# Deliverable of Fall 2020 - Spring 2021

**Research Assistant: Priscilla Hopper**

**Overseeing Instructor: Annie Margaret, ATLS**

**Index:**

Breakdown of Work …… 2
Reflection …… 3
'Trust is Dead' Essay …… 4
Outline for Literature Review …… 15
Literature Review: How Trust is Processed Through Social Media …… 16
Literature Review: Tik Tok and Resources …… 22
Survey and Survey Results …… 26
Relevant Links …… 29

**Breakdown of Priscilla Hopper's work:**

Although credits will not be applied to Priscilla's work in the fall, she was engaged in Annie Margaret's research and administrative work. Initially, Priscilla's work was more so on the organization side in the Fall. She worked with Annie to plan, organize, and administer work for the future. She and Annie mainly collected and created assets to create Annie's website. Priscilla took control over the making of the website's first few rough drafts. She organized assets given by Annie including photos, Annie's work like articles and her class information (syllabi), resources, quotations, presentations, and more. In addition, Priscilla and Annie workshopped a scripted video to introduce Annie's work, persona, and website. After a few weeks of planning, storyboarding, recording, and editing, Priscilla created a five minute video about Annie's work. It was scripted to gain the attention of Annie's students and other viewers of her website to understand the attention economy, polarization, mindfulness, and empathy and technology. The majority of the video ended up being scrapped and Priscilla instead committed to making a new one minute video just about Annie's work.

The Spring took a turn when Priscilla entered a class on Cognitive Science. Work in this class ended up influencing much of what she created as a final product for Annie. In her final work, Priscilla has a survey with over 50 responses from students, an essay on trust in media, a literature review on cognitive science in technology and specifically on Tik Tok, and a Google Slides presentation. The interest in Tik Tok came from Priscilla; Priscilla loves Tik Tok but also has lots of interest in the algorithm and philosophy behind the platform. Annie's interest in Tik Tok is due to her lack of understanding of the platform and the lack of information on it in

general. Tik Tok has many influential components to what Priscilla's interest in ethics and policy on social media and was an obvious choice for focus. In addition, in the Spring Priscilla worked alongside Annie and the other research assistant, Autumn Stevens, to finalize and publish the website in March. Since then, Priscilla has worked with Annie to centralize her focus onto the other deliverables mentioned above.

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**Reflection:**

This year taught me a lot about what skills I have and am proud of. Being able to combine my strengths in video editing and design made me feel extremely comfortable working with Annie. I was also really excited to work with Annie as she became one of my favorite professors in my sophomore year and helped guide my vocational interests. I am really proud of what I learned, especially when it comes to the lit review. I have never done one before and at times struggled through it. Oftentimes though, struggling forward is what makes you a better student, person, worker, etc. I have been really grateful for the opportunity to work with Annie and learn from her. Annie has been really instrumental in helping me figure out what I want to do with my life, she has always cheered me on. In addition to our professional relationship, I genuinely do consider Annie a friend, and hopefully one for a long time. She has given me more guidance and leadership than I could’ve imagined and I am very grateful for the year I spent working alongside and for her.

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**Trust is Dead:**

An Analysis on Social Systems' Interaction with Cognitive Biases

We are a species prone to addiction and easy to trust. We see it in dark places like drug use and alcoholism and in light places like a morning routine or meditation. In the last decade, humankind has willingly subjected itself to a new addiction: our pocket-sized computers on which we rely for every aspect of our lives. Social media has proved huge swings in revolutionary culture—we're able to design our lives, personalities, interests, etc. And, according to what's expected of society, we are nearly required to publicly mold our lives in order to suit what friends, family members, celebrities, or strangers want. Trends are everywhere, and within our time on social media, our interests have involved and, not very coincidentally, so have the platforms we love. From Facebook to Twitter and Instagram to the now-dead Vine and Music.ly and now Tik Tok—They have shaped trends, interests, actions, beliefs, communities, culture, desire, and most importantly, how we trust. We have begun craving how those platforms make us feel. As humans, we want to seem and be desirable—needing to feel included and wanted in an ecosystem built around what we're attracted to. In turn, each of us has hindered our judgment and ability to think, decide, and act reasonably and with good intention. In fact, we've lost much of our capacity to think individually. With massive intakes of information and content, we are consuming too much and too often to strengthen our abilities to have any unique thoughts. And, it's safe to say, the philosophy and capitalistic values behind these social media platforms, sought this result and conclusion intentionally. We no longer seek the approval and appreciation of just our friends and family, now we aim to please thousands and even millions of strangers—whether

intentionally or not. We feed on social media and it hijacks our conscious and subconscious decision-making. This makes us more prone to illogical judgments due to our now-compromised higher cognitive functions. Without outside knowledge, interest, and research, each of us remains under the spell of our tiny-computers and the zeros and ones behind our favorite forms of entertainment. And, even with proven research on the attention economy and tribalism through social media, we are unaware of the manipulation behind our biggest cravings. What users are blind to is that due to our substantially extensive content absorption nourishing our inability to comprehensively understand information is actually intentional and redistributing our trust. This is unethical. We're in the age of the most user-interest-centered platforms and content wholly created—and the architects behind these platforms need you to create content, they need you to enjoy other's content, they need you to repeatedly open the application and come back for more. By curating content directly to the user and allowing them to create subcategories of subcategories of platform content, they indirectly commit to a tribe. These tribes are polarizing and our brains simply trust them.

When considering trust on an industrial level, like in our applications, the designers behind them, and of course their owners, we must first analyze where trust began—locally. Back in hunter-gatherer times, if one person in a community lied to another it could prove fatal, now our local communities of trust are much bigger than we think. While, of course, our local circle could include family, friends, peers, and professors, it's imperative to consider our local online communities. For example, when any user scrolls through Tik Tok, initially, the algorithm pushes the most popular content to their "For You" page (Tik Tok). However, one sees a video about plants that they really enjoy, they like, comment, and/or share the fifteen second short and

suddenly within the next 30 minutes or day, they begin to notice new plant videos every few Tik Toks they see. Gradually, users are grouped into a big, yet, selective group of fellow Tik Tok users that adore plant videos—landing in "Plant-Tok." This is a new community for our user, and as wide as it is, it is still very local and has the ability to adjust anyone's trust. Users begin learning new ways to take care of their succulents, how to make home-made plant holders, how to recycle old soil, etc. But, why are we trusting these accounts created miles away from us by people we have never met, heard of, or know? Because this algorithm funnels our interests, it also is able to pigeonhole our ability to trust. Consider the consequences when a user is grouped into a side of social media that is not as happy and quirky as "Plant-tok." According to Tik Tok, "To keep your For You feed interesting and varied, our recommendation system works to intersperse diverse types of content along with those you already know you love. For example, your For You feed generally won't show two videos in a row made with the same sound or by the same creator. We also don't recommend duplicated content, content you've already seen before, or any content that's considered spam. However, you might be recommended a video that's been well received by other users who share similar interests." So, every Tik Tok user is funneled by their interests into a certain category with users who "share similar interests." This is what is forming our local-yet-large communities. From an industrial perspective, think about buying something from eBay or Amazon, what incentives do you have to trust the seller without the middle man—the corporation behind the transaction protecting your credit card information, address, name, etc. This type of trust is much less localized. Instead of trusting another human you can see on your screen for plant information and fun facts, you're trusting a website and *maybe* a customer service representative to guard your privacy. When analyzing how social

