



Surveillance and the future of work: exploring employees' attitudes toward monitoring in a post-COVID workplace

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Abstract

The future of work increasingly focuses on the collection and analysis of worker data to monitor communication, ensure productivity, reduce security threats, and assist in decision-making. The COVID-19 pandemic increased employer reliance on these technologies; however, the blurring of home and work boundaries meant these monitoring tools might also surveil private spaces. To explore workers' attitudes toward increased monitoring practices, we present findings from a factorial vignette survey of 645 U.S. adults who worked from home during the early months of the pandemic. Using the theory of privacy as contextual integrity to guide the survey design and analysis, we unpack the types of workplace surveillance practices that violate privacy norms and consider attitudinal differences between male and female workers. Our findings highlight that the acceptability of workplace surveillance practices is highly contextual, and that reductions in privacy and autonomy at work may further exacerbate power imbalances, especially for vulnerable employees.

Lay Summary

Workplace monitoring practices have seen widespread growth since the beginning of the COVID-19 pandemic. As many employees shifted to remote work, companies began using a wide range of technologies to track employee communication and productivity, capturing video and screenshots, tracking websites visited and time spent on specific tasks, and even tracking attentiveness in Zoom meetings. While these practices may have been viewed as acceptable during the acute phase of the pandemic, concerns have mounted that these surveillance practices will continue in a postpandemic world because employers see benefits in capturing more data about workers. In this article, we present survey findings that explore workers' attitudes toward a wide range of workplace monitoring practices to understand where they draw the line between acceptable and unacceptable monitoring. This is especially important because of the potential for harm from widespread surveillance and an increasing reliance on predictive algorithms, which are more likely to negatively affect vulnerable populations. We also present findings related to gender differences in attitudes toward workplace surveillance; women found several types of data collection practices more concerning and more inappropriate than men.

Keywords: workplace surveillance, future of work, information and communication technologies, privacy, contextual integrity

Advances in information and communication technologies (ICTs) have spawned a new generation of pervasive surveillance technologies for the workplace, including AI-driven monitoring of workplace communications and productivity, sensor-based biometric data collection, and algorithmic management of workers to gain new efficiencies. In this vision of the future of work, meaningful decisions about employees—including whether they should be hired, promoted, reprimanded, or even fired—are based on faceless and opaque algorithmic processes (Köchling & Wehner, 2020). It is clear, then, that the future of work is increasingly intertwined with the widespread collection of employee data (Nguyen & Mateescu, 2019), a practice unevenly distributed across workers that raises concerns about fairness and power in the workplace (Brown et al., 2022; Levy, 2015; Rosenblat & Stark, 2016).

While reliance on technology to monitor employee productivity extends back decades, in this article we focus on how surveillance and monitoring practices¹ evolved during the COVID-19 pandemic and the shift to remote work. Without being able to monitor employees on-site, employers wanted assurances that productivity would continue while people worked from home. It is unsurprising, then, that interest in

employee monitoring grew significantly in the early months of the pandemic, with increasingly invasive tools at employers' disposal, including monitoring software to record employees' web browsing, active work hours, attentiveness in videoconferences, and more (for a summary, see Ball, 2021). As workers began returning to the office with the gradual easing of pandemic restrictions, employers took additional measures to track everything from location to body temperature to coworker proximity, and many will likely retain monitoring practices after the pandemic has ended (Zickuhr, 2021). For workers opting to remain remote, pandemic-motivated monitoring practices appear to have become normalized, meaning the future of work will have increased surveillance regardless of where employees are located (Parker et al., 2022; Van Dam, 2022).

Major crises like the COVID-19 pandemic highlight the tensions and tradeoffs between civil liberties and societal well-being (Alsan et al., 2020). In the aftermath of the 9/11 terrorist attacks, for example, employers greatly expanded their use of electronic monitoring, background checks, and other security measures, and workers were “increasingly willing to sacrifice accustomed niceties for this enhanced protection” (Bloom et al., 2002, p. 898). Over time, however, the extra

forms of monitoring only increased while the threat of another attack decreased.

In this article, we extend prior work exploring how these tradeoffs are negotiated in major crises by evaluating workers' attitudes toward increasingly invasive forms of monitoring during the COVID-19 pandemic. We are motivated by the concern that as pandemic restrictions are lifted, employers will continue to extend at-home monitoring while instituting new monitoring in the workplace. This raises concerns that increased workplace monitoring will lead to reduced worker agency, control, and autonomy, no matter where the workers are located (Ball, 2010, 2021; Ganster & Fusilier, 1989). And while the pandemic has many parallels to the rise in workplace monitoring in the aftermath of 9/11, we argue the COVID-19 crisis is further complicated by technological advances over the last two decades that allow not only more detailed data collection on workers—including nonwork data from social media and data on private spaces when working from home—but also application of that data for increasingly problematic purposes.

Nissenbaum's (2010) theory of privacy as contextual integrity (CI) provides a useful framework for examining how factors associated with data collection and use may lead to privacy violations. CI helps researchers move beyond simplified views of privacy to instead consider information norms within specific contexts. When CI has been violated—such as when employers engage in monitoring practices that workers see as highly invasive—the framework calls for a wider examination of the moral and political implications of the practice.

We use CI to guide the development and analysis of a factorial vignette survey of U.S. workers who shifted to remote work during the first year of the pandemic. We capture how various factors—including type of data collected by employers, purpose for that data collection, who had access to the data, and how long this monitoring would take place—affect their attitudes toward current workplace monitoring practices and, more importantly, their concerns regarding potential future use of workplace monitoring. We also explore whether these attitudes varied between male and female workers, given prior work suggesting gender differences (Stark et al., 2020).

