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The Invisible Eye? Electronic Performance Monitoring and Employee Job Performance

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Abstract

To enhance employee performance, many organizations are increasingly using electronic performance monitoring (EPM). The relationship between the frequency of EPM use and employee performance is examined in 2 field studies. In Study 1, which uses a unique longitudinal data set, results reveal that shorter time lags between 2 consecutive employee performance assessments are related to better task performance as indicated by call quality metrics. A second field study using matched supervisor–employee and EPM system data is conducted in 2 call centers to extend these results and to focus more directly on the supervisors' use of EPM and its relationship with additional performance criteria: counterproductive work behaviors (CWBs) and organizational citizenship behaviors (OCBs). Results indicate that more frequent supervisory use of EPM is associated with better task performance and OCB. However, supervisory use of EPM was not significantly related to CWB.

Electronic performance monitoring (EPM) systems—electronic technologies used to observe, record, and analyze information on employee performance (Stanton, 2000; US Congress, OTA, 1987)—have changed how supervisors monitor their subordinates (Ilgen & Pulakos, 1999). In contrast to traditional methods of monitoring, such as direct observation or meetings, which are undertaken at discrete time intervals and without the use of technology, EPM systems assess quantifiable aspects of employee performance continually (Hesketh & Neal, 1999; Stanton, 2000). In addition EPM systems also enable capturing qualitative observational data on specific service behaviors that supervisors and other organizational units such as quality teams subsequently assess (George, 1996; Lund, 1992; Stanton, 2000). These sophisticated systems can therefore provide supervisors the tools they need to assess employee performance more comprehensively (Ilgen & Pulakos, 1999) and to better align employee and organizational interests (Fayol, 1916; Simon, 1946). Given the increasing prevalence of EPM (American Management Association, 2005; National Workrights Institute, 2004), it is important to understand whether the frequency of supervisory use of EPM—critical in traditional monitoring (Komaki, 1986)—enhances performance and achieves the desired interest-alignment objective of EPM. Theoretical and

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practical imperatives call for examining whether EPM functions as an “invisible eye” that aligns intraorganizational interests and enhances employee performance.

However, empirical evidence informing this question is limited, particularly from field studies. Most research on the EPM–performance relationship consists of laboratory experiments that find, generally, that EPM facilitates performance for simple tasks (e.g., Davidson & Henderson, 2000; Kolb & Aiello, 1997). Of note, studies report experimental findings for the EPM–performance relationship only for in-role task performance, but little research considers the other performance dimensions such as organizational citizenship behaviors (OCBs) and counterproductive work behaviors (CWBs). Furthermore, the relatively few field studies of EPM largely focus on employees’ perceptions of the importance the organization places on different performance dimensions (e.g., production quantity vs. work quality) but not on the actual performance on these dimensions (e.g., Grant, Higgins, & Irving, 1988; Irving, Higgins, & Safayeni, 1986). Moreover, EPM research reports mixed evidence about the efficacy of EPM systems with productivity benefits contrasted with concerns related to privacy, fairness, and employee stress (see Bates & Holton, 1995; Chalykoff & Kochan, 1989; Lund, 1992). Finally, although by design EPM has two key constituents, supervisors using EPM systems and employees who are electronically monitored through these systems, EPM field studies primarily focus on the latter. Although important, that emphasis largely neglects the supervisor’s crucial role (for experimental exceptions, see Alge, Ballinger, & Green, 2004; Zweig & Scott, 2007). This omission is important because, as Komaki (1986) observed, the *frequency of supervisory monitoring*—traditional observational monitoring—is a key differentiator between effective and noneffective supervisors and one that is likely to prevail in EPM settings as well (Alge et al., 2004; Stanton, 2000).

