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A Moment of Creepiness: The Imagined Infrastructure of Behavioral Targeted Advertising on Social Media

I. Abstract

A few months prior to the Cambridge Analytica Facebook data scandal—and the #DeleteFacebook movement that followed—some Facebook users discussed a more subtle, but related, phenomenon. Users reported in-person, oral conversation with a friend or family member in which a product would come up. In the next few days, that user would see the same product advertised to them on Facebook. Feeling discomfort, users will often conclude that Facebook must be listening to them through the microphone on their smartphones. As a result, many users change their attitude and behavior towards their smartphones, the Facebook service as a whole, and the Facebook app. This qualitative content analysis of a single Reddit thread of 11,000 comments suggests that "creepiness" is a significant factor in some users' attitude toward Facebook. To theorize this phenomenon, I introduce the terms *moment of creepiness* and *imagined infrastructure.* The former refers to any moment in which an individual is "creeped out" by technology. The latter is a phenomenological perspective on infrastructure: it refers to an infrastructure whose exact structures are ambiguous or hidden, and so must be imagined by those who encounter it at moments of near-breakdown. Facebook advertising can be considered a kind of infrastructure, and the *moment of creepiness* a moment of breakdown. Because human users are an integral aspect of the infrastructure of Facebook advertising, they must behave predictably in order for the system to function as it was designed to. The *moment of creepiness* is a pebble thrown into the cog of the system; the presence of an *imagined infrastructure* in the collective imaginary is an indicator that the infrastructure of behavioral targeted advertising is close to breaking down. When a *moment of creepiness* occurs, the infrastructure reveals its *presence* to the user, but the details of how it functions remain obfuscated. This obfuscation creates space for the details of the infrastructure, e.g., how data is gathered, to be imagined. The new notions of a

moment of creepiness triggering the *imagined infrastructure* function as explanatory frameworks with which to conceptualize and understand an infrastructure that is meant to go largely unnoticed.

II. Introduction

On July 26, 2016, YouTube user "nevilleblackphoto" posted a video in which he conducts a test of sorts to determine whether Facebook is eavesdropping on his verbal conversations. The test consists of Neville discussing cat food with his wife, close to an iPhone, to see if Facebook advertises cat food to them. He claims that he and his wife have never spoken about cat food, and do not own cats. After they discuss cat food close to the iPhone, a cat food ad appears on the Facebook app on the same phone.[1] (N., 2016) The video went viral on Reddit in late October 2017, over a year and a half after it was posted.

Many Reddit users commented that they had experienced the same phenomenon. One user wrote, "I've never searched online for belts, never needed to since I had a belt my grandfather gave me years ago that I've worn forever. It broke about a week ago, and my wife and I had a conversation about belts and where I'd like to go to buy them, what kinds, etc. Now I'm still seeing Facebook ads for belts. Never looked it up or anything. Pretty creepy, if you ask me." Another user, who had mentioned buying a pregnancy test in conversation with a friend, stated that, "five minutes later, I got on Facebook and the very top of my news feed was an ad for first response pregnancy tests. And then, during a video I was watching, an ad for the Clear Blue brand of pregnancy tests played. It's so obvious." On November 2, 2017, the podcast *Reply All* released an episode titled "Is Facebook Spying on You?" in which they investigate the phenomenon, and speak with people who have experienced it. The episode's title was the question the makers of the podcast heard the most in the year 2017. In the words of one of the hosts, "…everybody thinks this is true. Including tech journalists who I respect a lot. It's not just a fringe belief. Everybody thinks this is true." (Goldman & Vogt, 2017). Even before the 2016 video, however, Facebook put out an official statement titled "Facebook Does Not Use Your Phone's Microphone for Ads or News Feed Stories," claiming, "We only access your microphone if you have given our app permission and if you are actively using a specific feature

[1] The findings of the test could easily be faked, but many of the comments on this video and on a viral Reddit thread tell similar stories.

that requires audio." ("Facebook Does Not…", 2016). This phenomenon on other social media platforms that employ behavioral targeted advertising as well (that is, nearly all of them), but this paper will focus on Facebook as a case study.

Online behavioral targeted advertising--advertising that uses data recorded about users to tailor specific advertisements to their needs[2]--is embodied as well as embedded; it is both spatial and algorithmic, at once ambiguous and concrete. Upon seeing an advertisement for a product that has only previously come up in oral conversation, users experience what I call a *moment of creepiness*. This is a moment of recoil, of suspicion, and of imagination. Moments of creepy technology crop up constantly (Rubin 2018), but often users do not change their behavior as a result (Barnard 2014, McAndrew and Kohnke 2016). Behavioral targeted advertising on Facebook functions as an infrastructure that is almost wholly invisible to users, even as users are integral to its existence and functionality. To recognize behavioral targeted advertising as infrastructure is to concretize it; infrastructures behave in predictable ways. In such a way, the *moment of creepiness* itself constitutes a near-breakdown of this infrastructure, because the system no longer functions as it was designed to (many users are not about to go out and buy the product if they are creeped out by the ad for it). I am calling this *near* rather than *full* breakdown, because the nuts-and-bolts of the system continue to work as they should (that is, advertisements are still being pushed to users), but the human element of the infrastructure is disrupted.

