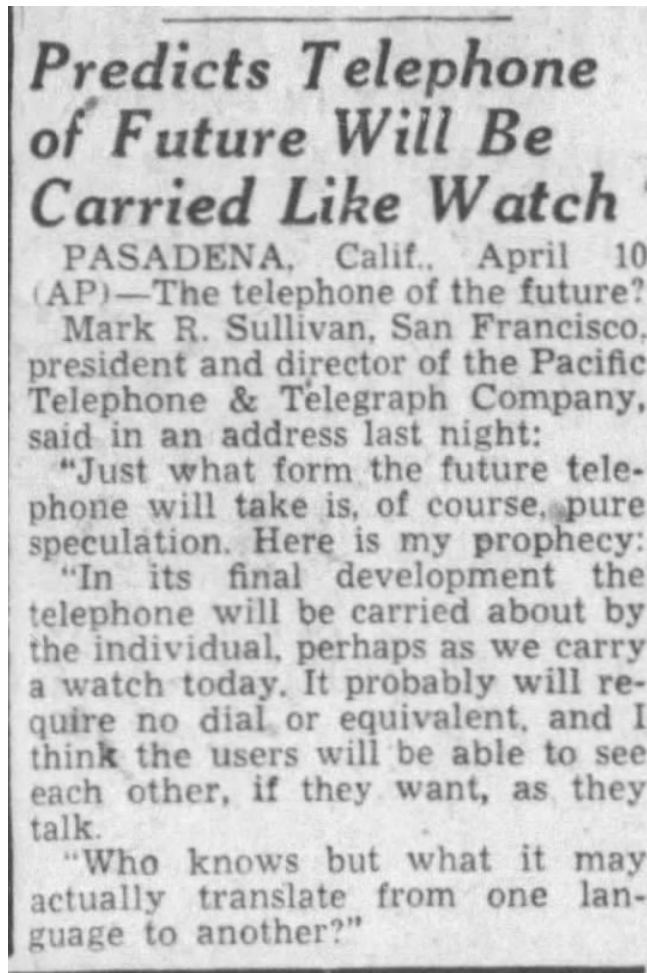


SYNTHETIC ADDICTION

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Synthetic Addiction



Mark Sullivan’s understanding of the future of the telephone from the Boston Globe in April 10, 1953^{1,2} is surprisingly prescient. Technology is in some ways cyclical, so as someone who had likely seen the 1941 invention of the portable radio by John Mitchell, Sullivan’s prediction is sensible given the context. He did not know, however, the degree to which portable telephones would fundamentally change the fabric of our society. As the internet exploded in growth and computers expanded in capability, our ability to carry around with us portable and constant access to the world wide web generated a shift in the psyche of society that is ongoing

¹ *Boston Globe*, “Predicts Telephone of Future Will Be Carried Like Watch”

² This source was ironically originally found by me on Reddit, located here: https://www.reddit.com/r/pics/comments/12jzwhd/a_headline_from_1953/

today and may define our future. I believe Steven Lisberger's 1982 film *Tron* prophetic in its analysis of the topic³:

Dr. Walter Gibbs: You've got to expect some static. After all, computers are just machines; they can't think.

Alan Bradley: Some programs will be thinking soon.

Dr. Walter Gibbs: Won't that be grand? Computers and the programs will start thinking and the people will stop.

While many may argue the semantics of the pivotal historical moment, the creation of the computer was undeniably a critical turning point for the history of humanity. Charles Babbage's difference engines in the mid-1800s⁴, the Navy's 1938 Torpedo Data Computer,⁵ Konrad Zuse's Z1 and Z2 in the early 1940s,⁶ Alan Turing's Enigma,⁷ or even ENIAC, the world's first general programmable computer nicknamed 'The Great Brain' in 1945⁸; the history of computers is paved with great minds and greater innovations. In the moment, humanity was unbeknownst to the revolutionary nature of the technology it had just developed, to the tumult and upheaval computers would bring to nearly all facets of our lives. The internet found life on the first day of 1983, and nine years later, in 1992, IBM released Simon, a touchscreen 'smartphone' that could access local networks. By 1996, Nokia released the 9000 Communicator, the first telephone with unfettered (though expensive) access to the internet. SixDegrees.com, the first true 'Social Media' website, followed soon after in 1997⁹; the dominoes had begun to fall. As of March 2023,

³ *Tron*, 15:55 to 16:05

⁴ Williamson, "History of computers: A brief timeline"

⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

⁹ Samur and Christison, "The History of Social Media in 33 Key Moments"

almost seven billion people own a smartphone and there are just under five billion social media users worldwide¹⁰. At a global population of just under eight billion, ‘social media users’ is a demographic containing approximately 60% of all humans on the planet; ‘smartphone owners’ contains over 85%. Social media has truly enveloped the globe, and the widespread epidemic of constantly accessible access has enabled the flourishing of a disease plaguing our modern society – internet addiction.