Our findings raise important questions about how reductions in privacy and autonomy due to excessive or invasive monitoring at work may have negative outcomes on worker productivity, satisfaction, and well-being. Furthermore, they highlight the potential for increased power imbalances as these outcomes—like the impacts of most surveillance systems—impact vulnerable workers more strongly.

Related work

The intensification of workplace surveillance amid evolving work environments highlights important questions about the exercise of power and employees' rights to privacy, fair treatment, and open communication in the workplace (Botan, 1996). In recent years, communication scholars have considered how newer technologies increasingly blur boundaries between public and private spaces (boyd, 2010; Vitak, 2012), and have called for a more contextual understanding of the impacts of increased surveillance and data flows across boundaries (Marwick, 2022; Marwick & boyd, 2014; Wu et al., 2020). The pandemic accelerated these blurred boundaries and contextual challenges to maintaining privacy, as

working remotely may implicitly—or explicitly—invite an employer into one's home.

To facilitate our analysis, we provide a brief overview of research on technology-driven surveillance practices in the workplace, as well as recent accounts of how new surveillance practices emerged during the pandemic, focusing on those working at home as well as in traditional workplaces. We then highlight the power imbalances that workplace monitoring raises before detailing how the CI framework can be applied to explore workers' attitudes toward the appropriateness of different monitoring practices.

Tracking the rise of modern workplace surveillance

Workplace surveillance is commonly used as a means to increase worker productivity, ensure workplace safety, reduce operational risk, mitigate employee theft, and generally support broad organizational objectives. Employers adopt a wide range of tactics for monitoring their employees (Ball, 2010, 2021; Rosenblat et al., 2014). Common approaches focus on monitoring performance (e.g., observing employees via cameras, listening in on customer service calls, tracking worker location), while other methods extend this gaze beyond performance evaluation toward more disciplinary functions or shaping certain behavioral traits (e.g., drug testing, dress codes, monitoring interpersonal interactions). Workplace monitoring also increasingly targets personal characteristics, such as psychometric evaluations prior to hiring, collection of biometric data for security and access controls, and the use of corporate wellness programs to track employees' health and wellbeing (Nguyen & Mateescu, 2019). Researchers have long explored the complex implications of workplace surveillance on employees, noting its pervasive use for monitoring and control (Beniger, 1986), while also highlighting how workers often need to negotiate their privacy expectations against justifiable reasons for employers to track their activities (Chung et al., 2017; Patil & Kobsa, 2004; Patil & Lai, 2005).

Contemporary workplace surveillance practices, however, increasingly happen in ways that elude employees' awareness (Adler-Bell & Miller, 2018), and that, as Nguyen and Mateescu (2019) note, is focused on "...collecting new kinds of data about workers, enabling quantification of activities or personal qualities that previously may not have been tracked in a given workplace—expanding the granularity, scale, and tempo of data collection" (p. 1). Such practices are becoming commonplace: in a 2019 survey of 239 large corporations, fully half were using "nontraditional" surveillance methods, including logging and analyzing phone calls, scrutinizing emails and social media posts, and tracking who attends meetings (Wartzman, 2019). Such levels of data collection are now common in the workplace, including automated time and task tracking, real-time monitoring of computer activities, stress and emotion detection, GPS tracking, and algorithmic systems designed to make significant decisions about employees (Lecher, 2019).

The potential of harm stemming from excessive workplace monitoring has been explored across numerous disciplines. In her canonical work exploring the history of workplace surveillance, Ball (2010) notes how the introduction of workplace surveillance inevitably sparks debates around (in)appropriate data collection and use, worker rights and power, and broader concerns over how such practices might perpetuate existing inequalities while also creating new ones.

[Introna \(2000\)](#) further details how workplaces blur the public/private divide; he argues for worker protections against the “inherently political interests in the ‘gaze’ of the employer” (p. 33). And through her investigation of remote monitoring in the trucking industry, [Levy \(2015\)](#) notes that workplace surveillance practices are embedded in a range of complex contexts that produce “multifaceted pathways to the entrenchment of power in modern organizations” (p. 171).

Of particular concern, the harms posed by workplace surveillance fall disproportionately on the most vulnerable workers, exacerbating existing workplace power imbalances and economic inequalities ([Browne, 2015](#); [Rosenblat et al., 2014](#); [Stark et al., 2020](#)). As [Nguyen and Mateescu \(2019\)](#) note, the expanding granularity and scale of workplace data collection “alter the power dynamics between workers and employers” and the automated management tools based on data surveillance risk “augment[ing] biased and discriminatory practices” (p. 3).

Such power imbalances are particularly pronounced when considering the variable impact on employees of different genders. [Monahan \(2009\)](#) provides a framework for understanding the gendered dimensions of surveillance systems, arguing that “power relations are vastly asymmetrical” (p. 299) and revealing how not only are the effects of surveillance gendered, but so are the opportunities to resist. Building from Monahan’s insight, [Ball et al.’s \(2012\)](#) study of surveillance practices at call centers found that privacy perceptions among workers were highly gendered, with women expressing significantly higher concern over email monitoring and the use of CCTV cameras. Likewise, [Hirst and Schwabenland \(2018\)](#) noted that women were particularly anxious about being perpetually visible when an office moved to an open floor plan. [Stark et al. \(2020\)](#) have also reported that women are less approving than men of facial recognition technologies used in the workplace, while [Mantello et al. \(2021\)](#) found that the widespread use of AI-driven management tools may lead to “heightened stress and anxiety among disadvantaged ethnicities, gender, and income class” (p. 1).

