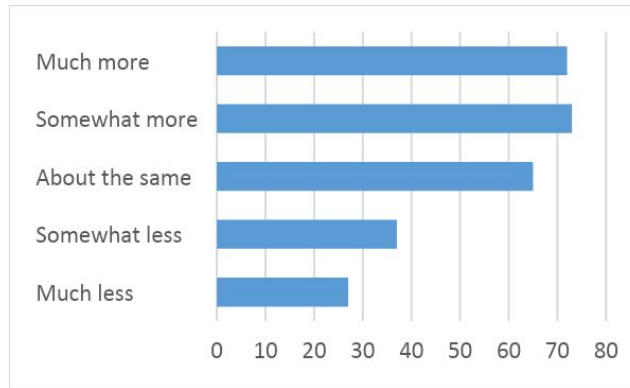


Figure 7. Participant Free Time

The majority of participants (58.2%) were working or studying from home due to the COVID-19 pandemic. For 28.2% of the participants, little had changed, as they are either classed as ‘essential workers’ and still working, or they were not working before the pandemic. 13.6% of the survey participants replied that they are out of work due to the pandemic; this demonstrates the enormous impact this pandemic has had on the population (Figure 6).

Twice as many of the participants (52.9%) reported having more free time during the COVID-19 outbreak, than those who reported having less free time (23.4%). This is to be expected with more people confined to their homes and not able to undertake their usual social and leisure activities. It is also a consequence of the high levels of unemployment caused by the pandemic (Figure 7).

Participants were asked if they had watched any disaster themed media during the quarantine, 30.8% responded that had watched disaster themed cinema or TV (Figure 8). Those who had watched disaster themed media were asked if they deliberately sought out this media, 50.5% responded that had deliberately searched for disaster themed media (Figure 9).

The most popular items of disaster themed media were *Contagion* (2011), *Outbreak* (1995) and the *Pandemic* (2020) documentary. During the period of COVID-19 quarantine,

Outbreak and the *Pandemic* documentary were available on Netflix and the film *Contagion* streamed for free for Amazon Prime customers (Figure 10).

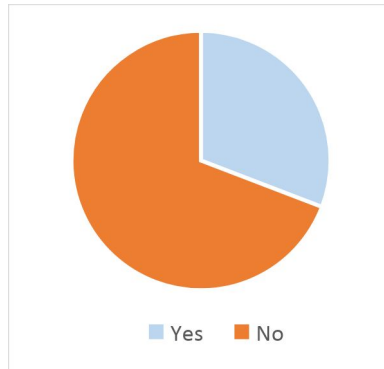


Figure 8. Watch Media



Figure 9. Seek Out Media

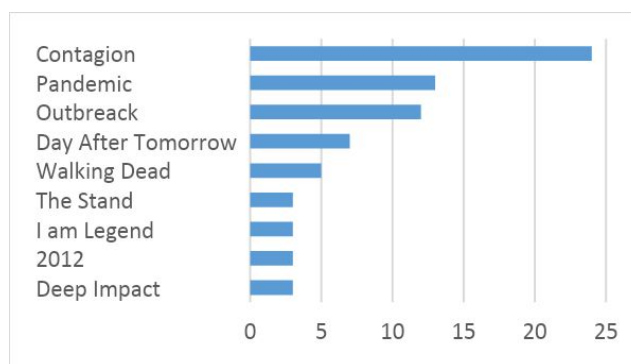


Figure 10. Media Watched

Participants were asked if they had played any disaster themed games during the quarantine, only 10.9% responded that they had played a disaster themed game (Figure 11). This low response is not unexpected given the low number of game players within the participant

population (Figure 5). Those who had played a disaster themed game were asked if they deliberately sought out this game, 16.3% responded that had deliberately searched for a disaster themed game (Figure 12).

The most popular disaster themed games were *Plague Inc* (2012), *The Last of Us* (2013), *Dying Light* (2014) and *Fallout 4* (2015). This is not an unexpected list as *Plague Inc.*, as discussed in the previous section, is currently the most popular paid application in many countries. It is interesting to note that the online version of the *Pandemic* board game was also quite popular among the participants (Figure 13).



Figure 11. Play Games



Figure 12. Seek Out Games

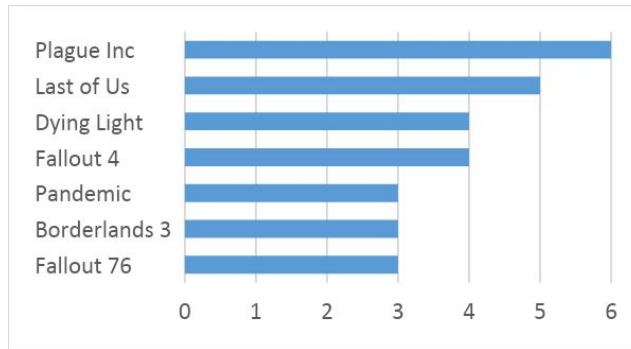


Figure 13. Games Played

DATA ANALYSIS

One of the benefits of having a large number of participants, is that the data can be sliced and sectioned to allow new insights into the survey responses. The first analysis undertaken involved comparing the situation of the participants with their available free time during the pandemic, and also comparing this to the number of hours they watched media or played games, on average, per day.

