Abstract

This empirical study explores labor in the on-demand economy using the rideshare service Uber as a case study. By conducting sustained monitoring of online driver forums and interviewing Uber drivers, we explore worker experiences within the on-demand economy. We argue that Uber’s digitally and algorithmically mediated system of flexible employment builds new forms of surveillance and control into the experience of using the system, which result in asymmetries around information and power for workers. In Uber’s system, algorithms, CSRs, passengers, semi-automated performance evaluations, and the rating system all act as a combined substitute for direct managerial control over drivers, but distributed responsibility for remote worker management also exacerbates power asymmetries between Uber and its drivers. Our study of the Uber driver experience points to the need for greater attention to the role of platform disintermediation in shaping power relations and communications between employers and workers.

Keywords

digital labor; on-demand economy; Uber; interaction design; flexible employment; ridesharing; algorithm; data; middle manager; rating; surge pricing; entrepreneurship; sharing economy; workplace surveillance
Introduction

The Uber “rideshare” smartphone application, which connects drivers of private vehicles with riders, markets itself as part of the so-called “peer,” “sharing,” or “on-demand” economy (Scholz, 2013), characterized by workers who are independent contractors and not employees (Malhotra & Van Alstyne, 2014). Uber claims that it is “just an app” (Lowrey, 2015), an intermediary platform (Gillespie, 2010, p.2) between users, passengers and drivers which eludes legal responsibility as a traditional employer. This positioning reveals the tensions in which the company is often embroiled: Uber makes claims that its platform fosters entrepreneurship in drivers, while simultaneously exerting significant control over how drivers do their jobs through constant monitoring, predictive and real-time scheduling management, routine performance evaluations, and implicit and explicit rules about driver performance.

Our research addresses the question of how workers experience labor under this regime of algorithmic and semi-automated electronic management (Irani, 2015, p. 228). Our methods combine a qualitative study of Uber drivers in both digital and physical spaces with a design critique of Uber’s technical systems and a discursive critique of its corporate communications (ads, interviews, policies). Our findings coalesced around the dynamics of Uber’s system of surveillance and control over workers’ behavior. Our conclusions are two-fold: first, that the information asymmetries produced by Uber’s system are fundamental to its ability to structure indirect control over its workers; and second, that Uber relies heavily on the evolving rhetoric of the algorithm to justify these information asymmetries to drivers, riders, as well as regulators and outlets of public opinion. In support, this paper examines four main features of Uber’s system: electronic monitoring; surge pricing and labor scheduling; the conflation of real-time and predictive analysis; and driver ratings. In each of these cases, we posit not only the intention behind Uber’s design choices to leverage or effect control indirectly, but the emergent practices of resistance that networks of drivers have developed in response. This two-part analysis illustrates how labor under algorithmic management is not characterized by freedom and flexibility, but by opposing conditions of surveillance and resistance.

We performed archival and real-time analysis of online Uber drivers between December 2014 and September 2015.¹ Online forums are particularly vital for understanding the experiential knowledge of Uber drivers. Drivers use these forums in a number of ways: to learn tricks and tips for being successful within Uber’s platform; to compare and share practices; to vent about passengers and the company; and to debate Uber’s practices, and discrepancies between the passenger and driver apps (Rosenblat, 2015; Clark, 2015; Snyder, 2015). The knowledge that drivers must acquire to be successful within Uber’s information space is shared in these semi-private or discrete publics. Since driver contact with physical Uber managers are primarily limited to the initial recruitment process, these communication networks are of particular importance – Uber communicates with its drivers almost exclusively via email and text.

Data was observed and collected from five dedicated forums (three larger, and two smaller).² Of these larger forums, Forum A is hosted as a standalone website and has 700-1000 daily visitors, according to the forum operator. Forum B is a closed-membership forum hosted on a social media platform and has around 5100 members (the numbers change marginally on a daily basis after increasing by hundreds over the 9-month period). Forum C is a standalone website (i.e. not hosted on a social media site) dedicated to Uber drivers: it has numerous participants and appears to be the largest, but the exact number of participants is unknown. Posters are required to enter minimal contact information in order to register and post on it; the majority of forum participants identify as drivers within United States. Approximately 1350 total archival items were collected, documenting the activities and conversations of drivers through forum posts, interviews, and other personal contacts, including email correspondence with Uber Community Support Representatives (CSRs), selected out of thousands of posts made over a nine-month period. To contextualize and extend the data gathered from forums, numerous casual conversations with Uber drivers took place during normal use of the service. Recognizing the limitations of such informal in-person conversations (e.g., drivers’ discomfort with talking about the service while on the job), researchers also conducted eight in-depth, semi-structured interviews with seven individual drivers to follow-up on issues observed in online forums.