These findings confirm Monahan’s concerns raised over a decade earlier, but, as noted recently by [Ball \(2021\)](#), the gendered experience of workplace monitoring deserves renewed attention. Motivated by this, our study explores how rapid expansion of remote worker monitoring during the COVID-19 pandemic further exacerbated these power imbalances, both in general and based on gender.

Workplace surveillance during the COVID-19 pandemic

While unemployment soared for retail and hospitality workers in the early days of the pandemic ([Long & Van Dam, 2020](#)), many office workers shifted from on-site office environments to working at home. Rather than shielding employees from workplace surveillance, the shift to working at home sparked a rapid expansion of remote monitoring technologies that tracked everything from keystrokes to website visits as employers sought to ensure service levels and worker performance metrics were maintained ([Ball, 2021](#); [Wang et al., 2021](#)). As workers returned to traditional work environments, employee monitoring practices became more invasive, with some companies using apps or requiring employees to wear sensors to track movement and interactions ([Putzier & Cutter, 2020](#); [Zakrzewski, 2020](#)).

And as a hybrid approach to work becomes increasingly the norm ([Aksoy et al., 2022](#)), many employers will continue using powerful surveillance tools. [Zickuhr \(2021\)](#) notes how these tools have become critical to employers across industries and occupations, and that surveillance is “growing largely unchecked due to weak worker power and a lack of legal protections or regulatory restrictions on these behaviors” (p. 3). Researchers have also noted that excessive monitoring can hurt employees due to “function creep,” whereby “monitoring technologies can sometimes yield more information than intended” ([Stark et al., 2020](#), p. 1076). [Leonardi \(2021\)](#) notes that the pandemic significantly increased the amount and diversity of data collected by employers; this “digital exhaust” allows companies to construct digital footprints of employees and “use algorithms that code digital exhaust into particular categories of action, sort those categories, and perform complex computations that link them together” (p. 251).

This normalization of technologically driven workplace monitoring represents not only a threat to worker privacy, but also fuels shifts in power dynamics within employment settings. For example, working from home clearly has uneven impacts. Among dual-income families, the pandemic disproportionately increased the burden of unpaid work for women compared with men ([Chauhan, 2022](#)). While most workers felt disconnected from their colleagues, which contributed to increased fatigue and stress ([Baym et al., 2021](#)), mothers working at home expressed feelings of anxiety, loneliness, and depression more frequently ([Lyttelton et al., 2020](#)). And while new technologies helped make working from home possible for many, [Pennington et al. \(2022\)](#) note that increased reliance on email, video conferencing, and texting increased stress and conflict among many workers, especially women. Given these concerns on how the pandemic has impacted the future of work, our study further explores how the rise in workplace surveillance during—and after—the pandemic might further entrench inequalities and power imbalances, to the detriment of employee privacy and well-being.

Framing the study: privacy as CI

The growing power and ubiquity of workplace surveillance practices have focused attention on the privacy rights and expectations of workers, and many concerns noted above draw on the unease regarding how monitoring might occur in unexpected contexts or collect/use personal data in unexpected ways. To explore these tensions, we turn to [Nissenbaum’s \(2010\)](#) theory of privacy as contextual integrity to motivate our study’s design and analysis. CI starts with the understanding that data flows occur in particular contexts, and norms govern our expectations of how personal information should flow within any given context. As such, CI rejects the traditional public/private dichotomy, instead tying adequate privacy protection to the value of respecting informational norms within specific contexts. These informational norms are formed around four parameters: context, actors, attributes, and transmission principles, which we describe below.

Context refers to the backdrop that informs what norms govern an interaction. For example, doctor–patient conversations often occur in a health context and supervisor–employee conversations in a workplace context. The shift to remote work complicated this, as the boundaries between the typically distinct work and home contexts blurred.

Actors include various individuals or parties involved in a given interaction. A *sender* discloses information about a *subject* to a *recipient*. For example, an employee (*subject*) enrolled in a workplace wellness program may use a fitness tracker to *send* data about their fitness to various *recipients*, which could include human resources staff as well as company servers.

Attributes refer to the types of data in play. A video conferencing platform, for example, might collect and share data about whether the camera and microphone are on, record background audio and video, track whether a person is at the computer, and so on.

Finally, *transmission principles* refer to the stipulations that shape or constrain the flow of information within a context. The principle of confidentiality surrounds doctor–patient conversations, and a principle of notice often applies to a company’s monitoring and collection of employee data.

When a new technology or practice affects any of these parameters in a way that breaches informational norms, CI may be violated. Thus, CI provides a helpful framework for explaining why certain information flows are acceptable in one context but problematic in another, and it is particularly suitable for understanding how information flows related to employee monitoring might lead to new privacy concerns as contexts shift from the workplace to the home. In this article, we seek to understand where workers draw the line between acceptable and unacceptable monitoring practices by looking at variations in CI’s core parameters. Specifically, we ask:

RQ1: How do the parameters defined in CI influence employees’ attitudes toward new workplace monitoring practices?

We also consider potential power imbalances related to workplace monitoring by evaluating whether gender differences exist regarding different monitoring scenarios. Prior studies of privacy attitudes have found that women often express greater privacy concerns (Baruh et al., 2017) and focus on privacy risks (Sun et al., 2015); however, work focusing on gender differences in attitudes toward workplace monitoring is somewhat limited and surveillance scholars have called for further work on this topic (Ball, 2021). Therefore, we ask:

RQ2: How do attitudes toward new workplace monitoring practices differ between male and female workers?