For many users, this moment of near-breakdown reveals what I call an *imagined infrastructure.* That is, the infrastructure is visualized, instinctively, to be spatial and physical, reaching into users' households to record their conversations. As a result of this instinct to imagine the infrastructure, users' orientations towards specific objects—the smartphone, the Facebook app—change. Social media systems like Facebook are inextricably caught up with the notion of being able to define oneself (Miller, Costa, Hayes, McDonald, Nicolescu, Sinanan, Spuer, Venkatraman and Wang**,** 2016), and many users consider them a comfortable, familiar online space. For users who have experienced this phenomenon, once-familiar objects, Facebook and the smartphone, may become suspicious. (The relationship between the familiar and the spatial is an important one, which will be addressed in more depth in Section VI. B. "The Phenomenological Perspective.") These changes in behavior cause the infrastructure to work less

[2] In this paper, behavioral targeted advertising will always refer to social media advertising.

efficiently, but perhaps not to break down entirely. What Sarah Roberts has called the "logic of opacity," present in nearly all technology companies (particularly corporate social media entities like Facebook) is unsustainable for infrastructures long-term (Roberts 2018). The *imagined infrastructure* takes on such significance that it ultimately has a tangible effect on the "actual" infrastructure of behavioral targeted advertising.

This paper is organized to move from the tangible aspects of this phenomenon (the *moment of creepiness* and the changes in behavior that result from it) to the less tangible (*imagined infrastructure*). Section III is a literature review of work on "creepiness," especially as it relates to technology, data, surveillance and privacy. Section IV presents research questions, describes the method of content analysis, and reviews the research design of a qualitative case study. Section V presents the data.. Section VI introduces the notion of *imagined infrastructure* by first mapping behavioral targeted advertising on Facebook onto Susan Leigh Star and Karen Ruhleder's characteristics of infrastructure, and then analyzing users' behavior through the lens of phenomenology. This allows for a more nuanced analysis of how *imagined infrastructure* bridges the gap between the *moment of creepiness* and changes in perception, attitude, and behavior. Section VII concludes the paper with a policy-focused discussion of how corporate social media's obscurity came to be so pervasive.

III. Literature Review: Creepy contexts

Joseph Turow has argued that when people, in particular lawmakers, use words like "creepy," "icky," and "spooky" to describe behavioral advertising, this demonstrates a profound misunderstanding of how the systems behind behavioral advertising function. When people in power call the practice "creepy," Turow argues, this demonstrates that they have decided that the problem is not a serious social issue—rather, it has to do with individuals' psychological and emotional states, which can be written off (2011, 172). Similarly, Frank Pasquale states that "Runaway data isn't *only* creepy, it can have real costs" (Pasquale 2015, 26; my emphasis). Pasquale and Turow want us to get "beyond" creepiness. I argue that creepiness is, instead, an important factor in and of itself for thinking through issues of datafication and user agency. It can indicate a *seam* of sorts within an infrastructure designed to be fully seamless and opaque (Ratto 2007); and can be a key point at which to study the phenomenology of *embodied interactions* (Dourish 2003). Kennedy, Poell, and Van Dijck (2015) suggest that Big Data and

the ubiquity of social media logics in contemporary society are often discussed as though users are simply *victims* of dataveillance, rather than agents operating within and shaping ever-complexifying systems of datafication. Contemplating agency, they say, is "...fundamental to thinking about the distribution of data power" (2).

Adam Kotsko, in his book *Creepiness*, looks at the concept in the context of popular culture. He suggests that "creepiness" might be the most apt English translation for the Freudian notion of the *unheimlich.* The *unheimlich* can be considered a blanket term that refers to all manner of unsettled feelings, but Kotsko emphasizes Freud's idea that the term has some innate "ambivalence" to it. The *unheimlich* invokes discomfort and unfamiliarity, but **"**experientially most often involves something that is *all too* familiar, something that fits *too well*" (Kotsko, 2014, 4). Thinking through the phenomenon examined in this paper, we might designate the "familiar" as the subject of a personal conversation that one has had with a friend or a spouse. When this subject comes up again in an *unfamiliar or unexpected context*, violating contextual integrity, it becomes creepy.

Francis T. McAndrew and Sara S. Kohnke bring a more quantitative psychological perspective to the project of operationalizing creepiness. Their article "On the nature of creepiness" (2016) surveys a population of faculty, students, and staff at an American Midwestern University about what traits in a person they consider to be creepy (11). Their findings indicate that "getting the creeps," so to speak, is a response to "the ambiguity of threat" (*ibid.,*14)--that is, when it is unclear whether or not a person or a thing poses a threat. Furthermore, a person may be classified as creepy if they display "non-normative nonverbal behavior," among other traits that could also be considered non-normative, and thus create an impression of unpredictability. On the other hand, Shkloviski et. al (2014) found that, after they had informed app users of the way the apps were sharing their data, participants overwhelmingly "expressed dismay, even outrage," but did not change their behaviors or patterns of smartphone use. The authors call for a change in how engineers and designers think about creepiness and privacy as they design apps, suggesting that, "For this, we need a practical theory of creepiness, its varieties, and its temporalities (e.g. does creepiness fade over time with familiarity, and if so, what replaces it?)" (*ibid.,* 2355). The answer to the parenthetical question here—suggested by the authors with the statement: "we are fumbling with the now norms rather than looking to the

[future] where these norms might move as a result of technologies we are developing"—is that our informational norms are not developing in pace with the technology of big data and behavioral advertising, resulting in a disconnect between what users expect from technology and what it is actually doing.