Essential workers and those working from home both generally reported an increase in free time. Essential workers reported that 45.5% of them had more free time, while only 25.0% reported that they had less free time. Those working from home reported similar responses, with 45.3% saying they had more free time, and 30.8% reporting they had less free time (Table 3).

Unsurprisingly, those who had unfortunately lost their jobs during the COVID-19 pandemic almost universally reported (97.3%) that they had more free time. Those who were not working before the pandemic and had no change in their situation also reported an increase in their free time; 51.5% of this group said they had more free time, while only 12.1% said they had less free time (Table 3).

This universal increase in free time among the participants can be attributed to the effects of the COVID-19 quarantine. The population is unable to interact socially with friends and family, and many entertainment venues are closed. With most of the population being under some form of quarantine, or stay-at-home order, people spend more time at home, leading to a perception of more free time.

Situation	Free Time				
	Much More	Somewhat More	About the Same	Somewhat Less	Much Less
Essential Employee	22.7%	22.7%	29.6%	11.4%	13.6%
Working from Home	15.7%	29.6%	23.9%	19.5%	11.3%
Laid Off Due to Pandemic	73.0%	24.3%	2.7%	0.0%	0.0%
No Change / Not Working	30.3%	21.2%	36.4%	3.0%	9.1%

Table 3. Free Time Survey Responses Split by Participant Situation

The next analysis undertaken involved comparing the situation of the participants with the number of hours they watched media and played games, on average, each day. Essential workers, those working from home, and those who were not working before the pandemic all generally reported similar results for the number of hours of media watched, on average, per day; 68%-74% watched between 1-4 hours per day, with 18%-21% watching between 5-8 hours. Unsurprisingly, those who had lost their jobs during the COVID-19 pandemic reported much longer periods of media consumption, on average, each day; with 38.6% watching 5-8 hours per day, and 25.0% watching over 8 hours per day (Table 4).

The number of hours video games were played each day showed little variance between the different categories. Between 45%-58% of participants in each category did not play video games at all and 29%-48% played between 1-4 hours, on average, per day. Unlike with media consumption, the number of hours of video games played was not increased for those who had lost their jobs due to the pandemic (Table 4).

Situation	Hours of Media Watched				Hours of Games Played			
	0	1-4	5-8	8+	0	1-4	5-8	8+
Essential Employee	4.3%	68.1%	21.3%	6.4%	45.7%	47.8%	2.1%	4.4%
Working from Home	0.6%	73.8%	18.3%	7.3%	50.0%	38.9%	8.0%	3.1%
Laid Off Due to Pandemic	2.3%	34.1%	38.6%	25.0%	55.3%	28.9%	7.9%	7.9%
No Change / Not Working	0.0%	70.6%	17.7%	11.8%	58.3%	30.6%	2.8%	8.3%

Table 4. Hours of Media Watched and Games Played Split by Participant Situation

The next analysis undertaken involved comparing the reported change in free time of the participants with the number of hours they watched media and played games, on average, each day. As expected, those participants who reported that they had more free time during the COVID-19 outbreak consumed more media each day; with 27.9% watching 5-8 hours, and 14.6% watching more than 8 hours per day. Those majority of participants with less free time generally watched 1-4 hours each day (76%-79%), and far fewer of them watched for longer periods (Table 5).

The number of hours video games that were played each day showed little variance between the different categories. Between 50-64% of participants who answered this question did not play video games at all and 27-36% played between 1-4 hours, on average, per day (Table 4).

Free Time	Hours of Media Watched				Hours of Games Played			
	0	1-4	5-8	8+	0	1-4	5-8	8+
More Free Time	1.9%	55.7%	27.9%	14.6%	54.0%	35.1%	5.9%	4.1%
About the Same	1.5%	76.1%	17.9%	4.5%	50.7%	36.2%	7.3%	5.8%
Less Free Time	0.0%	79.1%	11.9%	9.0%	64.2%	27.2%	3.7%	5.0%

Table 5. Hours of Media Watched and Games Played Split by Participant Free Time

Hypothesis 1

During the 2020 COVID-19 pandemic, the authors undertook a research project aimed at collecting data to show that media consumers will increase their consumption of disaster and pandemic themed media during a global pandemic.

- Hypothesis 1: People will consume more disaster/ pandemic themed media during pandemic induced quarantine

Participants were asked if they had watched any disaster themed media during the quarantine, 30.8% responded that had watched disaster themed cinema or TV (Figure 8). Those who had watched disaster themed media were asked if they deliberately sought out this media, 50.5% responded yes to this question; this meant that 15.6% of the participants had deliberately searched for disaster themed media during the COVID-19 outbreak (Figure 9).

By far the most popular movies and documentaries were those with a pandemic theme (50.8%); there were more pandemic themed movies listed by participants than in all other genres combined. One could argue that zombie movies should be included within the pandemic theme which would increase the popularity of pandemic movies to 62.3% (Table 6). This means that 7.9% of our participants deliberately searched for a pandemic themed piece of media (9.7% if we include the zombie genre).