Method

Study design

To address our research questions, we developed and deployed a survey during fall 2020, half a year into the pandemic when workplaces were still experiencing significant disruptions. We specifically sought to survey workers who had been with the same employer for all of 2020 and had shifted to remote work for at least part of the pandemic; this allowed us to focus on how this shift affected workplace attitudes generally and allowed us to ask about monitoring practices that had been introduced since shifting to remote work. The survey included three sections: (a) demographics, (b) questions about work environment before and during the pandemic, and (c) factorial vignettes describing potential workplace

surveillance scenarios. In this article, we focus primarily on this third section. For an analysis of changes in workplace attitudes and environments between the beginning and end of 2020 using this dataset, see Vitak and Zimmer (2023).

Factorial vignettes blend survey and experimental design and are especially useful for studying “the contexts and conditions affecting judgments” (Wallander, 2009, p. 506). By systematically varying factors within each vignette, this method allows researchers to gain insights into respondents’ mental models for decision-making in specific contexts and how small shifts in these factors affect judgments of acceptability. Factorial vignette surveys have been used to explore complex judgments in a variety of contexts, with researchers using vignettes to study privacy-related decision-making regarding personal data collection and use (e.g., Gilbert et al., 2021; Martin, 2012; Martin & Nissenbaum, 2016).

In the survey, respondents viewed 35 randomly generated vignettes describing potential workplace monitoring scenarios and assessed each vignette across two metrics: appropriateness and concern. We built the vignette template to account for CI’s core parameters. Context (workplace) was held constant, but we varied the type of data collected (attribute), the data recipient (actor), and the conditions that shape data flows (transmission principles). We also included a fourth factor—purpose for data collection—to further contextualize data collection.² The final template for vignettes read as follows:

Your company will begin collecting and monitoring employee data through new company software. [Data attributes] may be collected to [purpose]. This data will be made available to [actor]. This data collection will [transmission principle].

Building from rough taxonomies of workplace surveillance in the literature (Ball, 2010, 2021; Nguyen & Mateescu, 2019), and informed by recent accounts of monitoring practices during the pandemic (e.g., Putzier & Cutter, 2020; Zakrzewski, 2020), we developed a list of levels for the four factors that would vary across vignettes (see Table 1 for the final list). For example, we identified 14 levels of data attributes that represented various data types employers might collect. For attributes and purpose, we included several levels that directly addressed health concerns, as these variables were new to most monitoring practices, yet increasingly relevant in light of the pandemic (e.g., collecting body temperature; reducing the spread of diseases like COVID-19). Once the levels were finalized, we had a total corpus of 4,368 vignette combinations, based on 14 (attribute) * 13 (purpose) * 6 (actor) * 4 (transmission principle). Following the steps outlined in Helfer et al. (2018), we used a Python script to generate a TXT-formatted survey file, then imported the file to the survey platform Qualtrics. We used the randomizer feature to ensure respondents would view a randomly generated subset of 35 vignettes from the larger corpus. Descriptive statistics for each level, including the number of vignettes at that level as well as the mean and standard deviation for the two dependent variables, are included in the Supplementary Files.

Prior to beginning this section of the survey, respondents were presented with instructions, noting that they would view 35 scenarios, each on a separate page, and that the scenarios would be similarly structured, with changes between scenarios denoted in bolded/underlined text. Respondents were

Table 1. Full list of items included in factorial vignette scenarios

Factor	Number of levels	Items
Data Attribute	14	The average number and length of your work sessions per day Video or images of your home workspace The number and length of breaks you take during the workday Work-related data from your mobile phone Content of your social media posts Data about your physical activity Data about your mental health Data about your body temperature Content from your work emails Content from your work chat messages A record of all keys typed on your computer The amount of time you spend on nonwork-related websites IP address of where you log in to work systems Your attentiveness during video conferences Reduce the spread of diseases like COVID-19 Provide deductions for “healthy” employees Improve worker productivity Assist in promotion decisions Ensure employees are following workplace rules Facilitate collaboration across the company Encourage healthy behaviors Monitor the effectiveness of remote work tools Ensure minimum work efficiency Reduce distractions Meet monthly performance metrics Ensure information security practices are maintained Protect company trade secrets Other members on your direct team Your direct supervisor Your coworkers on an anonymous dashboard Senior executives The HR department The IT department Only occur while you are logged in to work applications from home. Continue after you return to the workplace. Occur anytime you use work-provided computing devices. Only occur during regular business hours.
Purpose for Data Collection	13	
Actor (data recipient)	6	
Transmission Principle	4	

asked to carefully read each scenario, then indicate their level of agreement with two items assessing their level of concern with and perceived appropriateness of the vignette. See a sample vignette from the survey in [Figure 1](#). The full survey instrument can be viewed in the [Supplementary Files](#).

Recruitment and participant details

Upon receiving IRB approval, we contracted Qualtrics to collect data from a national sample of US-based, adult workers.³ Prospective participants were required to have been employed at the same company for the entirety of 2020 and to have shifted to remote work for at least part of the pandemic. We also requested that the gender split of the sample be approximately even between male- and female-identifying respondents.

Qualtrics conducted a soft launch, collecting 50 responses for review. We identified areas of concern (i.e., gibberish in open-ended responses, straight-lining), which Qualtrics addressed, then completed two more pilot rounds, collecting 30 responses each time and adjusting inclusion metrics. Responses were automatically rejected if the survey was completed in less than 6 minutes (median completion time in the soft launch was 9 minutes), or if respondents selected an incorrect response to one or more attention check item. Qualtrics then collected the remaining number of responses, replacing those flagged by the authors as problematic. This

led to a dataset of 665 responses. An additional round of data cleaning by the authors reduced the final sample to 645 people, who collectively evaluated more than 22,000 vignettes.