Internet addiction has become legitimized as a serious concern, and it receives attention as a medical topic of interest from major institutions such as the National Institute of Health (NCBI) or World Health Organization^{11, 12}. The critical elements of this problem are diverse and complex, and it’s difficult to pin down with absolute confidence the exact systems responsible for its role in society’s psyche. The goal of this work will be to explore the mechanisms at work in the development and perpetration of technological and internet addiction, weaving core disciplines such as neurobiology, psychology, machine learning, marketing, design, economics and ethics to create a tapestry that depicts the story of society’s burgeoning drug.

Today, individuals are firmly entrenched into an attention economy. In contrast to a more typical business model, the attention economy is built on the idea of the users themselves being the ‘product’, or the pathway to profitability for the company. Social media companies often do not focus on the sale of a product or service, they are often free to join and easily accessible on any piece of technology you may have. Rather, these companies sell user attention to advertisers and user data to companies that help those advertisers better capture user attention. Attention economies aren’t systems that are entirely new to consumers; the media landscape has for

¹⁰ DataReportal, “Global Social Media Statistics - DataReportal – Global Digital Insights.”

¹¹ Weinstein and Lejoyeux, “Internet addiction or excessive internet use.”

¹² World Health Organization, “Public Health Implications of Excessive Use of the Internet and Other Communication and Gaming Platforms.”

decades been in part functioning on an attention economy and advertisements are also critical in the functioning of media subsets like radio and television. Due to the nature of the attention economy, media companies are inherently incentivized to keep users on the platform as long as possible. The use of their website or application, the interaction with specific posts and users, the choice to continue watching a youtube video when shown an advertisement or stop to check out those sunglasses from that sponsored instagram post, these are the goals of the attention economy. As consumers have fought back with systems such as adblock to preserve their unfettered use of the internet,¹³ advertisers have moved ads from integrated into the platform to integrated into the content, approaching creators for ‘ad-reads’ and sponsorships that more directly bring advertisements to the eyes and ears of users. Advertisements and the tendrils of the attention economy have only become more and more intertwined with the use of the internet, as what once was an advertisement every so often has become a constant barrage both before, during, and after content. In my opinion, Nolan Sorento from Spielberg’s adaptation of *Ready Player One* exemplified this ideology in a presentation to his fictitious company: “I believe we can sell up to 80% of an individual’s visual field before inducing seizures.”¹⁴ Now, Nolan Sorento was the villain in this story, but the concept behind a media magnate attempting to squeeze every last drop of advertiser value from their users is not foreign to reality. As horrifying as this reality may be, the average American is exposed to between 4,000 and 10,000 advertisements a day,¹⁵ more than anyone could ever consciously process. This creates an advertiser incentive to make sure their advertisements are efficient, to utilize data to push them on the perfect ‘targets’ and make them as glaring as possible so we are unable to filter them out. No longer is it adequate to have an advertisement in the sidebar – it needs to interrupt the reading

¹³ Wise, “How Many People Use Ad Blockers in 2023? (Usage Statistics).”

¹⁴ *Ready Player One*, 29:24 to 29:28

¹⁵ Flynn, “35+ Amazing Advertising Statistics [2023]: Data + Trends.”

of an article or the watching of a video, it needs to pop out of our feed in glowing text and bright visuals. Furthermore, the bleak reality of advertisements could deteriorate further; Sony's 2009 8246454 B2¹⁶ patent, shown right, a grim warning of the potential future of the attention economy.