The experiences reported on forums and described by interview subjects are not necessarily representative of

¹ As of October 13, 2015, after this research project was concluding, Uber (2015a) announced that it is rolling out a new app in select markets.
² For confidentiality reasons, we have not listed the names or links to these websites, and quotations are modified.
the Uber driver population as a whole. For instance, drivers who seek out and participate in online forums may be more strongly opinionated than other drivers, or may have had individual difficulties that drove them to seek help and information online. The ability to generalize from reported driver experiences is also complicated by the range of Uber services (of which uberX appears to be the most common) and drivers’ tendency to not identify for which tier of service they drive. However, while these accounts might not describe every driver’s experience, the collected evidence nonetheless reveals several structural features of the Uber system that could potentially affect any driver employed. This work provides a glimpse into the potentially messy work of being an Uber driver, and a starting point for formulating future research questions about the Uber driver experience.

**Digital Labor and the On-Demand Economy**

A growing body of journalistic (Griswold, 2014; Hill, 2015; Hockstein, 2015; Johnson, 2014; Porter, 2015; White, 2015) and academic research has begun to examine the impact of digital technologies on existing industries, the growth of new enterprises purporting to disrupt and break down the power of incumbents, and the conditions of labor and work within these new economic models. Sociologists such as Zwick (2015) have unpacked new terms, such as “prosumer,” (Ritzer and Jurgenson, 2010) that seek to reify the consumer’s role as a producer and manager of goods and services. Scholz (2013) along with his co-contributors to the volume Digital Labor: The Internet as Playground and Factory lay out the range and diversity of questions surrounding digitally mediated labor and new models of production and consumption enabled by digital media. As Scholz notes, “web-based work environments have emerged that are devoid of the worker protections of even the most precarious working-class jobs” (p. 1). Researcher Melissa Gregg (2015) observes the asymmetries between app designers, owners, and the service providers and “between those who offer rideshare work, but also wider questions regarding driver experiences and information asymmetry.

**Surveillance and Information Asymmetries as Business Model**

One of Uber’s undoubted appeals for workers is its promise of “flexible employment” (O’Brien, 2015): in a 2015 survey commissioned by the company, 85% of respondents agreed that flexibility was a major motivator for driving for Uber (Hall & Krueger, 2015, p. 11). To drivers, Uber advertises that, “With Uber, you have total control. Work where you want, when you want, and set your own schedule” and “Freedom pays weekly.” Uber also emphasizes that it creates part-time and full-time jobs: in Toronto, Uber claims it created “the equivalent of over 8,000 new full-time jobs in 2015,” but this equivalence belies the fact that these jobs lack benefits or worker protections. These rhetorical markers of freedom, flexibility, and entrepreneurship are hallmarks of the new “sharing economy,” and, in the case of Uber, they have proven broadly successful (Griffith, 2015). The promotion of entrepreneurship and freedom permits employers, the public, and regulators to imagine that workers “work by uncoerced choice” (Irani, 2015, p. 227). Yet in the Uber system, the labor drivers do is actually shaped by two primary factors: the employer’s use of surveillant practices to effect “soft control” (Deleuze, 1990; Boltanski & Chiapello, 2007) over otherwise flexible independent contractors, and corresponding practices of resistance developed by those workers in the system (Ball, 2010; Levy, 2014). Uber’s digital platform mediates drivers’ activities, performance, and locations, thus enabling constant monitoring even though their workplace is inherently mobile; the boundaries of workplace surveillance are effectively porous, even if they provide an incomplete view of all of the drivers non-digital interactions with customers, such as verbal communications.

Uber’s surveillant practices – accomplished through
both company policy and the interaction design of their app – produce significant information asymmetries
between the corporate entity and individual drivers. Through real-time data collection, Uber’s core full-time
employees, such as data scientists and engineers, have access to and control over vastly greater quantities of
information about each driver’s work experience. Each driver’s metrics can thus be compared to drivers in
aggregate and ranked accordingly; Uber thus produces prompts that direct drivers where, when, and how
to work (discussed in detail below). Information asymmetries are not byproducts of Uber’s app design,
but fundamental parts of the Uber business model. Instead of offering reliable wages, Uber’s system
enforces blind acceptance of passengers by drivers, who are not shown the passenger’s destination or how much
they could earn on the fare. Drivers risk “deactivation” (being suspended or removed permanently from
the system) for cancelling unprofitable fares. The Uber system requires drivers to maintain a low
cancellation rate, such as 5% in San Francisco (as of July 2015), and a high acceptance rate, such as 80%
or 90%. Drivers absorb the risk of unknown fares, even though Uber promotes the idea that they are entrepreneurs who are knowingly investing in such risk. This discourse of entrepreneurship in the tech sector is the legacy of a Silicon Valley environment where highly skilled and mobile workers could take on risks and trade-offs to be part of the start-up world (Neff, 2012, p. 24), but this rhetoric of risk has effectively been retooled to suit a contingent of lower-income workers who are recruited to perform service labor, not highly-skilled technical work.

