Received: 10 September 2020 | Revised: 25 March 2022 | Accepted: 3 April 2022

DOI: 10.1111/peps.12514

PERSONNEL PSYCHOLOGY WILEY

ORIGINAL ARTICLE

A meta-analysis of the effects of electronic performance monitoring on work outcomes

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Abstract

Electronic performance monitoring (EPM), or the use of technological means to observe, record, and analyze information that directly or indirectly relates to employee job performance, is a now-ubiquitous work practice. We conducted a comprehensive meta-analysis of the effects of EPM on workers (K = 94 independent samples, N = 23,461). Results provide no evidence that EPM improves worker performance. Moreover, findings indicate that the presence of EPM is associated with increased worker stress, regardless of the characteristics of monitoring. Findings also demonstrate that organizations that monitor more transparently and less invasively can expect more positive attitudes from workers. Overall, results highlight that even as advances in technology make possible a variety of ways to monitor workers, organizations must continue to consider the psychological component of work.

KEYWORDS
electronic performance monitoring, meta-analysis, performance management, technology

1 | INTRODUCTION

As millions of individuals transition to telework amid the COVID-19 pandemic crisis, organizations must consider the positive and negative consequences of electronic approaches to training, assessment, supervision, and performance management. Though the pandemic has dramatically increased the real and perceived need for remote monitoring, extensive electronic performance monitoring (EPM) practices have already been ubiquitous for many workers. For example, nurses have been subject to location tracking via GPS (Carr, 2014) and hygiene tracking via electronic

sanitizer dispensers (Levchenko et al., 2011); manufacturing employees have been asked to wear RFID (radio-frequency identification) technologies to track their productivity (Ranganathan & Benson, 2020); police-civilian interactions have been captured via body cameras (Adams & Mastracci, 2018); and Walmart has patented audio surveillance technology to track employee behaviors as customers check out (Silverstein, 2018).

EPM refers to the use of technological means to observe, record, and analyze information that directly or indirectly relates to employee job performance (Stanton, 2000). Unlike traditional close supervision, employers who use EPM can monitor individuals continuously or intermittently; discreetly or intrusively, and with or without warning or consent (Ajunwa et al., 2017). Advances in computing technology and the migration of work into cyberspace have allowed for the monitoring of individuals in a variety of new, invasive, and relatively inexpensive ways (Holland et al., 2015). As a result, there is increasing development and proliferation of work monitoring technologies (Golden & Chemi, 2020), with associated risks that the psychological effects of using such monitoring may be overlooked.

Although the use of technology to observe employee performance is now many decades old (with early research on the effects of such work practices dating back to the mid-1980s, e.g., Irving et al., 1986), the effects of EPM on work and workers remain largely unclear. Despite marketing claims that monitoring can be used to protect worker's health and safety, workers often react negatively to these tools. For example, warehouse workers whose idle time is tracked have reported feeling uncertainty and fear about being punished for not working long enough (Frenkel, 2021). Other reports show the ease with which monitored workers learn to manipulate monitoring criteria and "game the system" (e.g., Satariano, 2020). Findings from the academic literature are difficult to parse. Empirical findings regarding the effects of EPM on workers vary greatly from study to study (Ravid et al., 2020), and the common treatment of EPM as a unitary concept (i.e., present or absent) and lack of common language for discussing varying forms of EPM have made it difficult to evaluate the psychological implications and generalizability of these findings (Ravid et al., 2020). The need to navigate these contradictions and understand EPM is critical and timely as proliferation of EPM increases rapidly (Golden & Chemi, 2020).

A recent review article by Ravid et al. (2020) proposed a typology of EPM characteristics as an attempt to organize and explain the effects of EPM, but they stopped short of empirically testing the proposed framework. As a result, Ravid et al. review did not provide any estimates for the effects of varying forms of EPM on work outcomes or offer any substantive conclusions about the efficacy of such interventions. Ravid et al. note throughout their review the need for further empirical research to help clarify mixed findings within the EPM literature to help guide EPM in practice.

Our meta-analysis of the EPM literature answers this call, advancing EPM theory and research in several ways. By applying meta-analysis to this typology, to test the effects of EPM on work and workers, we estimate the magnitude and variability of relationships that research finds between EPM and a variety of important work outcomes; we place these effects in context with the effects of other common workplace interventions; and we offer substantive conclusions as to the efficacy of EPM. We include a wide range of outcomes: task performance, organizational commitment behaviors (OCBs), counterproductive work behaviors (CWBs), privacy invasion, perceived justice, felt autonomy, work commitment, satisfaction, perceived support, monitoring acceptance, and stress. In total, we meta-analyze 94 independent samples comprising 23,461 people—by far the most comprehensive review of the effects of EPM on work and workers to date. Importantly, we systematically code for the characteristics of monitoring included in each study, to then meta-analyze how the strength of relationships differ across varying EPM implementations. EPM is a phenomenon for which practice continues to outpace research efforts (Ravid et al., 2020). We advance the initial framework proposed by Ravid et al. (2020) to offer a theoretical and empirical set of findings and corresponding practical recommendations to guide this quickly evolving domain.

The structure of this paper is as follows: We first review the EPM literature, revealing the heterogeneity of EPM characteristics studied and methods used to study them. We then review Ravid et al. (2020) EPM framework as a means of organizing this heterogeneity. Because the early EPM literature lacked a common language to characterize EPM, we apply Ravid et al. (2020) framework to form hypotheses and research questions, test them meta-analytically, and guide the interpretation of meta-analytic results. In conducting this meta-analysis, we aim to help clarify the effects of EPM with varying characteristics to (1) offer guidance to researchers and practitioners using and studying

EPM; (2) identify areas of the EPM literature where significant homogeneity/heterogeneity exists; and (3) highlight areas of the EPM literature that are well studied and those areas that are in need of further research.

2 | LITERATURE REVIEW

Approaches to studying EPM have varied greatly, resulting in an increasingly disordered literature that obscures underlying psychological effects of interest. For example, early EPM research focused on computerized task monitoring (e.g., keystroke tracking on typing speed) as compared to traditional forms of supervisor monitoring (e.g., Aiello & Svec, 1993). Later research broadened to include video monitoring implemented for a variety of purposes (i.e., observation purposes in Becker & Marique, 2014, evaluation purposes in Claypoole & Szalma, 2019). Still more recent research has focused on the effects of location tracking technologies on employee performance (e.g., McNall & Stanton, 2011). As specific forms of EPM and EPM research have broadened over time, researchers have adopted idiosyncratic terminology, further hindering integrative organization and understanding of EPM. For example, what Bartels and Nordstrom (2012) term as "administrative monitoring" (monitoring to decide how hard one had worked in order to justly disperse rewards) is very similar to what Holt et al. (2017) describe as "monitoring for fairness" and to what Decaro et al. (2011) refer to as "outcome pressure" monitoring.

An additional source of disorder in the EPM literature is the diverse research methodologies used by researchers, making comparisons across studies challenging. In addition to experimental work, EPM researchers frequently conduct cross-sectional survey research using idiosyncratic or self-developed scales (e.g., Arnaud & Chandon, 2013; Jeske & Santuzzi, 2015; Stanton, 2000). Researchers have also used vignette-based studies to explore the psychological effects of EPM. Some studies have asked participants to picture themselves in a situation in which an organization uses various forms of EPM, and then evaluate their reactions to working in those conditions (Henle et al., 2009; Holt et al., 2017). A common critique of scenario studies such as these is that they are unrealistic, do not adequately immerse participants in the situation of interest, and are not generalizable (see Aguinis & Bradley, 2014 for a review). At present, it is unclear how well results from these simulation studies correspond to monitored individuals' actual reactions. Thus, EPM research is highly varied in the monitoring characteristics studied and the methods used to assess them. EPM researchers often report results in broad terms, without acknowledging psychologically relevant monitoring characteristics that vary from study to study. Collectively, these features make it very challenging to detect meaningful patterns in the EPM literature via qualitative review.

2.1 | Typology of EPM characteristics

Ravid et al. (2020) proposed a typology of EPM in which monitoring characteristics—the *purpose*, *invasiveness*, *synchronicity*, and *transparency* of the monitoring—interact to affect individual-level work outcomes. Ravid et al. (2020) typology provides an organizing framework and common language for discussing and studying EPM characteristics, and as the most recent and comprehensive framework for EPM characteristics, is a logical starting point for the current meta-analysis. It is important to note, however, that similar to other classification frameworks (e.g., the Big Five Personality framework) it is likely that dimensions of this typology can be further parsed to more granular descriptions if desired. Below, we briefly describe each of the EPM characteristics included in the typology (see Table A1 in the Appendix for an overview), and offer a rationale for the inclusion of each characteristic as a determinant of individual-level work outcomes in our meta-analysis.

2.2 | Purpose

EPM purpose is the communicated function of, or rationale for, EPM use. It has four categories. *Performance Appraisal, Loss Prevention, and Profit EPM* (Performance EPM) is meant to incentivize effort and performance through

between-individual comparisons, strengthening of performance contingencies, and discouragement of loafing and deviant work behaviors. For example, monitoring employee computer usage to deter cyberloafing (Henle et al., 2009) and using sensors to alert supervisors if stockroom employees are not moving quickly enough (Yeginsu, 2018) would both be considered Performance EPM. *Development, Growth, and Training EPM* (Development EPM) is meant to provide workers with constructive performance feedback to identify strengths and weaknesses and aid in learning, skill acquisition, and performance improvement over time. An example would be the use of time tracking software to provide employees with information they can use to self-monitor and adjust weekly time usage and self-assess efficiency as desired. *Administrative and Safety EPM* (Admin/Safety EPM) is meant to document behavior for legal, administrative, and informational purposes or to protect employees and organizations from harm. Some examples of Admin/Safety EPM include video monitoring for job analysis (e.g., to better understand how a job is performed or to demonstrate how a task is performed for future employees), email monitoring to identify phishing attempts or potentially dangerous malware, and wearable tracking technologies meant to identify and warn of employees about environmental hazards. Finally, *Surveillance or Authoritarian EPM* (Surveillance EPM) describes monitoring that is implemented without any explicit rationale, beyond, perhaps, to collect and have access to employee information (Ravid et al., 2020). In other words, Surveillance EPM describes monitoring without any explicit purpose.

2.3 | Invasiveness

Invasiveness describes the intrusive and constricting aspect of EPM, especially as it relates to an individual's sense of privacy or autonomy. Invasiveness has several subelements. *Scope* describes the number of ways an individual is monitored (breadth) as well as the degree to which EPM data are individualized or aggregated at a group level (specificity). The specificity of EPM describes the level of analysis at which electronic monitoring takes place, ranging from most specific (i.e., individual-level) to least specific (i.e., organizational level). The *target* of EPM refers to the qualitative focus of monitoring including the kinds of information collected. Informed by early work on surveillance for public welfare (Schoeman, 1979), individual privacy rights (Schoeman, 1984), and public discourse on the acceptability of differing forms of employee monitoring (Ravid et al., 2020; U.S. Congress, Office of Technology Assessment, 1987) propose that the most invasive target of EPM is the monitoring of a person's personal thoughts, feelings, or physiology (e.g., tracking the content of personal e-mails, biometric monitoring), followed by targeting a person's body or physical location (e.g., GPS tracking, video monitoring), and targeting task performance (e.g., typing speed). *Constraints* refer to the extent that an organization limits how and when EPM data can be collected, in addition to who can access the data and how it may be used (Ravid et al., 2020). For instance, an organization may enact high levels of constraints on EPM that captures potentially sensitive material (e.g., physiological data) by specifying exactly when the monitoring will occur and greatly limiting who has access to the gathered data. *Target control* refers to the extent that individuals have control over the methods and timing of monitoring. For example, an individual who is asked to record themselves performing a task for future employees to use as reference may have high levels of control to stop, start, pause, delay, and even edit monitoring whereas call center employees may have little control over when or how their performance is monitored. EPM with lower levels of constraints and target control are considered more invasive.

2.4 | Synchronicity and transparency

The last two characteristics in the Ravid et al. (2020) typology are Synchronicity and Transparency. Synchronicity describes the temporal characteristics of EPM, both the synchronicity of *data collection* and the synchronicity of *delivery of feedback* (Ravid et al., 2020). Highly synchronous data collection involves continuously gathering information about employee behavior, whereas asynchronous data collection is periodic or passive (e.g., stored for viewing later). Synchronous feedback systems provide feedback to employees as they work, whereas asynchronous feedback may

be an aggregated report of employee performance. EPM Transparency describes the degree to which individuals have access to information regarding monitoring characteristics (Ravid et al., 2020). Transparency is a continuous measure ranging from the provision of no information about EPM practices, to the provision of all details (e.g., purpose, invasiveness, synchronicity).