Lisa Barnard's 2014 dissertation, *The Cost of Creepiness: How Online Behavioral Advertising Affects Consumer Purchase Intention* focuses in part on the online marketing practice of behavioral targeting. She defines the practice as "marketers track[ing] consumers' Internet use and tailor[ing] ads for them based on that behavior." Barnard theorizes that people find the practice of "retargeting" (in which advertisers show users ads for products they have shopped for previously, on different websites from the original shopping website) creepy (Barnard, 1). She goes on to argue that "perceived creepiness" can increase the perception of a "threat or lack of control." However, instead of insinuating that creepiness is a result of the perceived ambiguity of a threat, as Kotsko and McAndrew and Kohnke did, Barnard suggests the inverse: that the creepier something seems, the more likely we are to perceive it definitively *as* a threat. Barnard goes on to suggest that creepiness may factor into "reactance theory," in which a "persuasive appeal" appears to "threaten a person's individual freedom," resulting in a negative reaction to the appeal. This reaction may manifest in behavior changes, including withdrawal from the service. She suggests this may be happening in the cases of behavioral targeting and, especially, retargeting (*ibid.,* 7). Barnard argues that marketers do not take into account that some of their targeting practices are *so* mysteriously relevant to the user that they may stop using services in the same way, or at all (*ibid.*, 40). She states that a threshold exists for people, including "digital natives," where an advertisement becomes *too* relevant, and users experience negative psychological effects. Ultimately, she calls on marketers to recognize this threshold and attempt to distinguish between relevance and over-relevance (*ibid.,* 91).

IV. Method

In this exploratory study, I performed a qualitative content analysis case study of a Reddit post from November 2, 2017 in which users discuss the video described in the introduction. The virality of the video—as determined by its critical mass of views (see figure 1 in appendix) indicates significance for a large number of people (Varis and Blommaert, 2015; Nahon and Hemsley 2016, 61). The comments in this thread constitute a rich repository of

theorizing (many Reddit commenters propose different ideas about what is happening), strategizing (at several points in the thread, users give each other advice on how to change their settings or delete their Facebook apps), witnessing (many users share their own stories of having experienced the Facebook-listening phenomenon), and debating (commenters hold their theories about what is happening quite strongly—and argue with one another about them).

A. Research Questions

1. Do people feel that the phenomenon in question to be uncomfortable, creepy, or scary? 2. Does an individual need to have a direct, personal experience with the phenomenon to "believe" in it, so to speak? 3. What kinds of debates are going on between commenters? 4. What kinds of behavioral changes (chilling effects) take place as a result of belief in the theory? (i.e. Do users delete or uninstall apps? Do they delete accounts entirely?) 5. What is it that makes this phenomenon *so* creepy/chilling/upsetting that users are changing their behavior as a result of experiencing it?

B. Content Analysis

Researchers have employed content analysis widely as a method for analyzing mass media products, in particular newspapers and television, since the 1980s (Krippendorf 2013, xiii). In the last two decades, scholars have attempted to bring the method of content analysis into the digital realm, facing many challenges in doing so. Hurwitz, Alvarez, Lauricella, Rousse, Montague, and Wartella (2016) have outlined seven challenges that come with online content analysis.

First, there is the problem of the vastness of the content available online. Studying just one platform can prove to be an insurmountable task. I have addressed this in my study by limiting my analysis to a single viral Reddit thread. I do not claim that it is possible to generalize about the opinion of all who have experienced the phenomenon, or even about the significance of the phenomenon, but I do think that it gives a good indication of both. The second challenge, that of finding a suitable sampling frame, is difficult in the digital environment because "published lists of new media products" become outdated nearly immediately. I used a search engine to identify all comment threads or other discussions relevant to my topic, and then sampled one thread, which contained the largest number of comments. This sampling technique is discussed

briefly by McMillan: “us[ing] search engine(s) to identify sites that met criteria related to the purpose of study” (2000, 83). The third challenge stems from the ephemerality of the Internet: how can a researcher sample from something reliably if it is constantly shifting and changing? Hurwitz et al. suggest that this problem can be mitigated by either collecting data in a finite timeline, or by using software to automatically collect data. I chose the former: the data for this project was collected on November 8, 2017, by saving each sub-thread in the larger thread from the browser in PDF form. All 11,000 comments were captured in this way. The fourth challenge, the inability of software to capture some of the nuances of the online environment, is not applicable to this project.

At this point in my research, I am the only person manually coding the thread—another reason that I chose just one thread to work with at this stage. I have addressed the fifth challenge, “deciding how much data to collect from a sampled media product,” by opting to collect all of the data from the sample, as described above. For challenge six, consisting of a decision between breadth (coding using software) and depth (using human coders), I have opted for depth. Challenge seven, verifying that specific populations are consuming the media products that the scholar wants to analyze, is not relevant to the topic at hand: all of the content to be analyzed is a text-based discussion of a certain kind of engagement with targeted advertising, the media product in question.

V. Data

Facebook’s official statement denying that they listen to users does not provide an alternative explanation for the phenomenon of highly specific advertising. Nor does their privacy policy shed much light on what might be going on. The company states that they collect the following user information: full name, email address, demographic information (age, gender), work information, all content created and shared, photo and post metadata, “information that other people provide about you when using the services, including when they send a message to you or upload information about you; all communications with other users of the services;” and feedback provided directly to Facebook (Facebook, *Data Policy,* 2017). They sell this information to third-party providers, and track users using cookies, as well.

We can see the commenters on Reddit wrestling with the lack of information from Facebook—the ambiguity of what has caused the *moment of creepiness*—and formulating opinions about what is going on using their own anecdotal anomalous experiences. One user discusses a medical issue: "I had a urinary tract infection. Didn't search for remedies or otherwise do anything online in regards to it, but somehow Facebook had ads for all manner of things for UTIs including a walk-in clinic suggestion. I promptly deleted Facebook. Zuckerberg is a creepy stalker." Another commenter stated:

> I've never allowed any Facebook app microphone access and I still get ads targeted around my conversations. I do have WhatsApp so that is likely the culprit. I have disabled its microphone access. These are 100% ads targeted about things I have only spoken about and not Googled or searched in any way. One time we kept mentioning pregnancy tests all day just to see if they would appear and lo and behold the next day they did. These are not like Google's ads, I know Google listens in as well but at least they do only seem to target ads in other apps (such as games) about things I have searched and clicked on. Facebook is creepy specific. ("YouTube User Demonstrates…" Reddit, 2017).