Uber refers to drivers as “Driver-Partners,” conveying a disassociation from an employer-employee relationship. Drivers in this study generally treated the language as either a formality, hypocrisy, as irrelevant, or as a lever to press negotiations for more autonomy. However, the terms “partner” or “sharing economy” both work to express engagement and commitment to similar goals – in this instance, to align the driver’s goals and motives with that of the company through the articulation of social bonds – even when they are distinctly out of alignment ( Gregg, 2011, p. 85). Uber has full power to control and change the base rates its drivers charge. Uber’s agreement with its “Partners” (drivers) permits drivers to negotiate a lower fare, but not a higher one (Uber Partner Agreement Section 4.1, 2014). Some drivers report strategically ending a trip early, and thus lowering the fare for the passenger, in the hopes of getting a higher rating. Rates, as well as minimum fares, vary across cities; while Uber implies that drivers have the “freedom” to charge less, Uber still asserts almost total control over their drivers’ remuneration. At their lowest, these rates are discussed in forums as a net-loss for drivers after factoring in overhead costs. Uber also perennially and unilaterally changes the commission it takes from each ride, ranging generally from 20-30% for uberX drivers.

Uber claims it has the data to adjudicate disputes between passengers and drivers (such as for criminal
matters like assault claims (LaFrance, 2015)); drivers perceive that Uber favors the passenger, implicating their wages. A fare is “guaranteed” through the credit card a customer has on file, but Uber sometimes retracts it from a driver’s earnings if the company decides that the driver has erred. For example, a passenger may complain about an “inefficient” route. However, there may be physical obstacles invisible to the navigation system; passengers also sometimes instruct drivers to deviate from the GPS-suggested route, or ask for multiple drop-off points for a group of passengers. Some drivers have begun to self-monitor by acquiring dash-cams that face the passenger, so they can use their own surveillant “data” to produce a counter-narrative to the one that Uber presents. Others track their rides manually or through another app in order to verify their pay records. In lieu of other forms of empowerment, dash-cams and alternative logs enable drivers to resist Uber’s power to interpret events unilaterally.

Tools like dash-cams also enable drivers to negotiate the grey area between Uber’s policies and the expectations and practices of Uber passengers. For example, some drivers discuss dash-cams as a tool of protection against false accusations when they carry unescorted minors as passengers. Uber account-holders are allowed to e-hail an Uber for someone other than themselves, but they are not permitted to e-hail an Uber ride for an unaccompanied minor according to Uber’s legal Terms of Service in the U.S. ( Uber, 2015c). But, passenger education on this point is low according to driver forum discussions. For instance, pediatricians’ offices in New York City have started to promote Uber as a fallback method for transporting

3. For instance, in NYC, uberX services as of September 2015 are $0.40/minute and $2.15/mile and the minimum fare is $8. In Austin, TX, the minimum fare is $2 and the rate is 0.18/minute and $1.10/mile.
4. Many drivers perceive that they lose money or make minimal amounts by driving when their overhead costs and expenses are factored in at mileage rates below a certain threshold, such as $0.90/mile.
5. Uber advises drivers of the change, but they have no ability to negotiate it.
Drivers who arrive at their pick-up location to find a minor waiting for them have to choose whether to leave them stranded or to take them to their destination. One fear drivers discuss on this issue is being accused of sexual misconduct with a minor. One Uber CSR advised a driver that, “If you think the rider is below 18 years old, you may still take the trip and write to us after to review the rider’s account information.” Yet, drivers may hesitate to accept this type of advice from a CSR because the risks of carrying a minor are murky. Poor passenger education heightens concerns for drivers because they risk receiving negative feedback on the service they provide if they hold passengers in compliance with rules that they are unaware of.

When an Uber driver accepts a ride request, one of the financial risks the driver faces is that this ride will be only long enough to be charged a “minimum fare,” which are unprofitable. For example, in Savannah, Georgia, the minimum fare is $5 for uberX (as of September 2015). Uber takes a $1 Safe Rides fee off of that amount, plus their commission of 20% on the remaining $4. That leaves the driver with $3.20, not accounting for any of their expenses, such as gas for arriving at the pick-up location and for the trip itself. Yet, the system is designed to encourage drivers to accept all rides by hiding the destination of the passenger, generating goodwill for the company and support from its passenger base. While hiding the destination before a driver chooses to accept or decline a ride request can potentially prevent destination-based discrimination (Smart et al., 2015), it can also foster reduced wages for drivers. In response, some drivers simply log out when they are within hailing range of a neighborhood from which they do not wish to accept ride requests (such as neighborhoods perceived to have high-crime rates, as Lee et al. also note (2015, p. 1607) or if they want to avoid ride requests in order to go directly to a surge pricing area. These drivers have the “freedom” to logout in this manner, but this is a resistance to Uber’s policies rather than a proactive, entrepreneurial strategy – they logout precisely because they would not be “free” to refuse an unprofitable ride otherwise. This situation is a direct result of information asymmetry: Lee et al. (2015, p.1610) found that drivers do not seek control over algorithmic assignments, perhaps in exchange for their flexible working conditions or because of their status as independent contractors. However, the drivers we interviewed sought some control over the remunerative value of their assignments, such as through personalized filtering system for obtaining fares that earn a higher minimum fare, because of their growing awareness of their contentious legal status as independent contractors.