media tunnels our vision, it is important to also consider how often it goes unseen by the user. However, the general audience on social platforms are not always the most impressionable. When scrolling through Tik Tok, anyone will see comments on videos like “what did I like to end up here?” or “the algorithm knows me too well.” This is because we are becoming more and more aware of how social media caters to our interests. That being said, everyone has an aunt or grandfather or parent, etc. that reads one post on Facebook but never detects the propaganda behind it—this is, of course, because they are trusting their still-wide-yet-local community.

It is not to say that younger generations are not as impressionable, but instead are sometimes more aware. In any case of life, the more one grows, the more one matures, naturally. However, due to how many influences are constantly pointed in the direction of our youngest generations, we are overwhelmed with content. This does not necessarily correlate to more or less trust, but instead it caters to more negligence. In fact, eighty-two percent of students in junior high are unable to tell the difference between an advertisement and a piece of news. News has been twisted and turned for hundreds of years, so much so that many people have developed the ability to differentiate between radical headlines in tabloids and sophisticated and fact-checked articles. We’ve seen crazy headlines like “Elvis is alive—and running for president”, “Court Scandal: The Queen is Nude”, etc. (The Sun). No, Elvis has not been reincarnated, and obviously the Queen of England is not nude in court; and, we know that. When we see a radical and crazy-sounding tabloid headline, our brains think, “well, I doubt the Queen of England is *actually* nude.” Tabloids have given us a type of filter that’s molded to detect nonsense. That being said, if your son, cousin, or friend was in this court room and watched the Queen of England prance around a court room nude, you would be more inclined to believe this news. This

begs the question, if we are so able to detect fallacy through headlines about celebrities, why is it so much harder when it comes to detecting extremes on social media? This is simply because our local network and community has vastly grown without us directly detecting the process occurring. Due to this funneling process of placing users on social media in specialized groups, platforms are essentially able to convince us that it was by our own doing, and that our individual algorithm that pushes specified content was customized by our own actions of liking, commenting, and sharing.

The Dorsolateral Prefrontal Cortex is responsible for cognitive functions such as elective function, response selection, conscious decision making, outcome prediction, and working memory. It sends projections to the dorsal stratum, an area involved in aspects of motivated behavior. Most importantly, the Dorsolateral Prefrontal Cortex is responsible for controlling reason. Studies suggest that the Dorsolateral Prefrontal Cortex plays a specific role in overriding emotional biases in moral dilemmas (Goel). These studies have lead to the hypothesis that "difficult social decisions…often involve competition between emotional processing and higher-level controlled or deliberate processing that bias decision making in opposite ways." Emotional signals and processes are controlled by the subcortical, limbic, and paralymbic systems whereas "deliberate processes" depend on anterior and dorsolateral regions of the prefrontal cortex. In a study done in 2004 on the Kerry and Bush election, researchers found that when subjects heard a controversial phrase said by the candidate they endorsed, the subjects defended their candidate. However, when subjects rooting for the candidate they endorse heard the same controversial phrase from the other presidential candidate, they criticized them. While researchers analyzed this feedback, they took a deeper look into their brain cognition. They noticed that the

Dorsolateral Prefrontal Cortex, what controls their reasoning, was completely inactive. Whereas the Orbitofrontal Cortex, that plays a role in emotional decision making, was lit up with enthusiasm and they were rewarded with dopamine, a neurotransmitter that plays a role in pleasure (Jessee). This interaction in our brain is called cognitive bias. Based on experiences, teachings, and personal reasoning, every walking human on earth possesses some cognitive bias (Montibeller). There are ten common forms of cognitive bias: confirmation bias, listening more often to pieces of information that assert our existing beliefs; hindsight bias, seeing some events more predictable than they are; anchoring bias, the tendency to be overwhelmingly swayed by the first piece of information heard; misinformation effect, the tendency of our memories being influenced by things that never happened; actor-observer bias, the attribution of our actions to others and vice versa; false consensus effect, the overestimation of how much their beliefs are supported; halo effect, how initial impressions of a person influence the overall opinion of them; self-serving bias, the habit of people crediting themselves for success and crediting their failures to other causes; availability heuristic, overestimating the probability of an event due to how many examples one can think of; and optimism bias, overestimation of good things when negative events impact life. While all relevant in daily life, this essay will focus on three of these cognitive biases: confirmation bias, anchoring bias, and self-serving bias.

Cognitive biases are a way of distorted thinking that, in turn, can greatly influence believes and sway the process of confirming decisions and judgement making. Sometimes biases are extremely obvious, some people make their biases and beliefs their entire personalities. Since our attention is limited and constantly divided among so much content consumption, it seems impossible for every single person to evaluate every tiny, important detail on new information.

We tend to rely on our mental bullet points of information, like little shortcuts, getting our thoughts from one place to another, and eventually to a conclusion. Although this speeds up our judgement making process, it more often than not leads to biases. Confirmation bias may be the most dangerous in our list. As many of our biases are subconscious, we often make subconscious decisions to put ourselves in echo chambers that reaffirm our biased beliefs, like only subscribing, following, and interacting with social media accounts that publish the same beliefs, refusing to listen to opposite points of view or perspectives, and not considering all accessible facts in a rational way. At the end of the day, no one necessarily *wants* to be wrong about their beliefs, especially if they've constructed a life, routine, or personality out of that belief. This safeguards self-esteem, confidence, etc., and this is where it gets destructive. One person may hold a certain controversial belief due to outright incorrect information being fed to them, they may be taught some truth, but not the whole truth, etc.