3 | HYPOTHESES AND RESEARCH QUESTIONS

Given the complexity of EPM and the variability in methods used to study EPM, this study aims to test a variety of hypotheses and research questions using meta-analysis. An aim of the current paper is to help clarify the effects of differing EPM characteristics across the broad range of work-relevant outcomes that are most represented in the EPM literature at the current time. We group these work outcomes into the broad categories of performance, attitudes, and stress/strain, and offer hypotheses and research questions for each. A great deal of variance is certain to exist within each outcome variable; we explore these differences by testing study-level moderators. We organize our hypotheses using Ravid et al. (2020) aforementioned typology of EPM characteristics. Given the great deal of variability in design and use of EPM, we chose not to formulate hypotheses as to any main effects of EPM and instead offer hypotheses regarding the moderating effects of EPM *characteristics*. For each characteristic in the typology (i.e., purpose, invasiveness, synchronicity, and transparency), we discuss relevant scholarship pertaining to the moderating effects of the characteristic on the relationship between EPM and performance, attitudes, and stress/strain. Where theory and evidence regarding the effects of an EPM characteristic on a work outcome is insufficiently developed, we propose general moderation hypotheses or research questions.

3.1 | Purpose as a moderator of the effects of EPM on work outcomes

3.1.1 | EPM purpose and performance

Purpose is likely to moderate the effect of EPM on performance. Social information processing theory (Salancik & Pfeffer, 1978) proceeds from the assumption that individuals use the activities and words of others to infer the social acceptability of their own behaviors and to understand behavior-outcome linkages. Individuals are likely to interpret the communicated purpose of monitoring as a signal about what behaviors an organization values and rewards, and therefore where effort and attention should be placed (Stanton & Julian, 2002). For instance, individuals monitored for performance purposes may focus narrowly on task performance; individuals monitored administrative purposes may attend to administrative compliance; individuals monitored for surveillance purposes may refrain from engaging in observable CWBs; and individuals monitored for development purposes may focus on skill acquisition and mastery believing these behaviors will be valued by the organization. Differences in where individuals place their attention and effort at work are likely to lead to differences in performance (Northcraft et al., 2011).

Further, EPM systems with different purposes are likely to send different messages about an individual's value and standing, creating differences in motivation to perform. McNall and Roch (2007) found, in support of this notion, that EPM purpose influenced performance through its impact on interpersonal justice perceptions and trust in management. Wells et al. (2007) found that employees were more motivated to help their organization achieve goals when monitoring was for development rather than for performance appraisal purposes; and Jeske and Santuzzi (2015) found that monitoring with different purposes (i.e., for worker safety, to deter resource abuse) differentially influenced workers' willingness to engage in OCBs. Thus, different purposes for monitoring are likely to have different effects on individuals' motivation to perform, ultimately leading to differences in performance.

Despite evidence for purpose as a moderator of the effects of EPM on performance, the current state of EPM scholarship makes it difficult to predict the precise form/direction that the moderation will take, particularly when

examining performance as defined broadly. Evidence suggests that as EPM focuses attention toward one aspect of performance, it may divert attention from other aspects of performance (Larson & Callahan, 1990; Stanton & Julian, 2002), but it is unclear if this is true in all cases. For instance, no research has examined whether focusing one's attention on administrative or safety compliance through Admin/Safety monitoring affects other aspects of performance (e.g., task performance, OCBs), making it difficult to predict the precise form of this moderating effect. Also unclear are the overall performance effects of Surveillance EPM, which may direct employee effort toward work tasks while also communicating to individuals that they are not trusted, perhaps decreasing motivation to perform. Thus, instead of specific hypotheses about the form/directionality of the moderating effects of each category of purpose, we pose the following general hypothesis:

Hypothesis 1a: The communicated purpose of EPM will moderate the effects of EPM on performance.

3.1.2 | EPM purpose and attitudes

Purpose is also likely to moderate the effects of EPM on attitudes. Nishii et al. (2008) HR practice attribution model argues that people attach causal attributions (i.e., an underlying purpose) to HR endeavors, and these causal attributions influence attitudes at work. Nishii and colleagues proposed that individuals respond positively to HR practices perceived as for their benefit and negatively to HR practices perceived as for organizational benefits (e.g., worker exploitation, cost-cutting). Similarly, Hovorka-Mead et al. (2002) drew on sociological and communications theory (e.g., Benoit, 1995; Scott & Lyman, 1968) to suggest that individuals use the communicated purpose of EPM to evaluate the extent that monitoring is justified; when individuals perceive that monitoring is less justified, they are more likely to respond with negative attitudes.

Again, it is difficult to predict the precise form/directionality by which purpose moderates the effects of EPM on attitudes. Research is still needed that explore the attributions employees might assign to each category of EPM purpose. Employees may perceive Performance EPM, for example, as implemented for organizational rather than employee benefit due to the evaluative nature of the monitoring; or they may perceive Performance EPM as for employee benefit due to EPM's ability to distribute rewards and punishments more fairly. Similarly, Admin/Safety EPM may be perceived as implemented for employee safety and well-being or may be perceived as paternalistic or implemented as a means of protecting the organization from employee legal claims. Although individuals are likely to view differing EPM purposes as more or less justified affecting their attitudinal responses to EPM, the precise magnitude and directionality of these differences are still unclear. We, therefore, offer the following hypothesis:

Hypothesis 1b: The communicated purpose of EPM will moderate the effects of EPM on attitudes.

3.1.3 | EPM purpose and stress/strain

Models of evaluation anxiety (e.g., Zeidner & Matthews, 2005) and role theory (Katz & Kahn, 1978) support the notion of purpose as a moderator of the effects of EPM on stress/strain but suggest different forms that this moderation may take. The communicated purpose for EPM is likely to signal to employees the degree to which they are working in an evaluative context, influencing their levels of evaluation apprehension and anxiety. Nebeker and Tatum (1993) proposed that stress might only result when EPM is paired with goals and performance-contingent rewards, suggesting that EPM for nonevaluative purposes (e.g., Development, Admin/Safety) may produce relatively little stress. However, different purposes for monitoring are also likely to vary in the degree to which they create uncertainty regarding role expectations, and thus role related stress (Katz & Kahn, 1978; Sonnentag & Frese, 2013). Highly evaluative EPM may help clarify organizational expectations through incentives and punishments attached to monitoring, mitigating

uncertainty and the resulting stress. Sherif et al. (2021) qualitative study supports this notion; for example, a participant in that study reported that the evaluative EPM system in their workplace provided them with clarity about where to focus their attention and how to spend their time. Monitoring for other purposes such as Admin/Safety or Surveillance may provide little role clarity to those being monitored. Thus, it is not clear the precise manner/form by which purpose is likely to moderate the effect of EPM on stress/strain. We, therefore, pose the following general hypothesis regarding the moderating effect of purpose:

Hypothesis 1c: The communicated purpose of EPM will moderate the effects of EPM on stress/strain.

3.2 | Invasiveness as a moderator of the effects of EPM on work outcomes

3.2.1 | EPM invasiveness and performance

Several theoretical frameworks suggest that invasiveness is likely to moderate the effects of EPM on performance such that more invasive monitoring has a more positive effect on performance. Goal-setting theory (Locke & Latham, 2006) and self-regulation theories, for example, suggest the importance of specific behavioral feedback for goal-achievement and work performance (Kanfer et al., 2017). More invasive EPM (e.g., monitoring with greater breadth, greater specificity) is likely to provide individuals and their organizations with more detailed and specific performance-related information, supporting performance improvements. Individuals monitored by a low-specificity EPM system (e.g., group monitoring) may feel more tempted to engage in social loafing than those experiencing EPM at higher specificity, and they may find the feedback from monitoring too general to improve their individual performance. Consistent with this idea, Earley (1988) found that computer-based performance feedback of magazine subscription employees enhanced performance when the feedback received from the system was specific but not when it was general.

Agency theory (Jensen & Meckling, 1976) provides further theoretical justification for the positive effects of invasiveness on performance. Agency theory assumes that individuals know more about their performance behaviors at work than others do and can behave opportunistically and in self-interested ways due to this information imbalance. EPM provides organizations with access to employee information, thereby reducing the information imbalance between individual and organization and limiting opportunities for individuals to engage in counterproductive behaviors (Alge & Hansen, 2014). According to agency theory, the performance benefits of EPM should increase as EPM systems transfer more informational control from employee to organization. Thus, we pose the following hypothesis:

Hypothesis 2a: Invasiveness will moderate the effects of EPM on performance such that more invasive EPM will be associated with more positive performance.

3.2.2 | EPM invasiveness and attitudes

We expect that invasiveness moderates the effects of EPM on work attitudes such that more invasive EPM is associated with more negative attitudes. More invasive EPM (e.g., broader scope, more personal target, less target control) is more likely to be perceived as a threat to individual behavioral freedoms. Psychological reactance theory (Brehm & Brehm, 1981) suggests that individuals perceive having certain behavioral freedoms that, when threatened or eliminated, produce an aversive motivational state. This motivational state, state reactance, is directed toward reasserting behavioral freedom and is associated with negative cognitions and affect (Rains, 2013). Results from a recent study by Yost et al. (2019) suggest that organizational monitoring policies may indeed produce state reactance in employees; the study also demonstrated that greater state reactance was associated with negative attitudinal work outcomes

(increased anger and negative cognitions; Yost et al., 2019). Second, more invasive EPM is likely to capture more non-work-related information than less invasive EPM, as the breadth of behaviors captured is wider, and it may target more personal data. The work-relatedness of personal information captured by monitoring may moderate the relationship between EPM use and perceptions of privacy invasion, such that the relationship is lessened when monitored content is perceived as work-related (Alder & Tompkins, 1997); thus, we expect individuals to respond more negatively to more invasive EPM.

Hypothesis 2b: Invasiveness will moderate the effects of EPM on attitudes such that more invasive EPM will be associated with more negative attitudes.

3.2.3 | EPM invasiveness and stress/strain

We expect more invasive EPM to be associated with greater levels of stress/strain, for several reasons. First, Karasek's (1979) job demands-control model argues that autonomy in the form of decision-making authority instills a sense of control in workers, thus reducing their feelings of stress or strain in otherwise demanding jobs. By definition, an EPM system that provides workers with authority over monitoring decisions is less invasive than one that does not provide such affordances. Second, highly invasive EPM may create a sense of privacy invasion among workers, and privacy-invading technologies are often associated with increases in worker stress (Tarafdar et al., 2007). Thus, high levels of EPM invasiveness should be associated with stress reactions from workers.

Hypothesis 2c: Invasiveness will moderate the effects of EPM on stress/strain such that more invasive EPM will be associated with greater levels of stress/strain.

3.3 | Synchronicity as a moderator of the effects of EPM on work outcomes

Relative to purpose and invasiveness, scholarship regarding the moderating effects of synchronicity is far less developed. Few studies have directly examined the effects of synchronous versus asynchronous monitoring and monitoring feedback on work outcomes. Although highly synchronous EPM may be perceived as more restrictive than intermittent or delayed data collection and storage, research suggests that individuals may prefer the predictability of continuous collection to the unpredictability of intermittent monitoring (Jeske & Santuzzi, 2015). Compared to intermittent monitoring, however, individuals may perceive more continuous monitoring as more thoroughly and accurately capturing typical performance within and across individuals; and, therefore, it may be perceived as more procedurally fair (McNall & Roch, 2007)

In general, timely feedback is considered useful for learning and skill development (Northcraft et al., 2011), suggesting that individual performance may benefit from greater synchronicity in EPM feedback. However, it is also possible that as compared to asynchronous feedback (e.g., a summarized report of aggregated performance behaviors) synchronous feedback delivery may increase evaluative apprehension (i.e., anxiety over negative evaluation) due to more detailed real time behavioral feedback, which in turn may inhibit feedback integration and learning (Green, 1983). Due to a lack of research and scholarship addressing the effects of EPM synchronicity on individual-level outcomes, we pose general research questions regarding the potential moderating effects of synchronicity.

Research Question 1: Does the synchronicity of EPM moderate the effect of EPM on (a) performance, (b) attitudes, or (c) stress/strain?

3.4 | Transparency as a moderator of the effects of EPM on work outcomes

Theory regarding the effect of transparency on individual level outcomes is well-developed and clear, suggesting that greater transparency in monitoring is likely to produce more positive work outcomes. Greater transparency about EPM should help clarify the goals and purpose of EPM, and thus guide individuals towards organizationally desired outcomes and more positive performance (Locke & Latham, 2006). Further, theories of workplace justice (e.g., Greenberg, 1987) argue that organizations that are honest and transparent about organizational practices will be perceived as fairer than organizations that are not. Greater perceptions of justice, in turn, have been shown to relate to a variety of positive work attitudes and behaviors (e.g., satisfaction, commitment, intention to stay, leader member exchange; Cohen-Charash & Spector, 2001). Indeed, Posthuma et al. (2018) have discussed the concept of transparency in a broader HRM context, theorizing that rich, clear communication between an organization and its workers will result in more favorable performance and attitude outcomes. Additionally, greater transparency about the nature of monitoring should help diminish uncertainty about the monitoring and therefore reduce stress/strain associated with uncertainty. Therefore, we propose the following hypotheses:

> *Hypothesis 3*: Transparency will moderate the effects of EPM on performance such that more transparent EPM will be associated with (a) more positive performance, (b) more positive attitudes, and (c) lower levels of stress/strain.