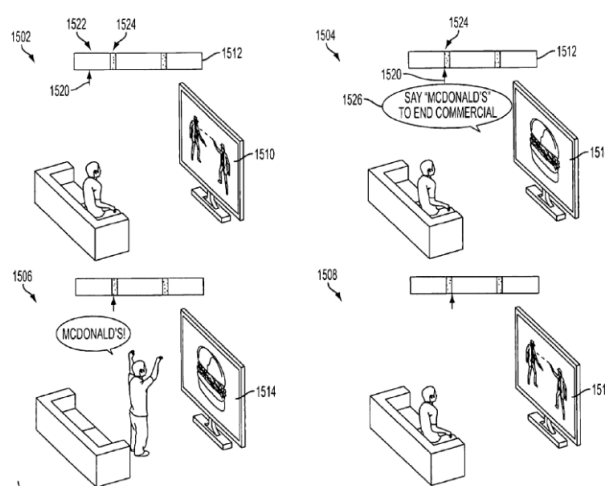


Fig. 9

The critical issue of the attention economy and its ascendancy to the core framework for online media is the misaligned incentives it creates for the companies that run these internet media platforms. Because profitability is directly tied to the quantity and quality – quality in this sense meaning degree and amount of interaction and engagement – of their users, social media companies are encouraged by the economic system to use any means necessary to maintain a profitable user base. In practice, this is a task supported by the omniscient ‘Algorithm’, the great brain of media companies and the core ethical issue of our attention economy. These algorithms underpin the recommendation systems that supply content to users on each platform, and, as depicted in the pages above, these companies have an incentive to make these recommendation systems as effective as possible to take advantage of the attention economy. As our use of social media has grown in scope and scale, the ability of these platforms to computationally process and contextualize this data so as to better serve us as users with content has grown as well. It is extraordinarily easy for modern firms to commodify the data of their users to drive profit,¹⁷ and as access to this data grows, the ability of these firms to predict user behavior and weaponize those predictions against these users

¹⁶ Zalewski, “System for converting television commercials into interactive networked video games”, US8246454B2

¹⁷ Bottis & Bouchagiar, “Personal Data v. Big Data: Challenges of Commodification of Personal Data”

grows with it.¹⁸ These media companies have an incomprehensible amount of user data that they use to generate their recommendation algorithms, and the models used to formulate these algorithms are constantly increasing in both depth – computational strength – and breadth – methods to utilize rising data inflow. These companies are getting to a point in algorithmic design where they're able to predict user habits and schedules, and this is extraordinarily dangerous. These artificial intelligence systems are not designed specifically with the intent to 'addict' the users, rather, addiction rises as the natural solution to the problems with which they are faced. Media companies use these machine learning models as tools to increase profitability, much as you might hire a consultant to improve your marketing strategy. The issue is that these AI 'consultants' have moved beyond 'consultant' to become core of the media landscape upon which all else is built, yet they're still only designed as tools to increase profitability. Machine learning algorithms are not 'actors', they don't have morality or advanced thought or ethics; one can think of an algorithm as a very advanced pattern recognition machine. The previously mentioned attention economy forces companies to express profitability in terms of engagement metrics¹⁹ and, thus, the algorithm measures its success in its ability to keep people engaged. When you hand an algorithm the reins, then, it shouldn't be surprising that an amorphous neural system devoid of ethics tries its best to addict everyone to its content; after all, we've only told the algorithm that its core goal is to raise engagement – and addictive features happen to be very effective in generating engagement.

Algorithms are the dominant force in allowing our media addiction to spiral so far out of control. By using the engagement and interaction data users constantly feed them through use of their platform, they can better feed those same users future content to further addict them. This

¹⁸ Berthon, Pitt, & Campbell, "Addictive De-Vices: A Public Policy Analysis of Sources and Solutions to Digital Addiction."

¹⁹ Fourcade & Johns, "Loops, ladders and links: The recursivity of social and machine learning"

feedback loop generates a sort of inverse-tolerance effect that still carries a similar result, where the more one ‘does’ the ‘drug’ of social media, the *better* it feels. A social media user doesn’t necessarily *need* more to achieve their ‘high’, like one might for a traditional addictive substance, but because the algorithm has been feeding them better and better content, they browse for longer and longer.

While the powerful machine learning algorithms that support the organization and administer content to users function as the ‘brains’ of the media addiction machine, the habit forming nature of media would not function without strategically addictive design that is fundamental to the usage experience of the platform. We humans are creatures of habit, and media companies intentionally focus on design that perpetuates ‘habit loops’²⁰ to supplement the AI-based algorithmic addictiveness. These habits, when combined with stimuli and cues that prompt the habits, form addiction, and social media platforms are designed to support this habit loop²¹. These social media platforms are designed and marketed with addiction in mind, and though some of this addiction is peddled innocently through ignorance, more still are these companies intentionally trying to spread addiction to consumers, despite their knowledge of the negative impacts²² – if you don’t believe corporations capable of such acts, look no further than Nicotine and ‘Big Tobacco’ or Opiates and ‘Big Pharma’. The difference in social media, however, is the role in which the presentation of the product plays an active role in its addiction. For something more traditionally addictive like cigarettes, it is the role of the marketer and designer to get the cigarette into the hands of the smoker; the nicotine does the actual ‘heavy lifting’ of the addiction. By contrast, in the media, marketing and design *are* the stimuli that

²⁰ Wendel, *Designing for Behavior Change: Applying Psychology and Behavioral Economics*

²¹ Berthon, Pitt, & Campbell, “Addictive De-Vices: A Public Policy Analysis of Sources and Solutions to Digital Addiction.”