So, how do you know when to trust someone or something? Falling for fake news is not about intelligence. We are hard-wired to listen and trust whatever information confirms our beliefs. A Buzzfeed News survey showed engagement to the total number of shares, likes, reactions, and comments for content on Facebook during the 2016 election, proving that fake news engagement rose from about three million to almost nine million on Election Day (Buzzfeed). The Ipsos Public Affairs team also found that perceptions in headline accuracy dramatically raised during the same time (Ipsos Public Affairs). For example, 84% of respondents believed the headline "Donald Trump Sent His Own Plain to Transport 200 Stranded Marines" or how 64% of respondents agreed that "Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement" was true. Folk theory can justify some of this

misinformation belief and interpretation"…folk theories can account for beliefs beyond simply about how the system works, but also beliefs about the company behind the cyber-social system, their goals, and how their goals influence the system as a whole"(Stanford Cyber Initiative). Folk theory could blame the entire social system, which is a relevant finding. That being said, self-presentation on social media is extraordinarily imperative when considering how algorithms feed into your trust. Your work and interaction with a platform is what is curating content for you, the algorithm is just a really great servant, ready to listen and return content you enjoy. "Self-presentation is a process that is significantly complicated by the rise of algorithmic social media feeds, which obscure information about one's audience and environment. User understandings of these systems, and therefore user ability to adapt to them, are limited, and have recently been explored through the lens of folk theories. To date, little is understood of how these theories are formed, and how they tie to the self-presentation process in social media" (Devito). We have such instant and easy access to clear and researched information at the tip of our finger tips that no generation has seen before, so what is compelling general viewers of news and social media platforms to never fact check? This is where the anchoring and self-serving biases comes into play. The anchoring bias "anchors" a piece of information based off what you initially learned and it simply does not quit. For example, when we first learn about Christopher Columbus, we learn that he discovered the new world, formulated lasting relations with the indigenous people of this great land, and settled with them, building working, lasting communities. Wrong. What we learn in our future is that, Columbus brought genocide, pain, massacre to innocent people; that he stole land and what we call home today was never ours to begin with. If someone learned this new information but did not believe it, and instead insisted that Columbus was a great,

upstanding citizen, that would be an anchored bias playing its game. On social media, we are able to follow, like, subscribe to, etc. any accounts, pages, and channels we want. There is freedom in social media, yet that freedom has persuaded us into curating our own bubbles of information that is simply unable to be trusted. Likewise, it is difficult for most people to accept they may be wrong, especially when they've held a belief for so long. The self-serving cognitive bias makes it's move when that insecurity alerts the consciousness. "I'm not wrong" it says, "I'm me, there's no way I'm wrong." Due to the self-serving bias and our innate need and want to be right, we tend to fasten ourselves and our mindsets to one path. This can be threatening and even jeopardize other people. "The folk theories literature in cognitive science suggests that people consistently tend to use knowledge in the world, gained from artifacts or systems directly, to supplement existing knowledge of that artifact or system. This tendency is stronger when there is an accessible 'top layer' of mechanism plainly visible to users, and hidden layers underneath. This is often the situation on social media platforms, where content is visible as a top layer but the underlying mechanisms of curation are hidden. Additionally, cognitive science also suggests that socially obtained information (e.g., talking to friends about how a system works) can also be valuable, such that these conversations work as an information source" (Devito). At the heart of humanity is empathy, and these cognitive biases are what is eliminating that from our society. Our trust is so easily attached to these local communities we empower ourselves to be in, that we've lost all sense of self—instead greatly relying on others to pursue a group effort on our thoughts, ideologies, beliefs, fears, and more.

Due to how much content is swarmed onto our tiny screens every minute of every day, we don't have time to deeply research every single little ounce of information we see or hear,

unless one wants to be out of the loop. This is on purpose. Industrial think tanks want us to be consumed by the products that feed into their capitalistic lifestyle. However, in this sense this is not necessarily just about monetization, but about the capitalization of our thinking and trust. We are being hijacked of any individual thinking and we're letting it happen. Craving entertainment is human, but we've turned into sheep. This is a frightening reality—the only way we can stop it is by addressing our cognitive biases and attempting to fix them. While we can't wipe our minds of our thoughts, traditions, beliefs, and ability to trust, we can listen, reassess, and research. Our biases are subconscious and sometimes unfixable, but they are manageable and noticeable. This world is evolving and it is constantly liberating itself. Minority communities are speaking up and out, politicians must live more transparent lives, the architects behind these social systems on which we rely are being held accountable. None of that matters unless we, as individuals, seek within ourselves for empathy and humanity. We are human, we make mistakes, and we are smarter than this. Trust is not something to give away at the drop of a hat, so why let it happen every 15 seconds?

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**Overview + Thesis:**

I'd like to focus my review on the trust and judgement and decision making among users as a result of user-specific AI on social media platforms. In addition, I aim to concentrate on the manipulation and unethical aspects to curating the most user-interest-centered endless scroll available, and how that has created new ways of thinking thus establishing tribes and a wave of polarization among different human ecosystems we've never seen before on social media.

**Outline:**

1. Why does this topic matter?

Social media is ever-changing and constantly evolving by adding new forms of AI that often cater to users' interests. We are then sucked into a certain group of people watching the same or similar content consistently which enables our trust to certain creators, topics, forms of information to be heightened.

2. What is the problem/issue?

Too much content overload leads to negligence on social media and information in general. "Don't trust everything you hear" has become almost obsolete due to our trust in much larger local communities that we've dedicated our thoughts and ideas to. This enables creators and platforms with negative motives to hurt groups and hinder individual thinking.

3. What is a possible solution or approach to resolve this issue or question?

- Awareness
- Open-mindedness
- Additional research
- Grain of salt thinking

4. What is the impact of resolving the problem or issue (how is the world better or different)?

While the spread of factual information is important, our trust in certain resources must change in order to actually find the facts. In my personal experience, I now only trust one person on Tik Tok for specified news because I've researched additional information about said person. This type of due-diligence would create a much more mindful society.

**How Trust is Processed Through Social Media**

**Thesis:**

With new-age social media emerging every year, it is imperative to be mindful of what and how users consume this new content. In order to do so, one must analyze who they trust. This can be evaluated in terms of community, however, local communities, where trust comfortably lays, have grown dramatically without much notice. Trust on social media is a cognitive issue and has much to do with the ways in which people push their own biases. I aim to interpret articles, publications, and journals referring to how social media users that support how social media effects users' perception of information using folk theory and case studies.

**Quantifying the Invisible Audience in Social Networks:**
https://hci.stanford.edu/publications/2013/invisibleaudience/invisibleaudience.pdf

**What:** This publication mainly reviews studies done on how social media users perceive their audiences and vice versa. They explored how and why They found that often times people believe those viewing their posts were close online friends, family, etc. However, what was found that by sheer volume of content publication, it was oftentimes the "weaker ties" who had more connections to the individuals analyzed. In addition, the study dives into privacy, and how although users on social media are interested in growing their subscriber-ship, follower-ship, etc., they are much less inclined when they are publicized and recommended—viewing this as a breach of privacy.

**Why:** This study is imperative to begin understanding how people perceive their own social audiences and how they are perceived back. What I aimed to learn from this piece was measured in how we individually intake our own perceptions of self versus how we are interested in being perceived. In addition, a motive behind this publication was to learn how people categorize their audiences or "tribes" and how they communicate with them differently.