4 | METHOD

We conducted two sets of analyses based on the two different approaches that researchers have used when studying EPM. The first set of analyses (Presence analysis) includes primary studies that compared electronically monitored and unmonitored individuals, that is, presence versus absence of EPM. These studies could be experimental (e.g., an experiment with an EPM condition and a nonmonitored condition) or nonexperimental (e.g., a survey study in which some respondents indicated the presence of EPM at their work and others indicated that EPM was not present at their work). In the Presence analysis, we examine the overall effects of the presence/absence of EPM on work outcomes and examine EPM characteristics as *between-study* moderators of these main effects. The Presence analysis allows us to answer the question, "what is the effect of EPM with a specific characteristic as compared to no EPM at all?"

The second set of analyses (Degree analysis) includes primary studies in which the presence of monitoring was a constant (i.e., no nonmonitored individuals). These studies measured or manipulated monitoring characteristics at the *within-study* level. For instance, an experiment in which one group of participants is monitored more invasively than another group of participants or a nonexperimental study in which respondents rate on a scale how transparent their organizations are about EPM practices would both be included in the Degree analysis. In these cases, primary studies were typically more explicit about the monitoring characteristics that were measured or manipulated. In the Degree analysis, we examine the relative effects of varying levels of an EPM characteristic (e.g., more or less transparency) on work outcomes and answer the question, "what is the effect more or less of a particular EPM characteristic?" We were able to test any given hypothesis or research question with either the Degree or EPM Presence analysis, or both, based on the body of primary studies available.

4.1 | Inclusion criteria

We set eight inclusion/exclusion criteria for primary studies. First, to qualify for inclusion, articles must have focused on EPM specifically. Articles that only examined traditional or broad performance monitoring rather than EPM were

excluded. Second, articles must have examined EPM in a work-related context. We considered experiments in which participants were instructed to engage in a work task (e.g., data entry, memory task, card sorting) or training exercise (e.g., learning a skill in Microsoft Excel) to be work-related. We excluded articles that examined EPM in nonwork settings such as consumer habit monitoring.

Third, articles must have reported Pearson correlations or descriptive statistics that could be transformed to a Pearson correlation for the relationship between an EPM characteristic and a work-related outcome. Articles that did not provide sufficient information to calculate a Pearson correlation, and whose authors did not or could not provide the needed information upon e-mail request, were excluded. Fourth, articles must have been conducted at the between-person level. Fifth, we excluded studies in which authors clearly used the same dataset and reported the same correlations in more than one published study, unless different outcomes were considered in both studies. In cases in which both theses/dissertations and published versions of these theses/dissertations were obtained, only the published work was included[1].

Sixth, when an article reported results obtained from multiple independent samples, each sample was included separately (e.g., Claypoole & Szalma, 2019; Decaro et al., 2011). Seventh, because our primary interest is in the effects of EPM on individuals who are monitored, articles in which individuals were asked for their perception of EPM use on others (e.g., Kaupins & Coco, 2017; in which HR managers rated the ethicality of using various monitoring techniques on other employees) or in which EPM was included as a dependent variable (e.g., Alge et al., 2004) were excluded. We also excluded articles in which EPM was operationalized using an attitudinal measure (e.g., Holman et al., 2002; in which respondents rated the amount that they were electronically monitored at work on a scale from "too little" to "too much"). Finally, for the EPM Presence analysis, to qualify for inclusion, articles must have included some individuals who were not electronically monitored to serve as a comparison in the calculation of correlations. To be included in the EPM Degree analysis, articles must have included EPM that varied on at least one psychological characteristic (e.g., EPM with more control as compared to EPM with less control; McNall & Stanton, 2011).

4.2 | Literature search

We conducted an extensive literature search between June and October of 2019 with supplementary searches conducted in December of 2019, August of 2020, and February of 2021. The literature search for the EPM Presence and EPM Degree analyses was conducted concurrently and studies were coded as Presence or Degree later. We started by searching the Web of Science electronic database using the following advanced search:

> *"electronic monitoring" AND "performance") OR TS = ("electronic performance monitoring") OR TS = ("computer monitoring" AND "performance") OR TS = ("computer surveillance" AND "performance") OR TS = ("employee monitoring") OR TS = ("work monitoring") OR TS = ("performance monitoring") OR TS = ("performance feedback" AND ("computer" OR "electronic")) OR TS = ("computer-aided monitoring" AND employee) OR TS = ("monitoring and performance" AND "computer")*

This search yielded 5664 results. We next refined results to only include articles from psychology-, management-, business-, and human-resource-related fields. The refined search yielded 941 articles. We next read through titles and abstracts of the articles collecting citations to those articles that were relevant. This process resulted in citations to 102 articles.

In the next step, we read through each article to select only those empirical articles that fit our a-priori inclusion criteria. We conducted forward searches and examined the reference lists of all retrieved articles to collect any additional articles not found in our initial search. We also searched the reference lists of several reviews of employee monitoring (Alge & Hansen, 2014; Jeske & Kapasi, 2017; Stanton, 2000) including a recently published review of the effects of

body-worn cameras (BWC) on police officers (Maskaly et al., 2017) and conducted follow up searches using Google Scholar, PsycINFO, and JSTOR to identify additional articles that fit the inclusion criteria.

Consistent with meta-analytic best practices (Aguinis et al., 2011) we sought to actively include unpublished master's theses, doctoral dissertations, and conference papers in our meta-analysis. We conducted a search in ProQuest Dissertations and Theses using the same combination of keywords as those above and collected citations for articles that appeared relevant. We then read through each dissertation selecting those that fit our inclusion criteria. We conducted additional searches within the conference programs of the Academy of Management Annual Meeting, the Society for Industrial–Organizational Psychology Annual Conference, and the American Sociological Association Annual Meeting from 2010 to 2019 and contacted authors whose abstracts focused on EPM. We also reached out to several authors who had published EPM-related research papers previously to inquire about unpublished and in-press data. This resulted in the inclusion of data from 15 additional studies. In total, our dataset included data from $S = 79$ sources, $K = 94$ independent samples, and $N = 23{,}461$ individuals. All articles can be found in Online Supplement 1A.

4.3 | Study coding

Four researchers were responsible for coding all data (see the Online Supplement 2 for complete coding). Content coding decisions for EPM characteristics (summarized below and described in greater detail in Online Supplement 1B) involved a high degree of rater judgment. We, therefore, calculated agreement indices for coding decisions regarding EPM characteristics. Consistent with previous meta-analytic efforts (e.g., Van Iddekinge et al., 2019) intercoder agreement was used as an index of reliability. There was relatively high agreement for coding of EPM characteristics (intercoder agreement = 82.9% across all coded relationships, and ranged from 70% agreement for relationships coded as for *Surveillance purpose* to 93% agreement for relationships coded as *Transparency*). All coding decisions, including EPM characteristics, were compared across coders, with disagreements reconciled through group discussion.

4.3.1 | Coding of EPM characteristics

For studies included in the Presence analysis (studies that included monitored and unmonitored individuals), we coded for EPM characteristics in each study as between-study level variables. For studies included in the Degree analysis (studies for which the presence of EPM was a constant), only EPM characteristics that were directly examined as within-study variables were coded. EPM purpose was derived from the monitoring rationale provided to individuals in a study. When individuals in a study were told that they were monitored for comparisons against others or some performance standard, the purpose was coded as *Performance*; when individuals were told that they were monitored for record-keeping purposes or for their safety, the study was coded as *Admin/Safety*; when individuals were told that they were monitored to provide them with developmental feedback or to help them in learning a new skill, the purpose was coded as *Development*; and when individuals were told that they would be monitored with no clear justification provided, the purpose was coded as *Surveillance*. A small number of BWC studies with police populations that fit study inclusion criteria were coded as Admin/Safety. Given the particularly complex nature of police BWC we present results for Admin/Safety monitoring with and without BWC studies.

Studies with within-study comparisons of monitoring that varied in *breadth* (e.g., greater vs. lesser variety of monitoring), *specificity* (e.g., individual monitoring as compared to group monitoring), *target* (e.g., task targeted monitoring compared to person targeted monitoring) or *constraints/target control* over monitoring (e.g., more or less control over when and where monitoring takes place and how collected information is used) were coded as *invasiveness* broadly and coded for their respective typology subelements more specifically. For the Presence analysis, in which invasiveness was coded at the between-study level, we coded for specificity and target, but did not code for the breadth or

constraints/target control of the monitoring due to insufficient information for making judgments about what constituted high compared to low levels of these characteristics at the between-study level.

Synchronicity of collection was coded as either *synchronous* (performance information is collected, analyzed, and evaluated in real-time) or *asynchronous* (performance information is archived to be viewed or analyzed later). Finally, data extracted from articles that represented the relationship between EPM with more or less transparency (e.g., individuals who were given more or less information about when, how, or why monitoring took place) and individual outcomes were coded as *transparency*. There was insufficient information available to make judgments about what constituted high or low levels of transparency at a between-study level, and therefore we did not code this variable at a between-study level.

4.3.2 | Coding of work outcomes

Consistent with previous meta-analytic efforts (e.g., Doerwald et al., 2021; Rudolph et al., 2017), we used a synthetic construct grouping approach to code for work-related outcome variables that overlap theoretically and empirically (see Table 1 for variable groupings). We used the online metaBUS platform (Bosco et al., 2015) to establish evidence for the relationships between several outcomes in our study. metaBUS is a search engine created to rapidly summarize research findings. Several outcomes were strongly interrelated according to the metaBUS database, justifying their combination into a synthetic construct (e.g., job satisfaction and task satisfaction, $r = .53$; burnout and fatigue, $r = .55$; affective commitment and organizational commitment, $r = .51$). We drew from theory to combine outcomes with insufficient data in metaBUS to estimate mean correlations (e.g., privacy concerns and privacy invasion).

In addition to our synthetic groupings, we content coded task performance criteria. Task performance was narrowly coded as speed/quantity (e.g., typing speed, response time, data entry attempts) or as accuracy (e.g., percentage of data entries correct, response accuracy) and left uncoded when performance required both speed/quantity and accuracy (interrater agreement = 93.6%). We include these narrower performance criteria as subgroups of task performance. We meta-analyzed relationships between EPM characteristics and synthetic outcomes that appeared in at least three ($K \geq 3$) independent samples. We also report the relationship between EPM characteristics and more narrow outcomes within synthetic groupings when $K \geq 3$ (e.g., OCBs, CWBs, burnout). Work outcomes that neither rationally fit within a synthetic construct (e.g., number of arrests by police officers; performance variability) nor appeared in $K \geq 3$ relationships were not included in analyses.