²² Ibid.

encourage addiction. Specifically, the addictive power of the notification is not to be underrepresented – it is the notification that initiates the dopamine hit that is critical to the formation of addiction²³, it is the notification that prompts the beginning of the habit loop²⁴, and it is the notification that constantly brings relapse. Humans are undeniably creatures of habit, yes, but we are also social creatures – the notification weaponizes this by informing users when a friend has liked or commented on a post, by reminding them to like and comment when their friends post, and most importantly, by allowing them constant access to an open line of communication with other human beings. We wouldn't ignore a friend or family member in a face-to-face conversation, so how can we ignore a notification when it *could* be that same friend conversing with us through technology? They affront us on all senses, they light up our screens and buzz in our pockets and chirp from their speakers. They are unavoidable, and they are tying us firmly to our media vices.

'Social' media contains the word social because it truly is built upon humanities social tendencies, and our own neurobiological wiring that we've attained through millions of years of evolution is so easily abused at the hands of specialized technology. By tying such a core human element to a randomized release system – in that every notification isn't always the one that a user wanted to see or was expecting – the psyche is pushed towards addiction in a behavioral vein similar to gambling.²⁵ Furthermore, the 'dopamine gambling' of notifications aren't the only facets of social media design that are intentional about their addictive intent. Another critical element is the removal of cues that allow users to slow down or stop, and these are numerous. These platforms hide the clock and provide that algorithmically personalized endless feed of

²³ Kuss & Griffiths, "Internet and Gaming Addiction: A Systematic Literature Review of Neuroimaging Studies"

²⁴ Berthon, Pitt, & Campbell, "Addictive De-Vices"

²⁵ Ibid.

content²⁶; they push users towards the ‘rabbit hole’, doing their best to turn the small hits of dopamine presented through notification systems into multi-hour sessions of addiction-fueled use. It is in these states of deep immersion, when the guardrails have been taken off, that addiction plays out. Often, one doesn't even have to cease their endless receipt of algorithmically supplied content to stop and read content that interests them, after all, if they keep reading, they may just find something even better.²⁷ Sharing, saving, creating lists of ‘watch later’, and other similar features allow users to both continue scrolling even when they’ve found content that would typically cause them to stop. The attention economy promotes anticipation over satisfaction, and by leaving users in an eternal “state of dissatisfaction”²⁸ they will continue to scroll to chase satisfaction. After all, if a user stops and interacts with a satisfying post, regardless of medium or genre, it may serve as the natural ‘stopping point’ for the session. Thus, to return to algorithmic design, the engagement metrics for serving a user the ‘correct’ piece of media can be quite poor. To reiterate, algorithms are *not* designed with the goal of creating the ‘best’ media platform or serving users with the ‘best’ content, they are designed with the goal of keeping users engaged. Therefore, it is not the content that users truly want that the algorithm is designed to present them; it is instead the content that is adjacent to the content that they truly want that they are given²⁹. This way, they can know that the content we truly want is out there waiting to be found, despite the fact that they have yet to find it. The content users are given is not *supposed* to be the content they want, it’s supposed to be content that makes them *look* for the content they want. But the algorithm will never let them find it. The algorithm manipulates content in other ways as well, helping users to avoid uncomfortable content – uncomfortability is

²⁶ Ibid.

²⁷ Berthon, Pitt, & Campbell, “Addictive De-Vices”

²⁸ Ibid.

²⁹ Ibid.

bad because a user may leave the platform in response – and promoting the formation echo chambers across social media platforms³⁰. The algorithm yet again preys on the social predisposition of the human mind, as finding others holding similar views can be extremely validating, and thus, great for engagement.