The most popular items of disaster themed media were *Contagion* (2011), *Outbreak* (1995) and the *Pandemic* (2020) documentary (Figure 10). Other pandemic themed media was also watched by the survey participants, these included *The Stand* (1994), *12 Monkeys* (1995), *Toxic Skies* (2008), *93 Days* (2016) and *The Last Ship* (2014-2018).

Apocalyptic, Zombie and Sole Survivor movies were also popular; *How it Ends* (2018), the *Mad Max* films (1979-2015), *The Walking Dead* (2010-2020) and *I am Legend* (2007) all featuring prominently among the participants' media lists. Disaster movies with a natural

disaster theme ranked as the second most popular theme to watch among the participants; *Day After Tomorrow* (2004), *Deep Impact* (1998), *2012* (2009) and *Dante's Peak* (1997) were all listed (Figure 10). The other category included anything that did not fit into the existing categories, and included such media as *Godzilla* (2014), *Life After People* (2008-2010) and *Chernobyl* (2019).

Participants were asked if they had played any disaster themed games during the quarantine, only 10.9% responded that they had played a disaster themed game (Figure 11). Those who had played a disaster themed game were asked if they deliberately sought out this game, 16.3% responded yes to this question; this meant that only 2% had deliberately searched for a disaster themed game during the COVID-19 outbreak (Figure 12).

Interestingly, pandemic/virus themed games made up a third of the games played by the participants (34.0%), with almost all of the rest being zombie/apocalypse themed games. The most popular pandemic themed games played by the participants were *Plague Inc.* (2012), *Dying Light* (2014), *Pandemic* (2008) and *Plague Tale: Innocence* (2019) (Figure 13).

To address the hypothesis, a comparison needs to be made between the behaviour of the survey participants during the COVID-19 outbreak and the general population before the pandemic. The survey data shows that 8.9% of participants specifically searched for pandemic themed media (combining film and game data). Considering that the pandemic based media is usually classed as being within the horror genre, then industry figures over the past year, before the pandemic outbreak, show that only 5.1% of the media consumed by the general population is from the horror genre (The Numbers, 2020). This means that more of the participants, searched for and watched pandemic based media during the COVID-19 outbreak, then watched horror films before the pandemic – even though pandemic movies are a very small subset of the horror genre.

The survey data shows that 17.6% of participants deliberately searched for all forms of disaster themed media (film and games). Even if we classed disaster themed media as being

in the action genre, then industry figures over the past year, before the pandemic outbreak, show that only 20.4% of the media consumed is from the action genre (The Numbers, 2020). This means that almost the same percentage of participants searched for and watched disaster themed media during the COVID-19 outbreak, as watched action films before the pandemic – even though disaster movies are a very small subset of the action genre.

The statistics demonstrate, with strongly significant supporting evidence, that Hypothesis 1 is true, media consumers will increase their consumption of disaster and pandemic themed media during a global pandemic.

Hypothesis 2

The research also hopes to differentiate this increase in disaster themed media consumption by correlating it with the differing circumstances of the viewers; specifically, whether they watch movies and/or play video games on their own.

- Hypothesis 2: Individuals with more control over their media choices are more likely to choose disaster/pandemic themed media.

To generate proof for this hypothesis the data on viewing and playing mode was split and the number of participants who watched disaster themed media, or played disaster themed games, in each category was collated (Tables 7 and 8).

It can be seen that in each category of viewing mode, for both films and games, more participants choose to watch or play disaster themed media when they are on their own, rather than with others. However, to validate the hypothesis, the significance of the data needs to be proven.

Assuming hypothesis 2 as our null hypothesis, the different category populations can be compared for proportional equivalency, to determine if the results fall within 95% confidence limits.

Examining the disaster themed media watched the results of the calculations are as follows:

- Comparing participants watching disaster themed media on their own with those watching with others, the increase was deemed significant ($z=1.14$, $p=0.13$).
- Comparing participants watching disaster themed media on their own with those watching in both modes, the increase was deemed significant ($z=0.15$, $p=0.44$).

Examining the disaster themed media that was sought out the results of the calculations are as follows:

- Comparing participants who sought out disaster themed media on their own with those watching with others, the increase was deemed significant ($z=0.14$, $p=0.44$).
- Comparing participants watching media on their own with those watching in both modes, the increase was deemed significant ($z=0.05$, $p=0.48$).

Examining the disaster themed games media played the results of the calculations are as follows:

- Comparing participants playing disaster themed games on their own with those playing with others in their household, the increase was deemed significant ($z=0.06$, $p=0.48$).
- Comparing participants playing disaster themed games on their own with those playing with online, the increase was deemed significant ($z=0.01$, $p=0.50$).
- Comparing participants playing disaster themed games on their own with those in multiple modes, the increase was deemed significant ($z=0.08$, $p=0.47$).