These users are two among many who mentioned they found Facebook creepy and changed their behavior as a result. Both users mention not having searched for anything regarding the topic they were advertised, which indicates that they were aware of the ability that Google and Facebook have to track users in the online environment. These commenters *expected* to be tracked online, but were "creeped out" when this tracking appeared to extend into the offline world. Although an offline/online dichotomy may seem simplistic, the two contexts do have different informational norms. Particularly with contemporary mobile phone capabilities, the online and the offline worlds are blurred (Miller et. al, 101). Yet it is also true that individuals treat online and offline social networks differently, and build them out differently as a result (Williams, 2006). Indeed, one user stated that she clearly thinks of the online and the offline differently: "I'm 100% okay with assuming that my life on the Internet isn't private, but it is WAY too far when I can't even have privacy IRL."

Other users pushed back against the idea that Facebook is eavesdropping on its users oral conversations. One user suggested the following explanation in the midst of one debate: "Machine learning and AI can easily pull together seemingly disparate data and pull together patterns that computer engineers aren't creative enough to imagine. Long story short, Google and Facebook don't need overt rudimentary tools to crudely record and store audio. Pattern

recognition and torrents of reams of data of all users across all its platforms is all it needs." Another user pointed out that, "Big Data and the associated deep learning mechanisms are an amazing thing that is not understood pretty much on almost any level by the average person yet, but they are involved intimately with them every single day." In reference to a user whose anecdotal evidence of the Facebook-listening phenomenon concerned a discussion about Nest smart thermostats, another user responded:

> This story and a lot of similar ones can be explained by location tracking. The advertising networks knew your friend was searching for thermostats. Maybe it was through Amazon or Google or some other site, but advertisers knew about it. Maybe they even know he bought it. Now if they're tracking their location and your location and happen to see the locations match up, they know this dude has been searching for thermostats and there's a chance you've been talking to him. Maybe he was telling you about the thermostat. In that case, they can decide to target thermostat ads at you ("YouTube User Demonstrates…" Reddit, 2017).

These explanations concern Facebook aggregating and analyzing large amounts of data about a user and his network. Many of the comments in the thread concern a debate between commenters who have had personal experience with the phenomenon and *believe* that Facebook is listening, and those who argue that they can figure out what is happening despite total infrastructural opacity and ambiguity.

Some pro-algorithm users condemn the stories of "believing" users by calling them "anecdotal evidence;" Other users state "this is anecdotal, but here is my story anyway." One such user presented the following story:

> My partner the other day mentioned a certain brand of mattress that's supposed to be good and that we could look into buying one. I have no problem with our mattress so I didn't search for it online. I'd also never heard of this brand before. I don't recall having a mattress advert come up on Facebook before. After she mentioned this brand though, for the next few days I got several adverts on Facebook for this particular brand of mattress. They're definitely listening. ("YouTube User Demonstrates…" Reddit, 2017).

This user was responding to another user who had condemned yet *another* user for presenting anecdotal evidence, but he doubled down on the fact that he believes this is happening despite qualifying his story as being "anecdotal." The fact that multiple people are experiencing similar *moments of creepiness*, is itself evidence that the phenomenon should be examined more closely.

Another debate that surfaced in the comments had to do with which explanation was creepier: the notion that Facebook was listening in to conversations, or the idea that the

algorithmic analysis of an enormous database of information about a user and her friend network allows Facebook to draw the same conclusions—in other words, that they don't "need" to be listening to face-to-face conversations. One commenter suggested that the algorithmic explanation is "both easier and less obviously immoral to implement." Another commenter responded, "and yet still disturbing." To these users, the algorithmic explanation is the more "moral" of the two, because users have given their (perhaps uninformed) consent to it. Still other users agreed: "listening to your conversations when idle is far weirder than basing your recommendations on your friends' activity;" the algorithmic explanation is "not quite as overtly creepy, but either way is pretty bonkers." ("YouTube User Demonstrates…" Reddit, 2017).

However, other commenters found it to be the opposite, stating that the aggregation explanation is no less creepy than the listening-in explanation: "Aggregating data without my consent is exactly what companies like Equifax do we all know how that turned out;" the algorithmic explanation "is arguably creepier, but not as overt as straight up using the mic;" "is kind of creepier than using your mic;" "even creepier;" "far more creepy and insidious." Other users are ambivalent about the method of collection: "At this point, who cares HOW it's happening. It's happening and it's creepy. Get out of my living room Facebook." "Does it really matter if they're listening or using constant geolocations and IP addresses to track where you've been and what you're doing for ads? It's all a huge invasion of privacy." There seems to be a wide range of opinions about where the creepiness stems from, in addition to what exactly the explanation for the phenomenon may be.

Often, changes in behavior result from what an individual thinks Facebook is "doing," so to speak—that is, how they picture the infrastructure. As mentioned earlier, some commenters, including ones quoted earlier, mention deleting Facebook (either the app or their account), and disabling Whatsapp's and Facebook's microphone access, respectively. Other users mention deleting the Facebook and messenger apps on their smartphones, reducing social media use in general "so I can minimize the details they know about me," deactivating their accounts, turning off all permissions and keeping restrictive privacy settings on the Facebook app, using a separate app called Microphone Blocker to block the microphone access on all apps until they need to use the mic (a camera blocker also exists), and deleting the Facebook app from a Samsung phone (on which it comes pre-installed and is difficult to delete—there is an entire individual comment

thread in the Reddit in which different users guide one another through the process of doing this). ("YouTube User Demonstrates…" Reddit, 2017). Turning off microphone access or disabling *just* the microphone on one's phone will only have an effect if Facebook is indeed listening. However, even those who believe that Facebook is listening will often take other precautions just in case, such as deleting the app from their phones.