4.3.3 | Coding of study method

In addition to understanding the ways that monitoring characteristics influence relevant work outcomes, it is also important to understand the degree to which research methods used to study EPM may influence these observed relationships. We therefore coded for study methodology as a potential moderator. Empirical EPM research tends to be conducted in one of three ways: (1) experimental studies in which a group of individuals are monitored, or made to think they are monitored, while they work or perform some task (e.g., Becker & Marique, 2014), which we coded as "*monitoring experiments*"; (2) experimental studies in which individuals are presented with vignettes or scenarios depicting EPM (e.g., McNall & Roch, 2007), which we coded as "*vignette studies*"; and (3) nonexperimental survey research in which survey questions assess experiences with EPM and relevant work outcomes (e.g., Sprigg & Jackson, 2006), which we coded as "nonexperiments".[2]

4.4 | Meta-analytic procedures

All analyses were conducted in R using the psychmeta package (Dahlke & Wiernik, 2019). We corrected observed correlations for sampling and measurement error and estimated meta-analytic effect size estimates using Hunter

TABLE 1 Summary of synthetic construct groupings for work outcomes

Broad attitudes	
Synthetic construct	***Included variables***
Fairness & justice	Distributive justice Interpersonal justice Perceived fairness Perceived ethics Procedural justice
Satisfaction	Job satisfaction Policy satisfaction Task satisfaction
Commitment	Affective commitment Continuance commitment Normative commitment Organizational commitment Turnover intentions
Privacy invasion	Informational privacy Invasion of privacy Privacy concerns
Autonomy	Perceived autonomy Perceived control
Perceived support	Perceived support Perceived organizational support
Monitoring acceptance	Acceptance of behavior tracking Monitoring acceptance
Broad performance	
Synthetic construct	***Included variables***
Task performance	Observed behavioral performance Performance complaints Performance ratings
Contextual performance	Counterproductive work behaviors Organizational commitment behaviors
Learning	Post-training knowledge Skill attainment
Broad stress/strain	
Synthetic construct	***Included variables***
Stress/Strain	Anxiety Burnout Fatigue Perceived stress Physiological indicators of stress (e.g., heartrate) Pressure

and Schmidt's (2004) random effects procedures. First, we corrected for sampling errors by calculating sample size-weighted correlations. Second, where possible (i.e., for multi-item scales), we corrected for lack of perfect reliability. Artifact distributions were used when reliabilities for multi-item scales were not reported (Hunter & Schmidt, 2004). Taking the most conservative approach, we did not correct for lack of perfect reliability in single-item scales or objective outcomes (e.g., number of words typed in a data entry task). We also chose not to correct for measurement error in experimental manipulations, given that variance in the degree to which participants in experimental paradigms are perfectly certain about if, when, and how they are being monitored, even when explicitly told, reflects uncertainties about EPM that exist in workplaces as well (Alder, 2001). Next, linear composites were calculated (Hunter & Schmidt, 2004) when an independent sample reported multiple correlations for the same relationship between an EPM variable and a synthetic outcome. For the EPM Presence analysis, EPM characteristics were treated as moderators of the relationship between EPM presence and work outcomes. For both the Presence and Degree analysis, study methodology (i.e., monitoring experiment, vignette study, nonexperiment) was also examined as a moderator. We used hierarchical subgroup moderator analysis due to the relatively small subgroup K (Schmidt, 2017). We additionally conducted PET-PEESE analysis (Stanley & Doucouliagos, 2014) and cumulative meta-analysis to address the influence of publication status on our conclusions.

In addition to the sample size-weighted correlation ($\bar{r}$) and the sample size-weighted and reliability-corrected correlation ($\bar{\rho}$), we report the 95% confidence interval and the 80% credibility interval for $\bar{\rho}$. When the confidence interval for $\bar{\rho}$ does not include zero, it is considered statistically significant. Confidence intervals can be directly compared across different levels of the same moderator, with nonoverlapping 95% confidence intervals suggesting that moderator subgroups are statistically different from one another ($p < .05$). When the credibility interval is wide, moderators are likely present, whereas when the credibility interval is narrow, any possible moderators can only have small effects (Geyskens et al., 2009).

5 | RESULTS

Meta-analytic results for the relationships between EPM characteristics and work outcomes are summarized in Table 2–5 for the EPM Presence analysis and Table 6 for the EPM Degree analysis. Effect sizes found in the EPM Presence analysis ($K = 59$) represent the absolute effect of a monitoring characteristic whereas those found in the EPM Degree analysis ($K = 44$) represent the effect of greater or lesser amounts of a characteristic. All relationships that met our $K \geq 3$ criterion were included in the results; however, in some cases, there was not sufficient K to make outcome comparisons across all EPM characteristics. Readers should interpret results from analyses with small Ks with caution. However, as Valentine et al. (2010) note, even when $K = 2$, meta-analysis is superior to other means of synthesis.

5.1 | Overall effects of EPM

Prior to testing our hypotheses, we examined the overall effects of EPM on outcomes without including the coded monitoring characteristics in analyses. As expected, results from these analyses were not predictive of work outcomes and strongly suggested the presence of moderators for nearly all relationships. As shown in Table 2 no statistically significant effects were observed between the mere presence of monitoring and performance, or any subset of performance behaviors (e.g., task performance, contextual performance)[3]. Similarly, the confidence intervals for nearly all relationships between EPM and attitudes were wide and all relationships except EPM with broad attitudes ($\bar{\rho} = -.11$ [95%CI: -.20; -.03]) and privacy invasion ($\bar{\rho} = .28$ [95%CI: .13; .43]) contained 0. Further, the credibility intervals for all relationships between EPM and performance and attitudinal outcomes were wide, indicating the likely presence of moderators.

TABLE 2 EPM presence analysis–overall effects of EPM

Work outcome & moderator	*K*	*N*	$\bar{r}$	SD_r	$\bar{\rho}$	SD_ρ	95%CI	80%CR
Broad attitudes	26	5969	−.10	.19	**−.11**	.21	[−.20, −.03]	[−.37, .14]
Monitoring experiment	12	1812	−.11	.15	**−.12**	.17	[−.23, −.01]	[−.31, .07]
Vignette experiment	6	1394	−.29	.11	**−.32**	.10	[−.46, −.19]	[−.48, −.17]
Non-experiment	8	2764	.00	.17	.00	.18	[−.15, .16]	[−.25, .25]
Fairness & justice	9	2390	−.04	.15	−.05	.18	[−.19, .09]	[−.28, .18]
Monitoring experiment	4	1065	.03	.04	.04	.05	[−.04, .11]	[.04, .04]
Non-experiment	3	777	.02	.10	.02	.11	[−.28, −.31]	[−.16, .20]
Satisfaction	14	3552	−.02	.13	−.02	.15	[−.11, .06]	[−.19, .15]
Monitoring experiment	8	993	−.04	.14	−.05	.18	[−.19, .10]	[−.25, .15]
Non-experiment	6	2559	−.01	.12	−.01	.14	[−.16, .13]	[−.21, .18]
Commitment	5	1148	−.03	.20	−.04	.23	[−.33, .26]	[−.38, .31]
Non-experiment	4	1041	.00	.19	.00	.22	[−.35, .35]	[−.34, .34]
Privacy invasion	8	2479	.27	.17	**.28**	.17	[.13, .43]	[.04, .51]
Monitoring experiment	3	744	.30	.21	.32	.22	[−.23, .87]	[−.09, .72]
Vignette experiment	4	1025	.33	.18	**.34**	.19	[.04, .63]	[.05, .63]
Autonomy	5	1262	−.15	.22	−.17	.24	[−.46, .13]	[−.52, −.19]
Non-experiment	3	1123	−.11	.08	−.12	.09	[−.33, .10]	[−.24, .01]
Broad performance	41	5804	−.01	.14	−.01	.14	[−.05, .04]	[−.15, .14]
Monitoring experiment	32	3757	−.01	.16	−.01	.17	[−.07, .05]	[−.18, .17]
Non-experiment	7	1816	.00	.09	.00	.09	[−.07, .08]	[−.07, .08]
Task performance	28	3246	.00	.16	.00	.16	[−.06, .06]	[−.16, .17]
Monitoring experiment	26	2972	−.01	.16	−.01	.16	[−.07, .06]	[−.18, .17]
Speed/quantity	11	1213	−.01	.18	−.01	.18	[−.13, .11]	[−.22, .20]
Accuracy	11	1005	.07	.10	.07	.10	[.00, .14]	[.07, .07]
Performance complaints	4	767	−.06	.05	−.06	.05	[−.13, .02]	[.05, .05]
Contextual performance	9	1922	−.01	.12	−.01	.13	[−.11, .09]	[−.16, .14]
Non-experiment	6	1615	.00	.08	.00	.09	[−.10, .09]	[−.09, .09]
OCBs	4	1012	−.03	.08	−.04	.10	[−.20, .12]	[−.15, .07]
CWBs	6	1575	.00	.11	.00	.13	[−.13, .13]	[−.16, .16]
Learning	4	635	−.02	.11	−.02	.12	[−.21, .16]	[−.16, .11]
Stress/strain	23	5022	.15	.08	**.16**	.09	[.13, .20]	[.09, .23]
Monitoring experiment	19	2159	.17	.12	**.18**	.12	[.12, .24]	[.07, .28]
Non-experiment	4	2863	.15	.04	**.15**	.05	[.08, .23]	[.11, .20]
Physiological stress	4	859	.22	.10	**.23**	.10	[.06, .40]	[.10, .36]

Note. *K* = cumulative number of studies; *N* = cumulative sample size; $\bar{r}$ = sample size-weighted correlation; SD_r = observed standard deviation of $\bar{r}$; $\bar{\rho}$ = sample size-weighted and reliability-corrected correlation; SD_ρ = standard deviation of $\bar{\rho}$; CI = confidence interval for $\bar{\rho}$; CR = credibility interval for $\bar{\rho}$; Corrected correlations with confidence intervals that do not include zero are bolded. Total EPM Presence analysis *K* = 59, including 23 field studies and 36 laboratory studies.

TABLE 3 EPM presence analysis with purpose included as a hierarchical moderator

Purpose	Work outcome	*K*	*N*	$\bar{r}$	SD_r	$\bar{\rho}$	SD_ρ	95%CI	80%CR
Performance	**Broad attitudes**	13	2997	−.22	.13	**-.23**	.15	[−.32, −.14]	[−.41, −.05]
	Fairness & justice	6	1646	−.09	.15	−.10	.18	[−.29, .08]	[−.35, .14]
	Satisfaction	5	1145	.08	.09	−.10	.10	[−.22, .03]	[−.20, .00]
	Privacy Invasion	7	2233	.25	.15	**.26**	.15	[.12, .40]	[.05, .46]
	Broad performance	18	2968	−.03	.14	−.03	.14	[−.10, .04]	[−.18, .13]
	Task performance	11	1238	−.04	.18	−.04	.19	[−.16, .09]	[−.26, .18]
	Speed/quantity	3	366	−.09	.27	−.09	.27	[−.75, .57]	[−.56, .38]
	Accuracy	4	424	.06	.05	.07	.05	[−.01, .14]	[.07, .07]
	Contextual performance	5	1294	−.02	.12	−.02	.13	[−.19, .14]	[−.19, .15]
	CWB	4	1325	.02	.11	.03	.12	[−.17, .22]	[−.15, .20]
	Stress/strain	9	953	.21	.12	**.22**	.13	[.12, .32]	[.11, .33]
Development	**Broad attitudes**	5	1102	.03	.20	.04	.23	[−.25, .32]	[−.29, .36]
Admin/Safety	**Broad attitudes**	5	1442	.01	.04	.01	.05	[−.05, .07]	[.01, .01]
	Police BWC	3	569	.03	.05	.03	.06	[−.12, .18]	[.03, .03]
	Satisfaction	3	1170	.06	.03	.07	.04	[−.03, .16]	[.07, .07]
	Broad performance	13	1528	.04	.13	.05	.14	[−.04, .13]	[−.19, .18]
	Police BWC	4	767	.06	.05	.06	.05	[−.02, .14]	[.06, .06]
	Without Police BWC	9	761	.03	.19	.03	.20	[−.12, .19]	[−.19, .26]
	Task performance	12	1441	.05	.13	.05	.14	[−.03, .14]	[−.08, .19]
	Police BWC	4	767	.06	.05	.06	.05	[−.02, .13]	[.06, .06]
	Without Police BWC	8	674	.05	.19	.05	.20	[−.12, .21]	[−.18, .28]
	Speed/quantity	4	411	.00	.20	.00	.20	[−.32, .32]	[−.29, .28]
	Stress/strain	7	1425	.15	.09	**.16**	.09	[.07, .24]	[.08, .23]
	Without Police BWC	6	1154	.15	.10	**.16**	.10	[.06, .27]	[.06, .26]
Surveillance	**Broad attitudes**	3	438	−.24	.12	−.26	.13	[−.59, .06]	[−.45, −.08]
	Broad performance	10	971	−.02	.15	−.02	.16	[−.13, .10]	[−.18, .14]
	Task performance	8	770	−.01	.14	−.01	.15	[−.14, .11]	[−.16, .13]
	Speed/quantity	4	436	.05	.09	.05	.09	[−.09, .20]	[.05, .05]
	Accuracy	5	439	.02	.09	.02	.09	[−.10, .13]	[.02, .02]
	Stress/strain	6	657	.15	.10	**.16**	.11	[.05, .28]	[.11, .22]

Note. *K* = cumulative number of studies; *N* = cumulative sample size; $\bar{r}$ = sample size-weighted correlation; SD_r = observed standard deviation of $\bar{r}$; $\bar{\rho}$ = sample size-weighted and reliability-corrected correlation; SD_ρ = standard deviation of $\bar{\rho}$; CI = confidence interval for $\bar{\rho}$; CR = credibility interval for $\bar{\rho}$; Corrected correlations with confidence intervals that do not include zero are bolded. Six cross-sectional studies that aggregated information across individuals who were monitored in many types of ways and provided no information about purpose were coded as "presence" and included in the broad presence analysis, but not in any analysis of EPM with a specific purpose.