Examining the disaster themed games that were sought out the results of the calculations are as follows:

- Comparing participants who sought out disaster themed games on their own with those playing with others in their household, the increase was deemed significant ($z=0.10$, $p=0.54$).
- Comparing participants playing disaster themed games on their own with those playing with online, the increase was deemed significant ($z=0.73$, $p=0.23$).
- Comparing participants playing disaster themed games on their own with those in multiple modes, the increase was deemed significant ($z=0.15$, $p=0.44$).

In all cases, those watching media or playing games on their own will choose more disaster themed media more than those in other viewing modes. Each of these comparisons was shown to be significant, based on 95% confidence limits. Therefore, the statistics demonstrate, with strongly significant supporting evidence, that Hypothesis 2 is true, individuals with more control over their media choices are more likely to choose disaster/pandemic themed media.

Hypothesis 3

The research also hopes to differentiate this increase in disaster themed media consumption by correlating it with the differing circumstances of the viewers; specifically, whether they currently have more free time to consume media.

- Hypothesis 3: Individuals with more free time to consume media are more likely to choose disaster/pandemic themed media.

To generate proof for this hypothesis the data on viewing and playing was split based on reported free time, and the number of participants who watched disaster themed media, or played disaster themed games, in each category was collated (Tables 9 and 10).

It can be seen that in each category of free time, for both films and games, more participants choose to watch or play disaster themed media when they have more free time, rather than the same amount, or less free time. However, to validate the hypothesis, the significance of the data needs to be proven.

Assuming hypothesis 3 as our null hypothesis, the different category populations can be compared for proportional equivalency, to determine if the results fall within 95% confidence limits.

Examining the disaster themed media watched the results of the calculations are as follows:

- Comparing participants watching disaster themed media with more free time with those watching with the same amount of free time, the increase was deemed significant ($z=0.36$, $p=0.36$).
- Comparing participants watching disaster themed media with more free time with those watching with less free time, the increase was deemed significant ($z=0.68$, $p=0.25$).

Examining the disaster themed media that was sought out the results of the calculations are as follows:

- Comparing participants who sought out disaster themed media with more free time with those watching with the same amount of free time, the increase was deemed significant ($z=0.32$, $p=0.37$).
- Comparing participants watching disaster themed media with more free time with those watching with less free time, the increase was deemed significant ($z=0.16$, $p=0.43$).

Examining the disaster themed games played results of the calculations are as follows:

- Comparing participants playing disaster themed games with more free time with those playing with the same amount of free time, the increase was deemed slightly significant ($z=1.4$, $p=0.08$).
- Comparing participants playing disaster themed games with more free time with those playing with less free time, the increase was deemed significant ($z=0.37$, $p=0.36$).

Examining the disaster themed media that was sought out the results of the calculations are as follows:

- Comparing participants who sought out disaster themed games with more free time with those playing with the same amount of free time, the increase was not deemed significant ($z=1.75$, $p=0.04$).
- Comparing participants who sought out disaster themed games with more free time with those playing with less free time, the increase was deemed significant ($z=0.09$, $p=0.46$).

In all of the above cases, those watching media or playing games with more free time will choose more disaster themed media more than those with the same, or less, free time. However, in one case there was only weak supporting evidence for the hypothesis and in one case there was no significance, based on 95% confidence limits. The two cases that do not provide strong significance are possibly due to the much lower responses regarding video games, when compared to the responses regarding film and TV. Therefore, the statistics demonstrate, with significant supporting evidence, that Hypothesis 3 is true, individuals with more free time are more likely to choose disaster/pandemic themed media.

Additional Analysis

A benefit of having a large number of participants, is that the data can be sliced and sectioned to allow new insights into the survey responses. Of particular interest is analysing the data by sectioning it using participant demographics.

Gender Demographic

Females made up 60.1% of the essential workers among the participants; more women had been laid off due the COVID-19 outbreak (60.0%) and more women were not working before the outbreak (66.7%). A higher number of male participants (56.7.0%) reported that they have more free time during the COVID-19 outbreak; more female participants (64.7%) reported that they have less free time.

A higher proportion of female participants (58.5%) reported watching between 1-4 hours of film and TV, on average per day; however, more males reported watching between 5-8 hours per day (53.2%) and watching over 8 hours per day (59.0%). A higher proportion of female participants (61.0%) reported not playing any video games. Among the participants that played video games there were a higher number of male participants (66.1%), and they played for longer hours than the female participants.

More female participants reported that they watched media with others (56.8%) rather than on their own. However, a much larger proportion of male participants (66.7%) reported that they played games online and with others.

A larger proportion of female participants (64.7%) reported watching disaster themed media, and a larger proportion (69.5%) also sought out disaster themed media. However, more males played (67.0%) and sought out (60.0%) disaster themed video games.

Age Demographic

In each age range under 65, most participants (56.9%-69.0%) were working or studying from home. Younger participants (18-24) experienced the highest level of unemployment (37.8%) due to the COVID-19 outbreak. This correlated with the fact the younger participants (18-24) were by the far the largest group reporting that they had more free time (72.1%).

