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**The Rise of Video Game Sales & It’s Health Effects on Consumers**

Ever since the renaissance of gaming that occurred after the Video Game crash of 1983, the Video Game industry has been experiencing constant growth. Even now, in the 2020’s, the industry is still projected to be on the rise. Just look at the key takeaways presented by an article from Investopedia:

* “ Video games have been around for decades, but their popularity has increased in recent years.
* The video game sector is larger than the movie and music industries combined.
* Tech giants Google, Meta, and Apple have all made plans to enter the gaming industry.
* Subscription streaming services are the future and will be beneficial to video game companies.
* Technical innovations, expanding market demographics, and an increase in video game-related merchandise have all contributed to the video game industry's new scope.”

The article later goes on to state the following as well, that “In 2020, the gaming industry generated $155 billion in revenue, By 2025, analysts predict the industry will generate more than $260 billion in [revenue](https://www.investopedia.com/terms/r/revenue.asp).” Just this information alone is enough to prove that this industry is starting to become a major player in the entertainment and technology sector. However, along with the rise of popularity and sales, concerns of the potential health effects that can occur as a result of continuous video game activity have begun to arise in recent years. This excerpt from the Journal of Addiction Medicine and Therapeutic Science explains this phenomenon well, stating that “It is concluded that video gaming has many characteristics of other addiction disorders including deleterious physical and mental health consequences. The social and ubiquitous nature of gaming makes it difficult to recognize the signs and symptoms of excess gaming.”. As the video game industry continues to thrive and expand, it is important to consider the potential health effects that may arise from prolonged video game use. While the industry's growth is impressive and undeniable, it is crucial to balance entertainment with personal well-being. As the Journal of Addiction Medicine and Therapeutic Science notes, excessive video gaming can have serious physical and mental health consequences, and it can be challenging to recognize signs of addiction.

**Review of Literature**

Before delving into the physical and congenital effects of video game usage among consumers, it is important to examine the remarkable growth and endurance of video game sales, especially during periods of market instability. For instance, the video game industry continued to break new records even during the challenging times of the Covid-19 pandemic. A quote from Jason Schreier’s column in The New York Times titled “Video Game Sales Are Up, but Production Setbacks Are Too” states the following:

“The Good News: Epic Sales

[Video games](https://go-gale-com.libweb.lib.utsa.edu/ps/retrieve.do?tabID=T004&resultListType=RESULT_LIST&searchResultsType=SingleTab&hitCount=1&searchType=AdvancedSearchForm&currentPosition=1&docId=GALE%7CA622053285&docType=Article&sort=RELEVANCE&contentSegment=ZONE-MOD1&prodId=AONE&pageNum=1&contentSet=GALE%7CA622053285&searchId=R1&userGroupName=txshracd2604&inPS=true) might seem to be the perfect business for this new reality, in which most of the world has asked citizens to self-isolate in hopes of combating the pandemic. Bored and restless at home, people are taking solace in games. The shooter game Doom Eternal, released in mid-March, had the best sales weekend of any game in the series. Animal Crossing, a simulation in which the player can create an idyllic existence by building homes and selling turnips, has broken sales records and become a cultural phenomenon. ESPN is showing e-[sports](https://go-gale-com.libweb.lib.utsa.edu/ps/retrieve.do?tabID=T004&resultListType=RESULT_LIST&searchResultsType=SingleTab&hitCount=1&searchType=AdvancedSearchForm&currentPosition=1&docId=GALE%7CA622053285&docType=Article&sort=RELEVANCE&contentSegment=ZONE-MOD1&prodId=AONE&pageNum=1&contentSet=GALE%7CA622053285&searchId=R1&userGroupName=txshracd2604&inPS=true), and video game streaming sites are bringing in massive viewerships: From the fourth quarter of 2019 to the first quarter of 2020, the streaming platform Twitch exceeded three billion hours watched for the first time, according to a report from the software service Streamlabs.''Gaming is one of those areas that people are diverting to from other activities that they would have done in a normal world,'' said Mat Piscatella, an analyst at the N.P.D. Group, which tracks the sales of video games. ''The game sales that are coming out are breaking franchise records.''