In the final dataset, 46.2% of respondents identified as female, compared with 52.7% who identified as male. Most participants (84.2%) identified as white, while 7.1% identified as Black and 4% identified as Latino. The average age across all participants was 44 ($SD = 13.3$). Most participants (76.9%) had at least a bachelor’s degree. More than one-third (36.7%) reported an annual household income below \$75,000, while 19.1% reported an annual household income above \$150,000.

Measures

Dependent variables

For each vignette respondents read, they indicated their agreement with two items: (a) “This form of monitoring is appropriate” and (b) “This form of monitoring would concern me” along a 7-point, Likert-type scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree*. Similar to prior work utilizing factorial vignettes to study the contextual nature of privacy (e.g., [Martin, 2012](#)), the inclusion of these items helps unpack two related, but distinct, components of how people assess the acceptability of a data flow. *Appropriateness* speaks directly to whether a data flow is acceptable in the specific context being evaluated, and is often governed by broader social/

Your company will begin collecting and monitoring employee data through new company software. **Your body temperature and other health measures** may be collected to **maximize work efficiency**. This data will be made available to **your direct supervisor**. This data collection will **only occur while you are logged in to work applications from home**.

	Strongly Disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
This form of monitoring is appropriate.	<input type="radio"/>						
This form of monitoring would concern me.	<input type="radio"/>						

Figure 1. Sample vignette in Qualtrics.

communal norms. Specific to this study, workers might expect fewer data protections while at work than in their personal lives, as U.S. regulations have codified reduced expectations for privacy in the workplace; asking about appropriateness captures this view. Prompting our participants to provide their level of *concern*, however, helps identify more specific attitudes toward the data flows in question, which might be impacted by personal characteristics or circumstances. For example, even if I think my employer is justified in collecting data, I may still be concerned about what is being collected or how it might be used due to my own unique circumstances. We followed earlier applications of this methodology and did not provide specific definitions to differentiate appropriateness from concern to avoid narrow conceptualizations of the constructs.

Across all evaluations, respondents evaluated the appropriateness of the scenarios positively, with the average slightly above the midpoint ($M = 4.17$, $SD = 2.06$). Perceived concern across all vignettes was higher, with a mean value of 4.87 ($SD = 1.80$). A Pearson correlation showed the two variables are moderately negatively correlated ($r = -0.38$, $p < .001$), meaning that, in general, higher appropriateness was associated with lower concern. We choose to include both DVs in our analyses to account for the subtle differences between these two constructs.

Independent variables

Our primary independent variables are the four factors included in the vignettes. To facilitate our evaluation of gender differences, we included a dichotomous measure (female vs. male-identifying) in analyses.⁴ We also included three control variables in some models: age, length of employment, and data privacy concerns. Age was an open-ended item ($M = 44.01$, $SD = 13.27$). Length of employment included seven options originally, which were then collapsed into four groups (two years or less, 16.6%; 3–4 years, 18.8%; 5–10 years, 35.3%; and >10 years, 29.4%). The data concerns scale was developed by the authors for a prior analysis of this dataset (Vitak & Zimmer, 2023). It includes four items assessing concerns about data collection by online companies and computing devices, as well as general concerns about employer-based and government monitoring. The items were measured on a 7-point, Likert-type scale ranging from

1 = *Strongly Disagree* to 7 = *Strongly Agree* ($M = 5.04$, $SD = 1.14$, $\alpha = 0.81$).

Data analysis

Because respondents evaluated multiple vignettes, data were hierarchical, being generated at two distinct levels (individual and vignette). To account for both within- and between-subject differences, we used linear mixed-effects modeling (LMM) (Hox et al., 1991), running analyses in both R (lme4 package) and SPSS v28. LMMs are an extension of common linear models like regression that include both fixed (independent) and random (nonindependent) effects. LMMs are especially useful when data are hierarchical; in this case, the hierarchy arises because each respondent evaluated 35 vignettes. Therefore, an individual's evaluations are not independent of one another—as we would expect some degree of correlation across their responses to different vignettes—but the responses from different respondents are independent.

Findings

RQ1: differences in perceived appropriateness and concern across CI parameters

Below, we summarize LMM outputs for each of the four factors included in the vignettes, using the two evaluative statements included with each vignette as the dependent variables. Results can be interpreted like an ANOVA; each model compares responses between all items in a given factor with a constant, which we indicate for each factor. A significant result indicates that a given level was perceived as significantly more or less appropriate (or concerning) than the constant. See the *Supplementary Files* for detailed tables presenting full results from the LMMs described in this section.

Data attributes

The first LMM includes data attributes as the fixed factor, with 14 levels. Compared with data from your work emails—which we used as our constant because it represents a data type with low expectations for privacy—we identified a number of attributes seen as less appropriate and more concerning. These include content from work chat messages—which may be seen as more informal/personal than emails, even though it is still data generated in a work context; data about

one's physical and mental health; and data from more personal or private sources (social media posts, time spent on nonwork websites, mobile phone data, videos/images of work environment). The only data attribute seen as more appropriate/less concerning than work email content was time spent working, which is one of the most common ways employees are monitored. Especially noteworthy are the results for "video or images of your home workspace," as this became common practice in the early months of the pandemic with the increasing reliance on video conferencing systems like Zoom. When framed in terms of a data attribute your employer seeks to collect directly—rather than as incidental collection during a meeting—workers may view it as particularly privacy invasive, especially those who wish to keep their work and home lives separate.