> *Overview:*
> *Social media users develop expectations of their audience composition that impact their on-site activity. Designing social translucence into audience information thus becomes a core challenge for social media [16, 15]. In response, speakers tune their content to their intended audience [12]. On Facebook and in blogs, people think that peers and close online friends are the core audience for their posts, rather than weaker ties [24, 38]. Sharing volume and self-disclosure on Facebook are also correlated with audience size [10, 40]. However, as the audience grows, that audience may come from multiple spheres of the user's life. Users adjust their projected identity based on who might be listening [17, 27] or speak to the lowest common denominator so that all groups can enjoy it [20]. Social media users are thus quite cognizant of their audience when they author profiles [8, 14], and accurately convey their personality to audiences through those profiles [18].*

> *Questions of audience in social media often reduce to questions of privacy. Users must balance an interest in sharing with a need to keep some parts of their life private [2, 31]. However, early studies on social network sites found no relationship between disclosure and privacy concerns [1, 34, 40]. Instead, people tended to want others to discover their profiles [40], and filled out the basic information in their profile relatively completely [23]. However, young adults are increasingly, and proactively, taking an active role in managing their privacy settings [35].*
>
> *Method:*
> *To study audiences in social media, we use a combination of survey and Facebook log data. Most Facebook content is consumed through the News Feed (or feed), a ranked list of friends' recent posts and actions. When a user shares new content — such as a status update, photo, link, or check-in — Facebook distributes it to their friends' feeds. The feed algorithmically ranks content from potentially hundreds of friends based on a number of optimization criteria, including the estimated likelihood that the viewer will interact with the content. Because of this and differences in friends' login frequencies, not all friends will see a user's activity*

**How People Form Folk Theories of Social Media Feeds and What It Means for How We Study Self-Presentation:**
https://dl.acm.org/doi/abs/10.1145/3173574.3173694?casa_token=2M_hps8kN1UAAAAA%3ACyd0CKxANEsNL_sdnohjSPqkmizvyjnw9MQvyabWSvq0KUKUKif-8i3tK4O455YiO4qhIL0UDsDX

**What:** Folk Theory is generally explained as the cognitive capacity to explain and predict human behavior.

**Why:** The reason I focus on Folk Theory is because there has been a lot of analysis done on cognitive perception on social media to assist explain the biases and behavioral processes behind social media users. In addition, a study done with contribution from Dr. Michael Ann Devito, a CU Boulder Fellow in the Department of Information Science where she works in the Identity Lab. Her research focuses on the algorithmically-driven systems that surround us and how they affect "major social processes such as the formation and presentation of the self concept." I'd use Folk Theory to connect our cognitive behavior with self presentation.

> *Overview:*
> *Self-presentation is a process that is significantly complicated by the rise of algorithmic social media feeds, which obscure information about one's audience and environment. User understandings of these systems, and therefore user ability to adapt to them, are limited, and have recently been explored through the lens of folk theories. To date, little is understood of how these theories are formed, and how they tie to the self-presentation process in social media.*
>
> *One reason users struggle to understand their social media audience is that content visibility is often controlled by proprietary, algorithmic social media feeds, such as the Facebook news feed or Instagram feed [4, 8, 15]. These algorithms take the content available to each user and curate it, resulting in a more manageable feed [15, 50]. From the perspective of an individual posting content, these feeds take self-presentation behavior (e.g., status updates or photos) and make it visible to some audience members but not others. These systems play an increasingly central role in people's everyday*

> *lives [15, 37, 38, 43, 50], and therefore in their everyday presentation of self. While valuable, these algorithms are often complex, difficult to understand and opaque [15]. They provide users with little information about how they work, and operate unpredictably [37, 38]. As such, most users understand them poorly [11, 12], which can exacerbate common online self-presentation problems (e.g., context collapse [34] and difficulty with fine-tuned self-presentation [6]).*
>
> *In describing how individuals locate specific sources of information, information foraging theory posits that decisions on what information to rely on, or forage, are evaluated based on the potential utility of the information in achieving one's goal [40, 41]. Here, this can be seen as evaluating information for utility in effectively fulfilling self-presentation goals. In information foraging this interplay between goals and utility is constrained by the foraging environment [40, 41]. The key environmental constraints here are on the availability of information about algorithmic social media feeds. However, as Pirolli notes, foraging models must consider both "the constraints of the environment and the psychological machinery available" to the user [40 p. 8]; similarly, self-presentation behavior has been linked to this psychological machinery as well (e.g., [6, 33]). In our analysis, we will be attuned to psychological factors that may further constrain foraging. The folk theories literature in cognitive science suggests that people consistently tend to use knowledge in the world, gained from artifacts or systems directly, to supplement existing knowledge of that artifact or system [45]. This tendency is stronger when there is an accessible "top layer" of mechanism plainly visible to users, and hidden layers underneath. This is often the situation on social media platforms, where content is visible as a top layer but the underlying mechanisms of curation are hidden. Additionally, cognitive science also suggests that socially obtained information (e.g., talking to friends about how a system works) can also be valuable, such that these conversations work as an information source [13, 24].*

**What's the Folk Theory? Reasoning About Cyber-Social Systems**

*People must now also interact with complex cyber-social systems, which refer to digital technologies that "facilitate, enhance, and scale human endeavors" (Stanford Cyber Initiative, 2014).*
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2910571

**What:** In this paper, the authors Megan French and Jeff Hancock analyst people's specific folk theory on cyber-social systems. A cyber-social system works on demand to incorporate aspects from cyber and social space, like social networks. It is also mainly focused on the data surrounding those spaces and how they correlate.

**Why:** This paper takes a much more semantic point of view to analyze attitudes and beliefs. This paper helped me just gain a better understanding of how we are influenced by social systems. French and Hancock take three studies into account. The first analyzes how people genuinely understand news on their Facebook and Twitter feeds. In the second study they use factor analysis to aggregate data into folk theories for Twitter and Facebook. Lastly, they replicated the data found in the factor analysis from Study 2 to examine the "semantic dimensions" for the folk theories among the Twitter and Facebook social-cyber systems.