While Uber’s power over drivers is generally structured to be communicated indirectly, such as through performance metrics, Uber’s announcements of rate changes make its control explicit and tangible. For example, in July 2015, drivers in Tulsa, Oklahoma were notified that uberX prices are reduced to increase ridership and boost earnings per hour, and to support this explanation, drivers were shown a graph of how lowering prices in Austin, TX led to a “huge boost in demand, and partner earnings per hour increased by 25% - that’s a lot of extra money!” In reactions that echo other driver responses to rate decreases in other cities, including Austin, drivers respond with incredulity, calling it “Uber math,” “propaganda,” and Orwellian double-speak. They observe that if they do the same amount of rides, they earn less, and more rides means greater wear and tear on their vehicles.
The drivers’ inability to contest or subscribe to stable rates highlights the power asymmetry between Uber and its workers, and points to the narrow brand of entrepreneurialism that Uber promotes.

Data Collection and Workplace Surveillance

Uber’s collection of logistical data from the activities of its drivers and passengers supports its ability to control and change rates based on customer demand and optimization, but it also creates a different metric of value – value that is not directly monetizable to the driver – for driver movements. Uber drivers continue to generate useful data for Uber even when they are not carrying a fare (known as “dead miles”) because they relay data back to the central platform from which inferences can be drawn about traffic patterns, and which feed into supply and demand algorithmic analyses. The automatic production, collection, and aggregation of data from workers who are connected to their workplace, even when they are not being paid, marks the on-demand platform-economy’s departure from a traditional service economy. The digital connectivity of platform-based work enables a type of continuous, soft surveillance by employers/platforms. It also enables more precise, efficient matching between “supply and demand” in real-time by the platform/employer with a broader view of a multifaceted system, while simultaneously maintaining a socio-legal distance between an employer and workers.

This change in value has roots in Taylorist traditions of using worker monitoring to identify and create new efficiencies in workflows (Beniger, 1989; Zureik, 2003). For laborers whose work is primarily mediated electronically, worker monitoring is more passive and the prominence of control is not as perceptible (Saval, 2014, p. 297), but for Uber drivers, the results of monitoring, delivered weekly in the form of ratings and rankings, acts as a remote threat and a tangible nudge to drivers to be in compliance with workplace expectations (these will be discussed further, below). Thus, through practices of pricing and messaging, Uber is able to systematically secure the supply of labor necessary for its core commercial service. In a service economy supported by the practices and characteristics of digital labor, the data that workers produce and are monitored by creates affordances for managerial control. The loss of worker efficacy as power is transferred from labor to capital (Braverman, 1974) is not new or unique to digitally-mediated labor, but digital spaces facilitate and scaffold new systems of monitoring and opportunities for remote control over workers. The ability for Uber to exert control over its “flexible” drivers in these ways is made possible through its technologies and policies of data collection and analysis.6

Uber’s practices and policies (or the ambiguities created by lack thereof) have implications for the ways that platforms use their power as intermediaries in the digital labor landscape to scaffold expectations about under-compensated or free labor for workers. For example, Uber’s policy on lost items allows the rider to request that individual drivers be located and contacted to retrieve lost items. Some drivers, particularly women, have been tracked by customers who claim to have lost an item, but whose demands indicate harassment and stalking (Bhuiyan, 2015).

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6. This data also helps Uber generate traffic data sets and estimate how long it should take a driver to get from A to B (Novak, 2014).

Fig. 2
A driver inquired if they would be compensated for returning lost items, and the CSR declined using the affectation of understanding and a template response.
Uber also fails to advertise that drivers are not paid for the time and energy they spend returning items passengers have left behind. Passengers often expect immediate action, and drivers must absorb that material and affective cost. Uber does mask driver phone numbers, but does not guarantee payment to drivers for returning lost items. Indeed, Uber explicitly tells drivers not to request payment. Some drivers say they might receive a fee of $25 or $10, or simply a “thanks” from Uber.

Information management between Uber and its drivers is generally constructed to be indirect, both in terms of the intermediaries that deliver information to drivers and in the language and affect deployed by the service. Uber’s active voice is relegated to Uber Help Community Support Representatives (CSRs), who communicate to drivers via email, and they seem to be employees of contractors, rather than Uber. These responses often lack a nuanced understanding of the context or challenges of their work, and drivers have to be persistent to get the answers they seek to questions without a template response. Some perceive that software is creating initial responses based on the keywords in their text, and they refer to CSRs as “Uber’s robots.” The responses drivers receive often resemble generic FAQs, and some drivers write “escalate to manager” in the body of their text in the hopes of flagging a human supervisor more quickly. The role of the CSR more closely resembles customer service than management.