In light of these conflicting and incomplete findings, rigorously assessing the importance of EPM in field settings is crucial. My primary objective in this study is thus to determine how frequently supervisors use EPM systems and how the frequency relates to employee performance. I draw on agency theory (Fama, 1980; Jensen & Meckling, 1976), which suggests that greater information allows supervisors to better monitor subordinates and to align subordinates’ and supervisors’ interests (and therefore align with organizational interests). To obtain deeper understanding of the relationship between EPM use and employee performance, specifically task performance, I undertook Study 1 using a unique longitudinal data set of objective call quality assessments in a call center firm. To complement Study 1’s objective EPM data, in Study 2 I drew data from multiple sources: supervisors, employees, and EPM system data provided by quality units from two different call center organizations. The multisource data allowed me to focus more directly on supervisors’ reports of EPM use while simultaneously incorporating a more comprehensive view of employee performance in the areas of task, OCB, and CWB. Collectively, this research addresses calls to better evaluate EPM contextual influences by drawing data from field settings, and by incorporating objective and subjective data to thoroughly assess EPM use and its relationship with multiple performance dimensions (see Johns, 2006). Thus, this research contributes to our knowledge of the essential role of technology for employee performance in technology-mediated contexts (see Hesketh & Neal, 1999).

Development of Hypotheses

Most research on the EPM–performance relationship has focused on task performance and has primarily used experimental methods. For instance, social facilitation theory (Zajonc, 1965) suggests that when other people are physically present, individuals perform complex tasks more poorly but perform simple tasks better. Drawing on that theory, Aiello and Svec (1993) investigated whether such social facilitation effects operate when EPM provides an “electronic presence.” They reported that participants in both electronic and supervisory monitoring conditions performed a complex task more poorly than did participants who were not monitored or were monitored in a group. On the other hand, Griffith (1993) reported better performance on a simple experimental task for electronically monitored study participants

compared with nonmonitored participants, although the differences were not statistically significant. Other studies using both complex and simple tasks have observed social facilitation effects; electronically monitored participants demonstrated higher performance on simple tasks but not on complex tasks (Davidson & Henderson, 2000; Kolb & Aiello, 1997). Overall, the experimental results suggest that EPM facilitates performance for simple tasks but hinders performance for complex tasks.

Field studies in the EPM literature have mainly focused on employee views of the importance of different performance attributes. For example, Grant et al. (1988) surveyed monitored and nonmonitored employees in the same firm and asked them which performance attribute they believed was most critical in their performance evaluations. Although 80% of monitored employees considered production quantity the main attribute affecting their performance ratings, most nonmonitored employees (85%) considered work quality the most important attribute. Irving and colleagues reported similar results: Employees in two organizations with EPM systems stated that managers placed a higher emphasis on quantitative aspects of work and a lower emphasis on quality of work, compared to employees in three organizations without EPM systems (Irving et al., 1986). Although these findings suggest that EPM can influence employees' attention to specific performance domains, they provide little information whether this results in changes in employee performance (Bates & Holton, 1995).

Overall, experimental studies have focused primarily on comparing electronic versus traditional forms of monitoring, whereas field studies have focused on soliciting employees' preferences for different aspects of task performance. In addition, both experimental and field studies in EPM have primarily focused on the employees' perspective, leaving an important question unaddressed: How does the *frequency of supervisory use of EPM*—critical in traditional observational monitoring (Komaki, 1986)—relate to employee performance? A related question is to understand the effects of supervisory use of EPM across the performance domain given that job performance is multidimensional (Campbell, 1999; Dalal, 2005; Rotundo & Sackett, 2002). To examine these questions, I draw on the theoretical perspectives of agency theory and social facilitation theory (see Alge et al., 2004; Stanton, 2000).

Supervisory Use of EPM and Task Performance

Agency theory (Fama, 1980; Jensen & Meckling, 1976) focuses on how work is delegated from a principal (here, the supervisor) to an agent (here, the subordinate) who does the work. Eisenhardt (1989) illustrated how agency theory metaphorically views the relationship between supervisor and subordinate as a contract for ascertaining the most efficient agreement between the two parties. Sometimes, however, moral hazard renders contracts inefficient (Milgrom & Roberts, 1992), which is more likely to occur when asymmetric information exists between the principal and the agent (Eisenhardt, 1989). For example, supervisors may lack accurate performance information about their subordinates and consequently are limited in eliciting performance improvements.

However, if supervisors cannot directly observe subordinates' performance, organizations can invest in information systems such as EPM (when the systems are less costly than other alternatives) to glean performance information (Eisenhardt, 1989). For instance, call center supervisors can use the EPM system to determine how well customer service representatives (CSRs) are performing on key metrics, such as their average time for handling calls, and use this information to suggest performance improvements. Agency theory predicts that this greater information facilitates better monitoring, which serves to align supervisors' and subordinates' interests. Experimental results are supportive: Particularly for simple tasks, electronically monitored participants demonstrate higher performance (Davidson & Henderson, 2000; Kolb & Aiello, 1997) indicating that greater performance information gathered through EPM mitigates agency problems caused by asymmetric information between supervisors and subordinates. Therefore, based on agency theory, I expect that greater use of EPM will be associated with favorable task performance effects.