The relationship between EPM and stress/strain was positive and significant ($\bar{\rho}$ = .16 [95%CI: .13; .20]), with a relatively narrow credibility interval. No studies of Development EPM measured stress or strain outcomes. There were sufficient samples of other EPM purposes included in analyses however, as well as variation in EPM target, and synchronicity of collection. As can be seen in Tables 3–5, all levels of purpose, invasiveness, and synchronicity were

TABLE 4 EPM presence analysis with invasiveness included as a hierarchical moderator

Invasiveness	Work outcome	*K*	*N*	$\bar{r}$	SD_r	$\bar{\rho}$	SD_ρ	95%CI_L	80%CR
Task-target	**Broad attitudes**	14	3828	−.06	.19	−.07	.22	[−.19, .06]	[−.34, .21]
	Fairness & justice	3	719	−.01	.13	−.01	.15	[−.37, .35]	[−.25, .23]
	Satisfaction	7	1378	−.04	.13	−.05	.15	[−.18, .09]	[−.23, .14]
	Commitment	3	355	−.25	.08	**−.29**	.09	[−.52, −.06]	[−.29, −.29]
	Privacy Invasion	4	1683	.19	.12	.19	.12	[.00, .39]	[.01, .38]
	Broad performance	25	3502	−.01	.11	−.01	.12	[−.05, .04]	[−.10, .09]
	Task performance	17	1667	.00	.13	.00	.13	[−.07, .06]	[−.11, .10]
	Speed/quantity	8	941	−.01	.17	−.01	.17	[−.15, .14]	[−.21, .20]
	Accuracy	9	863	.04	.07	.04	.07	[−.02, .10]	[.04, .04]
	Contextual performance	5	1342	.00	.09	.00	.10	[−.12, .13]	[−.11, .12]
	CWB	3	608	−.05	.08	−.06	.09	[−.28, .16]	[−.13, .01]
	Stress/strain	14	1942	.17	.12	**.19**	.13	[.11, .26]	[.07, .30]
Person-target	**Broad attitudes**	14	2979	−.13	.23	−.14	.25	[−.29, .00]	[−.47, .18]
	Fairness & justice	6	1565	−.09	.16	−.10	.19	[−.30, .10]	[−.36, .16]
	Satisfaction	5	1176	.05	.15	.05	.18	[−.17, .28]	[−.19, .30]
	Privacy Invasion	5	1041	.44	.10	**.46**	.10	[.33, .58]	[.33, .58]
	Broad performance	17	2123	.00	.19	.00	.20	[−.10, .10]	[−.23, .23]
	Task performance	13	1729	.01	.18	.01	.19	[−.10, .12]	[−.21, .23]
	Speed/quantity	3	272	−.02	.26	−.02	.26	[−.66, .63]	[−.46, .43]
	Contextual performance	3	307	−.05	.25	−.06	.29	[−.79, .66]	[−.57, .44]
	Stress/strain	10	1665	.18	.11	**.19**	.11	[.10, .27]	[.07, .30]

Note. *K* = cumulative number of studies; *N* = cumulative sample size; $\bar{r}$ = sample size-weighted correlation; SD_r = observed standard deviation of $\bar{r}$; $\bar{\rho}$ = sample size-weighted and reliability-corrected correlation; SD_ρ = standard deviation of $\bar{\rho}$; CI = confidence interval for $\bar{\rho}$; CR = credibility interval for $\bar{\rho}$; Corrected correlations with confidence intervals that do not include zero are bolded. Task-targeted is EPM that strictly focuses on task related information (e.g., typing speed); Person-targeted is EPM that targets a person's body, location, or thoughts and feelings (e.g., email-content monitoring or GPS tracking). Thoughts, feelings, and physiology were initially coded separate from person, but later combined with person due to a very small sample (*K* = 3).

positively and significantly related to stress/strain, and no level of the moderators significantly differed from each other. These results suggest that, independent of monitoring characteristics, the presence of EPM may tend to increase worker stress. Together, these initial analyses demonstrate the need for further differentiation of EPM studies by EPM characteristics.

5.2 | EPM purpose

We hypothesized that the articulated purpose of EPM moderates the effect of EPM on performance (H1a), attitudes (H1b) and stress/strain (H1c). We tested these hypotheses with the EPM Presence analysis, examining the coded purpose of monitoring as subgroup moderator of the effects of presence/absence of EPM. As shown in Table 3, we found little support for these hypotheses. For H1a, estimates for the moderating effects of EPM purpose on performance were all nonsignificant, with effect sizes near zero. There was an insufficient sample of studies (*K* = 2) that

TABLE 5 EPM presence analysis with synchronicity included as a hierarchical moderator

Synchronicity	Work outcome	*K*	*N*	$\bar{r}$	SD_r	$\bar{\rho}$	SD_ρ	95%CI	80%CR
Synchronous collection	**Broad attitudes**	13	2033	−.26	.12	**−.29**	.13	[−.37, −.21]	[−.43, −.16]
	Fairness & justice	3	675	−.22	.18	−.20	.12	[−.76, .25]	[−.60, .10]
	Satisfaction	5	461	−.18	.07	**−.21**	.09	[−.32, −.10]	[−.21, −.21]
	Privacy Invasion	5	1129	.33	.17	**.35**	.17	[.13, .57]	[.10, .60]
	Broad performance	25	2388	−.03	.18	−.04	.19	[−.11, .04]	[−.24, .17]
	Task performance	21	1940	−.02	.19	−.02	.19	[−.11, .06]	[−.23, .19]
	Speed/quantity	10	1074	−.01	.19	−.01	.19	[−.15, .13]	[−.24, .22]
	Accuracy	11	1005	.07	.10	.07	.10	[.00, .14]	[.07, .07]
	Stress/strain	16	1457	.18	.13	**.20**	.14	[.12, .27]	[.09, .31]
Asynchronous collection	**Broad attitudes**	8	2080	.00	.21	.00	.23	[−.19, .19]	[−.31, .31]
	Fairness & justice	4	1138	.04	.04	.04	.05	[−.03, .12]	[.04, .04]
	Satisfaction	5	1241	.04	.16	.05	.18	[−.17, .28]	[−.20, .30]
	Commitment	3	833	.03	.20	.04	.24	[−.55, .63]	[−.39, .47]
	Broad performance	13	2102	.01	.11	.01	.12	[−.06, .08]	[−.11, .13]
	Task performance	8	1349	.03	.09	.03	.09	[−.05, .11]	[−.04, .10]
	Contextual performance	3	320	−.05	.24	−.06	.28	[−.75, .64]	[−.54, .43]
	Stress/strain	7	1500	.17	.07	**.18**	.08	[.11, .25]	[.13, .23]

Note. *K* = cumulative number of studies; *N* = cumulative sample size; $\bar{r}$ = sample size-weighted correlation; SD_r = observed standard deviation of $\bar{r}$; $\bar{\rho}$ = sample size-weighted and reliability-corrected correlation; SD_ρ = standard deviation of $\bar{\rho}$; CI = confidence interval for $\bar{\rho}$; CR = credibility interval for $\bar{\rho}$; Corrected correlations with confidence intervals that do not include zero are bolded. Synchronous Collection is EPM in which performance information is collected, analyzed, and evaluated in real-time (e.g., a supervisor watching a live feed of employee performance); Asynchronous Collection is EPM in which performance information is recorded or archived to be viewed or analyzed later. Synchronicity of feedback was also coded for but was not included in results due to insufficient sample variance (i.e., $K < 3$ studies coded as *synchronous*).

examined the effects of Development EPM on performance. Similarly, little support was found for H1b. In general, the effects of monitoring on attitudes did not differ by purpose. Additionally, credibility intervals for nearly all relationships between the four purposes and attitudinal outcomes were wide, indicating the likely presence of moderators. As previously described, results did not show a moderating effect of EPM purpose on stress/strain. Thus, H1c was not supported.

5.3 | Invasiveness

We predicted that invasiveness moderates the effects of EPM on performance such that more invasive EPM is associated with more positive performance (H2a). We had sufficient data to test aspects of EPM Invasiveness in both the EPM Presence Analysis (Table 4) and the Degree Analysis (Table 6) Results, for the most part, did not suggest that EPM with varying levels of invasiveness has significant effects on performance, with one notable exception. As shown in Table 6, results indicated that EPM of greater breadth (i.e., monitoring individuals in more ways) significantly and positively predicted CWBs (e.g., antisocial behavior, withholding effort) ($\bar{\rho}$ = .22 [95%CI: .005; .440]). Beyond this observed relationship, invasiveness broadly, nor the subelements of invasiveness (e.g., target, breadth, constraints/target control), were not found to predict performance behaviors. There was an insufficient sample of primary studies ($K = 2$) that directly compared the effects of EPM with more or less specificity to analyze the effects of specificity on its own, but specificity correlations were included in the broader analysis of EPM Invasiveness.

TABLE 6 EPM degree analysis

EPM characteristic	Work outcome	*K*	*N*	$\bar{r}$	SD_r	$\bar{\rho}$	SD_ρ	95%CI	80%CR
Invasiveness	**Broad attitudes**	30	10904	−.15	.12	**−.17**	.13	[−.22, −.11]	[−.32, −.01]
	Monitoring experiment	4	530	−.20	.19	−.22	.21	[−.55, .11]	[−.52, .08]
	Vignette experiment	11	5109	−.12	.12	**−.13**	.14	[−.22, −.04]	[−.30, .04]
	Non-experiment	15	5265	−.17	.11	**−.19**	.12	[−.26, −.13]	[−.34, −.05]
	Fairness & justice	11	3766	−.12	.15	**−.14**	.17	[−.25, −.02]	[−.35, .08]
	Monitoring experiment	3	422	−.22	.12	−.24	.12	[−.55, .07]	[−.40, −.08]
	Vignette experiment	4	2145	−.06	.08	−.06	.09	[−.21, .08]	[−.19, .06]
	Non-experiment	4	1199	−.21	.22	−.23	.24	[−.61, .15]	[−.61, .15]
	Satisfaction	4	703	−.05	.23	−.05	.25	[−.45, .35]	[−.44, .33]
	Commitment	4	1004	−.15	.09	**−.18**	.11	[−.36, −.01]	[−.30, −.07]
	Non-experiment	3	628	−.14	.12	−.18	.14	[−.54, .18]	[−.39, .04]
	Privacy invasion	13	4652	.18	.15	**.20**	.16	[.10, .29]	[−.01, .40]
	Vignette experiment	6	2605	.12	.13	.13	.14	[−.02, .28]	[−.06, .32]
	Non-experiment	5	1704	.25	.17	**.27**	.18	[.04, .49]	[.00, .53]
	Autonomy	11	3695	−.15	.11	**−.18**	.13	[−.26, −.09]	[−.33, −.02]
	Non-experiment	8	3304	−.14	.12	**−.17**	.14	[−.28, −.05]	[−.34, .01]
	Monitoring acceptance	4	2882	−.19	.14	−.20	.15	[−.44, .04]	[−.43, .04]
	Broad performance	9	2451	−.11	.14	**−.13**	.16	[−.25, −.01]	[−.32, .07]
	Non-experiment	7	2266	−.10	.14	−.12	.16	[−.26, .03]	[−.32, .09]
	Task performance	4	1044	−.05	.13	−.05	.15	[−.28, .18]	[−.26, .15]
	Contextual performance	5	1407	−.16	.14	−.18	.16	[−.38, .01]	[−.40, .04]
	CWBs	4	1217	.20	.12	**.22**	.14	[.00, .44]	[.02, .42]
	Stress/strain	10	3260	.17	.11	**.20**	.13	[.10, .29]	[.04, .35]
	Non-experiment	7	2785	.19	.09	**.21**	.10	[.12, .30]	[.10, .33]
	Burnout	3	1591	.15	.04	**.18**	.05	[.06, .30]	[.18, .18]
Breadth	**Broad attitudes**	18	7077	−.16	.12	**−.18**	.14	[−.25, −.11]	[−.35, −.01]
	Vignette experiment	4	2021	−.08	.17	−.09	.19	[−.39, .21]	[−.39, .20]
	Non-experiment	13	4850	−.18	.08	**−.21**	.09	[−.26, −.16]	[−.29, −.12]
	Fairness & justice	7	3117	−.01	.11	−.01	.12	[−.12, .10]	[−.16, .14]
	Vignette experiment	3	1937	.03	.06	.04	.07	[−.13, .21]	[−.06, .14]
	Non-experiment	3	974	−.04	.08	−.05	.08	[−.25, .16]	[−.15, .06]
	Privacy Invasion	10	3931	.21	.19	**.23**	.20	[.09, .37]	[−.03, .50]
	Vignette experiment	4	2021	.07	.14	.08	.15	[−.16, .31]	[−.15, .31]
	Non-experiment	5	1704	.35	.05	**.38**	.05	[.31, .44]	[.38, .38]
	Autonomy	7	3114	−.15	.12	**−.18**	.14	[−.30, −.05]	[−.36, .00]
	Broad performance	6	2076	−.11	.14	−.13	.16	[−.30, .05]	[−.35, .10]
	Contextual performance	4	1217	−.19	.13	−.21	.14	[−.44, .02]	[−.42, .00]
	CWBs	4	1217	.20	.12	**.22**	.14	[.00, .44]	[.02, .42]
	Stress/strain	7	2785	.19	.09	**.22**	.10	[.12, .31]	[.10, .33]
	Burnout	3	1591	.15	.04	**.18**	.05	[.06, .30]	[.18, .18]