VI. Discussion

A. Imagining Infrastructures

Susan Leigh Star (2016) rejects the more technical definition of infrastructure as "a system of substrates," arguing that a system may be an infrastructure for one person, but not for another (477). With Karen Ruhleder, Star (2016) defines infrastructure according to nine properties: "embeddedness," "transparency," "reach or scope," "learned as part of membership," "links with conventions of practice," "embodiment of standards," "built on an installed base," "becomes visible upon breakdown," and "is fixed in modular increments."

Embeddedness describes the characteristic of infrastructure as it is "sunk into other structures" (Star 2016, 477). Corporate social media in general is built on advertising as its revenue model; in this way advertising is embedded in the system of corporate social media. *Transparency* refers to the notion that infrastructure "invisibly supports" a variety of activities (477). Social media advertising supports the activity of scrolling through a social media feed—often tolerated as the price for being on social media. *Reach or scope* indicates that infrastructure goes beyond "a single event or one-site practice" (477). Certainly, social media advertising is distributed throughout the reach of the social media network itself; not only in terms of the users reached, but also in terms of the different devices on which users access the platform. *Learned as part of membership* refers to the fact that "New participants acquire a naturalized familiarity with its objects, as they become members" (477) Those who have been on social media for a long time are *used* to seeing advertisements and interacting, or not interacting, with them. For a first time user, new to social media, it could be distracting and confusing to see something unfamiliar pop up that, in format, looks quite like the rest of their feed. Of course, this person would also have to be unfamiliar with advertising as a practice in general, suggesting that perhaps there are

layers to membership in corporate social media advertising. *Links with conventions of practice* indicates that, "infrastructure both shapes and is shaped by the conventions of a community of practice" (477). Again, there are layers to this in the case of social media advertising. In the largest sense, conventions of practice of corporate social media exist within and are shaped by capitalism, especially with the drive to continually grow the company. Conventions of practice may also be to blame for the constant attempts to obscure any and all activities carried out by social media giants (again, Roberts' [2018] "logic of opacity").

In *embodying standards*, infrastructure plugs in "to other infrastructures and tools in a standardized fashion" (Star 2016, 477-478). Advertisements on Facebook and Instagram, for example, are formatted so that they look like any other post. If the advertisement is a video, the sound will play or not depending on whether or not you have set sound to be on for other videos on the platform. This functions to make advertisements less distinguishable from other posts on the platform. Infrastructure is also *built on an installed base* meaning that it "wrestles with the inertia of the installed base and inherits strengths and limitations from that base" (478). This property is more difficult to apply to advertising on corporate social media. This is in part because it is not clear exactly what the structure of social media advertising *is*, as will be elucidated later on in this paper. As has already been addressed, when infrastructure *becomes visible upon breakdown,* its transparency fails—that is, its presence *as* an infrastructure becomes apparent. Breakdown can reveal more than simply the presence of an infrastructure—often, it also reveals its reach and scope. Finally, infrastructures are *fixed in modular increments, not all at once or globally.* That is, "Because infrastructure is big, layered, and complex, and because it means different things locally, it is never changed from above" (478). Thus, to make changes to the infrastructure of corporate social media advertising, individuals must re-orient themselves to it, making changes modularly on the local level. *Imagining* the way that infrastructure may extend into space is one aspect of doing this.

Where the points of connection between an individual user and the infrastructure of Facebook advertising are, is equally as important as her awareness of these points. One point of contact is her smartphone: its geolocation data, the data shared between the Facebook app and other apps, the Facebook app itself (as well as Messenger, Instagram and WhatsApp—all owned by Facebook). Another point of contact is her computer, and the third-party websites for which she has made an account by connecting her Facebook account. Furthermore, her friends and her

interactions with them on these platforms constitute points of contact. And there are many more, of course. However, she may not be aware that these *are* points of contact with the infrastructure of Facebook advertising. And so she imagines a new point of contact.

Importantly, too, those who do not own a smartphone, perhaps because they cannot afford one, do not have as many points of contact with the infrastructure, so they do not experience the phenomenon in question in any sense. They have not learned the *conventions of practice* as part of *membership.* According to Star (1990), those who are not members of a network often view it as a "source of chaos and trouble" because its standards do not conform to their own needs as users. She further argues that any analysis of a network must choose a "point of departure:…does [a given network] represent a stable network, a source of chaos, or a third thing altogether?" (42) Star is here discussing networks rather than infrastructures, but her point that networks can be viewed from different perspectives and function differently stands for infrastructures as well. And as we have seen evidence of already, many Facebook users, upon experiencing a *moment of creepiness*, feel their perception shift: Facebook swings from "a stable network" to "a source of chaos."