Purpose for data collection

Next, we evaluate LMM results from a model including 13 levels in the Purpose factor. In this model, "ensure employees are following workplace rules" is included as the constant for comparisons, given this should be viewed as a generally appropriate reason for workplace monitoring. Across all vignette evaluations, four purposes were perceived as significantly less appropriate and more concerning than the constant—reducing distractions, meeting monthly performance metrics, reducing healthcare costs for healthy employees, and assisting in promotion decisions—while five purposes were seen as statistically similar to the constant. Two purposes—encouraging healthy behaviors and ensuring minimum work efficiency—were perceived as more concerning but not less appropriate. The purpose that garnered the most extreme response was reducing healthcare costs for healthy employees, a purpose for workplace data collection with a long history, even before the COVID-19 pandemic. We'll return to this finding in the *Discussion* section.

Data recipient (actor)

Next, we consider LMM results for the Data Recipient factor, which includes six levels. We chose "your direct supervisor" as the constant, as the supervisory relationship typically entails significant information sharing, especially related to work performance. Our model identified two groups perceived as less appropriate and more concerning across all scenarios: other members of one's direct team and coworkers on an anonymous dashboard. This finding is unsurprising, especially given that many workplaces have clear hierarchical structures that map onto data flows. While there may be many logical reasons to share data with one's supervisor (or with HR or IT), sharing data more widely without a clear reason is more likely to be seen as problematic.

Transmission principles

Finally, we evaluate the LMM predicting differences in appropriateness and concern of four transmission principles defining the boundaries for data collection. Compared with the constant (continue after you return to the workplace), the other three options were all seen as more appropriate and less concerning.

RQ2: gender differences in perceived appropriateness and concern

To address our second research question, we built two full factorial LMMs—one for each DV—to explore whether male and female workers had significantly different perceptions toward different monitoring scenarios. These models include fixed (vignette factors, gender) and random (participant) effects, as well as three control variables: age, length of time working for their current employer, and data privacy concerns. In Table 2, we present results from the LMMs.

First, looking at fixed effects, we found significant main effects for each of the four vignette factors in predicting both the perceived appropriateness of and concern about potential workplace monitoring scenarios. There was no main effect for gender—meaning that when looking across all vignette assessments, men and women's scores did not significantly differ. However, the LMMs identified several significant interaction effects between gender and the factors. We then looked at detailed estimates of fixed effects for each model and identified eight significant interactions (full details in *Supplementary Files*). In interpreting these results, a negative interaction term predicting appropriateness indicates that female respondents perceived a given scenario as less appropriate than male respondents, while a positive interaction term predicting concern indicates that female respondents perceived a given scenario to be more concerning than male respondents. Notably, we found a similar trend for interaction terms involving data attributes and data purposes, with male respondents reporting higher appropriateness and less concern than female respondents. On the other hand, male respondents reported significantly higher concern and lower appropriateness than female respondents when assessing two actors (direct supervisors and HR).

Table 2. Linear mixed models predicting perceived appropriateness and data concern

	Appropriateness		Concern	
	F	p	F	p
Type III test of fixed effects (between-subject)				
Intercept	160.59	.000	284.297	.000
Gender	0.674	.412	0.000	.992
Data Attribute	141.034	.000	96.100	.000
Purpose	5.964	.000	5.650	.000
Actor	13.997	.000	7.409	.000
Transmission principle	3.876	.009	6.672	.000
Gender * Data Attribute	2.431	.003	2.448	.003
Gender * Purpose	1.068	.382	0.367	.975
Gender * Actor	1.225	.294	2.307	.042
Gender * Transmission Principle	0.975	.404	1.399	.241
Age	0.046	.830	1.772	.184
Data Concerns	0.881	.348	0.226	.634
Time with Employer	5.158	.023	1.165	.281
Random effect (within-subject)				
Residual	103.349	.000	103.346	.000
Intercept	17.603	.000	17.446	.000
Model fit (Bayesian Information Criterion)		77,024.74	75,405.29	

Discussion

While the COVID-19 pandemic upended workplace practices throughout 2020 and into 2021, recent data suggest many workplaces will never fully return to their prepandemic “normal,” and some changes have significant privacy implications for workers. Two years into the pandemic, [Aksoy et al. \(2022\)](#) note that “no other episode in modern history involves such a pronounced and widespread shift in working arrangements in such a compressed time frame” (p. 1); they argue that remote work will continue to remain common practice in many industries after the pandemic ends. While this increased work flexibility has many benefits, some experts expect that many surveillance practices initiated during the pandemic will also continue, even as the initial “threat” used to justify them disappears ([Zickuhr, 2021](#)).

Exploring how ICTs blur public and private spaces has been a focus of CMC research for more than a decade. [boyd \(2010\)](#) described it as one of three central dynamics of networked publics, noting that “without control over context, public and private become meaningless binaries, are scaled in new ways, and are difficult to maintain as distinct” (p. 49). While boyd’s work focused on social media, it provides useful insights into the challenges and risks that arise when work and home are collocated. Workplace surveillance has historically been distinct from surveillance in more private spaces, with U.S. laws and regulations clearly limiting workplace privacy rights ([Determinmann & Sprague, 2011](#)). While the rise of social and mobile media began breaking down boundaries between these spaces ([McDonald & Thompson, 2016](#)), and AI accelerated widespread data collection and use for decision-making ([Kresge, 2020](#); [Nguyen & Mateescu, 2019](#)), the shift to remote work immediately raised concerns regarding how surveillance practices may infringe upon workers privacy—and how the impact of more invasive monitoring may be unequally distributed.

In this section, we further unpack our findings to identify where workers draw a line between reasonable and unreasonable uses of their data, as well as consider the broader social, moral, and political implications of these practices, as articulated in Nissenbaum’s CI framework. While we primarily focus on gender in our analysis, we also acknowledge wider issues of power and control that suffuse workplace surveillance practices.