Internet addiction is not rooted in a substance, borne out of a drug such as nicotine or opiates, but is instead a behavioral addiction, akin to addictions like gambling. Addiction is a subject of great debate in the psychiatric field, and it can be difficult to parse and identify exactly what defines it as a behavioral phenomena. The DSM-5, a mental health diagnostic tool published by the American Psychiatric Association, highlights eleven criteria in four main categories – these categories being impaired control, physical dependence, social problems, and risky use³¹. The APA, and thus, the DSM-5, focuses more critically on substance addiction as opposed to behavioral addiction, though they have recently confirmed its existence with an entry in the DSM-5-TR (TR meaning text revision) titled ‘Internet Gaming Addiction’ that encourages further research into the concept³². By many accounts, internet addiction is already widespread and deeply-rooted in the fabric of modern society, despite the fact that the APA has only recently included it in its documentation. The average US citizen spends 7 hours and 4 minutes a day looking at a screen³³, and mobile usage jumped from a 2 hour and 56 minute average in 2019 to a 4 hour and 12 minute average in 2021³⁴. Research into the incidence of addictive tendencies in relation to media and technology – and especially the technology that travels with us such as wearables or our smartphones – has found worrying results. Researchers have found that approximately 8% of the U.S. population suffers from internet addiction³⁵, meaning just under 30

³⁰ Ibid.

³¹ American Psychiatric Association, “Diagnostic and statistical manual of mental disorders (5th ed.)”

³² American Psychiatric Association, “Diagnostic and statistical manual of mental disorders (5th ed., text rev.)”

³³ Howarth, Josh. “Alarming Average Screen Time Statistics (2023).”

³⁴ Ibid.

³⁵ Cheng & Li, “Internet Addiction Prevalence and Quality of (Real) Life”

million Americans are entrenched in a battle with their media usage – who knows how many millions more are well on their way.

It is likewise critical to understand the social context within which technology and media are represented. Capitalist society has generated a materialistic tendency that leaves consumers wanting the next cool new gadget, and social media perpetrates a system where users are incentivized to further invest themselves both technologically and emotionally into staying attached to the system because it has become so central to modern society. People purchase the newest technology in an anxious bid to stay relevant, and this is a phenomena not limited to the realm of technology. Social media inherently allows us to see in greater detail the developments of everyday life than we have ever been able to before, and this has brought into existence a widespread fear of missing out³⁶ – FOMO, if you will. FOMO exists in technology, as aforementioned, but it also plays a huge role in generating throes of addiction for media denizens; by allowing us to see the digital experience of everyone around us, we are naturally inclined to desire inclusion, to avoid being ‘the one that missed out’³⁷. FOMO serves as yet another example of the methods in which social media companies weaponize the innate neurological social systems of humanity, systems that were essential to our evolution to the world’s ‘super-predator’, systems that are now feeding the beginning of our downfall. FOMO also functions as an advertising system for social media as a whole; because social media platforms are inherently siloed – as in, if you want to post something on instagram or interact with a friend’s instagram account, you need your own instagram account – we inherently expand our media portfolio to accommodate this system so as to minimize FOMO. This concept extends beyond individual platforms as FOMO is utilized with a higher degree of granularity in systems

³⁶ Gupta & Sharma, “Fear of missing out: A brief overview of origin, theoretical underpinnings and relationship with mental health”

³⁷ Chianella, “Addictive digital experiences: the influence of artificial intelligence and more-than-human design”

like ‘private stories’, ‘snapchat streaks’, ‘best friends list’, or ‘group messages’, all are systems that inherently include some and exclude others, further preying on the FOMO dynamic. Users want to be a member of every group chat, to be included in every private story and see every detail from every one of their friends, but platforms are again intentionally designed to always show them something they’re *not* yet a part of and leave them wanting more. By framing disconnection from the internet as a bad thing, something where one ‘misses out’, the addictive nature of media is only furthered. This aligns with the dissatisfaction-based system so effective at producing engagement, as it’s impossible to truly maintain a membership in every social group and a relationship with every member. This functions particularly because there is a critical mass of already-engaged users across all platforms, so one truly *is* missing out if they choose to disconnect. Society has, at large, become comfortable with the idea of an internet addiction³⁸, and that is what makes it so hard to pull away. It is adjacent to the age-old problem of the quitting smoker surrounded by their smoker friends – it is so much more difficult to escape the cycle of addiction when one is surrounded by addicts who are at peace with said addiction, especially when – as is the case with the internet – so many do not see the addiction in the first place.