By ensuring that its community management organs are removed from Uber’s central offices, Uber has crafted a distance from the types of information or disinformation it is accountable for, and from its own role as a powerful governing actor. Drivers must rely on the information they crib from CSRs, the metrics that govern their behavior as they drive such as the rating system, shifting performance targets, informational communications from Uber that sometimes vary by market, and the limited and confusing company policies. Despite this distributed model, all communications from Uber – whether from CSRs or other Uber representatives – are taken to be the company line. These types of information asymmetries create confusion in drivers about Uber’s policies, practices, and incentives, leading drivers to try and gain as much information as they can by strategizing with the limited information that is available to them; they also ensure that Uber has heretofore effectively controlled its workforce without necessarily being responsible for them in the eyes of legal and regulatory authorities.

Surge Pricing and Labor Scheduling Management

Among drivers interviewed and posts collected from forums, the ambiguity and resistance surrounding “surge pricing” surfaced as the most obvious intersection of information asymmetry with Uber company policy and everyday driver experience. Surge pricing is displayed to drivers through a type of heat map visualization, where the algorithmic assessment of supply and demand will temporarily raise fares for a particular geographic location.

Fig. 3
A sample heat map on the driver app that visualizes surge pricing on the driver app. Red means surge is in effect, orange means demand is building, yellow indicates demand is there (Rosenblat, 2015). Some drivers refer to surge as a “herding tool” that ushers them into specific geo-fences.

7. CSRs appear to be outsourced to Human Resources companies that manage contingent workforces, such as Taskus or ZeroChaos; they work remotely (Anonymous, 2015).
Visible to both riders and drivers, the creation of such surge pricing zones is billed by Uber as a means to ensure positive customer experience by enticing new supply to an area of high demand (Uber, 2015b). Surge pricing, however, is unreliable: notably, pricing is based on what a passenger sees on screen in their location, not a driver’s position. Drivers travel to surge pricing zones in search of fares advertised at a given rate, but they can and do receive ride requests from passengers in other, adjacent areas. A driver may enter a zone that is surging at 3.5x, but receive ride requests at a lower surge rate, such as 1.5 based on the passenger’s (not the driver’s) location. In forums and in interviews, some drivers describe this as a type of wage theft: they are advertised one rate of pay through heat maps, but given another. Others offer the company rhetoric, which is that surge pricing is subject to dynamic change and that the rate they see for their area may not reflect the rate at which passengers request them. Some drivers report that passengers are gaming the system by placing their pick-up location pin outside a surge zone, and then calling drivers to redirect them to their actual pick-up location. Drivers also noted that they would sometimes converge en masse at a surging area, and find that supply was no longer too low — the surge would disappear. Some drivers reported experimenting with trying to game these algorithms, and many developed responses to surge pricing based on their experience with its duration, reliability, and potential reward in their respective locations. As various drivers become familiar with the features and functions of the app, they have begun to advise each other and to ask about surge; “don’t chase the surge,” is offered in forums as guiding advice to new drivers.

Uber’s heat maps and messages indicate that drivers will make more money if they drive at a particular time or in a particular place: drivers must weigh the costs/benefits of this in relation to how much more competition they anticipate and how much they trust Uber’s incentives. Many drivers expressed frustration, and enthusiasm alike for surge pricing because its very dynamism is characteristically fickle and opaque, a finding supported by Lee et al. (2015, p. 1609). This frustration stems partly from the implicit, technophilic promise of accuracy and fairness (Rosenblat et al., 2014b), but these notions are blurred by the idea that the governing responsibility for pay resides with algorithms, which acts as a disclaimer against company responsibility for shifting pay rates.

Through an appeal to the concept of algorithms, Uber can generate and co-ordinate clusters of labor in response to dynamic market conditions (Aneesh, 2009, p. 356), without explaining the reliability of its cluster incentives or guaranteeing the validity, accuracy, or error rates of its labor deployments. This rhetorical appeal to algorithmic certainty also appears in the affective messaging that Uber sends to its drivers at key moments – such as when they’re about to log off. Rather than an appeal from Uber’s position as employer – we’d like for you to keep working – these messages cite the (presumably algorithmically derived) idea that demand is high in that driver’s location at that exact time. We suggest
that Uber’s matching service is, in some ways, analogous to on-demand scheduling software, and prompts similar costs — material and social — from workers who work in the flexible, “anything but 9-5” economy (Kantor, 2014). Workers absorb the costs of being available, accessible and responsive to their employer without being guaranteed paid work.

For drivers, the most tangible evidence of Uber’s data collection and analysis emerges through predictive scheduling communications that Uber sends to its drivers regarding surge pricing and high demand. Some drivers view this attempt at predictive scheduling as undermining their ability to make more money, and describe how they resist Uber’s attempts to predict and plan for “supply and demand”, such as by refusing to submit information about their intended working hours to Uber when that information is solicited. For example, Uber sent drivers in Atlanta notices that demand would be “off the charts” on Labor Day weekend, and surveyed drivers to “help us [Uber] plan supply and demand.”