The youngest group of participants (18-24) also consumed far more media than the older groups of participants; with 32.8% of the group watching 5-8 hours per day and 22.4% watching over 8 hours of media per day. The participant group aged between 25-34 were the second largest consumers of media, with 26.7% watching between 5-8 hours per day and only 6.7% watching over 8 hours of media per day. These two groups also played games for much longer than the older participants; 22.5% of those under 35 played for between 5-8 hours per day and 9.9% played for over 8 hours per day. A large proportion (83%) of the older participants (over 35 years old) reported that they did not play games at all.

A higher proportion of the youngest (18-24) demographic (40.7%) watched media alone rather than with others. A high proportion of the 18-24 group (67.4%) and the 25-33 group (66.7%) played online. Older players (over 35 years old) mainly played on their own.

The 45-54 year old participant group watched a lot more disaster themed media (49.1%) than any other age range; in all other age ranges less than 30% of participants watched disaster themed media. The 45-54 year old demographic also sought out a lot more disaster themed media than other age ranges (56.8%); in all other age ranges less than 30% of participants sought out disaster themed media. With video games, participants in the 18-24 age range watched and sought out slightly more disaster themed media (21.7%) than other age ranges.

Media Availability

It seems fair to assume that the media that participants choose to watch, and the games they choose to play, is impacted by the media available to them. Hence, it seems logical to correlate the watching habits of the participants with the media services and formats that they use.

The survey responses indicated that Netflix and Amazon were by far the most popular media format among the participants (Table 1). These services remain the most popular when considering which service participants used if they were watching disaster themed media; 42.0% of participants who watched disaster themed media used Netflix or Amazon. However, further analysing individual media modes, a higher percentage of participants who pay to download media (45.7%) watched disaster themed media.

This pattern is repeated when considering which service participants used if they were actively seeking out disaster themed media; 45.2% of participants who sought out disaster themed media used Netflix or Amazon. However, further analysing individual media modes, a higher percentage of participants who pay to download media (45.4%) sought out disaster themed media.

DISCUSSION AND CONCLUSIONS

There is no doubt that the COVID-19 outbreak has had a huge impact on the film industry and a significant impact on the video game industry. The pandemic has also affected media consumers and changed the way they watch films and TV and play video games. The authors have attempted to identify and understand how the media consumption patterns change during a time of global crisis.

The previous paper in this set of two publications, “It’s the End of the World and You Watch It: A Brief History of Disaster Themed Media” provided a more focused examination of the

history of disaster themed media consumption. This paper demonstrated that the prevalence of disaster themed media in popular culture is closely correlated with ‘real world’ events. These disaster and post-apocalyptic narratives provide the consumer with safe spaces where they can metaphorically deal with the tensions and anxieties of the present world.

The 2020 COVID-19 outbreak has seen most film production come to a halt, and cinemas across the United States are closed. Studios began to test the waters with theatrical Video on Demand (VOD) or Premium Video On-Demand (PVOD) releases. This has led to an increase in media streaming and has also increased of at least 12%. However, people in quarantine seem to be, generally, watching the same genres they watched in previous years.

In contrast to many other sectors that are affected by the 2020 COVID-19 outbreak, the video game industry has been generally more resilient to the pandemic. The large number of people in quarantine, or under stay-at-home orders, has led to a significant increase in video game playing, and Internet use has also multiplied. Also, sales of video games have increased as a result of stay-at-home and lockdown orders from the pandemic, as people turn to video games as a pastime. A number of pandemic themed games such as *Plague Inc.* (2012) and *Pandemic* (2008) have seen an enormous boost in sales as a result of the COVID-19 pandemic.

During the 2020 COVID-19 pandemic, the authors undertook a research project aimed at collecting data to show that media consumers gravitate towards media choices that reflect their particular environment. The data collected provided a range of information on the group of 282 participants, including demographic data, information of the work status of participants, and the amount of free time participants have. Participants also reported in the media viewing habits and video games playing, including the time spent participating in these activities and the media formats used. For this research, the most important piece of data collected was participants reporting on whether or not they had watched, or played, disaster themed media, or games – specifically pandemic themed media.

This data analysis provided statistically significant evidence to support three hypotheses:

- Hypothesis 1: People will consume more disaster/ pandemic themed media during pandemic induced quarantine
- Hypothesis 2: Individuals with more control over their media choices are more likely to choose disaster/pandemic themed media.
- Hypothesis 3: Individuals with more free time to consume media are more likely to choose disaster/pandemic themed media.

These hypotheses are supported by the trends reported in the author's previous paper in this set of two publications, "It's the End of the World and You Watch It: A Brief History of Disaster Themed Media" which demonstrated the correlation in disaster/ pandemic themed media consumption during previous period of crisis.

A significantly larger proportion of female participants reported watching, and seeking out, disaster themed media. When analysing the different age demographics, the 45-54 year old participant group watched, and sought out, a lot more disaster themed media. The authors have no explanation for these significant statistical anomalies in the data and feel that this is an area that warrants further investigation and research.

Netflix and Amazon were by far the most popular media format among the participants, and they remained the most popular among participants who were watching, or seeking out, disaster themed media. The most popular disaster themed media watched by the participants was available on either Netflix or Amazon. A high percentage of participants who download their media also watched and sought out disaster themed media.