Beyond the conceptual frameworks behind internet addiction across data science, design, economics, and neuropsychology, and the other disciplines we’ve touched on above, it is also essential to explore the individual impacts of societal shift towards internet addiction. While the influence of the internet is widespread and our constant access has allowed innumerable benefits, societal obsession with social media does not contain solely positives, and it is not without its fair share of tangible negative effects on the life of the individual. In practice, internet addiction manifests in a nature similar to a gambling addiction, where devoid of physical, substance-based

³⁸ Alter, “Irresistible: The rise of addictive technology and the business of keeping us hooked.”

symptoms, addiction is borne from a lack of control that impairs daily life.³⁹ The research into potential impacts is comprehensive and has been a topic of great interest as media has developed and grown in the past decade. Findings such as an increased incidence of depression among adolescents⁴⁰ indicate the potential of an internet addiction to degrade the neurological balance of dopamine, a seemingly logical impact given the habit system that drives online lives. Another study discovered the existence of ‘Brain Drain’⁴¹, a reduction in capacity of both working memory and functional fluid intelligence spurred by the mere *presence* of a smartphone in the vicinity. It takes a tangible quantity of brainpower to resist the temptations of one’s smartphone, and this scales with smartphone dependence in that the more dependent one is, the greater the impact of the ‘Brain Drain’. Notably, attempts to mitigate the negative effects and control oneself by muting the phone or turning it face down are ineffective at reducing the impacts, separation is the only recourse⁴². Social media also brings with it a tendency to supplant internal validation with a mooring of one’s self esteem to their online ‘success’. We often see individuals define their self-worth through the lens of their media personality; how many likes their photo got or how many people viewed their story can have significant impacts to the way they see themselves.⁴³ This is especially prevalent among those who suffer from a diagnosable internet addiction, though it’s also been theorized that low self-esteem could be a typical impact of social media that can *lead* to addiction, rather than something that exists solely as a symptom of said addiction. Internet addiction can have very real negative impacts on the way that people perceive

³⁹ Yoo, et. al, “Psychiatric Comorbidity Assessed in Korean Children and Adolescents Who Screen Positive for Internet Addiction”

⁴⁰ Lam & Peng, “Effect of Pathological Use of the Internet on Adolescent Mental Health”

⁴¹ Ward, et. al, “Brain Drain: The Mere Presence of One’s Own Smartphone Reduces Available Cognitive Capacity”

⁴² Ibid.

⁴³ Andreassen, et. al, “The relationship between addictive use of social media, narcissism, and self-esteem: Findings from a large national survey”

both themselves and others, and these negative impacts are not extended solely to individuals deep enough in an online lifestyle to be classified as ‘addicted’.

It would not be prudent to discuss the impacts of social media as a modern phenomena without paying special attention to the particular negative impact that social media has on adolescent women. In a similar vein to the deterioration of self-esteem described above, social media platforms – and particularly those that revolve around a photo-based habit loop – are particularly damaging to young women in the perpetration of body dysmorphia. Whereas men may be more likely to ‘passively’ use social media, women tend to approach social media platforms, again, especially those that are photo-based, with a more ‘active’ mindset^{44,45}, furthermore women tend to use these imaged-based platforms more in general⁴⁶. This active engagement is rooted specifically in comparison of themselves to others, a comparison that can promote a negative satisfaction with weight, a drive for thinness, and a general aura of self-objectification.⁴⁷ Women so often utilize social media to present an idealized image of themselves to others, and this forms a self-perpetuating cycle as other women compare themselves to these idealized images and thus respond with equally idealized images⁴⁸. This comparison is also so often upwards or peer-to-peer, whereas women may not perform negative comparisons with women that aren’t personally seen to be as attractive as they are. The National Institute of Health (also NCBI) presents research that somewhere between 20% to 40% of women experience a degree of body dissatisfaction⁴⁹, a number undoubtedly spurred by the widespread use of social media and the culture surrounding that use. It is clear that women suffer specifically at the hands of social media, though that isn’t to say that there aren’t negative

⁴⁴ Smith, “What people like and dislike about Facebook.”

⁴⁵ Hogue & Mills, “The effects of active social media engagement with peers on body image in young women”

⁴⁶ Lenhart, Amanda. “Teens, Social Media & Technology Overview 2015.”

⁴⁷ Ibid.

⁴⁸ Manago, et. al, “Self-presentation and gender on MySpace”

⁴⁹ Frederick, et. al, “Surveys and the Epidemiology of Body Image Dissatisfaction

impacts for other demographics, such as the perpetration of toxic masculinity among online male spaces. The core concept is that the impacts of social media are at least in some ways demographically oriented, with certain demographic groups more vulnerable to the negative impacts of the internet or to internet addiction in general.