(Continues)

TABLE 6 (Continued)

EPM characteristic	Work outcome	*K*	*N*	$\bar{r}$	SD_r	$\bar{\rho}$	SD_ρ	95%CI	80%CR
Constraints/Target control	**Broad attitudes**	16	6794	.15	.15	**.17**	.16	[.08, .25]	[−.03, .37]
	Monitoring experiment	3	393	.12	.14	.13	.15	[−.24, .49]	[−.08, .34]
	Vignette experiment	9	4364	.12	.11	**.13**	.12	[.04, .22]	[−.02, .28]
	Non-experiment	4	1037	.33	.18	**.36**	.20	[.04, .68]	[.05, .67]
	Fairness & Justice	7	2292	.25	.17	**.27**	.19	[.10, .45]	[.02, .53]
	Vignette experiment	3	1484	.16	.05	**.18**	.05	[.05, .30]	[.18, .18]
	Satisfaction	3	377	−.06	.15	−.07	.16	[−.46, .33]	[−.30, .17]
	Privacy invasion	7	2688	−.19	.12	**−.20**	.13	[−.32, −.08]	[−.36, −.04]
	Vignette experiment	4	1860	−.14	.10	−.15	.10	[−.32, .02]	[−.30, .00]
	Autonomy	4	581	.20	.05	**.22**	.06	[.12, .31]	[.22, .22]
	Monitoring acceptance	3	2221	.13	.06	.13	.07	[−.04, .29]	[.02, .23]
	Broad performance	3	375	.13	.16	.14	.16	[−.27, .54]	[−.12, .39]
Transparency	**Broad attitudes**	14	3696	.22	.22	**.25**	.24	[.11, .39]	[−.07, .57]
	Monitoring experiment	3	334	.02	.29	.02	.32	[−.78, .81]	[−.55, .59]
	Vignette experiment	5	1941	.11	.03	**.13**	.03	[.08, .17]	[.13, .13]
	Non-experiment	6	1421	.42	.21	**.47**	.24	[.22, .72]	[.13, .80]
	Fairness & justice	9	2632	.19	.20	**.21**	.22	[.04, .38]	[−.09, .51]
	Vignette experiment	5	1941	.11	.06	**.12**	.06	[.04, .20]	[.07, .17]
	Satisfaction	8	1745	.23	.19	**.26**	.21	[.08, .44]	[−.02, .54]
	Non-experiment	5	1213	.29	.17	**.34**	.19	[.10, .58]	[.06, .62]
	Commitment	5	1164	.29	.17	**.35**	.21	[.10, .61]	[.06, .65]
	Affective commitment	3	501	.19	.13	.22	.15	[−.16, .59]	[−.01, .45]
	Privacy invasion	4	1608	−.06	.07	−.07	.08	[−.19, .06]	[−.16, .03]
	Vignette-experiment	3	1471	−.08	.04	−.08	.05	[−.20, .03]	[−.08, −.08]
	Perceived Support	5	1143	.32	.17	**.37**	.20	[.13, .62]	[.09, .66]
	Non-experiment	3	871	.38	.12	**.45**	.14	[.10, .80]	[.21, .68]
	Broad performance	6	1001	.08	.09	.09	.11	[−.03, .21]	[.00, .18]
	Non-experiment	4	758	.08	.11	.10	.14	[−.12, .31]	[−.07, .26]
	Task Performance	3	500	.05	.02	.06	.03	[.00, .12]	[.06, .06]
	Contextual performance	3	501	.10	.14	.13	.17	[−.30, .56]	[−.14, .40]

Note. *K* = cumulative number of studies; *N* = cumulative sample size; $\bar{r}$ = sample size-weighted correlation; SD_r = observed standard deviation of $\bar{r}$; $\bar{\rho}$ = sample size-weighted and reliability-corrected correlation; SD_ρ = standard deviation of $\bar{\rho}$; CI = confidence interval for $\bar{\rho}$; CR = credibility interval for $\bar{\rho}$; Corrected correlations with confidence intervals that do not include zero are bolded; Invasiveness = EPM that is greater in breadth, higher in specificity, more personal in target, and has fewer constraints and less target control. EPM constraints and target control were initially coded separately, but later combined into a single variable due to conceptual similarity between the two characteristics. Analysis with and without studies coded as constraints revealed no significant differences in effects. EPM Degree analysis *K* = 44, including 25 field studies and 19 laboratory studies.

We predicted that invasiveness moderates the effects of EPM on attitudes such that more invasive forms of EPM are associated with more negative work attitudes (H2b). In our Degree Analysis, invasiveness (i.e., EPM with greater breadth, more personal target, more specificity, or less constraints/target control) negatively and significantly related to broad attitudinal outcomes ($\bar{\rho} = -.17$ [95%CI: −.22; −.11]), fairness and justice perceptions ($\bar{\rho} = -.14$ [95%CI: −.25; −.02]), commitment ($\bar{\rho} = -.18$ [95%CI: −.36; −.01]), and autonomy ($\bar{\rho} = -.18$ [95%CI: −.26; −.09]) and positively and significantly related to privacy invasion ($\bar{\rho} = .20$ [95%CI: .10; .29]). In terms of the specific subelements of invasiveness, breadth was significantly and negatively related to perceptions attitudes broadly ($\bar{\rho} = -.18$ [95%CI: −.25; −.11]) and autonomy ($\bar{\rho} = -.18$ [95%CI: −.30; −.05]) and positively related to privacy invasion ($\bar{\rho} = .23$ [95%CI: .09; .37]). Providing greater constraints/target control over EPM positively and significantly related to broad attitudinal outcomes ($\bar{\rho} = .17$ [95%CI: .08 .25]), and more narrowly, positively related to perceptions of fairness and justice ($\bar{\rho} = .27$ [95%CI: .10: .45]) and autonomy ($\bar{\rho} = .22$ [95%CI: .12: .31]) and negatively related to privacy invasion ($\bar{\rho} = -.20$ [95%CI: −.32; −.08]). In the Presence analysis, task−targeted EPM (less invasive) and person−targeted EPM (more invasive) did not differ in their effects on broad or specific attitudes. However, as seen in Table 4, a pattern emerged such that estimates for person-targeted EPM tended to be larger than those for task-targeted EPM. For instance, the relationship between person-targeted EPM and privacy invasion was significant and negative for person-targeted EPM but not for task-targeted EPM. Overall, the above findings support H2b.

We predicted that invasiveness moderates the effects of EPM on stress/strain such that more invasive forms of EPM are associated with greater levels of stress/strain (H2c). Results from the Degree Analysis indicated that more invasive EPM was associated with greater levels of stress/strain ($\bar{\rho} = .20$ [95%CI: .10: .29]). At the subelement level, breadth was positively related to stress/strain outcomes ($\bar{\rho} = .22$ [95%CI: .12: .31]), including burnout ($\bar{\rho} = .18$ [95%CI: .06: .30]). Too few studies examined the relationship between constraints/target control and stress/strain ($K = 2$) to include in analyses. Results from the Presence Analysis, however, did not show that task-targeted and person-targeted monitoring differed in their effect on stress/strain. Thus, partial support was found for H2c.

5.4 | Synchronicity of collection

We asked whether synchronicity moderates the effect of EPM on performance (RQ1a), attitudes (RQ1b), and stress/strain (RQ1c). We were able to examine this research question with data included in the Presence Analysis. Results provided mixed evidence for differences between synchronous and asynchronous EPM (see Table 5). Synchronicity was found to moderate the effect of EPM on broad attitudes, such that the effect was negative when EPM was synchronous ($\bar{\rho} = -.29$ [95%CI: −.37; −.21]) but not when EPM was asynchronous ($\bar{\rho} = .00$ [95%CI: −.19; .19]). We did not find evidence, however, for synchronicity as a moderator of the effects of EPM on more narrowly defined attitudes nor did we find evidence for synchronicity as moderator the effects of EPM on performance or on stress/strain.

5.5 | Transparency

We predicted that transparency moderates the relationship between EPM and performance, attitudes, and stress/strain such that greater transparency is associated with more positive performance (H3a) and attitudes (H3b) and lower levels of stress/strain (H3c). We were able to test two of these hypotheses with data in the Degree analysis. Results did not show that transparency had any effect on performance overall, or task performance or contextual performance more narrowly. Thus, support was not found for H3a. As shown in Table 6, transparency was found to positively relate to attitudes overall ($\bar{\rho} = .25$ [95%CI: .11; .39]). More narrowly, transparency was positively related to fairness and justice ($\bar{\rho} = .21$ [95%CI: .04; .38]), commitment ($\bar{\rho} = .35$ [95%CI: .10; .61]), perceived support ($\bar{\rho} = .37$ [95%CI: .13; .62]), and satisfaction ($\bar{\rho} = .26$ [95%CI: .08; .44]). Overall, these findings support H3b. There was an insufficient sample ($K = 2$) to test H3c regarding the moderating effects of transparency on stress/strain.

5.6 | Study method as a moderator

Including study method (monitoring experiment, vignette experiment, nonexperiment) did not reveal significant method effects in most cases. One exception was in the relationship between EPM and attitudes. Participants in vignette-based experiments reported significantly more negative attitudes ($\bar{\rho} = -.32$ [95%CI: −.46; −.19]) than those in nonexperiments ($\bar{\rho} = .00$ [95%CI: −.15; .16]).

5.7 | Robustness and post hoc analysis

Sensitivity analyses did not provide evidence that publication bias affected estimates in our study. More specifically, the slope of the standard error for the relationship between EPM and tested outcomes in PET-PEESE models were all nonsignificant, and cumulative meta-analysis in which published and unpublished studies sequentially entered into analysis showed no evidence of "drift" (McDaniel, 2009). See Online Supplement 1C for more detailed findings from sensitivity analyses.

One possible explanation for the null findings regarding the moderating effect of EPM purpose could be heterogeneity within categories of purpose. In particular, the category of Performance EPM included a variety of specific purposes. We identified three subcategories within Performance EPM: (1) studies in which the purpose of EPM was to deter CWBs such as theft or off-task behaviors (recoded as *Deterrence EPM*); (2) studies in which the purpose of EPM was to help inform performance related decisions such as performance evaluations (recoded as *Evaluative EPM*); and (3) studies in which the purpose was to provide specific rewards or punishments (recoded as *Incentive EPM*). All studies were coded by two researchers (Cohen's kappa = .76). Meta-analytic estimates were recalculated including the coded subgroups as moderators of relationships with sufficient *K* for such analysis. Results did not show any significant differences between the newly coded subgroups (see Online Supplement 1D). Therefore, we did not find evidence that heterogeneity within the Performance EPM operationalization was responsible for null findings.

6 | DISCUSSION

Though the COVID-19 pandemic has presented organizations with new concerns about EPM, the practice of electronically monitoring workers has existed for decades. Recent media reports suggest that sales of EPM services have risen dramatically since the pandemic began (Golden & Chemi, 2020), perhaps because organizations are implementing EPM to track individuals as they work remotely (Bureau of Labor Statistics, 2020; Satariano, 2020). Further, electronic forms of safety monitoring (e.g., location tracking to ensure physical distancing, body temperature tracking) may be required as individuals return to workplaces. These practices are indeed new for many organizations, but the principles of applied psychology and available scientific evidence are still essential to their implementation.

The present study extends previous reviews of the EPM literature (e.g., Ravid et al., 2020; Stanton, 2000) by applying meta-analytic techniques to reveal patterns of relationships among EPM and a variety of work-related outcomes. Specifically, we present empirical evidence to guide the monitoring decisions of organizations in ways that consider effects on worker attitudes, performance, and stress. While some of our findings are consistent with observations from Ravid et al. (2020) qualitative review (e.g., the negative effect of invasiveness on attitudes), other findings (e.g., the null effects of EPM on performance) deviate from their review. Thus, this study presents an opportunity to advance psychological theory and organizational practice of EPM in an evolving world of work.

6.1 | Summary and interpretation of findings

There were several noteworthy findings in this study. First, the presence of EPM increases stress/strain, regardless of monitoring characteristics. This conclusion is strengthened by the variety of stress indicators (e.g., fatigue, performance pressure, anxiety, physiological indicators) included in the analysis and the consistent and moderate effect sizes observed. Ravid et al. (2020) briefly discuss the effects of EPM on worker stress in their review, but these effects are worthy of further consideration. Our results are in line with Zajonc's (1965) assertion that the mere presence of others (in this case, regardless of monitoring characteristic) increases arousal levels and suggest that EPM should be treated as a job demand (Demerouti et al., 2001) with associated physiological and psychological costs. There were no studies examining Development EPM in our analyses of stress/strain; however, it remains possible that workers feel significantly less stressed when they perceive EPM to be for their own growth and development, and future research should examine this possibility.