Based on Komaki's (1986) work in traditional observational monitoring, using EPM systems to gather employee performance information can be conceptualized either as (a) objective measures of EPM frequency based on the actual time between EPM assessments or (b) subjective supervisor reports on how frequently they electronically monitor focal subordinates. Although these alternative conceptualizations are consistent with the agency theory reasoning that greater EPM facilitates employees' task performance, nuances occur in their rationale for favorable performance effects. In addition, the specific operationalization of EPM frequency differs based on the conceptualization, which prompts a more refined examination of the frequency of EPM–task performance relationship.

Objective Measures of EPM Frequency

The first conceptualization of the frequency of EPM use is based on the time between EPM assessments. According to social facilitation theory (Zajonc, 1965), EPM may enhance task performance because it serves as an “electronic presence” (Aiello & Svec, 1993) driving employees to perform better because they are aware of being evaluated (i.e., evaluation apprehension; Cottrell, 1972). Furthermore, in the presence of others, employees want to impress observers favorably and present a particular image of themselves (i.e., self-presentation; Baumeister, 1982; Goffman, 1959). Evaluation apprehension and self-presentation undergird social facilitation effects by increasing employees' arousal levels and desire to achieve task performance expectations. In other words, more frequent EPM would signal that the organization focuses strongly on evaluation, which would increase employees' evaluation apprehension and, in turn, enhance their task performance (see Brewer & Ridgway, 1998). Thus, according to this social facilitation explanation, longer time lags between EPM assessments will decrease employees' drive to meet task performance expectations. In sum, social facilitation theory and agency theory suggest that longer time lags between EPM assessments will adversely affect task performance.

- *Hypothesis 1:* Time between two consecutive EPM assessments is negatively related to task performance.

Subjective Supervisory Reports of EPM Use

Another way to conceptualize EPM is based on supervisors' subjective assessment of how frequently they electronically monitor their subordinates. Research on traditional observational monitoring shows that more frequent monitoring is essential to motivate subordinates to achieve work-related goals (Komaki, 1986). The frequency of supervisory monitoring signals the importance of the work to subordinates and directs their attention to its completion (Larson & Callahan, 1990). That is, by cueing subordinates on valued aspects of performance, more frequent supervisory monitoring aims to enhance performance. As discussed previously, this reasoning is congruent with the propositions of agency theory: More frequent supervisory use of EPM will help mitigate agency problems related to asymmetric information between supervisors and subordinates (Eisenhardt, 1989). Accordingly, I expect that greater supervisory use of EPM (based on supervisors' judgments of how much they electronically monitor their subordinates) will facilitate task performance.

- *Hypothesis 2:* Supervisory use of EPM is positively related to subordinates' task performance.

Supervisory Use of EPM and CWBs

CWB “refers to any intentional behavior on the part of an organization member viewed by the organization as contrary to its legitimate interests” (Sackett, 2002, p. 5) and is another vital dimension of performance (Campbell, 1999; Dalal, 2005; Rotundo & Sackett, 2002). It is noteworthy that the definition of CWB explicitly recognizes the role of incongruent interests between the organization and its members in classifying behaviors as counterproductive—incongruent interests that agency theory suggests might be alleviated by monitoring. CWBs can include a wide range of behaviors such as theft, tardiness, violence, accidents, sabotage, absenteeism, sexual harassment, and drug and alcohol abuse (Ones, 2002). For

parsimony and to focus explicitly on the performance domain, this study will focus on the counterproductive behaviors that Robinson and Bennett (1995) classified as *production deviance* (e.g., intentionally working slowly, taking excessive breaks).

From an agency theory perspective, employee-shirking behaviors are an example of CWBs in which employees avoid working as hard as expected (Eisenhardt, 1989; Milgrom & Roberts, 1992). Agency theory contends that shirking may occur because agents (employees) know more about their work efforts than do principals (supervisors). The resulting information asymmetry may prompt employees to act opportunistically by shirking (Eisenhardt, 1989). Specific monitoring mechanisms, such as EPM, help counteract information asymmetry by curtailing opportunistic subordinate behavior and obtaining more accurate performance information (Eisenhardt, 1989; Fama, 1980). Substantial research has illustrated that monitoring may combat shirking behavior. For instance, Eisenhardt (1985) found that greater monitoring mechanisms (e.g., budgeting systems) yielded more accurate performance information about salespersons in specialty stores.