Tagging on to that recent example of market instability, I also want to present the following case as well. A study conducted in 2008 (During the time of the 2008 US recession) had the following to say about video game sales during this instable time frame:

“Even with products priced at $50 and up, video-game marketers are finding the recession more friend than foe. The $18 billion industry is on a tear, with sales up 31% over 2007 through April, according to NPD Group. And that's barely counting the April 29 release of "Grand Theft Auto IV," which shattered records with a $500 million opening week. That's five times what "Iron Man" made in its opening weekend. Game publisher Activision recently reported sales increases of 93% year over year, boosted by stellar sales of "Guitar Hero III" and "Call of Duty 4." And just last week, Electronic Arts reported revenue gains of 84% on strong sales of titles such as "Rock Band."

Following this information with a quote from PR Newswire, which states “The video game industry is generally considered "recession-proof" because people spend more time at home during a downturn. In addition, games are a relatively inexpensive form of entertainment.”, it is evident that the market for video games is going to remain constant throughout time, and that accessibility to video games during any time period will remain high due to it’s relative affordability in terms of market conditions.

Moving on, now that we know that the video game industry is relatively stable in any time period since the crash of 1983 and that it is constantly growing and obtaining new consumers, I’d like to discuss the health impacts that playing video games can make on an individual, be it positive or negative. Starting with the first study I read, titled “Exploring the possible mental health and wellbeing benefits of video games for adult players: A cross-sectional study”, this studies objective was to identify correlations between video game genre, player demographics, wellbeing, and the in-play psychological processes for adult players. The conclusions of the study were as follows:

“Results

88.4% of participants experienced emotional benefits from gaming, with stronger benefits experienced by younger players in all categories. The genres most strongly correlated with psychological benefits were music games, role-playing games and survival horror games. Multiplayer online battle arena games had lower scores for psychological and emotional wellbeing.

Conclusions

Certain genres have stronger correlations with beneficial mechanisms, while some may be detrimental to players. These results may guide experimental studies to measure the directionality and strength of these correlations and can also impact practical aspects in development of therapeutic games to treat mental distress.”

As we can see from the findings above, the survey of 2107 adult gamers found that 88.4% experienced emotional benefits from gaming, with stronger benefits among younger players. The study suggests that certain genres may be more beneficial or detrimental to players, which can guide the development of therapeutic games to treat mental distress.

The next paper I reviewed was “The Brain-Boosting Power of Video Games”. This study was conducted in July 2016 and wanted to observe the cognitive effects of high action/shooter-based video games on consumers, and had the following to say:

“During our research, we and other teams have found that video-game play boosts a variety of cognitive skills. Individuals who regularly play action games demonstrate improved ability to focus on visual details, useful for reading fine print in a legal document or on a prescription bottle. They also display heightened sensitivity to visual contrast, important when driving in thick fog. Action gamers also mentally rotate objects more accurately—and so are able to judge how an oddly shaped couch might best fit in an overpacked moving van. The multitasking required to switch back and forth between reading a menu and holding a conversation with a dinner partner also comes more easily. Furthermore, a player's ability to react to events that unfold quickly gets better with regular play. Tests of reaction times of action video-game players show that performance improved by more than 10 percent compared with before they took up gaming. The video game as life coach may even provide a leg up in the workplace. Game playing seems to confer the ability to make correct decisions under pressure—the type of skill sought by employers in many professions. One study revealed that laparoscopic surgeons who were also game players were able to complete surgeries more quickly while retaining the necessary precision in the operating room. Game-playing surgeons appeared to work more efficiently, not just faster.”

With this study, we can conclude that playing video games can improve cognitive skills such as visual attention, contrast sensitivity, mental rotation, and reaction times. It suggests the possibility that these skills can be useful in various real-life situations, such as reading fine print, driving in fog, packing a moving van, and making correct decisions under pressure in the workplace.

Another fascinating benefit of the affect video games can have on the consumer and previously mentioned in the article “Exploring the possible mental health and wellbeing benefits of video games for adult players: A cross-sectional study” was the factor that video games have the ability to influence an consumer’s emotions. A similar study (The effectiveness of computer games on communication skills and emotion regulation of children with autism spectrum disorder) was conducted on young children rather than adults. Presented below are the materials and methodology of the study along with its results, which are as follows:

Materials and Methods: The statistical population of this study included all children with autism disorder aged 7 to 9 years at the rehabilitation center in Tehran in 2019. For this purpose, 20 children were selected by the convenient sampling method and randomly assigned into two equal groups. The research instruments included the Social Communication Questionnaire (Rutter, Bailey, and Lord, 2003) and the Emotion Regulation Checklist (Shields and Cicchetti, 1998). The experimental members were trained with computer games in twelve 45-minute sessions three times a week. The data were analyzed by using covariance analysis and SPSS software. Results: The results showed that computer games significantly affected the emotion regulation of children with autism disorder (P< 0.01). However, this effect on the communication skills was not significant (P> 0.05). Conclusion: It can be concluded that training with computer games improves the emotion regulation of children with autism disorder. Therefore, families, educational institutions, and psychological and counseling services centers can benefit from this method to improve this disorder.”