Matt Ratto (2007) problematizes the socio-technical design value of *seamlessness* that is implicit within many systems of ubiquitous computing. Seamlessness is the value upon which certain infrastructural features, especially invisibility, are predicated. In Ratto's words, infrastructural function is predicated on "a conflation of social, technical, and legal regimes, that, in addition to the technical objects themselves, work to create and maintain a coherent and seamless experience for users" (3). Ratto discusses Chalmers and Galani's notion of *seamful design*, which argues that seams and boundaries are important for users to understand where they come in and what their particular kind of agency could be. Seams between systems in the infrastructure of behavioral targeted advertising can reveal a lot about the functioning of an infrastructure, its users, and its contexts. Ratto concludes his paper by saying, "...it appears that the seams between systems provide the most opportunity for extending, troubling, and repurposing infrastructures...without knowledge of the boundaries, users may be left with little ability to negotiate the moments of switching between active and passive roles." The phenomenon at hand in this project is a solid example of a "seam" appearing within a technology that was designed with seamlessness in mind. The positive aspect of users experiencing *moments of creepiness* is that it spurs them into realizing that their agency is determined almost wholly by

the advertising infrastructure in which their data shadow self lives. They may, as illustrated in the "data" section of this paper, come to a realization that they need to take more control over their informational environment. Perceiving this one seam, between the gathering of user data, processing of that data, and reflection back to the user, makes all of the existence of the data processing black box more visible, even as it emphasizes the invisibility of how the infrastructure itself functions. .

B. The Phenomenological Perspective

Infrastructures direct and guide us through related systems and substrates. Recognizing behavioral targeted advertising as an infrastructure concretizes it in spite of its persistent opacity. Phenomenology allows for an examination of the way this infrastructure is perceived, and how it is spun out into space through the imagination of an individual who experiences a *moment of creepiness.* Thus, the phenomenological perspective will help us to comprehend what exactly about the *moment of creepiness* causes users to see Facebook as chaotic rather than stable. Within the field of Human-Computer Interaction, phenomenology has proven useful for thinking through how technologies are embodied within individualized subjective experiences. Phenomenology, "...points to our action-oriented way of being-in-the-world as determining how we experience the things around us, and it emphasizes the important role that embodiment plays in perception and cognition" (Gallagher 2014). To think through the problem of too-specific behavioral targeted advertising on social media phenomenologically is to understand the effects of design infrastructures that purport to be value-neutral.

Phenomenology, founded as a kind of "radical philosophy" by Edmund Husserl in the early 20th century, is a descriptive practice. Husserl reacted against both the overly-positivist practices of psychological diagnoses, and the immaterial, intellectualized floatings-about of philosophy. The goal of phenomenology is not to *explain*, but rather to *describe*, in the fullest sense, a phenomenon both as object(s) and as individuals experience it cognitively. This is termed a "reduction" of phenomena to their *modes of givenness*, made again material and spatial, set free from philosophical or other kinds of judgments or assumptions about their nature.

In this case study, the anecdotal nature of some commenters' experience with too-specific Facebook advertisements, condemned as empirically useless by many of the Reddit commenters, in fact proves to be phenomenologically significant. In the words of Dermot Moran, "…the way

problems, things, and events are approached must involve *taking their manner of appearance to consciousness into consideration*" (2000, 6). Husserl's objective was to understand and describe the "basic structures of consciousness," that influence the ways in which humans perceive objects (Gallagher 2014). For Husserl, intuition was an important aspect of consciousness; it was the embodied experience at the root of all judgment and thought. His Principle of All Principles is as follows: "every *originary presentive intuition* is a legitimizing source of cognition…everything originally (so to speak, in its 'personal' actuality) offered to us in 'intuition' is to be accepted simply as what it is presented as being, but also only within the limits in which it is presented there" (Husserl 1982, sec. 24). That is, intuition is the first step in drawing conclusions about a phenomenon. For this case study specifically, the embodied intuition—the *moment of creepiness* —must necessarily occur before the work of imagining the infrastructure behind the phenomenon can take place.

Imagination, *l'imaginaire,* is significant at certain points and for Husserl and other purveyors of phenomenology. Husserl argues that imagination (or, in his words, "phantasy,") is an embodied experience of an object when it is not present. He calls this a kind of "quasi-perception" (Husserl, 2005). For Jean-Paul Sartre, who drew on empirical psychology for his work in phenomenology (Gallagher 2012, 74), imagination is decidedly *not* a kind of perception. Sartre argues that imagining something is like *intending* it, that is, bringing it into being. Imagining an infrastructure, then, manifests it in some way. However, Sartre claims, the imaginer is always aware that his imagination does not reflect reality except in some circumstances. One of these circumstances, it seems, has to do with imagining that is derived from filling in the blanks, so to speak. Here Sartre cites several "schematic drawings" (Sartre 1948, 41). In reference to a sketch of a man (figure 2 in Appendix), Sartre states,

> In these black lines we do not only envision a silhouette, but a complete man, we concentrate in them all his qualities without differentiation: the drawing is filled to the breaking point. But, these qualities are not really *represented:* in fact the black lines *represent* nothing more than some structural relationships and an attitude. But a mere hint of representation is enough for all the knowledge to descend upon it, thereby giving a sort of depth to that flat figure. Draw a man in a kneeling position with arms uplifted and his face assumes the expression of indignant surprise. But you do not *see* it there: it is there in a latent state, like an electric charge (Sartre 1948, 42).

It is in this same way that imagined infrastructure manifests itself in a near-tangible sense. The ambiguity of the actual *shape* of the infrastructure is such that the user can see parts of it—specifically, the output in the form of a too-specific advertisement. Thus, the user imagines what the rest of the infrastructure must be. In particular they give "depth to that flat figure," by imagining that part of the infrastructure consists of recording in-person conversation—that the infrastructure reaches out, in a sense, from their smartphone into their physical space.

Maurice Merleau-Ponty, in his seminal *Phenomenology of Perception* (1962) made the observation that imagining an object or person brings them into being in a partial sense, because the imaginer's behavior changes as though the object or person is in their presence. In giving an example of imagining a friend, Peter, Merleau-Ponty muses:

> When I imagine Peter absent, I am not aware of contemplating an image of Peter numerically distinct from Peter himself. However far away he is, I visualize him in the world, and my power of imagining is nothing but the persistence of my world around me. To say that I imagine Peter is to say that I bring about the pseudo-presence of Peter but putting into operation the 'Peter-behaviour-pattern' (Merleau-Ponty, 181).