Incorporating these agency theory arguments, Alge et al. (2004) reported that when team leaders' dependence on their subordinates was higher, which could create information asymmetry and opportunist subordinate behavior, they engaged in more intense monitoring. To supplement these experimental results, Alge et al. (2004) conducted a qualitative study of 22 managers. Results of this qualitative study indicated that EPM was used to elicit accurate information on subordinate CWBs, specifically those related to production deviance. One manager reported monitoring employees when it seemed that certain workers were starting to slack on the job. Another manager said that "lack of productivity" would prompt monitoring to "find out what the employee was really doing" (p. 400). Similarly, in a call center setting, a supervisor can use EPM data to determine whether a CSR is taking too many breaks and then use the information to combat shirking. These illustrations are consistent with agency theory arguments that supervisory use of EPM can help mitigate subordinate production deviance when supervisors cannot directly observe subordinate behavior. To this end, monitoring mechanisms would alleviate agency problems manifested in CWBs. Accordingly, I expect that supervisory use of EPM will help mitigate CWBs.

- *Hypothesis 3:* Supervisory use of EPM is negatively related to subordinates' CWBs.

Supervisory Use of EPM and OCBs

OCBs, another facet of job performance, are defined as "contributions to the maintenance and enhancement of the social and psychological context that supports task performance" (Organ, 1997, p. 91). Broadly, OCBs are employee behaviors that go beyond the call of duty (Bolino & Turnley, 2003) and reflect a latent construct representing "behavioral manifestations of positive cooperativeness at work" (LePine, Erez, & Johnson, 2002, p. 61). Because predictability and personalization represent a core dichotomy in customer service interactions (Surprenant & Solomon, 1987; Wallace, Eagleson, & Waldresee, 2000), examining citizenship behaviors is especially intriguing. For example, call center customer-service interactions are designed to be predictable so that all customers receive standardized service levels (Batt & Moynihan, 2002). Monitoring processes inform employees, implicitly and explicitly, that the organization desires certain work behaviors, particularly those that focus on task performance (Larson & Callahan, 1990). Monitoring thus emphasizes in-role behaviors the organization expects. Although traditional job responsibilities do not include OCBs, they contribute positively to the organization's social and psychological context (see LePine et al., 2002). By focusing employees on task performance, EPM may hinder OCBs.

From an agency theory perspective, monitoring may restrict certain employee behaviors. Supervisors and subordinates have differing interests that can cause problems in rewarding task performance while sustaining OCBs (Deckop, Mangel, & Cirka, 1999). The supervisors' interest would require the employee to maximize in-role or task performance, at the cost of likely decreasing OCBs (Deckop et al., 1999). That is, when organizations explicitly specify behaviors to be rewarded, employees will be less likely to

exhibit unrewarded behaviors such as OCBs (Morrison, 1996). In accordance, research has reported negative and direct effects between supervisory monitoring methods such as observations and formal meetings with specific dimensions of OCBs (Niehoff & Moorman, 1993). A related finding shows that employees are more creative under less supervisory monitoring (Zhou, 2003). Along the same lines, because EPM systems comprehensively monitor task performance to ensure predictability in service interactions, generally helpful behaviors in the workplace are likely to suffer. Consequently, supervisory use of EPM would cue employees to the importance of task performance factors and adversely affect their performance of OCBs.

On the other hand, alternative theoretical perspectives and empirical findings suggest that supervisory use of EPM may positively affect subordinates' OCBs. First, the EPM literature shows some contradictory findings when considering performance dimensions other than task performance. EPM systems highlight performance expectations, but in emphasizing task performance they may also stress the importance of other performance facets. For instance, Grant and Higgins (1989) reported that if employees believe that managers ascribe greater importance to the number of calls handled over the customer service, the employees nevertheless also increase their focus on customer service. As a result, Grant and Higgins (1989) contended that managerial attention to one facet of employee performance stimulates employees to value all performance facets. Furthermore, some experimental work suggests that EPM causes no compromises between service quality and quantity (e.g., Nebeker & Tatum, 1993).