Second, relative levels of EPM characteristics do influence work outcomes—particularly regarding the effects of invasiveness and transparency on attitudes. Invasiveness was found to moderate the effects of EPM on attitudes such that more invasive EPM was generally associated with more negative attitudes. No observed relationship in our meta-analysis was stronger than the relationship between person-targeted EPM and perceptions of privacy invasion, indicating that tracking of more personal kinds of information (e.g., location, social exchanges) is particularly likely to violate perceived privacy expectations. The privacy calculus model argues that workers react negatively when the perceived costs of giving up their privacy outweigh the benefits (Acquisti, 2009). As EPM becomes more invasive, individuals forgo more of their privacy, thus raising the costs. The observed positive relationship between EPM Invasiveness and CWBs (e.g., withholding effort, computer abuse) in our study hints at how individuals may respond to these rising costs. The positive relationship between invasiveness and CWBs was particularly noteworthy given that the explicit purpose of monitoring is often to deter CWBs. Thus, highly invasive EPM may be counterproductive in many circumstances.

Findings regarding the moderating effects of EPM Transparency provide further information about how workplaces may mitigate negative attitudinal effects of EPM. Per the privacy-calculus model, individuals may react more favorably to EPM when they understand how the system will benefit them or their organization (Acquisti, 2009). As such, organizations using invasive forms of EPM should clearly communicate the reasons that they are collecting personal information. Our study demonstrates the benefits of greater transparency regarding monitoring decisions—workers report more satisfaction, commitment, and perceived support, and more positive fairness perceptions, when their organizations are open about EPM. Transparency becomes even more important as monitoring technologies become increasingly discreet and unobtrusive, as there are more opportunities to conceal what is being tracked.

An unexpected finding was how little the effects of monitoring appeared to differ based on the explicit purpose communicated to workers. Due to the state of EPM scholarship, we offered very broad hypotheses regarding the moderating effects of purpose, and yet, were still unable to find evidence to support these hypotheses. There are several possible explanations for these counterintuitive findings. It is possible that individuals often come to their own conclusions about the purpose of monitoring even when a purpose is communicated to them. They may also assume that monitoring occurs for multiple purposes at once. The few studies that included manipulation checks lend some credence to this idea. Karim (2015) reported that participants' assignment into a development EPM condition (vs. administrative EPM condition) was associated with perceptions that the EPM was used for administrative, not development, purposes. Wells et al. (2007) similarly found that workers in a single organization had varying perceptions regarding whether their shared EPM system was used for developmental and deterrent purposes. Our null findings suggest the possibility that the way EPM is psychologically experienced is more important than what an organization communicates to their employees.

We also found little evidence for a moderating effect of study method (i.e., monitoring experiment, vignette study, nonexperiment), suggesting that a variety of methods may be appropriate for studying EPM. These null findings were

surprising given evidence that individuals' self-reported hypothetical behaviors are often misaligned with their actual behaviors (Baumeister et al., 2007). Studies on affective forecasting have shown that individuals tend to overreact to imagined negative events more than they do to imagined positive events (Wilson & Gilbert, 2003). Thus, there are theoretical reasons to think that experiencing EPM with real stakes will differ from imagining how one would experience EPM in a hypothetical scenario. We encourage future research to extend our findings regarding study method.

Finally, we found little evidence for the effects of monitoring and monitoring characteristics on performance behaviors. These null findings deviate from the conventional wisdom that EPM increases motivation to perform. Small or nonsignificant effects were observed across a variety of performance criteria (e.g., speed/quantity, accuracy, performance complaints, and contextual performance). Comparing these null findings to the positive performance effects observed in meta-analyses of other work practices such as mentoring (Eby et al., 2008), coaching (Theeboom et al., 2014), and multisource feedback (Smither et al., 2005), we can conclude that EPM appears to be a relatively ineffective intervention if one's goal is improving worker performance.

6.1.1 | Implications for the typology of EPM characteristics

This study was the first to test the usefulness of Ravid et al. (2020) typology of EPM characteristics as a framework for predicting work outcomes. Results show that some parts of the typology, such as transparency and invasiveness, were diagnostically useful for work outcomes (e.g., privacy invasion, justice perceptions) and other aspects, such as purpose and synchronicity, were less useful. Our results suggest that focusing on a single EPM characteristic (i.e., purpose, synchronicity) may not fully clarify the relationships between EPM and work outcomes, perhaps because of high levels of heterogeneity. We encourage future research that examines interactive effects of EPM characteristics. For instance, any positive performance effects of invasiveness may only be observed when considered in combination with the synchronicity of feedback. Highly invasive EPM may be able to capture performance behaviors in great detail and specificity, but these benefits may be lost if feedback is not timely (DeNisi & Kluger, 2000; Lechermeier & Fassnacht, 2018).

We also encourage researchers to continue to evolve the typology of EPM characteristics as new technologies enter workplaces and become the focus of research. For instance, as a body of research develops regarding the use of EPM for health and safety purposes, it may become necessary to distinguish health and safety monitoring purposes from administrative and liability purposes. Likewise, one generally unexplored purpose for monitoring is that of acting as a coach or recommender to support workers. We identified one study of such monitoring: Carayon (1994) investigated office workers' reactions to EPM used for phone call routing. The EPM system in that study tracked workers' calls to inform them of their call acceptance volume and transfer calls to workers with lower volume. We coded this study as Admin/Safety EPM, but we believe, a new category, *Support*, may more accurately represent the purpose and will be a significant category moving forward. As more EPM tools are designed and implemented with job design and organizational development in mind (Landers & Marin, 2021), Support EPM will present research opportunities to understand how workers structure and make sense of their jobs.

6.2 | Directions for future research

Results highlight a number of avenues for future EPM research. We discuss some of these opportunities in the following section and present further opportunities in Table 7.

6.2.1 | Unstudied and understudied areas from the typology

There were several aspects of the EPM typology that we were unable to test due to absence of primary studies; other characteristics were included in the meta-analysis but can be regarded as understudied (i.e., $K \leq 5$). For example, we

TABLE 7 Avenues for future EPM research and example research questions

Unstudied and understudied areas from the EPM characteristics typology
• Does Development Purpose moderate the effects of EPM on attitudes, performance, and stress/strain?
• Under what circumstances do individuals find safety-focused EPM acceptable/unacceptable?
• Does synchronicity of feedback moderate the effects of EPM on work outcomes (e.g., performance, stress)?
• How do individuals respond to highly invasive forms of EPM (e.g., physiological monitoring, social media monitoring)?
• Does transparency in monitoring moderate the effects of EPM on performance outcomes?
Purpose as perceptions
• Do specific profiles of purpose perceptions (e.g., high in Admin/Safety and high in Development) moderate the effects of EPM on attitudes, performance, and stress/strain
• How do purpose perceptions develop, change, strengthen, or weaken with time and experience?
Boundary conditions and mediators
• Do individual differences (e.g., intelligence, neuroticism, trait reactance, age, experience with monitoring) interact with the characteristics of monitoring to predict work outcomes?
• To what extent does work setting (e.g., central office, home office) moderate the effects of EPM on work outcomes such as privacy invasion and perceived justice?
• Do occupational characteristics (e.g., job complexity, automatability) interact with EPM characteristics to influence individual-level work outcomes?
• Does national culture (e.g., uncertainty avoidance) interact with EPM characteristics to influence individual-level work outcomes?
• Do the characteristics of monitoring interact with the passage of time to influence work outcomes (i.e., do individuals desensitize or sensitize to the effects of EPM over time)?
• Do more proximal outcomes of EPM (e.g., privacy invasion, loss of autonomy, justice perceptions) mediate the relationships between EPM characteristics and other work outcomes?
Unexamined potential outcomes of EPM
• What are the effects of safety focused EPM on safety behaviors and safety climate?
• Does the presence of EPM technologies during nonwork periods (e.g., rest breaks) influence recovery experiences (e.g., detachment)?
• Does the presence of EPM influence individual- and team-level creativity?
• Does EPM influence organization-level work outcomes such as work climate and culture?
• Does EPM affect individuals' perceptions of management and organizational leadership?

were unable to include synchronicity of feedback in either of our analyses. A key distinction between traditional and electronic monitoring is in the capability of EPM to synchronously collect and analyze performance data and deliver almost instantaneous performance feedback. Research is needed to understand how real-time synchronous work feedback may influence performance, attitudes, and stress.

By far the most prevalent EPM purpose we identified was Performance, with fewer studies examining EPM for other purposes. We were able to identify few studies that examined EPM for health and safety purposes (i.e., Dumlao et al., 2019; Raveendhran & Fast, 2021), despite increasing production and marketing of monitoring technologies designed to keep employees safe and reduce worksite accidents (Mamun & Yuce, 2019). The COVID-19 pandemic has raised further questions about how employees experience and respond to health and safety monitoring in times of emergency. The affordability of wearable devices capable of collecting health indicators makes such research practically relevant and feasible. There is a clear need for research that explores how individuals respond to EPM for health and safety and the contextual and environmental factors that may change these responses.

We identified very few studies examining the effects of EPM for training and development. Given the rapid increase in virtual and augmented reality technologies that organizations are implementing to track, train, and develop employees (i.e., Development EPM; Rogers, 2020), it is important that future research examine how Development EPM

influences workers. The question of which job skills are most appropriate for delivering developmental feedback via EPM, for example, is unexplored. There is also much to learn about the circumstances under which individuals trust and incorporate algorithmic feedback captured via EPM as compared to human feedback, and what EPM design elements may alter these perceptions? Answers to these questions have implications for organizations implementing training technologies as well as for designers of those technologies. Finally, there were insufficient primary studies that examined EPM technologies that targeted individuals' thoughts, feelings, and physiology (e.g., social media monitoring, physiological monitoring), which might be considered the most invasive forms of monitoring (Kaupins & Coco, 2017) and can increasingly be found in workplaces (Morris et al., 2017).

6.2.2 | Purpose perceptions

We found little evidence that the communicated purpose of monitoring moderates the effects of EPM on work outcomes. Posthoc analyses did not suggest that these null findings were due to heterogeneous subcategories of purpose (e.g., Deterrence, Incentives). These null findings suggest the possibility that purpose may be better explored as a set of multidimensional perceptions. We encourage the development of multidimensional scales of EPM purpose perceptions to better capture interactive effects of EPM purpose. Such studies may also allow for the discovery of profiles of monitoring purposes (e.g., EPM that is strongly perceived as for Performance and Development as distinct from EPM that is strongly perceived as for both Performance and Safety). Perceptions of EPM purpose no doubt evolve and shift over time, across contexts, with cultural shifts, and with experience. Many of the studies included in our meta-analysis conveyed the purpose of monitoring shortly before collecting outcome measures. It is possible that effects of purpose may only be observed once individuals are convinced of the purpose, requiring time, repeated exposure, and trustworthy organizational communication.

6.2.3 | Boundary conditions and mediators

Interpersonal and contextual moderators may help explain the significant heterogeneity observed in our results. For instance, although some research has examined trust in management as an outcome of EPM (e.g., Butler, 2012; McNall & Roch, 2009) it is also likely to be an important determinant of individual responses to monitoring. In this study, EPM characteristics such as Purpose were coded according to the nature of explicit communications to workers, but these communications will only have predictable effects to the degree that employees believe that they are truthful. Individuals in organizations, as well as those participating in research studies, who have low levels of trust in the organization (Rousseau et al., 1998) may come to their own conclusions about how and why monitoring is occurring. Similarly, the positive effects of transparency may be attenuated when trust in an organization is very high, as employees may assume their organization is acting in good faith even with little information provided (Bhattacharya et al., 1998). We see interpersonal and organizational trust as a potentially important boundary condition for future researchers to explore.

There is also need for a better understanding of how individuals perceive and receive work monitoring in their home or personal space. Very few studies included in our meta-analysis captured the work setting in which monitoring took place (e.g., work office, home office, during commutes, during work breaks). Wang et al. (2021) recently observed employee monitoring as a prominent theme emerging from discussions with individuals who transitioned to remote work during the pandemic, reporting that the number of ways that individuals were monitored in their home predicted greater levels of work-to-home interference. Monitoring that is seen as appropriate in a centralized work location may be seen as overly invasive elsewhere.

Finally, a number of mediating mechanisms are likely to exist, through which EPM influences work outcomes. Exploring privacy invasion perceptions as a mediator between EPM characteristics and work outcomes of interest

may be a particularly promising route. Such research would also answer recent calls (e.g., Bhave et al., 2020) for studies to better understand how individuals evaluate and respond to workplace practices that have the potential to violate privacy expectations.