> *First, how do people understand the way in which communication behavior and activity is organized on social network sites, such as Facebook or Twitter? A user's beliefs about social network sites can help explain why people behave in certain ways, advancing theories of communication that focus on how people interact with one another, such as computer-mediated communication, as well as with technology, such as human-computer interaction. Second, technology design is enhanced when a user's reasoning about the technology is understood and incorporated in the design process (Norman, 1988). Third, understanding a user's expectations regarding how a system allows that user to interact with other users, such as disclosing information on a social network site, can help a system avoid violating those expectations.*
>
> *Folk theories, in contrast, refer to a person's intuitive, causal explanation about a system (e.g., another human's mind, gravity, etc) that guide their thoughts, beliefs, and actions with that system (Gelman & Legare, 2011).*
>
> *…folk theories can account for beliefs beyond simply about how the system works, but also beliefs about the company behind the cyber-social system, their goals, and how their goals influence the system as a whole.*
> *Work on people's understanding on the Facebook News Feed, a content curation algorithm, found that many users first noticed the algorithm when certain expectations were violated, such as posts that were not presented in chronological order or their friends mentioned a post they had never seen (Rader & Gray, 2015). When expectations were violated, users often speculated about the algorithm, constructing theories about what the News Feed was trying to show them (e.g., interesting posts), or how it was making its decisions (e.g., I see posts by people I comment on) (Eslami et al., 2015).*

**"Algorithms ruin everything": #RIPTwitter, Folk Theories, and Resistance to Algorithmic Change in Social Media**

https://dl.acm.org/doi/pdf/10.1145/3025453.3025659

**What:** This paper analyzes how much more common algorithm driven content is on social platform, and the user backlash that comes with larger issues. #RIPTwitter was a trending hashtag where many Twitter users mentioned the Twitter algorithm in somewhat conflicting, and normally negative ways. Research questions include: "What reasons for resistance to the idea of algorithmic change did participants in #RIPTwitter express?" "What folk theories of algorithmic influence over Twitter were displayed by #RIPTwitter participants?" "Do certain types of reactions to algorithmic change reflect the expression of different folk theories?"

**Why:** This study is important because it analyses the reactions of many Twitter users like: generalized, anger/frustration, metacommentary, platform duplication, confusion, resignation, platform attachment, economic motivation, and more. Then it analyzes those same categories while incorporating Folk Theory like generic, opposition, comparison abstract theories, and operational theories like popularity, platform directed, and relevance.

> *At a high level, there does appear to be a relationship between specific type of algorithm theory expressed and reaction to algorithmic change, as chi-square tests indicate the two variables are not independent*

> *To answer the question in more detail, we used a contingency analysis via post-hoc single degree-of-freedom chi-square tests with a Bonferroni correction applied (corrected $\alpha = 0.00075$). This analysis suggests that the different levels we found in the first two sections of results are linked, such that more specifically focused types of reactions are more likely to express more specific folk theories, and less specifically focused types of reactions are more likely to express less specific folk theories. This suggests in turn that more detailed levels of algorithmic knowledge, as expressed through folk theories, may allow or prompt more detailed, and therefore actionable, expressions of resistance. This may seem intuitive or obvious at first, but this isn't the case. It would theoretically be quite reasonable to react with a specific feature in mind, but describe it with an abstract theory (such as the hypothetical "The timeline makes Twitter what it is. Algorithms will destroy it") and vice versa.*
>
> *To better understand what might be framing or influencing user resistance, we also investigated the folk theories expressed by #RIPTwitter participants about the rumored algorithm (RQ2A). In particular, we wondered if specific types of folk theories would influence the way people discussed the rumored changes, and if this could help us understand people's perceptions of how the system works and why/how they derive value from it. We found six distinct types of user folk theories (see Table 2). Overall, it appears that the folk theories expressed via #RIPTwitter do not show detailed, causal theories of how algorithmic curation might work. However, we did find a diversity of more general, high-level theories which seem to indicate differing levels of user understanding. That difference allows us to group the theories into two broad categories: operational theories and abstract theories.*

**Social network and user context assisted personalization for recommender systems**
https://ieeexplore.ieee.org/abstract/document/6207782?casa_token=oQi1uYPKlBQAAAAA:XrOwEoosdqZ4G3VdTZMxnLRsuO8jymtAlrEwiGlNtRi3AL-m50Z5Jno-u9VP9I528Ajdp7t-

**What:** Recommender systems are used extensively from e-commerce websites like Amazon, on our streaming platforms like Netflix and Hulu, and especially on social media. The reason recommender systems are so important is because it provides users with customization options. In this paper, the authors analyze the ways in which users of differing platforms understand and perceive their recommended shows, purchases, content, etc. by these platforms. It analyzes how users should reduce their content intake and make it much more broad as to not get so much repeated content.

**Why:** Why are recommender systems important in a conversation about trust? Unfortunately, social media and even e-commerce sites force people into what are called echo chambers. Think of standing in a cave, facing the big rock wall—you scream information you know and believe like "I love plants!" or something much more radical like "Trump 2020!" What happens? The cave screams it back to you, it echos. This is what happens when we get too immersed in customized social platforms. What happens is we express our beliefs through commenting, posting, sharing, and even liking, and these platforms scream those beliefs back to you. They give you controversial content they know you want to attack, and content that is just perfectly in alignment with your beliefs. But the lure is that not all content users engage with is like this, instead they cover it up and drown those small inciters of belief in comedy, romance,

storytelling, etc. And, that is the danger in recommender systems; they recommend content the algorithm knows you and any other user will love, but keeps is simple and light, so you and everyone else does not get suspicious. The issue here is that too often than not, this type of content is politically radical. The insurrection in Jan. 2021 was highly trafficked and communicated on social media, yet liberal and most social media users did not learn of it until the day of, this is due to the fact that those recommender systems would never think to recommend that type of information to liberal leaning social media users since it is not in alliance with what they believe and have told the algorithm they love and trust.

*Abstract:*
*In recommender systems, social networks are considered as a trusted source for user interests. In addition, user context can enhance users' decision making. In this paper, we design a new architecture for user personalization which combines both social network data and context data. Our system aggregates a user's preference data from various social networking services and then builds a centralized user profile which is accessible through public Web services. We also collect user's contextual information and store it in a central space which is also accessible through public Web services. Based on Service Oriented Architecture, recommender systems can flexibly utilize users' preference information and context to provide more desirable recommendations. We present how our system can integrate both types of data together and how they can be mapped in a meaningful way.*

**Personalization and Recommender Systems in the Larger Context: New Directions and Research Questions**
https://www.ercim.eu/publication/ws-proceedings/DelNoe02/CliffordLynchAbstract.pdf

**What:** Personalization and recommender systems are extraordinarily important to focus on when considering how and why people see the content they consume. Recommender systems are aspects built into algorithms that take commonalities into account. For example, if every now and then, maybe once a week, a user searches for a specific shoe, not only will shoe advertisements appear more often on the users search engines, advertisements, etc., but they will also see advertisements from the specific brands being searched. This is meant to cater to people's interests and increase usability when on the internet. However, there is a conversation on echo chambers and privacy that but be explored and considered. When there is too much personalization in anything, it may radicalize a user's interests, wants, beliefs, etc. In addition, when recommender systems are too on the nose to what users are searching for, it is just blatantly scary and concerning—"how do they know that?" "why do they know that?" However, when looking at these issues from the designers point of view, what about recommender systems is making anyone's experience worse?