A related but separate view suggests that employees may use impression management tactics to influence supervisory evaluations (Bolino, 1999). Furthermore, the odds of impression management may be higher under electronic monitoring; employees may be motivated to perform more citizenship acts because they believe supervisors will observe them. This reasoning is also consistent with emerging research on OCB role definitions, which suggests that employees may perceive that the organization essentially requires and rewards OCBs (e.g., Kamdar, McAllister, & Turban, 2006; Morrison, 1994; Tepper, Lockhart, & Hoobler, 2001).

Overall, two contradictory sets of arguments govern the supervisory use of EPM–OCB relationship. Based on agency theory and empirical findings from traditional monitoring, supervisory use of EPM may inhibit OCBs. Based on the broader job performance literature and some evidence from EPM research, however, supervisory use of EPM may enhance OCBs. Given the polarity inherent in these arguments, rather than offering a formal hypothesis, I examine the relationship between supervisory use of EPM and OCB as a research question:

- *Research Question:* Is there a relationship between supervisory use of EPM and subordinates' OCBs?

Overview of the Present Research

I tested the EPM–performance hypotheses by conducting two field studies in call centers. Call centers use EPM to continually collect a stream of performance information that permits supervisors to track employee performance in “real time” and includes a wide variety of work activities that can be potentially monitored (e.g., work pace, breaks, and accuracy; Aiello & Kolb, 1995; Holman, Chissick, & Totterdell, 2002). Although EPM systems can continually monitor employees and provide information on objective metrics, supervisors still must assess specific behaviors—an aspect labeled *service observation*—either by listening in during a customer transaction or by accessing digital records of the call later (George, 1996; Lund, 1992; Stanton, 2000). In general, of the total calls the CSR handles in a call center, only a few are assessed on service behaviors; the call center industry estimates that 75% of call centers monitor approximately four to five calls per employee per month (Incoming Calls Management Institute [ICMI], 2005).

Because service observation requires supervisors to devote more time and be more involved, many call center organizations also establish quality assessment units to track, observe, and evaluate CSR

performance (ICMI, 2005). Some call centers use quality departments to assess performance internally; others use external consulting firms, primarily because consulting firms specialize in service observation and provide benchmarking metrics across call center organizations. Third-party monitoring is consistent with the principles of quality assessment (Crosby, 1980; Juran, 1974) because external assessors are less likely to be biased by internal organizational (client) dynamics. As discussed below, the two studies in the present research incorporate these different organizational structures that call center firms adopt for electronically monitoring their employees.

Study 1 differs from Study 2 in its emphasis on external rather than internal assessments of EPM. This facilitates directly measuring the time between performance assessments and provides a more objective measure of frequency of EPM use. Therefore Study 1 primarily examines the relationship between degree of use of EPM, in terms of objective assessment of the time between EPM assessments and task performance. Study 2 uses surveys that directly assess supervisory use of EPM and its relationship across the three employee performance dimensions of task, CWB, and OCB. Thus, it is necessary to take a complementary view of both studies: Study 1 provides a more objective understanding of frequency of EPM by measuring the time between two consecutive assessments and tests Hypothesis 1; Study 2 provides an understanding of the frequency of supervisory use of EPM based on an individual supervisor's perspective and facilitates a test of the other hypotheses.

Study 1

Method

Participants, procedures, and setting

As mentioned above, Study 1 focuses on external rather than internal assessments of EPM. I obtained data on EPM assessments for “Finco,” the call center of a financial services firm, from “Consultco,” a third-party consulting firm (organization names are changed for confidentiality). Both firms are U.S. based. Finco's customers call primarily to resolve issues related to financial trade requests and account statuses. A group of assessors at Consultco rated a random selection of CSRs' performance in handling these client calls. Only one assessor, however, rated each of these randomly selected calls. CSRs at Finco were aware that their performance would be assessed and were provided their performance evaluation soon after the assessment took place.

Consultco assessors were specifically trained in service observations and were also skilled in identifying differences among superior, acceptable, and poor service based on a template of behaviors developed in collaboration with Finco. Consultco made ratings on specific customer service behaviors as well an overall employee performance score (discussed below) accessible to Finco supervisors and CSRs weekly. Over a 3-month period, assessment data for 4,207 calls were available for 248 of Finco's CSRs.