CI identifies problematic workplace surveillance practices and provides a framework for how to respond

This study adds to a growing body of research using CI to evaluate privacy attitudes toward new ICTs (e.g., [Martin & Nissenbaum, 2016, 2020](#); [Vitak et al., 2023](#)) by considering how emergent workplace monitoring practices may violate norms of information flows. Such violations are likely when data collected and used for a narrow purpose is then used for others (i.e., function creep); when data collection exceeds what people perceive as necessary or appropriate; and when monitoring negatively affects employee control, autonomy, and trust ([Ball, 2021](#)). In this case, the uncertainty in the early days of the pandemic and the abrupt shift to remote work may have led workers to initially accept increased monitoring; however, as time went on and employees started returning to the office, the purpose of monitoring became less clear. That said, where these lines are drawn also depends on additional

social and organizational factors and, as we suggested early in the pandemic ([Vitak & Zimmer, 2020](#)), CI allows us to begin identifying the boundaries between appropriate and inappropriate monitoring.

We included a diverse set of attributes in the vignettes, ranging from data types that would generally be perceived as “reasonable” (e.g., work-related communications, IP address) to data that appear less connected to work practices (e.g., social media posts, physical and mental health data) and data types directly related to remote work and pandemic restrictions (e.g., photos/videos of home workspace and body temperature). Findings clearly highlight that as data types move further from those with clear connections to traditional work activities toward more sensitive and/or nonwork-related data, workers’ concern increased and perceived appropriateness decreased. This is especially noteworthy because respondents expressed concerns about data collection directly tied to remote work, such as attentiveness during Zoom calls or photos of their workplace; even with a justification tied to monitoring productivity, the collection of data from a private space (the home) likely makes workers uncomfortable.

Attitudes toward workplace surveillance grow more negative when there isn’t a clear rationale for collecting this more sensitive data, and workers may see this as an abuse of power ([Ball, 2021](#); [Levy, 2015](#); [Sannon et al., 2022](#)). Therefore, it becomes essential for employers to clearly communicate both the purpose for collecting data, how they will use that data, and constraints on future data use. The other three factors included in our vignettes focused on these aspects of monitoring. When looking across data purposes, respondents more strongly disapproved of reasons that went beyond expected goals like ensuring productivity or information security. For example, monitoring to encourage healthy behaviors was viewed as less appropriate/more concerning than several purposes more directly tied to workplace rules and safety. Employers have an obvious interest in encouraging healthy behaviors given the increasing costs of U.S. healthcare ([Berry et al., 2010](#)); however, workers may see this as an overextension of employers’ power regarding private spaces, behaviors, and information. Workers also took issue with data being repurposed for certain work-related purposes, such as using data to assist in promotion decisions or meet monthly performance metrics. Such concerns are warranted, given recent research highlighting the inherent biases in algorithms used to assist in workplace decision-making ([Köchling & Wehner, 2020](#); [Kresge, 2020](#); [Nguyen & Mateescu, 2019](#)).

The assessment of actors and transmission principles was the most straightforward. Respondents took issue with data flowing laterally to coworkers or team members at a similar level in the organizational hierarchy. Likewise, they took issue when the length of monitoring was ambiguous and would continue for an unknown length of time. CI notes that a data flow is more likely to be perceived as problematic when the constraints on that data are unclear ([Nissenbaum, 2010](#)); the best transmission principles provide clear guidance on their constraints, and the ambiguity in monitoring that will “continue after you return to the workplace” opens up possibilities for a wide range of future (mis)uses. [Ball’s \(2021\)](#) work further supports these findings; she notes that monitoring with a clear, work-relevant goal will likely be more accepted than one where the purpose is more generic or ambiguous.

Looking beyond CI’s parameters, an evaluation of the broader moral and political landscape in which monitoring

occurs—an important part of the CI framework that is often overlooked in empirical work—can help surface power imbalances that negatively influence some workers more than others. We explore this further in the next section.

Gender differences and power imbalances in workplace surveillance practices

Applications of CI in empirical research typically focus on the first six steps of the process, which entail describing a given practice, identifying the parameters that shape information flows and linking them to a prevailing context, and making a *prima facie* determination regarding whether the practice violates privacy (Nissenbaum, 2010). However, the framework includes three additional steps, which involve evaluating the social, moral, and political implications of the practice, and making a recommendation for or against the practice. For example, when contact tracing apps became prevalent during the pandemic, we (Vitak & Zimmer, 2020) employed CI's full framework to warn against “function creep”—when a technology deployed for benign purposes slowly gets repurposed for problematic ends—arguing extending data collection to contexts beyond public health goes against prevailing values of individual autonomy and freedom from widespread government surveillance. In the case of workplace surveillance, it is just as important that we not focus narrowly on monitoring as helping achieve goals of worker productivity or ensuring safety, but rather we consider the potential harms associated with this monitoring, especially for workers who lack power or voice.

Ball (2021) notes that “surveillance always involves an exercise of power” (p. 10). At one level, workplaces typically reflect clear power structures through roles; however, it is also important to consider broader power imbalances reflected in the workplace. While we lacked sufficient diversity in our sample to explore racial differences, we are able to reflect on the role gender plays in attitudes toward surveillance and how power imbalances further exacerbate the potential harms. Prior studies have highlighted gender differences in attitudes toward privacy and surveillance practices (Hirst & Schwabenland, 2018; Stark et al., 2020); we extend these findings by identifying gender differences in workers’ attitudes toward specific monitoring practices.