**Why:** Personalization contributes the most to echo chambers as the more a system pushes content that aligns with their interests, ideas, cultures, etc, the more that content and system gains

a user's trust. I think that it's sort of ridiculous to assume that there should or even could be limits to algorithmic personalization. As, the more user-centric something is, the more it appeals to the user and the more they enjoy. However, I believe this could be solved with just more informative research and interest. The more informed one is, the less likely they are to fall into this "trap."

> *Libraries have always been very strong defenders of privacy. A key best practice for libraries in recent years, at least in the United States, has been to destroy patron-related data unless there is a compelling business need to keep it. Thus, for example, circulation systems typically break the link between a patron and a book that has been borrowed when that book is returned. While the book is out on loan, the library needs to keep a record of who has borrowed it in order to protect the library's assets (and thus, with an appropriate court order, it is possible to find out what books a given patron has currently borrowed); but the library simply doesn't keep a record of what has been borrowed and subsequently returned by a given patron, and thus cannot be compelled to reveal this information. It simply doesn't exist to be subpoenaed.*

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**Literature Review: Tik Tok**

Tik Tok Specific:

**How Tik Tok Holds Our Attention**
https://www.newyorker.com/magazine/2019/09/30/how-tiktok-holds-our-attention

**What:** This is more of a story telling approach to how Tik Tok holds attention. The author analyzes their subject Marcella's experience on the platform and then dives into their own experience. They analyze how and why they received certain content and how Tik Tok sucked them in.
**Why:** Firsthand accounts of persons using Tik Tok is imperative to learning about how users perceive the platform. This is a great story to either listen or read as it provides a different point of view than my or anyone I know—since oftentimes, my friends on Tik Tok have similar feeds, and therefore see extremely similar content.

> *Marcella is eighteen and lives in a Texas suburb so quiet that it sometimes seems like a ghost town. She downloaded TikTok last fall, after seeing TikTok videos that had been posted on YouTube and Instagram. They were strange and hilarious and reminded her of Vine, the discontinued platform that teen-agers once used for uploading anarchic six-second videos that played on a loop. She opened*

*TikTok, and it began showing her an endless scroll of videos, most of them fifteen seconds or less. She watched the ones she liked a few times before moving on, and double-tapped her favorites, to "like" them. TikTok was learning what she wanted. It showed her more absurd comic sketches and supercuts of people painting murals, and fewer videos in which girls made fun of other girls for their looks.*

*TikTok is available in a hundred and fifty markets. Its videos are typically built around music, so language tends not to pose a significant barrier, and few of the videos have anything to do with the news, so they don't easily become dated. The company is reportedly focussing its growth efforts on the U.S., Japan, and India, which is its biggest market—smartphone use in the country has swelled, and TikTok now has two hundred million users there. ByteDance often hacks its way into a market, aggressively courting influencers on other social-media networks and spending huge amounts on advertising, much of which runs on competing platforms. Connie Chan, a general partner at Andreessen Horowitz, told me that investors normally look for "organic growth" in social apps; ByteDance has been innovative, she said, in its ability and willingness to spend its way to big numbers. One former TikTok employee I spoke to was troubled by the company's methods: "On Instagram, they'd run ads with clickbaity images—an open, gashed wound, or an overtly sexy image of a young teen girl—and it wouldn't matter if Instagram users flagged the images as long as the ad got a lot of engagement first."*

**Tik Tok: How Tik Tok Recommends Videos For You**
https://newsroom.tiktok.com/en-us/how-tiktok-recommends-videos-for-you

**What:** This is information directly from Tik Tok's blog.
**Why:** This is simply used to compare how analysts perceive Tik Tok and how they advertise their platform's algorithm.

*Recommendation Systems:*
*Recommendation systems are all around us. They power many of the services we use and love every day. From shopping to streaming to search engines, recommendation systems are designed to help people have a more personalized experience. In general, these systems suggest content after taking into account user preferences as expressed through interactions with the app, like posting a comment or following an account. These signals help the recommendation system gauge the content you like as well as the content you'd prefer to skip.*
*User interactions such as the videos you like or share, accounts you follow, comments you post, and content you create.*
*Video information, which might include details like captions, sounds, and hashtags.*
*Device and account settings like your language preference, country setting, and device type. These factors are included to make sure the system is optimized for performance, but they receive lower weight in the recommendation system relative to other data points we measure since users don't actively express these as preferences.*
*Interrupting repetitive patterns:*
*To keep your For You feed interesting and varied, our recommendation system works to intersperse diverse types of content along with those you already know you love. For example, your For You feed generally won't show two videos in a row made with the same sound or by the same creator. We also don't recommend duplicated content, content you've already seen before, or any content that's*

> *considered spam. However, you might be recommended a video that's been well received by other users who share similar interests.*
> *Diversifying recommendations:*
> *Diversity is essential to maintaining a thriving global community, and it brings the many corners of TikTok closer together. To that end, sometimes you may come across a video in your feed that doesn't appear to be relevant to your expressed interests or have amassed a huge number of likes. This is an important and intentional component of our approach to recommendation: bringing a diversity of videos into your For You feed gives you additional opportunities to stumble upon new content categories, discover new creators, and experience new perspectives and ideas as you scroll through your feed.*
> *By offering different videos from time to time, the system is also able to get a better sense of what's popular among a wider range of audiences to help provide other TikTok users a great experience, too. Our goal is to find balance between suggesting content that's relevant to you while also helping you find content and creators that encourage you to explore experiences you might not otherwise see.*
> *Safeguarding the viewing experience:*
> *Our recommendation system is also designed with safety as a consideration. Reviewed content found to depict things like graphic medical procedures or legal consumption of regulated goods, for example – which may be shocking if surfaced as a recommended video to a general audience that hasn't opted in to such content – may not be eligible for recommendation. Similarly, videos that have just been uploaded or are under review, and spam content such as videos seeking to artificially increase traffic, also may be ineligible for recommendation into anyone's For You feed.*

**Infrastructuralization of Tik Tok: Transformation, Power, Relationships, and Platformization of Video Entertainment in China**

https://journals.sagepub.com/doi/abs/10.1177/0163443720939452?casa_token=3aihv_tMZu8AAAAA:-Eyfke2txgAe1_iFuf3ypZrS_Buup2fVGKyoXbfeI8L8UgEoUfVtP_LmcYqbcsZhkUzq-abuayNg

**What:** This article considers the issue of "infrastructuralization" on Tik Tok. It also focuses on China's specific influence to its platform. This explores how video streaming platforms transform is infrastructure and how it changes the power dynamic among relationships between the users and the designers.

**Why:** This article is important because it argues two very specified points. One, it focuses on how Tik Tok uses commercial monetization, content distribution, and acquisition of data. Then it focuses on the propaganda behind what Tik Tok promotes either intentionally or not.