Measures

Employee performance

In consultation with Finco's subject matter experts, Consultco organizational consultants, who have PhD degrees in industrial-organizational psychology, developed a set of measures to assess performance based on 20 items measuring different aspects of service observation: service orientation (e.g., opening call appropriately), issue identification (e.g., obtaining the right information), issue resolution (e.g., providing thorough information), communication (e.g., projecting enthusiastic tone), and call management (e.g., using time efficiently). Based on these items, Consultco assessors provided a summary score (on a scale of 0–100) for each assessment.

Time between EPM assessments

The EPM system digitally recorded the specific times that Consultco assessors evaluated a focal employee's performance. These digital records of the time between EPM assessments provided the difference between two consecutive assessments, measured in days. On average, 4.35 days passed

between any two consecutive EPM assessments. As a reference point, the time between EPM assessments was positively skewed; it was less than 10 days in most cases, which is consistent with industry standards (ICMI, 2005).

Control variables

Although calls were similarly complex, customer attitudes are likely to vary. For example, one customer checking an account balance may display a hostile attitude; another may be neutral. To control for potential effects of such variations on CSR performance and consequent assessor evaluations, the analysis controlled for both *customer attitude at the initiation of the call* and *customer attitude at the end of the call*. Trained Consultco assessors also coded customer attitudes—measured on a four-point scale (0 = *negative* to 3 = *delighted*). Furthermore, each CSR's prior performance ($t - 1$) was also controlled; the inclusion of a lagged measure of performance in model estimation helps to account for time-based dependencies arising from performance monitoring (see Ployhart & Hakel, 1998).

Analysis Strategy

In these data, CSRs' performance was measured over time, with CSRs nested within supervisors, which necessitated the use of multilevel modeling procedures (Raudenbush & Bryk, 2002). In accordance, the intraclass correlation (ICC) values of .14 and .12 indicated that 14% of the variance in employee performance was at the CSR level and 12% of the variance was at the supervisor level, respectively (see Hox, 2010; Kim, 2009). To account for these interdependencies, multilevel models were estimated in STATA 10.0 to check whether employee performance deteriorated as time between EPM assessments increased.

Results

Table 1 shows the descriptive statistics and within-person correlations. The time between two EPM assessments was expected to be negatively related to performance. Although negative, the bivariate correlation was not statistically significant ($r = -.03, p > .05$); note, however, that the bivariate correlation does not consider temporal effects and omitted variables.

Table 1. Study 1 Means, Standard Deviations, and Bivariate Within-Person Correlations

		<i>Mean</i>	<i>SD</i>	1	2	3	4
1.	Performance	81.97	5.42	–			
2.	Lagged performance	81.94	5.44	.30	–		
3.	Time between EPM assessments	4.35	5.38	–.03	–.02	–	
4.	Customer attitude at beginning of call	1.19	.42	–.03	.00	.01	–
5.	Customer attitude at end of call	1.37	.50	–.02	–.05	.06	.63

Note

$N = 3,959$. Customer attitudes at the beginning and at the end of the call were assessed on a five-point scale. Correlations are at the within-persons level. Correlations greater than $|.03|$ are significant at $p < .05$.

Multilevel results were supportive of Hypothesis 1: Time between EPM assessments was negatively related to task performance, $b = -.04$, $p < .05$, 95% CI $[-.06, -.01]$, $\beta = -.04$. Note that these analyses control for the initial levels of CSR performance at the previous assessment period (see Table 2, Model 2).

Table 2. Study 1 Multilevel Model Results of Performance

	Performance	
	Model 1	Model 2
Lagged performance	.09**	.09**
Customer attitude at beginning of call	-1.35**	-1.37**
Customer attitude at end of call	.98**	1.02**
Time between EPM assessments		-.04**
Model deviance	23,839.10	23,832.72

Note

$N = 3,959$. Unstandardized regression coefficients are reported. The intercept is included in each model but omitted from the table. Model deviance = $-2 \times \log$ likelihood of the full maximum likelihood estimate. Following the smaller-is-better criterion, the model with the smaller deviance value indicates better model fit (Burnham & Anderson, [2002](#); Cavanaugh, [2005](#)).