6.2.4 | Unexamined outcomes of EPM

Several work outcomes were measured in too few studies to be included in our analysis but should be explored in future work. The majority of studies in our analysis measuring performance focused on tasks such as data entry and customer support that have easily measurable performance criteria such as task speed or quantity of output. As EPM becomes more varied in design and use, there is a need for research examining other dimensions of performance. We were unable to identify research examining the effects of monitoring on safety behaviors, although these are probably of primary interest for those using Admin/Safety EPM. One study included in our meta-analysis (Schlund, 2020) measured the effect of Performance EPM on objective creativity criteria (i.e., the number of ideas generated in a creativity task) but further work is needed to better understand the effect monitoring on subjective creativity (e.g., the quality of the ideas), particularly as creative team processes increasingly move into monitored virtual spaces (Thompson, 2020).

There is a need for research exploring the effects of EPM on recovery experiences shown to relate to important work and health outcomes (Sonnentag & Fritz, 2007). We found that the presence of monitoring was associated with greater levels of stress/strain. This finding raises questions about how the presence of these technologies influence individuals during breaks. Might the mere presence of monitoring technologies negatively affect one's ability to experience relaxation during a rest break? How might monitoring influence one's ability to psychologically detach—the subjective feeling of leaving work behind—during breaktimes? And how might monitoring technologies (e.g., physiological monitoring) be implemented to assist in facilitating these important experiences?

We also see a need for research examining the effects of EPM on team and group level processes. As work shifts to more virtual formats, teamwork increasingly takes place virtually (Meluso et al., 2020). This shift may result in fewer available channels for nonmonitored teamwork. Evaluation expectations have been shown to alter group processes (e.g., Amabile et al., 1990). Research is needed to better understand the effects of EPM on team-level processes such as communication and member integration, and whether the characteristics of EPM moderate these effects.

6.3 | Practical implications

This study provides important practical guidance for organizations considering the implementation of EPM. First, we caution organizations against investing in EPM with the expectation of guaranteed worker performance improvement. Many EPM systems represent a significant financial investment (Zielinski, 2020) with an expectation that these costs will translate to quick improvements in performance. Our study found no such effects.

Second, we recommend that organizations that choose to electronically monitor workers do so in ways that are minimally invasive. We found that more invasive monitoring was associated with a number of negative attitudinal outcomes, as well as increased reports of CWBs and stress, without any evidence for performance improvement. We, therefore, advise leaders to make decisions about what and how to monitor as conservatively as possible, aiming to monitor narrowly (e.g., capturing only task relevant information when possible) and limiting the tracking of more personal kinds of information to circumstances where such invasiveness is merited (e.g., to ensure worker safety). Setting clear parameters about how collected data can and cannot be used and finding ways to provide employees with greater levels of control over monitoring (e.g., allowing employees to turn monitoring off during work breaks) can further mitigate negative attitudinal effects (Alge et al., 2006; Slemp et al., 2018).

Third, individuals find monitoring to be stressful. As such, EPM should be considered a work demand that requires effort expenditure and corresponding opportunities for recovery (Meijman & Mulder, 1998). Just as individuals benefit

from formal and informal breaks (e.g., lunchbreaks, coffee breaks) from other work demands (Sonnentag et al., 2017), individuals are likely to benefit from breaks from monitoring. We recommend that organizations using EPM provide workers with periods of time throughout a work shift in which monitoring is greatly reduced or removed all together as times for workers to rest and recover. This advice is particularly important as it becomes easier for organizations to monitor workers continuously and in a variety of ways throughout work shifts, including during rest breaks.

Fourth, maximizing transparency when using EPM is essential (e.g., informing workers how and when monitoring will occur, what data will be collected and who will have access to them) to minimize negative work attitudes in monitored individuals (Lowry et al., 2015; McNall & Roch, 2007). As noted above, beliefs about monitoring purpose often differ from what is officially communicated. We recommend that organizations have consistent conversations with employees about the purpose of monitoring, clearly connect this purpose to organizational and individual goals and values, and limit monitoring to ways consistent with the communicated purpose to convince workers that alternative motives for monitoring do not exist (Mayer & Davis, 1999; Schnackenberg & Tomlinson, 2016).

Implied in each of these recommendations is a need for organizations to first identify behaviors that describe performance and then find appropriate ways to measure those behaviors, rather than the other way around. Although EPM makes it easy to measure a wide range of behaviors, organizations can expect favorable work outcomes only when the characteristics of their EPM systems adhere to principles of applied psychology. EPM is just one of many work practices influencing workers at any given time; as such, even small effects may be practically meaningful. Effect sizes observed in the current analysis range from small to modest in strength and are similar in strength to those reported in meta-analyses of other important work interventions such as high-performance work practices (Combs et al., 2006) and telework (Gajendran & Harrison, 2007). We believe that results from this study provide practical guidance for organizations considering using EPM.

6.4 | Limitations

We note several limitations to this analysis. First, meta-analyses are always constrained by the population of studies available for a given research question. Several aspects of the EPM typology could not be tested due to absence of primary studies ($K < 3$) and caution should be exercised when interpreting results that are based on a relatively small number of primary studies (e.g., $K < 5$). However, as argued by Schmidt, "even with a small number of studies and small ns, meta-analysis is the optimal method for integrating findings across studies" (Schmidt et al., 1985, p. 749). We hope this study serves to guide future research toward aspects of EPM that remain un- or understudied.

Second, although our synthetic construct approach was necessary to accumulate a sufficient sample of work outcomes to conduct a comprehensive meta-analysis, this compound approach may produce greater between-study variance in outcomes, and thereby larger standard errors and inferential uncertainty. Thus, the wide confidence intervals and nonsignificant results that were observed in this study are likely, in part, due to the variance attributable to measurement. Similarly, characteristics within the EPM typology are theoretically derived, but prior to this study, empirically untested. It is possible that heterogeneity exists within the proposed characteristics of monitoring that contributed to wide confidence intervals. Our post-hoc examination of subgroups within the Performance purpose characteristic did not support such interpretation, but we encourage future research to continue to examine the proposed typology to test the degree to which categories describe relatively homogeneous constructs.

Third, this study represents a first step in disaggregating the effects of EPM characteristics but, both in research and practice, certain EPM characteristics are very likely to covary. For instance, EPM used for Surveillance purposes is likely to be low in transparency whereas EPM used for Development purposes may tend to be characterized by high levels of transparency. Performance EPM may tend to be high in Synchronicity of collection to enable immediate feedback. This study had limited power to control for these covarying effects or examine the interactions among EPM characteristics. Fourth, our method of coding EPM purpose according to the explicit purpose provided to those being

monitored was neither able to capture the perceptions of those being monitored, nor the possibility that monitoring may be used, or perceived as used, for multiple purposes.

Finally, meta-analyses can broadly be criticized for either being reflective of the quality of the research that is available in the literature or dependent upon significant findings that have been published (i.e., the "file drawer" problem). Many studies included in our analysis measured EPM and outcome variables with a single method. This was more common in studies included in EPM Degree analysis, perhaps accounting for the stronger effect sizes observed in this analysis. We expect, however, that as EPM continues serving an important role in modern day work, the quality and creativity of EPM research that is published will only increase. Considering the latter issue of the file drawer problem more directly, we took several steps to locate and include unpublished data sources in our analyses and our publication status sensitivity analysis analyses did not provide evidence that publication status had a significant effect on our results.

7 | CONCLUSION

Advances in information technologies and a mass transition to remote work is causing organizations to monitor employees in myriad ways and with great intensity and detail. A growing number of organizations have begun developing and using monitoring software to track worker behavior (Dreyfuss, 2020). Despite such technological advances, we found no evidence for EPM as an effective performance intervention. Our meta-analysis suggests that best practices in human resource management such as honesty, procedural transparency, and providing individuals with control over their work continue to be important mechanisms for guiding workers toward individual and organizational goals.

ACKNOWLEDGMENTS

The authors would like to thank Erich Dierdorff and our anonymous reviewers for their constructive suggestions, which greatly improved the manuscript. Fred Oswald and Richard Landers provided helpful comments on earlier versions of the paper. We sincerely thank Brad Pitcher, Jenna McChesney, and all members of the Workplaces and Virtual Environments Lab (wave-lab.org) for their valuable feedback and support.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article. Online supplements can be found using the following link: https://osf.io/kc89f/?view_only=78f770d10b704dd3ae91190720ce00b8

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ENDNOTES

[1] In the case of Zweig and Webster's (2002) Study 1 and Zweig's (2001) doctoral dissertation, the relationships reported overlapped completely. However, the doctoral dissertation reported descriptive statistics that were unreported in the published study. We used descriptive statistics from the dissertation to supplement coding for the published study.

[2] We also coded studies as occurring in field or laboratory setting. The large majority of field studies were non-experiments, whereas lab studies were highly variable (e.g., high fidelity simulations, vignette studies) and thus, we caution against interpretation of these effects as representing the fidelity of the setting. Results for analyses with field vs lab setting can be found in Online Supplement 1D.

[3] A reviewer raised the possibility that null relationships found between EPM and performance could be attributable to studies measuring non-relevant or very distal performance criteria. For instance, in a study in which employee emails were

monitored to catch phishing attempts, one might expect a weak relationship between EPM and overall job performance, and this weak effect could mask a relationship between EPM and more proximal or relevant performance criteria. We, therefore, reviewed each study included in our meta-analysis that measured performance for non-relevant or distal performance criteria in relation to monitoring. No such studies were identified and therefore, we did not conclude that the null relationship was due to the use of non-relevant performance criteria.

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How to cite this article: Ravid, D. M., White, J. C., Tomczak, D. L., Miles, A. F., & Behrend, T. S. (2023). A meta-analysis of the effects of electronic performance monitoring on work outcomes. *Personnel Psychology*, *76*, 5–40. https://doi.org/10.1111/peps.12514

APPENDIX A1

TABLE A1 Typology of EPM characteristics with monitoring examples

EPM element	Sub-element	Category	Examples in practice
Purpose The explicit or perceived rationale for EPM use		Performance appraisal, loss prevention, and profit	• Webpage browsing is tracked via computer monitoring software to deter off task behaviors • Product assembly speed is tracked via smart cameras (e.g., Amazon Panorama cameras) with metrics used to evaluate performance
		Development, growth, and training	• Employees are provided real time computerized feedback during a Microsoft Excel training • Welders are provided with automatized welding cues to help improve their skills
		Administrative and safety	• A therapist logs session notes in electronic health systems for liability purposes • Location tracking at construction sites to alert individuals if they have stepped into an unsafe zone
		Surveillance or authoritarian	• An employer uses computer software to collect employee data (e.g., how long word documents are open) that have no clear link to performance criteria • Installing monitoring (e.g., cameras) technologies without articulating any rationale
Invasiveness	Scope	Breadth	
The amount, target, and systematic constraints placed on EPM use		High	• A wide variety of employee work behaviors at a call center are tracked (e.g., call time, call content, employee affect, number and length of breaks)
		Low	• A very narrow and limited set of university professor work behaviors (e.g., classroom lectures) are recorded
		Specificity	
		High	• Performance behaviors of individual manufacturing employees are tracked and evaluated

(Continues)

TABLE A1 (Continued)

EPM element	Sub-element	Category	Examples in practice
		Low	• A retailer monitors sales at the group level (e.g., sales of the clothing department)
	Target	Thoughts, feelings, and physiology	• Biometric sensors monitor fatigue in heavy-machine operators • Employer monitoring of employee Slack exchanges
		Person and location	• Location tracked RFID nurse badges • Video surveillance of an office space
		Task	• A grocery store tracks how many customers each cashier checks out.
	Constraints	High	• EPM data are stored securely and can only be accessed for safety purposes by top management
		Low	• EPM data are housed in a public database can be used for a variety of purposes
	Target Control	High	• A worker can turn off internet activity tracking to use Facebook
		Low	• A rideshare driver has no control to disable location tracking while on the job
Synchronicity The temporal aspects of EPM use including frequency and regularity of monitoring	Collection	High	• Theft prevention actively and continuously monitors employee behavior at a department store via security cameras
		Low	• Screen shots of employees' work computers are intermittently captured and stored for viewing at a later time
	Feedback	High	• A surgeon wears smart glasses and receives real-time feedback during a procedure
		Low	• A recruiter receives a monthly report of the number and average duration of calls made
Transparency The extent to which employees are provided information about the characteristics of monitoring		High	• A company explicitly outlines EPM practices in employee handbooks; managers discuss EPM practices face-to-face with new hires
		Low	• A company does not outline in writing or formally discuss EPM practices; employees speculate what EPM data are used for