For Merleau-Ponty, then, changes in behavior themselves constitute manifestation of the presence of the imagined. Those who experience the *imagined infrastructure* (that is, those who imagine the infrastructure) act differently toward actualized objects that are part of the Facebook advertising infrastructure—the smartphone, the app, the service itself. Thus, the imagined infrastructure is functionally brought into being.

Importantly, too, phenomenology has always resisted, at various levels and times, the positivist tenet that objectivity exists. Instead, phenomenology "attempts to provide a rigorous defence of the fundamental and inextricable role of subjectivity and consciousness in all knowledge and in descriptions of the world." (Moran, 15). Sara Ahmed has brought this notion into conversation with queer theory in her 2006 monograph *Queer Phenomenology.* Ahmed gives us some useful ways to think about what it means for a body to be *orientated* in space, towards objects, and how that relates to familiarity with a space or an object. Ahmed draws mostly on Husserl and Merleau-Ponty for her discussion of phenomenology, arguing that there are many "queer moments" of disorientation within the discipline already. Thinking through orientation and disorientation, Ahmed writes, "In order to become orientated, you might suppose that we must first experience disorientation. When we are orientated, we might not even notice that we are orientated: we might not even think 'to think' at this point. When we experience

disorientation, we might notice orientation as something we do not have." (5-6) In the case of the phenomenon in question, disorientation occurs at the *moment of creepiness.* Immediately, users are disorientated towards their mobile devices. They will re-orient once *imagined infrastructure* manifests in their consciousness, but it will be in a very different way.

For Ahmed, orientation, familiarity with space, and "feeling at home" are inextricable. Spatial orientation is particularly important: "Familiarity is shaped by the 'feel' of space or by how spaces 'impress' upon bodies. This familiarity is not, then, 'in' the world as that which is already given. The familiar is an effect of inhabitance, we are not simply in the familiar, but rather the familiar is shaped by actions that reach out toward objects that are already within reach" (7). Smartphones, part of both the imagined infrastructure and the "true" infrastructure of Facebook advertising, exist for many as exceedingly familiar objects--particularly as they are designed often with the implicit value of *seamlessly* fading into the background of daily life (Ratto 2007). We pick up our smartphones to check email, text, etc., almost unthinkingly. In that sense, we are always orientated towards our phones—many individuals constantly know where their smartphones are located, and become anxious when they are temporarily lost.

Indeed, smartphones are considered to be objects of informational agency. Shkloviski, Mainwaring, Skúladóttir, and Borgthorsson (2014) suggest that smartphones are, among other things, functionally "about projecting and constructing the self" (2348). Certainly, smartphones present an opportunity for self-determination through social media, etc., but they also may limit our agency. We constantly produce large amounts of data from our smartphones, and in that way we create a secondary layer of personhood that exists within and around the smartphone-object, our "data shadow" so to speak. The uncanny *moment of creepiness* is one of recognition, when we see our data-shadow-self reflected back at us through an advertisement. The familiar smartphone-object, in which we feel "at home" in some sense, has its everyday comfort revoked by the ultra-familiarity of the advertisement, the unexpectedness of the reflection. The *moment of creepiness* therefore has as much to do with an unexpected encounter with dis/embodied identity as it does with feelings of violated privacy.

Spatiality is fundamental to the phenomenon in question, particularly with respect to the *imagined infrastructure.* It is relevant in a concrete sense as well: many of the conclusions drawn by the system (that your friend bought a product, and so you would be interested in that product)

are most likely related to geolocation data. That is, the system is "aware" when an individual is having lunch with a friend, because the two smartphones are physically close together.

Michel de Certeau's (1984) ideas about spatiality are also relevant for this project. He introduced the notion that any designed system cannot be fully controlled by those who designed the system. Inevitably, it will be encountered and activated by users in unanticipated ways. Those who walk around the city write the "urban text." They operate within the established, designed framework of streets and alleys, but cannot be directed in any specific way beyond that framework. As a collective, the walkers define the city itself. The streets of the city are an infrastructure, but that infrastructure is not activated into a *space*, a *city,* until the walkers walk through it in unpredictable ways. This notion can be applied to advertising, as well. Stephanie O'Donohoe states that, "Advertising texts are inherently polysemic; while text and context place some constraints on readings, they are open to multiple and not necessarily consistent or compliant interpretations" (2001, 95). Even within a structured text *and* a structured context, a multiplicity of consumer behaviors follows from a multiplicity of interpretations. Yet, the entire purpose of advertising infrastructure is to guide consumers to buy products. This is one reason that the *moment of creepiness* can be considered a semi-breakdown of the advertising infrastructure—because it is no longer guiding users in the way it was designed to. In de Certeau's words, "To practice space is thus to repeat the joyful and silent experience of childhood; it is, in a place, *to be other and to move toward the other.*" Practicing space, therefore—activating an infrastructure—can be ambivalent: joyful as well as dissonant. Imagining an infrastructure functions as a kind of amplified activation.