Surge recurs in driver discussions as a central pre-occupation, and it remains a popular incentive: screenshots of surge rates and zones are often posted to forums to display enthusiasm for a pay lottery. Some drivers are propelled into a similar emotional space as gambling or gaming (Schüll, 2015; Cherry, 2012) through tools like surge pricing, which encourages drivers to go to places Uber directs at certain times in the hopes of getting fares at higher rates (such as 2.5x or 5x normal). When Uber sets low rates for routine work, incentive-based pay steers drivers into working under much stricter and less flexible conditions. For example, Uber sometimes offers select drivers guaranteed hourly pay at higher rates, such as $22/h, if they opt-in to the guarantee. The conditions for receiving this guarantee could be: accept 90% of ride requests, complete 1 trip per hour, be online for at least 50 minutes of every hour, and receive a high rating for all of those trips. Thus, Uber leverages control over drivers’ schedules while simultaneously sustaining the idea that drivers enjoy total freedom from working flexible schedules. The regular occurrence of surge pricing along with heat maps of passenger activity and affective messaging all work as behavioral engagement tools that impact how drivers schedule their work, and their effect is amplified when low base rates result in unreliable income, undercutting the “freedom” that drivers have to login and log-out at-will. These gamic elements remain an understudied component of the on-demand economy.

What Algorithms Demand and Obscure

The discourse used by Uber to frame its practices of surge pricing also reveals how the company can leverage the rhetoric of algorithms to produce additional information and power asymmetries, through which Uber justifies the incomplete portrait of labor conditions it communicates to individual drivers. Rather than scheduling drivers to work at particular times, Uber emphasizes the dynamic, algorithmic qualities of its system. Central to this technique is that Uber’s communications to drivers leverage two related yet-distinct forms of data analysis: real-time analytics and predictive analytics. While each of these algorithmic processes is significantly different, Uber’s app and communications work to conflate the two means of abstracting and predicting opportunities for work. Drivers are both alerted to the presence of high demand by predictive messages about future instances of high demand, as well as by real-time surge pricing that occurs in specific geographic zones (Lin et al., 2014). Thus, what are essentially predictive “guesses” about possible future demand can be billed as real-time “measurements” of existing present demand. Uber’s attempts at predictive demand, whether through
algorithmic forecasts or through messages, complicates the claim that Uber is merely a platform-intermediary for information about a given marketplace with a limited curatorial role over that information, rather than an active and controlling shaper of that marketplace.

Uber contends that the surge-pricing algorithm is a function of real-time analytics. However, as noted, Uber also sends messages to drivers that forecast high demand. The language Uber uses to describe surge pricing is identical to the language it uses to describe predicted demand.

Based on their patent filings, Uber has the ability to generate predictions of high demand based on historical data that it collects (Lin et al., 2014), which signals intent but does not indicate that it always uses predictive analytics to forecast demand. Whether Uber uses predictive analytics or whether a human actor anticipates demand in each instance that a message is sent to drivers that forecasts demand is unclear; planning and forecasting for supply and demand algorithmically may not be the consistent practice or policy at all levels of the organization.

Travis Kalanick, Uber’s founder, has made oft-circulated comments that describe its system as a reflection of the marketplace (Hwang and Elish, 2015). “We are not setting the price. The market is setting the price,” [Kalanick] says. “We have algorithms to determine what the market is” (Brustein, 2015). There is considerable ambiguity about whether Uber is merely using algorithms to “reflect the marketplace.”

Regardless of whether data analytics are real-time or predictive, drivers interpret the language used to describe high demand as a prediction that surge pricing will happen at the times and places described by Uber’s advertisements, which complicates Uber’s claim that surge pricing is solely a reflection of real-time analytics (Clark, 2015). The opaque combination of algorithmic data analytics and their rhetorical invocation act as a substitute for direct managerial power and control. The ambiguities between real time analytics and predictive analytics shape the drivers’ own assessments of when they plan to drive. Data analysis and predictive messaging combine to produce a total method for producing, scheduling, and managing a larger supply of “flexible” labor.

Fig. 7
Sample text messages that Uber sent a driver in the Dallas-Fort Worth area. The words “high demand” to describe that surge pricing is happening is similar to other advertisements

Fig. 8
When drivers try to log-off, they sometimes receive affective messaging from Uber.

The risk is transferred to the driver as to whether or not demand actually exists where and when Uber advises, but the app, and heat maps in particular, is designed to maximize user engagement with the system (Schüll 2015, p. 57) through persuasive alerts. In this combined model of real-time and predictive labor

9. Aneesh (2009) describes how, “In an algorithmically managed field of communicative network, information can flow directly from lower level units to top management, with a reduced need for middle managers, flattening bureaucratic hierarchies to a degree” (p. 357).
management, the company structures the conditions and scheduling behaviors of its on-demand labor marketplace while disavowing responsibility for those conditions and how they impact the work of drivers.