Based on the conclusions of this study, we can see that the results suggest that computer games significantly improve the emotional regulation abilities in children with autism, however, it had no significant effect on their respective communication abilities. Furthermore, the study suggests that computer/video games can be used as a fantastic intervention tool to improve and work on the emotional regulation abilities of children that have autism.

The three previously mentioned peer-reviewed studies all highlighted benefits that are a result of video game/computer game usage, but just as there are positive benefits from playing video games, there are also negative aspects as well. Starting with the article “Factors Associated with the Problematic Use of Video Games in Adolescents and Young People”, The aim of this study is to identify which factors are associated with the problematic use of video game play in adolescents and young people. As written in the study:

“Problems with video games have also been repeatedly associated psychopathological symptoms. Thus, studies have indicated that problematic VGP (Video Game Playing) may be related to higher levels of anxiety and depression (Gentile et al., 2011; Hyun et al., 2015; Mentzoni et al., 2011; Stockdale & Coyne, 2018; Wartberg et al., 2017), higher scores for psychiatric symptoms (Király et al., 2017), or lower scores for overall mental health (Stockdale & Coyne, 2018). A special line has focused on cognitive aspects, given their importance in related problems such as pathological gaming. A few studies have addressed the cognitive aspects associated with VGP (Forrest et al., 2016; King & Delfabbro, 2014, 2016; Marino & Spada, 2017; Moudiab & Spada, 2019). In this regard, King and Delfabbro (2016) found a higher presence of maladjusted beliefs in adolescents with problematic game use. They suggested that the level of persistence, specificity, intrusiveness, and intensity of cognitions were likely to influence the degree to which an individual is at risk of gaming problems. These types of thoughts may underlie persistent, excessive engagement in VGP activities.”

From this information, one can conclude that problematic consumption of video games and media has the tendency to be associated with psychopathological symptoms, which include anxiety, depression, and other psychiatric symptoms. Maladjusted beliefs and thoughts also have the potential to contribute to excessive engagement in video game playing, and in particular, the risk factor for mental health issues is high among adolescents, adversely affecting males more than females in most cases (Although symptoms will be similar between the two genders).

Moving forward, another study which discusses the possible pitfalls of constant video game consumption come from the study “Video game disorder and mental wellbeing among university students: a cross-sectional study”, which is in direct contrast with another study I mentioned earlier, which was “Exploring the possible mental health and wellbeing benefits of video games for adult players: A cross-sectional study”. In this study, Egyptian undergraduate students were administered questionnaires that consisted of three individual sections: 1. Sociodemographic data. 2. A questionnaire containing 20 questions on various gaming disorders, and 3. A 5 question mental health evaluation. The results of this study were as follows:

“About one-fifth of the university students studied experienced VGD, which was strongly linked to being male, living in an urban area, having a high socioeconomic status and higher BMI, playing more hours per week, and sleeping fewer hours per day. VGD negatively impacted these subjects´ mental health. Accordingly, education and health authorities should view video game use and/or addiction as a health threat. Programs should be created to help people manage problematic video gaming. University faculty must continue to track and help students meet their psychosocial needs by detecting vulnerable students early. Future empirical longitudinal studies should address how to deal with VGD alone or in combination with other types of addiction, such as substance abuse.”

The two studies definitely provide contrasting perspectives in regard to the impact that video game consumption has on its respective user. The study "Exploring the possible mental health and wellbeing benefits of video games for adult players" suggests that video games may have some positive effects on mental health, while the study "Video game disorder and mental wellbeing among university students" warns of potential negative effects associated with excessive video game consumption. As mentioned in the quote, possible negative side effects of excessive video game consumption include higher BMI/unhealthy weight, less overall sleep and more sleep deprivation, and negatively impacts to an individual’s mental health.