> *The article contributes to complicate the issue of 'infrastructuralization of platform' through an empirical study on China's video streaming platform, Tik Tok. It aims at exploring how video streaming platform will transform in its infrastructural process and changing powering relationships between different actors in the platform ecosystem. After scrutinizing its technique features, business model, platform discourse, and power relationships with government, it argues that the infrastructural process of Tik Tok is not only embodied in its transformation from an entertainment community to an integrated*

> *platform, including services in e-commerce, online education, propaganda, and tourism, but more in its growing power of indispensability entrenched in our society. The main argument will be elaborated in two layers: first, Tik Tok attains its power on commercial monetization, content distribution, and acquisition of data sources through its infrastructural ambition of building a 'video encyclopedia' that can be salable, ranked, and archived. Second, Tik Tok has started to engage in fields of propaganda and tourism for city branding in alignment with central and local government. Tik Tok thereby wins its legitimacy in content management and government in turn plays as a role of stakeholder sharing the dividend from its contribution for state's development goals. Therefore, the article not only fills in the gap of a case study on infrastructural video streaming platform but also intends to highlight changing power relationships between government and platform in the process of infrastructuralization.*

**Analysis of Tik Tok User Behavior from the Perspective of Popular Culture**

https://francis-press.com/papers/706

**What:** This article analyses the relationship between users on Tik Tok and how in which the platform plays a role in user behavior.

**Why:** Based on the transmission mode of Tik Tok, users will consciously or unconsciously become the disseminators of popular culture. There are two ways for users to disseminate:First, when users have a desire to share a video, they can share it directly on social media through Tik Tok's one-click forwarding function, which is the way users consciously disseminate. Secondly, Tik Tok has a unique traffic algorithm for video recommendation. Traffic distribution is mainly about neighborhood and attention.

> *For the ordinary users, they find an outlet for their display desire. Daniel Bell pointed out that the characteristic of popular culture is "to continuously express and rebuild oneself in order to achieve self-realization and self-satisfaction[3]. The mode of UGC on Tik Tok platform is that the platform empowers each ordinary user to produce content to meet the psychological needs of their self-presentation. For the internet celebrities, in order to realize the commercial value, they precisely divide their fan groups, and carry out professional content planning, so as to get attention on Tik Tok platform, and gain network traffic monetizing. For example, the stars use Tik Tok platform to publicize film and television works, sell endorsement products and realize fan economy, which is an extension of star manufacturing in the whole field of popular culture. Fans chase idols to the new media platform and bring more users to Tik Tok. Tik Tok is also regarded as stars' other production platform by relevant stakeholders. Some business organizations have also become the main users of Tik Tok. They produce content on Tik Tok platform to close the gap with young users, based on the consideration of the younger users of Tik Tok.*

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**Survey on Media and Influence**

I administered this survey by sending it to my friends and followers on Instagram, group chats, and Slack channels of which I am apart. There are 52 respondents and are all within the age range of 18-25, which accurately depict college students' age range. With this survey, I wanted simple quantitative data to make my respondents think and evaluate how they spend their time on social media. To learn more about each question's motive, see the descriptions and major discoveries for the six questions asked below:

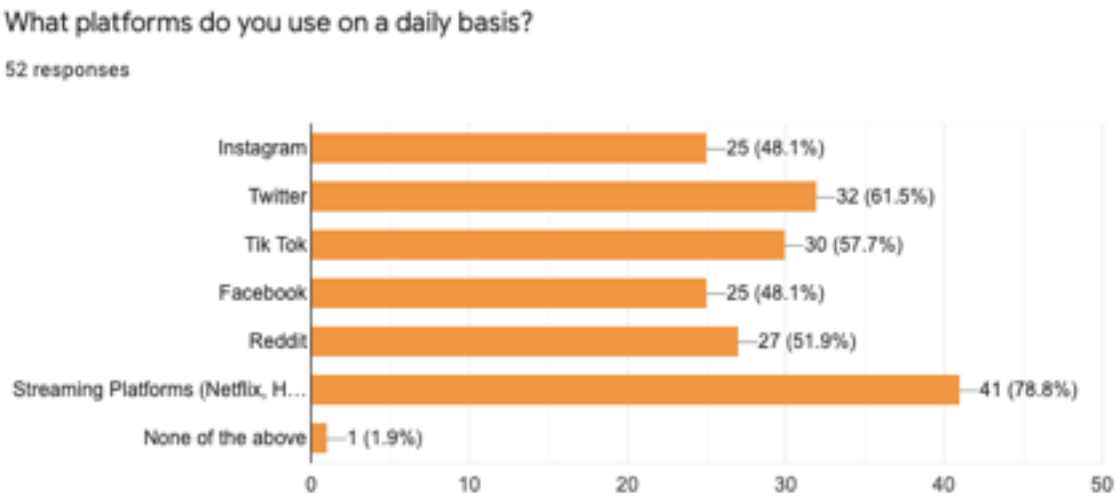
**Question 1: What platforms do you use on a daily basis?**

Why is this question important and what did I attempt to answer?

Here I just wanted to get a good overview as to what platforms the respondents used. I was also curious to see which platform was used most often. It was not a surprise that streaming platforms were checked most often; I would potentially keep that option out in the future, but it is interesting to learn that so often people use them as Netflix, Hulu, and other streaming platforms greatly rely on recommender systems.

Major discovery:

*Streaming platforms were checked most often at 78.8%, followed by Twitter at 61.5%, and Tik Tok at 57.7%, then Reddit at 51.9%, then Instagram and Facebook come in at the same percentage at 48.1%, and lastly, "none of the above" was checked by one respondent at 1.9%.*



**Question 2: Have you ever taken action on a cause after seeing it on social media? i.e. signing petitions, sharing content, donating, etc.**

Why is this question important and what did I attempt to answer?

*This question is important because it can show that social media can and does, in fact, influence users actions. I came at this question from a more positive perspective also seeing that social media greatly gave legs to BLM and other matters surrounding it. Examples I included were signing petitions, donating, and even just sharing content.*

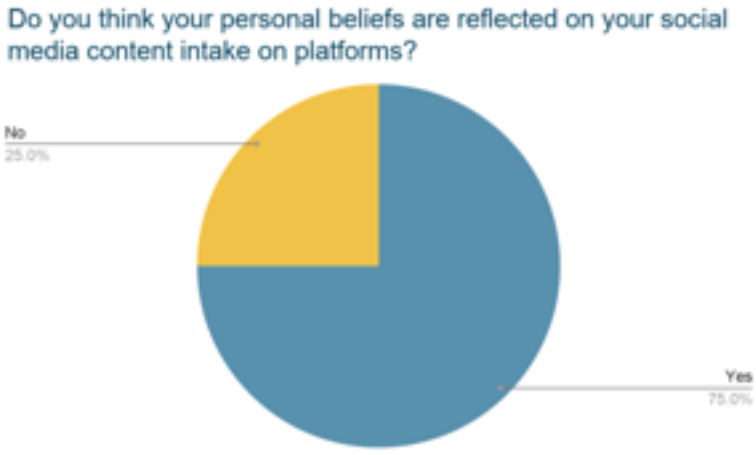

Major discovery:

*Over 71% of respondents have taken action on a cause after seeing it on social media.*

**Question 3: Do you think your personal beliefs are reflected on your social media content intake on platforms like Instagram, Twitter, Tik Tok, etc.**

Why is this question important and what did I attempt to answer?