**Monitoring Drivers: Surveillance, Ratings, and Control**

Uber also exerts significant control over driver behaviors through its driver rating system: in it, passengers are empowered to act as middle managers over drivers, whose ratings directly impact their employment eligibility. This redistribution of managerial oversight and power away from formalized middle management (Castells, 2002) and towards consumers is part of a broader trend in flexible labor: companies or platforms can create expectations about their service that workers must fulfill through the mediating power of the rating system. Uber monitors drivers’ ratings, customers rate drivers on their Uber experience, and the company deactivates drivers whose ratings drop too low, although the cut-off point is a shifting target. To achieve good ratings, drivers must modify their behavior to produce a fairly homogenous Uber experience. Uber’s rating system is exemplary of how even automated systems can control how workers do their jobs without exerting explicit discipline. Instead of imposing strict disciplinary measures on drivers, Uber leverages control over how drivers behave through performance metrics that are delivered through weekly feedback notices. The ratings that passengers give drivers constitute the most significant performance metric, according to driver discussions. Individualized metrics foster a “highly individualized sense of responsibility for one’s own job stability” (Neff, p. 28), even though drivers have limited control over how passengers interact with the rating system or how Uber uses it.

Uber’s visibility in the relationship between drivers and passengers is primarily facilitated by the ratings system, as well as by other metrics that govern the drivers’ experience. This data-surveillant mechanism has the effect of distancing discipline from effect: Uber can achieve an organization where the workforce behaves relatively homogenously without giving explicit directives – as with traditional employers (Girard and Stark, 2002; Bruder, 2015).

Passengers are implicitly enlisted in the surveillance and censure of drivers. In Uber’s system, passengers have the ability to watch drivers as they approach, surveil their route, and have the ability to track them after they have departed.

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**Fig. 9**
Drivers receive weekly feedback notices from that display a comparative look at their own ratings and performance, such as fares/hour, in comparison to “top drivers”, which drivers describe as gratifying or deflating.

**Fig. 10**
A sample map of available drivers as indicated by the black sedans. No obstacles, visible traffic, or other vehicles appear on the map, giving the impression to the passenger watching them that the sedans have a seamless route. Once a ride is requested, the passenger is able to watch and scrutinize the movements of a specific vehicle.
The app that passengers use to watch their driver approach extends their role of ‘the watcher’ (a stand-in for an traditional manager (Stark & Levy, 2015)). Uber passengers, who are also rated by drivers (Price, 2015), have begun to learn that they are empowered in Uber’s system in part because of how the app is designed to give passengers literal oversight of drivers, but also because of the structure of ratings. Drivers need to maintain a rating of around 4.6/5 to remain active on the app, though this requirement can seemingly vary by area. Ratings are used as a proxy for driver quality: passengers rate drivers on a scale of 1 to 5 stars, and a driver’s ratings are averaged to reflect their last five hundred rated trips, although some drivers receive deactivation notices if their previous twenty-five or fifty trips receive low ratings. The rating system and its direct determination of ongoing employment suggest that drivers are engaged in a long-term, evaluative relationship with Uber as a company, and that relationship is partly regulated by passengers’ shifting expectations around the service and the rating system.

Performance evaluations that center on numerical metrics demonstrate to drivers that they are being observed; their actions are measurable; and they are measured against other drivers, which emphasizes that the individual driver is responsible for a drop in ratings even though the rating system is controlled by Uber. Many drivers discuss feeling anxious about what they did wrong or in some instances, which passenger wronged them. However, Uber displays select feedback to drivers, and generalized feedback, rather than the rating and feedback that correspond to each ride. Drivers cannot have ratings removed, even if they received them unfairly. The rating system thus functions to elicit compliance with the Uber system. One driver we interviewed said, “It’s so much better to have 100 managers than one who maybe doesn’t like you because he hates your hair.” The interviewee asserted that no one at Uber cared personally about him; only his metrics, and this disassociation provided some benefit to him. However, most driver discussions on ratings centered on performance anxiety, unfairness in ratings, and occasionally, boasting.

The result of these metrics’ effect on employment status can be seen in the ways drivers treat passengers. Once a passenger is in the car, drivers often provide them bottled water; more enterprising ones offer chargers for their customers’ smart phones. Drivers try to gauge whether customers want to speak or if they would prefer to stare at their smartphones, using a combination of friendly conversational attempts with eye contact and general demeanor to guess at their passenger’s preferences. A common complaint from Uber drivers was the lack of passenger education on how the company utilizes ratings. A passenger might assume that a four-star rating is a good way to reflect an “above-average” Uber experience, or that a three-star rating implies a neutral experience. Passengers are not made cognizant of the fact that a 4.6 represents a hazardously low rating for a driver, and subsequently it always appears to a passenger that all the available drivers are good performers. Some drivers directly nudge passengers to prompt good ratings such as by adding five star stickers to a visible place near their windshield. This behavior is partial compensation for Uber’s overt lack of communication with passengers as to the value and instrumental character of driver ratings.

These behaviors on the part of Uber drivers are classic examples of what sociologist Arlie Russell Hochschild (2003) has identified as “emotional labor” – whereby service workers like taxi drivers or flight attendants suppress or contain their emergent emotions in order
to present a pleasant or welcoming demeanor to customers, regardless of that customer’s reciprocal emotional state. Facey’s (2010) study of Toronto taxi drivers found that, much like Uber drivers, emotional labor was frequently accomplished through similar instances of “placative and entertaining talk,” which serve both to keep passengers happy and to evaluate the type of passenger (difficult or friendly, distracted or chatty) their fare happens to be (p. 1265).