The last article I reviewed in regards to negative side effects of video game consumption was “The Role of Avoidance Coping and Escape Motives in Problematic Online Gaming: A Systematic Literature Review.” In this study, the review of several databases, peer-reviewed papers between 2010 and 2020, and other studies that contained more than 500 participants and based on video game consumption were compiled together in order to draw conclusions on how video games have the potential to be abused and used as a escape mechanism, thus leading to a unhealthy relationship between the consumer and game. Findings of the study were as follows:

“The results show that escapism and avoidance coping represent both a predictor of IGD and play a mediating role between many psychological factors (e.g., self-esteem, loneliness, self concept, anxiety) and problematic online gaming. However, the review also highlights the paucity of longitudinal studies that hinder the determination of the causal direction of these associations. Despite this limitation, the evidence has important implication for developing more effective prevention programs and clinical interventions.”

In conclusion, the study above shows us that video game consumption can lead to unintended consequences, especially that being the development of problematic online gaming which is correlated with escapism and other forms of avoidance coping.

**Methods**

For this study, I analyzed three different datasets. The first data set was from Kaggle and was called “Video\_Games.csv”. In this csv file was a list of games complied by vgchartz.com, and the list itself contained nearly every videogame launched starting in the year 1983 and continuing onwards to 2020 (It is missing data for 2017, 2018, and 2019. Either missing data or very little for these respective years. 2020 contains multiple games in its respective year for some reason however). Some of the information shared in this dataset include year of release, publisher, regional sales, and critic scoring, just to name a few. The other two data sets come from Data.Gov, and were from a study conducted by the Department of Agriculture, with that study being “The influence of active video game play upon physical activity and screen-based activities in sedentary children”. The study contained 5 data sets, but I used two within my analysis, with those two being “Actigraph Activity” and “Liking Data”. The study was aimed at young children and wanted to assess the influence prolonged and unlimited access to video games, be it games that contain moderate-to-vigorous physical activity, light physical activity, and sedentary (little movement) activity. They would ask the children to discuss their thoughts on continued gaming, as well as have in depth analysis on each child’s behavior as well during the 10 weeks in which the project was conducted, along with a actigraph/pedometer with each child to observe their physical movement and how intense said movement was. For the Video Game sales related dataset, my objective was to show that there as been an constant increase in sales revenue and consumer interest in video games especially in the 21st century (Post 2000), and for the child study, my objective use to see a potential correlation between increased video game usage in young children and any health side effects, be in physical or cognitive, that may occur. A majority of my findings were derived from manipulation of these 3 datasets, using the various rows and columns to designated an specific X and Y variable in order to create graph-based visualizations.

**Analysis**

As just mentioned, most of my analysis was conducted through X/Y variable correlations. However, along with the variable correlations, I would also typically create separate new databases based off the master csv/database I was reviewing, this way I can have self-contained databases that have information that specifically relates to the observation I am trying to see. In my Video Game sales analysis, I first created 35 different databases that were based off the “Year\_of\_Release” row in the master database (Video\_Games.csv). Once I got the individual dataframes, I was able to conduct a for loop that ran through every individual database and obtained “NA\_Sales, EU\_Sales, JP\_Sales, and Other\_Sales” (The revenue made per game in each respective region) as the X-Variable and got the total revenue (Sum of all games sold per region) to be the Y-Variable. Once that information was received, I was able to create 35 separate bar charts that show the total revenue based on that fiscal year. After this bar chart analysis, I went on to create line charts that showed the total revenue across all the years and its respective growth, but only until 2016 as the data for 2017-2020 was incomplete. For this I got it to pull the year of release (Until 2016), grouped by year of release and the sum of a respective regions sales, with revenue shown on Y-Axis and the year/time on X-Axis in order to show a “Value over time” style graph. Then I created a scatter plot to see the distribution of video game launches through the years. I made two versions for each region, one where X-Axis was Year of Release and Y-Axis was Sales information, and a variant of the same scatterplot but the axis was inversed in order to show distribution through the years a lot better. Lastly, I created pie charts to show total genre distribution across all regions, as well as for individual regions in order to show the preferences each region has towards video games.