*A massive incorporation of my research has been the implementation of recommender systems. How these work is based on genuine interest and echo chambers created by these platform's own users. What I aimed to answer was whether or not my respondents were aware of said echo chambers.*

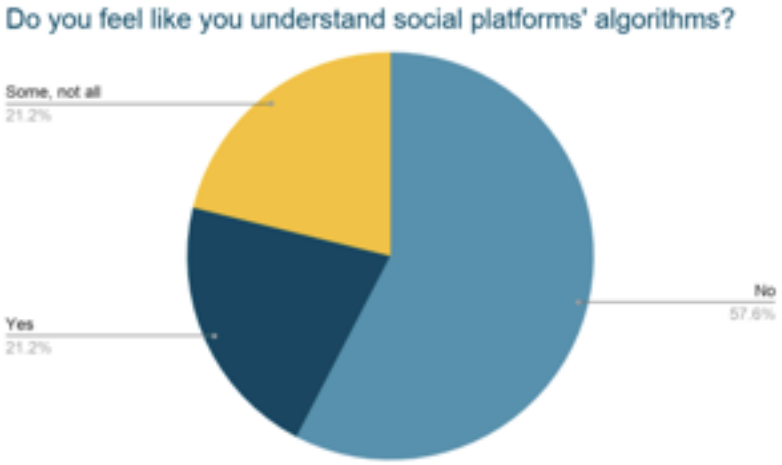



Major discovery:

*75% of respondents feel as though their personal beliefs are reflected in their social media intake.*

**Question 4: Do you feel like you understand social platforms' algorithms?**

Why is this question important and what did I attempt to answer?




*I was interested in figuring out whether or not people believed they genuinely understood what happens behind the screens of their favorite platforms. I personally do not believe that those who answered yes do understand these algorithms, but I'd estimate about 15% of those "Yes"'s do have adequate knowledge and not just a general understanding.*

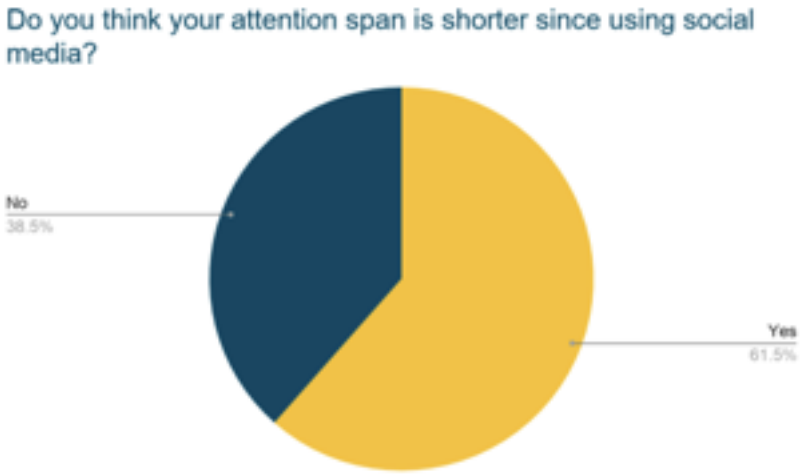
Major discovery:

*78.9% of respondents don't believe they understand all or some platforms' algorithms.*

**Question 5: Do you think your attention span is shorter since using social media?**

Why is this question important and what did I attempt to answer?

*The goal here was to get my respondents to recognize their shortcomings with social media. We've all allowed social media to consume our attention and I wanted to make my respondents analyze their own actions in terms of their attention spans.*



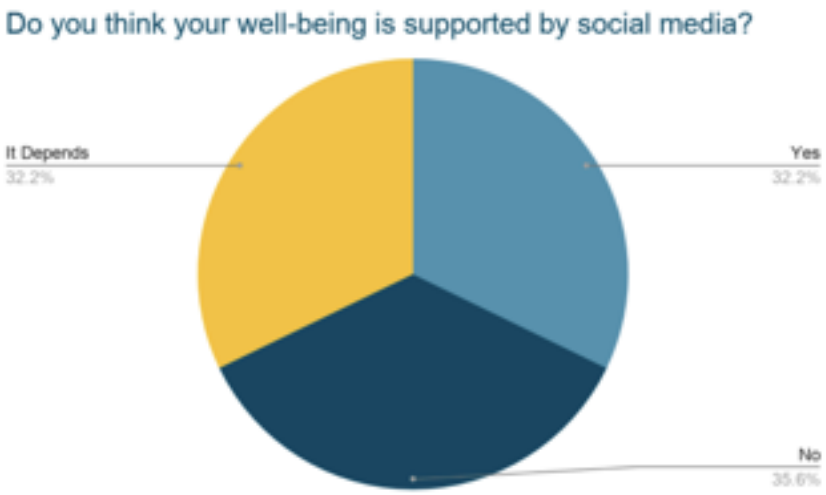

Major discovery:

*61.5% of respondents believe that social media has negatively impacted their attention span.*

**Question 6: Do you think your well-being is supported by social media?**

Why is this question important and what did I attempt to answer?

*Since wanting to focus on trust and tribalism, I was interested in learning more on whether or not the respondents believe they were genuinely supported on their favorite platforms. Considering the findings that the majority of my respondents believed their beliefs were reflected in the content they see on social media, I think the findings from this question support the earlier survey.*




Major discovery:

*76.9% of the respondents either answered "no" or "it depends" to whether or not their well-being is supported*

**Relevant Links:**

**Google Slides Presentation**: https://docs.google.com/presentation/d/1-Qik97g0LkTdRlQ4U_IePPAgV6urk9KoB12X38JuA6g/edit?usp=sharing

**Survey on Media and Influence:** https://docs.google.com/forms/d/e/1FAIpQLSd4vyseTurKEZ_DZYiabi2goucAfyvy10Q0mlPTrsxJ356nvQ/viewform?usp=sf_link

**Google Form for Survey Questions and Responses:** https://docs.google.com/forms/d/1GJWFQZtmzCvRm_wX6osKp_SOLMCyYY0fbc_x8M0jUDY/edit?usp=sharing

**Google Sheets for Survey:** https://docs.google.com/spreadsheets/d/1lNqMTD1247KAM7MMqkgYQJOIzWMuVwQCj11flgoAoC4/edit?usp=sharing