Part of Uber’s advertised appeal is that the passenger experience of the app is meant to be seamless: payment is automatically processed through a credit card associated with the passenger’s account. In removing that moment of fumbling exchange, Uber removed the nudge passengers might receive to tip in a service job that is historically underwritten by a cultural practice of tipping (Hansen & Jespersen, 2013; Lynn, 2015). Drivers in the Uber system perform affective labor in exchange for ratings instead of tips. Uber strongly discourages tipping through explicit policy and through the absence of a tip function in the app.10 Uber’s business model is based on leveraging, but not compensating, the affective labor of its drivers.

The rating system serves as an indirect way to structure and control the etiquette and uniformity of drivers’ behavior. Uber will send routine messages to drivers that recommend that passengers give low or high ratings to drivers who behave in particular ways. This feedback is carefully designed to be indirect, presumably to avoid the appearance of a company policy. Uber promotes certain driver behaviors without specifically requiring them. While employers of employees can control how their workers behave to carry out their jobs, they cannot leverage that control over independent contractors. The advice Uber provides may be valid (such that passengers do give better ratings to drivers who follow those instructions), but the way the advice is delivered has the effect of creating distance between what Uber expects of its drivers as opposed to what it merely suggests.

10. Tips constitute the price people are willing to pay on top of the ticket price when they purchase services, and employers are prohibited from taking a portion of workers’ tips. Surge pricing also reflects the total amount passengers are willing to pay. Uber is able to take a commission off the total rate, including surge.
By relegating the role of evaluating workers to consumers, companies such as Uber that manage the infrastructure for “on-demand” economy transactions are able to regulate the behaviors of workers through the lens of the consumer experience in a much more exacting manner. The rating system provides a channel for direct feedback, such that a negative passenger experience can directly affect the employability or income-earning potential of platform-based workers. As sociologist Robin Leidner (1999) observes of interactive service jobs,

> In these kinds of jobs, it is impossible to draw clear distinctions between the worker, the work process, and the product or outcome, because the quality of the interaction is frequently part of the service being delivered and thus, in many cases, the product generating the company profits (p. 83).

In this sense, workers are subjected to all of the downsides of “entrepreneurship” with few of the upsides: they shoulder the blame when there is a failure in the system because the operating assumption is that their rating reflects their own behavior, rather than systemic accountability. Drivers throughout the course of our study reflected that even when their behavior was unchanged, they would invariably experience a drop in their ratings. While ratings appear to be fair in the sense that the passenger “public” is responsible for worker evaluations, an underexplored area for future research is the hidden bias in ratings. Questions remain as to whether female drivers, or drivers with obvious religious apparel, darker skin color, or other protected class characteristics are rated differently than, for example, heteronormative, English speaking, white male drivers.

**Conclusion**

Uber occupies a strong place in the public imagination, but the polarization Uber provokes in public debate assumes the company has a singular coherence and efficiency. Uber’s system uses a combination of digital labor modes, such as interactions through the app, while facilitating physical interactions. The seamless delivery of services provided digitally creates expectations around seamless physical delivery of services, both for passengers and for drivers. Yet the disintermediation that the app enables between the different actors who use the Uber system facilitates channels of communication that are ripe for information mismanagement: indirect management gives Uber power over its workers for which it is often not held accountable. Uber’s claims regarding its labor model – which center on freedom, flexibility, and entrepreneurship – are not borne out in the experience of Uber drivers, in large part due to the information asymmetries and controls that Uber exerts over driver behaviors through performance metrics, behavioral nudges, unreliable, dynamic rates, and scheduling prompts, and design.

The Uber driver workplace is characterized by constant change and by remote management structures, such as algorithms, Community Support Representatives, and passengers, removes the governing responsibility for a reliable workplace away from a central actor – Uber as a corporate entity, or a singular managerial body. Drivers must compare the information they gather from their own experiences with CSRs, media reports, company statements, written policies, notices from local markets, and their own advice in forums as though there is a singular, sense-making machine at work. There are multiple authorities for what Uber says or does that drivers rely on because the Uber system provides the architecture for digital and physical points of engagement and interaction with different authoritative actors. As a case study in the emerging on-demand economy, our analysis of the Uber driver experience signals the need for further study of the social and technical dynamics of distributed work systems.

New forms of labor communications are needed to address the inconsistencies of work that is characterized by algorithmic dynamism and ambiguous information flows to improve labor-platform relations. In a bricks-and-mortar workplace, the physical infrastructure is relatively reliable and unchanging. In a semi-digital workplace, small technical changes to the app’s interface, or built-in features that support a dynamic workplace, such as surge pricing and heat maps, can create ambiguity and confusion about worker (and passenger) expectations. More work is needed to translate these insights into deployable changes that will be useful to regulators (such as the Federal Trade Commission and the Consumer Financial Protection Bureau), decision-makers at Uber, and passengers and drivers themselves.
Works Cited