I've presented a substantial amount of data exploring the mechanisms and systems behind internet addiction and related disorders connected to social media, as well as some of the general individual impacts, however, social media and the widespread adoption of life in the online world has also generated a handful of significant society-wide shifts to the way we function as a civilization. The core driver of these impacts is the way in which the internet reinvented the way we access and consume information – never as a society have we had such instant connection with individuals, ideas, and information on such a vast scale. It has never been easier to interact and ideologically innovate with individuals around the globe, but this ease has also degraded our social skills to an extreme degree – an entire generation finds it easier to text than to have a face-to-face conversation, and social media platforms are growing as a replacement for true human interaction.⁵⁰ This reduction in real human contact is critical on a society-level, but it is also particularly relevant to students within the education system. An important element of our education as children and young adults is the development of relational skills, and social media is performing as a pseudo-substitute in many school systems degrading this development, crippling the true relational skills of many⁵¹. Furthermore, due to the intrinsic anonymity in social media – in that if you so choose it is easy to hide your true identity – it can be easy to discard your own self-actualization for the cultivation of an online persona. This concept is seen prominently in phenomena such as Catfishing, the practice of using stolen or fabricated identities to interact

⁵⁰ Amedie, "The Impact of Social Media on Society"

⁵¹ Akram & Kumar, "A Study on Positive and Negative Effects of Social Media on Society"

with others online, often with the goal of emotional connection or a relationship⁵². This can be extended further to the concept of cyberbullying, online torment inflicted upon others that is funded partly by anonymity and partly by the distance between one's true self and their virtual persona⁵³. Toxicity in video games, spreading of false drama, so often we see negativity inflicted upon others enabled by the anonymity afforded by the virtual world. This toxicity and negativity is not only degrading to one's mental health, but it can also prompt the degradation of one's reputation to an extreme degree. Due to the innate virality of much of the information on social media, reputations can be obliterated by the spreading of negative stories, even when the stories are false⁵⁴. Businesses that at first found social media to be a boon to their ability to advertise and market may now find the same platform a painful thorn, as the aforementioned reputational degradation seen on an individual level can likewise easily occur at a corporate level. Negative reviews and public relations mistakes can spread like wildfire,⁵⁵ and even when falsified they can do irreparable reputational damage or cause the collapse of a business. Furthermore, much of the boon afforded by social media in the form of increased advertising capacity and viral marketing campaigns has eroded as the existing platforms have become overloaded with businesses and advertisements⁵⁶. Social media is, obviously, not devoid of benefits, but the negative impacts can be felt across a wide variety of societal spheres.

While social media has undeniably enhanced the expression of negative elements of our society and degraded the existence of some positive elements, it has also enabled the growth of a new sphere of criminal activity. Despite the ability for users to maintain anonymity online, many don't, and privacy is a critical concern. The increased degree of connection with strangers has

⁵² Ibid.

⁵³ Akram & Kumar, "Effects of Social Media on Society"

⁵⁴ Amedie, "The Impact of Social Media on Society"

⁵⁵ Akram & Kumar, "Effects of Social Media on Society"

⁵⁶ Ibid.

given rise to a behemoth fraudulent online industry of scammers and fraudsters attempting to part others with their data, passwords, or money⁵⁷. Hackings have become a fairly common occurrence⁵⁸, and many individuals do not practice adequate operational security within their virtual lives; they use the same password for every website, they click on random links and download random files, they don't invest in VPNs or anti-malware programs. Beyond individual crime, social media has also enabled criminal *organizations* to both conduct crime and recruit to their ranks. Radicalization of individuals to terrorist groups is made easier by the negative impacts of social media on the individual, namely the increased prevalence of depression and isolation.⁵⁹ These criminal organizations prey on isolated individuals by making them feel worthy or important, making them feel powerful in an era where it is so easy to become discouraged by society.⁶⁰

The relationship between social media and the dissemination of information is also vital to understanding how the internet has changed our world, and while it was touched on above, the concept begets further exploration. The internet is undeniably the critical driver of the modern spread of information, and social media does much of the heavy lifting in terms of getting information in front of the eyes of users – between 40% and 60% of adults in most developed countries rely on social media for their news.⁶¹ Any one individual is obviously incapable of processing all of the information that the internet has to offer, and thus, the specific information that one interacts with is often as much a factor of where they spend their time online as it is a factor of the actual information they're interested in. That isn't to say that users don't control to a certain degree the information they receive by being intentional about the virtual spaces they

⁵⁷ Ibid.

⁵⁸ Akram & Kumar, "Effects of Social Media on Society"

⁵⁹ Amedie, "The Impact of Social Media on Society"

⁶⁰ Ibid.