Since the COVID-19 virus hit the United States in 2020, the mainstream media have regularly covered its psychological impact on the American public (Craighead, 2020; Dickson, 2020). According to these reports and commentaries, the potentially deadly disease

is stirring not just fears of illness but also sadness, anger, and loneliness created by the strain of mandatory self-isolation.

In such situations it is becoming apparent that disaster themed media, in particular pandemic themed media, can provide useful tools for understanding emotions and behaviors, and reassuring the population that changes in mood, energy, and personal habits are normal reactions to a dangerous situation with many uncertainties (Spencer, 2020). The future will no doubt bring disaster themed media based around the 2020 COVID-19 outbreak, one that is unprecedented in many respects. Hollywood creates cinematic artifacts based upon events and past circumstances with regularity. In regard to disaster themed media, this provides a way to help people cope with the extreme existing conditions, almost in the same way a doctor responds to a medical situation, or first responders to an accident. So, it seems, Hollywood and video game developers have a small part to play as a response to crisis and disaster, as the media produced can provide relief and edutainment.

The narrative content of disaster themed media often hovers somewhere between science fiction and science fact, for example the realism and correlation to the current pandemic shown in the film *Contagion* (2011), or the realistic disease transmission model used in the game *Plague Inc* (2012). Both of these examples are currently extremely popular items of disaster themed media among the general population during the COVID-19 pandemic. Perhaps these titles, and other forms of disaster themed media, participate in the reinscription of anxieties relating to the pandemic and of the desire for the understanding the process needed to take back some element of control, and understand more about the unfamiliar situation unfolding daily in the world (Servitje, 2016).

Possibly, in a few months, the COVID-19 outbreak will fade away and society will return to some version of the old normal. But this pandemic is not going to be easily forgotten. When new crises appear and once again threaten global civilization, the public remembers how we behaved this time, how it worked and the media we consumed (Robinson, 2020b).

REFERENCES

- Banerjee, S. (2020). 'Onward' and the Future of the Movie Industry, *The Observer*, 1st May 2020.
- Barney, C. (2020). Coronavirus: Streaming Platforms See Big Surge During Pandemic, *The Mercury News*, 7th April 2020.
- Beech, M. (2020). COVID-19 Pushes Up Internet Use 70% and Streaming More Than 12%, First Figures Reveal, *Forbes*, available at: <https://www.forbes.com/sites/markbeech/2020/03/25/covid-19-pushes-up-internet-use-70-streaming-more-than-12-first-figures-reveal/#57eb603b3104> (Accessed 30/5/2020).
- Brown, L. (2020). Digital Video Game Trends and Stats for 2020, *Filmora*, available at: <https://filmora.wondershare.com/infographic/video-game-trends-and-stats.html> (Accessed 23/5/2020).
- Budryk, Z. (2020). Drive-in Movie Theatres See Resurgence During Coronavirus, *The Hill*, available at: <https://thehill.com/blogs/blog-briefing-room/488485-drive-in-movie-theaters-see-resurgence-during-coronavirus> (Accessed 29/5/2020).
- Clark, T. (2020). 'Onward' Had The Worst Opening-Weekend of Any Pixar Movie in the Disney Era, *Business Insider*, available at: <https://www.businessinsider.com/box-office-weekend-pixars-onward-stumbles-invisible-man-strong-2020-3> (Accessed 30/5/2020)
- Comcast. (2020). COVID-19 Network Update, available at: <https://corporate.comcast.com/covid-19/network> (Accessed 6/5/2020)
- Couch, A. (2020). 'Mission Impossible VII' Halts Filming Due to Coronavirus Outbreak, *The Hollywood Reporter*, 24th February 2020,
- Craighead, C. (2020). As Mental Illness Rates Rise, 68% of Americans Say Social Media, News Cause Anxiety During Pandemic, available at: <https://www.seattlepi.com/coronavirus/article/news-social-media-cause-anxiety-during-covid-19-15300935.php> (Accessed 1/6/2020)
- D'Alessandro, A. (2020a). 'Trolls World Tour': Universal PVOE Experiment Racks Up Near Estimated \$100M To Date, *Deadline*, available at: <https://deadline.com/2020/04/trolls-world-tour-vod-revenue-universal-coronavirus-1202919723/> (Accessed 29/5/2020)
- D'Alessandro, A. (2020b). Coronavirus Concerns at the Box Office, *Deadline*, available at: <https://deadline.com/2020/03/black-widow-f9-no-time-to-die-coronavirus-impact-on-box-office-1202874214/> (Accessed 29/5/2020)

D'Alessandro, A. (2020c). Weekend Box Office Plunges to 22-Year Low at \$55M, Deadline, available at:

<https://deadline.com/2020/03/vin-diesel-bloodshot-i-still-believe-the-hunt-weekend-box-office-coronavirus-1202882333/> (Accessed 30/5/2020)

D'Alessandro, A. (2020d). Comscore Pauses Weekend Box Office Reporting Amid Coronavirus Crisis, Deadline, available at:

<https://deadline.com/2020/03/box-office-reporting-suspended-comscore-coronavirus-1202889000/> (Accessed 30/5/2020)

Dickson, E.J. (2020). Coronavirus is Wreaking Havok on Our Mental Health, *Rolling Stone*, 4th March 2020.