It is important to note here the significance of the notion of text versus context. In a 2003 article, Paul Dourish questions whether or not designers' positivist conceptions of context are doing productive work. He particularly draws attention to the given positivist notion that context exists as a separate entity from activity/content: in this view, context, which "describes features of the environment" provides the static setting for the activity or content. Presenting an alternative view of context, not positivist but also not fully phenomenological, Dourish suggests that context and activity should be taken together, as one entity: "*context arises from the activity*. Context isn't just 'there,' but is actively produced, maintained and enacted in the course of the activity at hand" (2003, 22). Considering "activity/content" to be analogous to "text," we might conclude that Dourish's notion of *embodied interaction* is similar to de Certeau's "walking the

city:" the planned *text* (the city) is activated by the activities and contexts of users. In conceptualizing *activity* and *context* separately, designers of behavioral targeted advertising infrastructure did not predict the effects of too-specific advertisements. In practice, geolocation data--viewed by designers as purely *contextual*--turns out to be indistinguishable from the *activity* of a verbal conversation with a friend. Designers of the Facebook advertising infrastructure treating them as separate entities may be one root of the phenomenological issues outlined in this section. However, it bears recognizing that embodied interaction is, in some sense, unpredictable. Is it even possible to design *seamfully*, with embodied interaction in mind?

Ahmed argues that space not only shapes bodies, but that bodies also shape space. The spatial nature of the imagined infrastructure is significant. It is the way that a body's orientation is able to affect space: by bringing an imagined infrastructure, functionally, into existence through quasi-perception and behavioral changes. It is not only the immediate space of the individual in relation to her phone that is affected by the imagined infrastructure—the extant infrastructure is affected as well. So many imagining the infrastructure in the same way, and changing their behavior in relation to points of contact with the infrastructure in similar ways, inevitably has an effect on the infrastructure as a whole. Thus, not only are individual users affected by the infrastructure of targeted behavioral advertising on Facebook, but the infrastructure is also itself affected by the imagination of it extending into physical space. Users have become suspicious of the system, their orientation and behavior towards it has shifted to the point that it no longer behaves as it was designed to.

VI. Conclusion

This paper has shown that the tendency of technology companies to keep their systems in total obscurity contributes to infrastructural failings. The *moment of creepiness* in which a user sees an advertisement for a product that had recently come up in an in-person conversation is the catalyst for that same individual to *imagine* an *infrastructure* in which their smartphone is actively listening to them. This imagined infrastructure is spatial, due in part to the fact that infrastructures are generally spatial entities. The behavioral changes that result from this imagining of infrastructure, or any other kind of theorizing, necessarily affect the system as a whole as each module (in the form of an individual user) changes the way that they interact with

both their smartphone and with Facebook as a service. Facebook took a risk by building such a powerful and obscure infrastructure, in the name of growing the company, and it has seen some consequences from this, such as Mark Zuckerberg's having to testify before congress in the wake of the Cambridge Analytica scandal (Wichter 2018).

Several paths for further research into this topic exist. First, a more robust study would analyze continuing conversations about smartphone eavesdropping that have taken place since 2017. Further, some larger questions could be answered in a deeper inquiry: is it possible to design an infrastructure that remains opaque to users *seamfully*, as Ratto (2007) suggests? Alternatively, can an infrastructure that must function within logics of opacity (Roberts 2018) ever be built using critical technical practice (Boehner et. al 2005)? Can it ever be built upon a design value like social justice? On a separate note, what do other imagined infrastructures look like? Can imagined infrastructures exist where no original infrastructure exists at all? Is obscurity/opacity always needed for an imagined infrastructure to come about? Are imagined infrastructures only manifest in relation to technology? Many other questions could and should be asked regarding this subject. In the end, it is imperative that we recognize that because of this phenomenon, the infrastructure of Facebook advertising has faltered—a sign of hope in the face of the enormous power wielded by such companies.

Appendix

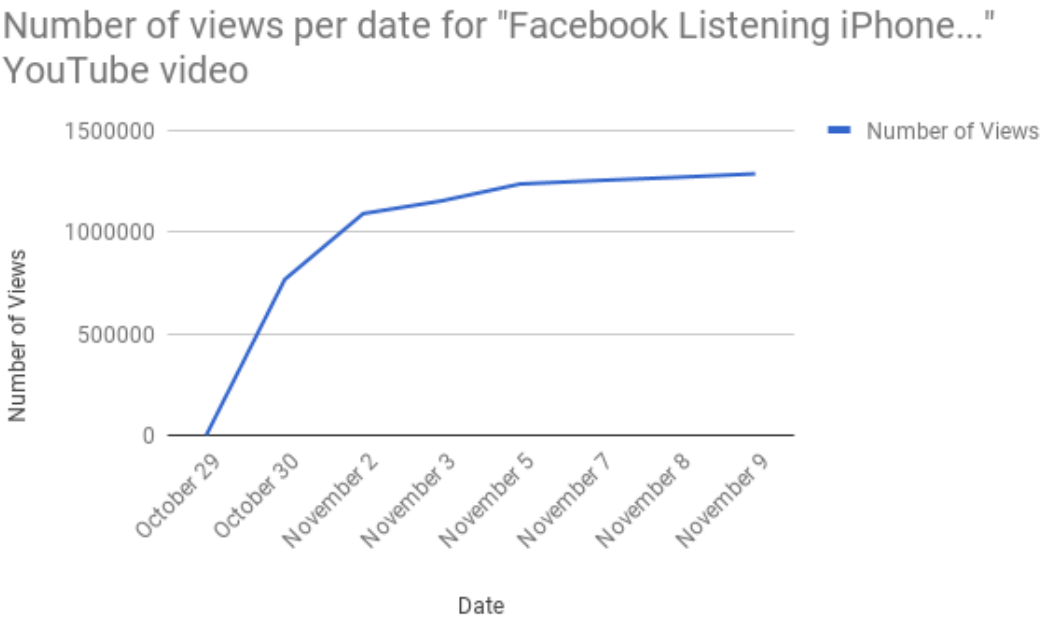

Figure 1: Cumulative views per day of "Facebook Listening iPhone…" video. Starting value on Oct 29 is 2,514 views.

Figure 2: Jean-Paul Sartre, *The Psychology of Imagination, 1940.*

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