⁶¹ Reuters Digital News Report

spend their time in, but it's impossible to have full control over one's own flow of information online. In the modern era, information is often consumed because it's placed in front of the user, not because the user has chosen to seek it out. When I choose to browse a facebook group or a sub-reddit for my favorite video game, I'm choosing the *topic*, but the specific information that I receive is purely a result of the other individuals who post and the algorithm that chooses which posts I see. In the context of the video game media group, this isn't a particularly big deal, because the information is fairly unimportant in a greater context. However, not all information on the internet is unimportant, and not all groups are as niche or as irrelevant societally as the virtual hub for a specific video game. Because users don't have full control over the information they see, they are vulnerable to a manipulation of their perspective by other users around them and by the platforms they engage in. The information that individuals receive online is so often unverified – whereas users in the past may have once gone and fact-checked all of the information they received, users today receive too much information on a daily basis to responsibly vet the truth. I've touched above on the virality of information on social media, and just as in the concept of reputational damage, information that spreads quickly is not always accurate. Information spreading on a peer-to-peer system is critical to the human psyche, and for much of the human experience, whoever was giving information was someone one could evaluate in real time and in person; a family member, a friend, a teacher, it is much easier to trust information from these sources or to question and critique information than it is when online. As information spreads, the critical mass of 'believers' in said information grows, whether it's truly accurate information or not. As the number of believers grows, the pressure to become a believer also grows – again, regardless of the accuracy of the information. This creates widespread adoption of misinformation as truth, and it contributes greatly to the destruction of effective

discourse online. This disinformation has become particularly relevant to the field of politics, as a critical element of an effective democracy is the ability to disseminate and debate important information. Because disinformation has created societal differences in what individuals are willing to accept as a fundamental truth, the political system has become innately polarized as it is nearly impossible to have a productive debate about *facts*, rather than policy or political candidacy. It seems at first glance that social media would be a boon for political discourse, allowing individuals who would typically not include ideological opposites in their social circle to increase the rate at which they interact with those who have different opinions⁶². The problem, however, returns to the innate issue with content algorithms and uncomfortability – the challenging of one’s views can be an uncomfortable experience that decreases engagement, and thus algorithms are incentivized instead to create echo-chambers of like-minded individuals. These echo chambers can be problematic in increasing polarization as, for example, in the case of twitter, users with more extreme ideological positions share disproportionately more content than moderate users;⁶³ meaning that even more moderate echo chambers can be influenced by extremist positions. This is only furthered as these echo chambers are exposed to specifically negative views from opposing political ideologies, reinforcing perceived polarization,⁶⁴ exposure often pushed by the algorithm as the ‘othering’ of individuals can be a powerful force in generating group engagement.

As we look forward to the internet’s relationship with society, it’s clear that the virtual world will be a defining factor of our lives for the foreseeable future. Social media has become the new home for a rising proportion of human interaction, and its ability to connect individuals and spread ideas has been revolutionary for human society. That being said, the widespread

⁶² Tucker, et. al, “Social Media, Political Polarization, and Political Disinformation”

⁶³ Barberá and Rivero, “Understanding the Political Representativeness of Twitter Users.”

⁶⁴ Iyengar, et. al, “Affect, Not Ideology: A Social Identity Perspective on Polarization.”

adoption of social media has brought with it a variety of maladies – the increase in rates of depression, degradation of relational skills, erosion of self-esteem, and countless others. We have as a society accepted social media with open arms, and we've reached a critical mass of usage where it is nearly impossible to turn back. Part of one's life is now irrevocably tied to one's virtual experience, and choosing *not* to participate may bring upon its own host of negative impacts, such as a fear of missing out. Social media companies have effectively weaponized algorithms and the design of their platforms to entrap us, preying on vulnerabilities in the human psyche to drive up engagement and addict us to their platforms. Though the official rate of internet addiction is only 8%, a variety of the negative effects that are entwined within internet usage – and specifically social media – are likely felt by a proportion of society much, much larger. Advancements in machine learning have enabled a degree of behavioral prediction and control unbeknownst to previous generations, and these media corporations are utilizing these algorithms with reckless abandon at the expense of our political and social systems. We as a society are only on the cusp of understanding and regulating the synthetic addiction of the internet and social media – attempts to escape the ever-increasing scope of the virtual world are becoming increasingly difficult, and our understanding of the true nature and impacts of the problems presented by social media still lags behind. Societal trust and online privacy have already eroded, political systems and in-person relational abilities are on life support. As natural language models and fake image and video technology improves, we may soon find ourselves in a world where online information is meaningless, where one has no way of knowing who – or what – they are interacting with. It is critical, then, that the users of these media platforms understand their own vulnerabilities, that they understand how they've become victim to the habit loops of media design, that they understand how they are given information through the

lens of algorithms controlled by a small number of engineers in Silicon Valley. The attention economy is a ruthless market, and we must understand how our minds are manipulated by media companies hungering endlessly for profit.

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