Duffy, C. (2020). Video Game Company Urges Players to Avoid Plague Inc. Game For Information on Coronavirus, CNN, available at:

<https://www.cnn.com/2020/01/26/tech/plague-coronavirus-game-warning/index.html> (Accessed 24/5/2020).

Edwards, J.J. (2020). Video Games Set a Record for Quarterly Sales, Bloomberg, available at:

<https://www.bloomberg.com/news/articles/2020-05-15/video-games-hit-quarterly-sales-record-amid-virus-driven-surge> (Accessed: 22/5/2020).

Evrod, C., (2015). Why and How I am Enjoying Quarantine, available at:

<https://www.clickondetroit.com/news/local/2020/04/07/evrod-cassimy-why-and-how-i-am-enjoying-quarantine/> (Accessed: 7/5/2020).

Evry, M. (2020). AMC, Regal, Landmark, Cineplex and Alamo Drafthouse Theatres Close, available at:

<https://www.comingsoon.net/movies/news/1127329-amc-regal-landmark-cineplex-alamo-drafthouse-theaters-close> (Accessed 29/5/2020).

Feaver, P., (2013). Now I Remember Why President Bush Urged People to go About Their Daily Lives, available at:

<https://foreignpolicy.com/2013/04/17/now-i-remember-why-president-bush-urged-people-to-go-about-their-daily-lives/> (Accessed 21/5/2020).

GeekNesis. (2020). Best Epidemic and Virus Games to Play During Quarantine, YouTube, available at: <https://www.youtube.com/watch?v=1eiYvdNexRI> (Accessed 23/5/2020).

Gilbert, B. (2020). All PlayStation 4 Owners are Getting Great Games for Free as a Gift from Sony During the Coronavirus Pandemic, *Business Insider*, April 2020.

Gordon, S., (2015). COVID-19: Understanding Quarantine, Isolation and Social Distancing in a Pandemic, available at:

<https://health.clevelandclinic.org/covid-19-understanding-quarantine-isolation-and-social-distancing-in-a-pandemic/> (Accessed: 7/5/2020).

Gurwin, G. (2020). Twitch Has Record-Setting Quarter Amid Coronavirus Lockdown, GameSpot, available at:
<https://www.gamespot.com/articles/twitch-has-record-setting-quarter-amid-coronavirus/1100-6475610/> (Accessed 22/5/2020).

Heritage, S. (2020). Corona Zombies: The Terrible Movie We Might Just Need Right Now, *The Guardian*, 13th April, 2020.

Joy, M. (2020). Outbreak of ‘5G Zombies’ Coming in May, 2020, HorrorNews, available at:
<https://horrornews.net/154061/outbreak-of-5g-zombies-coming-to-dvd-on-may-1-2020/>
(Accessed: 22/5/2020).

Kang, C., Alba, D. and Satarino, A. (2020). Surging Traffic is Slowing Down Our Internet, *New York Times*, 26th March 2020.

Kastrenakes, J. (2020). Sony Will Slow Down PlayStation Downloads, The Verge, available at:
<https://www.theverge.com/2020/3/24/21192370/playstation-coronavirus-download-speeds-slowed-europe-multiplayer> (Accessed 22/5/2020).

Kimble, S. (2020). Pandemic in the Era of COVID-19, Z-Man Games Press Release, available at: <https://www.zmangames.com/en/news/2020/3/28/pandemic-and-covid-19/>
(Accessed 24/5/2020).

Kinsman, T.B., (2015). Staying Sane in Quarantine, available at:
https://www.cs.rit.edu/~tbk/REF_PAPERS/Staying_Sane_In_Quarantine_Thomas_B_Kinsman_PhD_v20.pdf (Accessed: 7/5/2020).

Ko, N., Lu, W., Chen, L., Li, D. and Yen, C., (2020). COVID-19-Related Information Sources and Psychological Well-being: An Online Survey Study, *Brain, Behavior, and Immunity*, in press.

Kois, D. (2020). How Hollywood is Adapting to the Pandemic, Slate, available at:
<https://slate.com/culture/2020/04/hollywood-coronavirus-shutdown-deals.html> (Accessed 29/5/2020).

Lang, B. (2020). ‘No Time to Die’ Postponed Due to Coronavirus Outbreak, *Variety*, 4th March 2020.

Littleton, C. (2020). NBCUniversal Chief Says Premium VOD for some Movies Will Be Complementary to Theatrical Distribution, *Variety*, 30th April 2020.

Mamiit, A. (2020). Pandemic Strategy Game Plague Inc.'s Popularity Renewed Amid Coronavirus Threat, Digital Trends, available at:
<https://www.digitaltrends.com/gaming/plague-inc-downloads-spike-amid-coronavirus/?amp>
(Accessed 24/5/2020).