One of the clearest trends in our data was increased concerns about collecting health data or other forms of monitoring for health-related purposes. While these concerns were elevated across all participants, women expressed greater concerns regarding certain types and uses of health data. Within the USA, women have faced numerous challenges related to their health and their bodies in the workplace. Laws were passed, starting in the 1970s, to protect women’s job security when becoming pregnant or raising children; however, pregnancy discrimination remains common today (Kitroeff & Silver-Greenberg, 2018). In a more recent example of this, numerous media outlets detailed the ways law enforcement could use data from period-tracking apps to identify women who had an abortion in a state where it was recently outlawed, following the summer 2022 overturning of Roe v. Wade (Sorkin et al., 2022). Women, therefore, may have greater reason to fear how the collection and use of health-related data might be used against them, and may be more likely to perceive certain data flows as contextually inappropriate. The strength of CI is that it recognizes that privacy is

not a binary; it does not apply equally in every situation. Data flows in one context, or involving one set of actors, may be appropriate, but not in another.

As noted above, the shift to working from home during the pandemic had a disparate impact on women (Chauhan, 2022; Lyttelton et al., 2020). Women’s frequent role as primary caregivers became significantly more difficult during the lockdown as they lost childcare and needed to manage both working from home and their children’s remote schooling. This further complicated their ability to remain productive while working remotely, and researchers found that women struggled more to separate their work and home roles, leading to increased work–family conflict (Eddleston & Mulki, 2017). Because of this reduced ability to segment their work and home lives, women may experience heightened concerns about how they would be assessed by their employer as they attempted to manage work tasks, childrearing and remote schooling, and other household tasks. Our findings reveal a heightened anxiety among women that new forms of workplace monitoring that have emerged during the pandemic could further exacerbate these inequalities and power imbalances.

Limitations and future work

Because this study was motivated by questions related to the shift to remote work, our recruitment focused on a particular type of worker—those in largely white-collar jobs where working from home was possible. This, of course, excluded a wide range of workers—those in retail and hospitality, gig workers, warehouse workers, and more who needed to be on-site to complete job duties. These workers are also among those with the least power and those who are among the most heavily surveilled (Gurley, 2022). Other scholars have examined surveillance practices within the gig economy (Sannon et al., 2022); however, it is not clear how the pandemic-induced push for even more surveillance technologies will influence monitoring practices in these emerging labor sectors. Given the increasing reliance on contingent workers, and the often-precarious nature of their employment, we encourage researchers to continue to study the relationship between a variety of workplace environments and employees’ privacy rights.

We chose to survey workers in the middle of the pandemic; although many workers had been remote for eight months when they completed the survey, they may have been more accepting of enhanced monitoring at that time due to broader social factors and stressors. Follow-up studies could be conducted, now that most workers have returned to in-person work at least part of the time—to assess attitudes toward increased monitoring now that the immediate public health threat has passed. Such a study could also assess whether policies enacted in the early months of the pandemic have continued three years later.

In addition, our discussion of power differentials in workplace surveillance is limited to gender differences due to the constraints in data collection (i.e., focusing on white-collar industries) as well as limited diversity in other demographic and job-based characteristics. We encourage researchers to continue to explore the ways surveillance harms are unequally distributed across different demographic variables and to push for policies that will reduce the social, economic, and organizational harms faced by vulnerable groups.

Surveys measuring privacy attitudes may be susceptible to the “privacy paradox,” where respondents indicated an elevated level of privacy concern that does not align with their actual behaviors. We point to critiques that the privacy paradox is oversimplified (Solove, 2021) and note our research design does not allow us to correlate attitudes with behaviors. Future work could engage with individuals as they experience workplace surveillance and assess privacy attitudes and behaviors *in situ*.

Conclusion

The future of work need not embody dystopian science fiction. Some forms of workplace monitoring are justified and employers should have the right to track employees’ work communication, assess productivity metrics, and ensure security protocols are followed. We worry, however, about the function creep Ball (2010) warned of more than a decade ago when she described “how one particular surveillance technique can reveal more than one kind of information about employees” (p. 90). Increasing data collection, capturing nearly everything workers do while on the clock, has fueled a range of new technologies that purport to predict who to hire, fire, and promote. But these technologies are far from perfect (Nguyen & Mateescu, 2019), and many will likely be met with skepticism, concern, or outright hostility by workers.

CI helps us identify and understand why workers may have concerns about workplace surveillance in the aftermath of the pandemic by identifying explicit “pain points” as well as situating these practices in the wider socio-political landscape. Our findings suggest that workers—especially women—are responding to shifts in informational norms that spark new concerns over the appropriateness of these data flows while working from home or after returning to traditional work environments. More importantly, CI urges us to go further than descriptive analyses and theorize on the broader moral and political implications of such changes in information flows. Our work provides a starting point for this, and we call for a wider examination of how the increased surveillance that marks the future of work might affect autonomy and power relations in the workplace.

Supplementary material

Supplementary material is available at *Journal of Computer-mediated Communication* online.

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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Notes

1. We follow Ball (2021) in using the terms “surveillance” and “monitoring” interchangeably in this article, encompassing the wide range of practices employers use to collect data about workers and use that data to aid in decision-making about work/worker processes.
2. Our inclusion of “purpose” follows Nissenbaum’s (2010) emphasis on it being a critical feature of how people define contexts and embedded informational norms.
3. For more information about Qualtrics’ online panel services, see <https://www.qualtrics.com/experience-management/research/research-panels-samples/>
4. When working with Qualtrics on defining our sample, we indicated we welcomed responses from nonbinary participants; however, the final dataset only included seven people who did not identify as male or female, and so they were excluded from any analyses including gender as an independent variable.

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