Moving on the child study of “The influence of active video game play upon physical activity and screen-based activities in sedentary children”, the same style of analysis was conducted here, with x/y variable manipulation being used in order to pull results and conclusions. Starting with “Liking Data.csv”, this data showed how children rated how much they would want to perform both physical and sedentary activities on a scale of 1-10 at baseline, week 6, and week 10. I wanted to see the distribution in which the children rated said activity, with the type of activity being divided among 4 types: Trad (Rating of how much they liked traditional physical activities), AVG\_T (Rating of how much they liked performing physical activity while playing an active video game (AVG)), Sed ( Rating of how much they liked engaging in sedentary activities (i.e. activities that involve sitting or lying down), and AVG\_S (rating of how much they liked playing sedentary video games (SVGs) on a scale of 1-10.) I created 3 separate databases to analyze, with the 3 databases being based off the Week row from “Liking Data.csv” and containing the scores the children input for each type of activity. Which this information in hand, I created 12 different histograms containing the distribution of scores per week per category of activity. I also created a master bar chart that showed the mean of all the scores across all weeks within its respective category of activity.

Lastly, for the part of the child study that was on the csv file called “Actigraph.csv”, this database contained a measure of each child’s MVPA (Moderate-to-Vigorous physical activity), Light physical activity, and Sedentary activity, across the measured time period of baseline (Week 0), Week 6, and Week 10. My objective here was to create a line graph that showed him a rise or decline in respective MVPA, light, or sedentary activity. To do this I created 3 separate databases based off “Actigraph.csv” which pulled the type of activity along with the amounts recorded per week check point (Bsl, Wk06, Wk10). I then got the mean value of each type of activity for each of the week check points and used that as my analysis point.

**Results and Discussion**

I will discuss the results in the same order I explained in my Analysis.

Starting with the Video Game Sales analysis:

I created the 35 separate bar charts to compare how sales revenues were beginning to climb higher and higher as the years progressed. To show that, below I am presenting 7 of the 35 graphs to show you the revenue growth/decline every 5 years.

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As we can observe based off the Y-Axis on these bar graphs, we can see that while turbulent during the 80’s and 90’s, by the 2000’s the gaming industry was well on its way making upwards of 80 million+ a year, with the era of 2000-2010 being especially successful with total revenue reaching nearly 300 million+ in 2010. By 2015, while still making much more profit than the time frame of 1980’s and 1990’s, the gaming industry was making roughly around 100 million+ in sales revenue. (All the sales values above were based on North America, but we can see a similar trend across all the other markets except in Japan, were a gaming market crash never occurred in the 1980’s., thus resulting in high sales revenue in the 1980’s and 1990’s.)

Moving on, next I will present the same information but presented in line chart format. While the bar chart is useful at comparing the revenue per region for a specific year, I tailored the line graph to focus on only one of the four regions, showing its growth/decline over time. Here we can see the immense growth experienced by the gaming industry post 1995.

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My next analysis in terms of gaming sales was based on the top 100 games sold worldwide and per region along with their year of release and total revenue made. This analysis was useful because it allows us to see the immense increase in video game sales per individual game that occurred post-1995. North America, Europe, and Other Regions follow a similar pattern, but Japan sales are unique because as previously mentioned Japan never had a video game crash, so sales stayed persistent during the 1980’s and early 1990’s.

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The final analysis I did was to see the best genre of video game sold worldwide and in relation to specific regions. This analysis was done in conjunction with the information provided from some of the peer-reviewed studies which had stated that certain genres had the potential to help regulate emotions better than others (RPG’s, Horror Games (Misc.), just to name a few). These pie charts demonstrate that certain genres excel better in certain regions.

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The graphs below are additional graphs I made that display various points of data in relation to Video Game sales. These were made after I conducted my initial analysis, so please feel free to examine them and draw your own conclusions below:

Chart, bar chart, histogram

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Chart, bar chart

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Word Chart in relation to the top selling genres worldwide:

Text

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Now I will discuss the results of the Department of Agriculture’s study, which was “The influence of active video game play upon physical activity and screen-based activities in sedentary children”. Of the 2 datasets I reviewed from this study, the first one I conducted analysis on was “Liking Data.csv”. As stated in the Analysis portion, this data showed how children rated how much they would want to perform both physical and sedentary activities on a scale of 1-10 at baseline, week 6, and week 10. My goal was to see the distribution in which the children rated said activity, with the type of activity being divided among 4 types, the results were as follows:

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Chart, histogram

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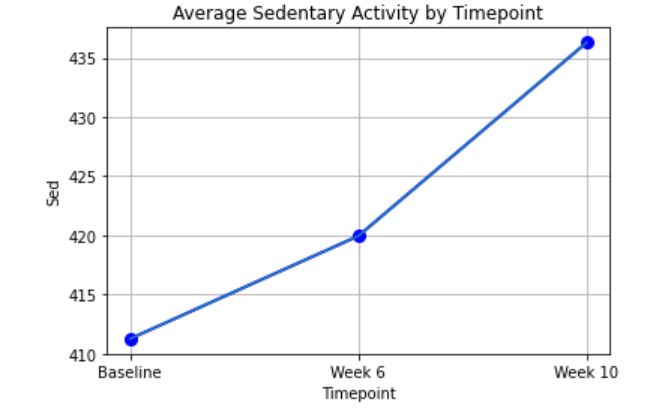
As we can see, the average score hovered around 7-8 for all 4 of the categories, meaning the children, regardless of their video game consumption, on average mentally thought the same for each style of physical activity within any time period/week within in the study.

However, moving on to the second dataset I analyzed, this one told a completely different story. The second dataset was “Actigraph.csv” and this data was based on information acquired from a pedometer that was given to each child to record their physical activity along with their sedentary (little to no movement) activity over the study. The results were as followed:

Chart, line chart

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Here, we can easily see that despite the children’s mental evaluation of their physical activity remaining consistent, we can see that their physical activity went down (MVPA graph and Light Physical Activity Graph) and the average sedentary activity increased as the children were given more and more time to play and consume their video games. It shows an interesting phenomenon, where despite the children (or in this case it can be any consumer) thinking they were still staying relatively activity in correlation to their video game consumption, they were actually beginning to become less physically active overall as the actigraph data suggests.

**Conclusions**

Looking at the video game sales analysis first, my objective was to demonstrate the continuous growth of the industry and its ability to generate revenue despite fluctuations in sales. We can see that sales exponentially increased once gaming entered the third dimension around 1995 (This was around the time Sony and Nintendo were releasing their flagship consoles the PS1 and Nintendo 64, along with Sega and their Sega Saturn system). The best period of sales was during the time period of 2000 to 2010, where sales were beginning to reach new milestones, reaching potentially upwards of $350 million in revenue. The increase in sales is a clear indication of the growing number of consumers entering the video game market. However, as noted in peer-reviewed studies, the rise in consumer engagement with video games also raises concerns about the potential psychological and behavioral side effects. These effects can be significant and should not be ignored, as excessive video game use has been linked to various negative outcomes, although at times there are positive ones as well.

Looking at the child study, this experiment shows us first hand the adverse effects consistent/unchecked video game consumption can have on the consumer/children. While cognitively speaking, a majority of the children were under the assumption that their physical activity was on par with levels previous to when the study began. However, as the actigraph data clearly shows us, as the weeks went on and the children were beginning to actively play games more, we can see their respective MVPA (Moderate-to-Vigorous Physical Activity) and Light Physical Activity decline 10% and 5% respectively, while their Average Sedentary Activity (Activities that involve siting or laying down, little energy expenditure) increase by 7%.

It's the results of the child study that leads me to agree with the findings of/ theories presented within the peer-reviewed studies I had in my literature review. This child study provided by the US Department of Agriculture was one of the only few publicly available datasets I was able to procure which provided a scientific analysis on the effects of video game usage among individuals, or in the case of this study, young children. However, even the analysis of this one dataset was enough to show that yes, video games can have a affect on our psychological and physical capabilities, and in the case of this study it was proving to be more physical than psychological, as this study was catered towards the observation of physical activity rather than mental activity. Interestingly, we can also make a note of how the children still thought they were just as active when they actually weren’t, perhaps there is some cognitive reasoning in play, but based on maladjusted viewpoints from the consumers/children’s perspective.

To close out, I want to present a few bullet points from an article written by Bain & Company that discusses the future of gaming.

* “Three big trends are changing the video game industry: better technology, metaverse-style environments, and new monetization models.
* As competition increases, scale will become even more important, since big games are expensive to make and require a massive global audience to succeed.
* Good franchise management and fan engagement also will become more critical than ever, prompting leading companies to put it at the center of decisions.
* Success will require finding and keeping the best creative and technical talent—a challenge in an industry that’s losing developers to larger tech companies.”

It’s very easy to see the prevalence of gaming within modern society, and with the sales figures reviewed in this study along with the articles discussing constant industry growth, the Video Game industry is going to be here to stay. The psychological and physical effects of gaming are starting to equally become prevalent as well, and as a society moving forward, it would be very wise to keep an eye on the correlation between video game consumption and an individual’s overall health.

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24