McClintock, P. (2020). U.S. Movie Theatres Aim to Stay Open Amid Coronavirus Concerns, *The Hollywood Reporter*, 10th March, 2020.

McWhertor, M. (2020). Steam is Changing How Game Updates Work to Manage Bandwidth During Record Usage, Polygon, available at:
<https://www.polygon.com/2020/3/30/21200043/steam-auto-update-changes-managing-bandwidth-coronavirus-pandemic> (Accessed 22/5/2020).

Mitchell, S. and Hamilton, S.N. (2017). Playing at Apocalypse: Reading Plague Inc. in Pandemic Culture, *Convergence: The International Journal of Research into New Media Technologies*, 24(6), 587-606.

Moreau, J. (2020). Production Company American High Organizing Face Mask Assembly, *Variety*, 22nd March 2020.

Nelson, B.W., Pettitt, A., Flannery, J.E., & Allen, N. B., (2020). Rapid Assessment of Psychological and Epidemiological Predictors of COVID-19, *International Journal of Methods in Psychiatric Research*, 21(3), 169-184.

Noack, R. and Pitrelli, S. (2020). Virus Games Are Going Viral as the Coronavirus Spreads, *The Washington Post*, 16th February 2020.

Orland, K. (2020). Plague Inc. Rolling Out New Mode Where You Fight to Contain The Outbreak, *Ars Technica*, March 2020.

Pardo, A. (2020). Puzzle, Board Game Sales Increase During Pandemic, KRQE, available at:
<https://www.krqe.com/health/coronavirus-new-mexico/puzzle-board-game-sales-increase-during-pandemic/> (Accessed 24/5/2020).

Robinson, A. (2020a). Steam Has Now Broken It's Active Player Record, *Video Games Chronicle*, March 2020.

Robinson, K.S. (2020b). The Coronavirus is Rewriting Our Imaginations, *The New Yorker*, 1st May 2020.

Romano, N. (2020). Game (Still) On: How Coronavirus is Impacting the Games Industry, *Entertainment Weekly*, March 2020.

Schelle, C. (2020). Pandemic Board Game Sells Out as Coronavirus Sweeps Across the World, 7 News, available at:

<https://7news.com.au/lifestyle/health-wellbeing/pandemic-board-game-sells-out-as-coronavirus-sweeps-across-australia-c-901114> (Accessed 24/5/2020)

Schreier, J. (2020). Gaming Sales are Up, But Production is Down, *New York Times*, 21st April, 2020.

Serjeant, J. (2020). Hollywood Movie Studio Suspend Release of Box Office Data After Coronavirus Slump, Reuters, available at:

<https://www.reuters.com/article/us-health-coronavirus-box-office-idUSKBN21700Z>
(Accessed 30/5/2020).

Servitje, L. (2016). H5N1 for Angry Birds: Plague Inc., Mobile Games, and the Biopolitics of Outbreak Narratives, *Science Fiction Studies*, 43(1), 85-103.

Shoard, C. (2020). Cinema Bullish in the Face of Coronavirus Despite Projected \$5BN Loss, *The Guardian*, 6th March 2020.

Snider, M. (2020). Video Games Can Be A Healthy Social Pastime During Coronavirus Pandemic, *USA Today*, 28th March 2020.

Spencer, M. (2020). Inside a Pandemic: Media Struggle to Define What's Normal, available at:

<https://www.madinamerica.com/2020/04/pandemic-media-define-whats-normal/> (Accessed 1/6/2020)

Stuart, K. (2020). Xbox Game Pass Subscriptions Hit 10 Million, *The Guardian*, 20th April 2020.

Takahashi, D. (2020). WHO and Game Companies Launch #PlayApartTogether to Promote Physical Distancing, VentureBeat, available at:

<https://venturebeat.com/2020/03/28/who-and-game-companies-launch-playaparttogether-to-promote-physical-distancing/> (Accessed 1/6/20).

The Numbers, (2020). The Numbers: Where Data and the Movie Business Meet, available at: <https://www.the-numbers.com/> (Accessed: 21/5/2020).

Tolito, S. (2020). When a Gaming Fantasy is Eerily Close to Reality, *The New York Times*, 8th April 2020.

Wallace, K. (2020). Navigating Anxiety in Quarantine with Simulation Games, *Game Informer*, 325, 16-17.

Warren, T. (2020). Microsoft Tweaks Xbox and Teams Services During Surge in Cloud Demand, The Verge, available at:

<https://www.theverge.com/2020/3/29/21198673/microsoft-cloud-demand-xbox-gamerpics-disable-coronavirus-pandemic> (Accessed 23/5/2020).

Whiting, K. (2020). This is How Coronavirus Has Changed the Film and TV Industry, World Economic Forum, available at :

<https://www.weforum.org/agenda/2020/05/covid-19-coronavirus-tv-film-industry/> (Accessed 30/5/2020).

Whitten, S. (2020). More than a Third of US Adults say Movie Theaters Should Close Amid Coronavirus Outbreak, CNBC, available at:

<https://www.cnbc.com/2020/03/11/hollywood-sales-threatened-as-coronavirus-pandemic-worsens.html> (Accessed 29/5/2020).