** $p < .05$.

Discussion

The results of Study 1 provide a test for the hypothesis examining the relationship between the objective frequency of EPM assessments and task performance. Consistent with agency theory and social facilitation theory predictions, results indicate that shorter time lags between EPM assessments (more frequent use of EPM) are associated with better employee performance. These results suggest that more frequent monitoring would enable organizations to improve employee performance.

The longitudinal data set gives Study 1 distinct methodological advantages enabling direct measures of time between performance assessments and an objective measure of frequency of EPM use. Moreover, Finco already had EPM systems and processes in operation before data collection, which made it difficult to establish a causal relationship between frequency of EPM and performance, but by accounting for temporal performance dependencies there is greater confidence in these results. In addition, the effects of performance feedback received at the previous assessment ($t - 1$) may influence performance at the current time (t). By controlling for performance at the previous timepoint, this potential effect of performance feedback has been captured in the analysis, which lends additional credibility to these findings.

Furthermore, in contrast to Finco supervisors, Consultco assessors do not directly interact with Finco's CSRs. Consequently, they are less likely to be biased in their evaluations than are supervisors who know CSRs personally. As numerous studies have previously noted, bias in performance evaluations is an important issue (Feldman, 1981; Landy & Farr, 1980), so third-party assessments offer advantages by avoiding potential distortions in the evaluation process. To that end, estimates of the relationship of time between EPM assessments and CSR performance will be robust, relatively unbiased, and immune to many common method concerns (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Finally, data in Study 1 were not collected through a survey and were therefore relatively uncontaminated by issues such as social desirability and mood states of survey respondents (Podsakoff et al., 2003).

One concern in Study 1 is that, in large samples, even relatively small effects may be significant (see Combs, 2010). Results of Study 1 indicate that, all else being equal, an increase in each additional day between any two consecutive monitoring assessments is associated with a .04 point decrease in performance. Based on Ellis's (2010) advice, I interpret this effect size on the basis of the study's context and sample characteristics. Compare two EPM systems: one in which assessment is done on a daily basis, and a second in which assessment is done on a monthly basis. In the latter EPM system, the estimated drop in performance compared to the former system will be 1.2 points. This result is put in perspective by considering the standard deviation of performance. The observed standard deviation is low ($SD = 5.42$), which is consistent with previous research suggesting that performance ratings in a "strong" situation (one in which desirable behavior is clearly defined and highly consequential) generally exhibit range restriction (Meyer, Dalal, & Hermida, 2010). Given the low observed standard deviation, an estimated drop in performance of 1.2 points represents 22% of the standard deviation. In short, when the distribution of performance ratings is compressed, relatively small changes in performance scores capture meaningful differences in actual performance.

Finally, a noteworthy feature of Study 1 is that it does not directly assess supervisory use of EPM; rather, external assessors used EPM to assess employees. Thus, although the study provides insight into the frequency of EPM use and its relationship with employee performance, it cannot identify the specific effects associated with supervisory use of EPM. Study 1 also provides no information on the association of EPM with other performance dimensions such as OCB and CWB. Study 2 aims to address those limitations and to more comprehensively test the hypotheses.

Study 2

Method

Participants, procedures, and setting

Data were collected from call center units of two large organizations in a midwestern U.S. city. These call centers, which are specific divisions within larger organizations, provide billing, promotions, and related services to their customers. Both call centers handle in-bound transactions wherein customers initiate the calls. Multiple site visits at both organizations helped generate, clarify, and change items to terminology appropriate to the organization. As outlined below, I used three data sources: supervisors, CSRs, and EPM data provided by quality teams. The organizations provided an employee roster that enabled matching CSR data to supervisor and EPM data.

Across these two organizations, I sent web-based surveys to 284 CSRs and received 204 completed surveys for a response rate of about 72%. Both organizations showed similar response rates. CSRs provided information on demographic attributes of age, gender, tenure, education, and employment status. Most respondents were female (72%), worked full time (84%), and averaged 37.6 years old ($SD = 13.7$). The average organizational tenure was 5.2 years ($SD = 5.8$). All CSRs had at least a high school degree, and 27% were college graduates.

All supervisors ($n = 24$) completed both an individual web-based survey and paper survey for each of their subordinates, for a response rate of 100%. Most of the supervisors were female (66.7%) and

averaged 38.6 years old ($SD = 9.7$). All supervisors worked full time and possessed a high school degree or higher (33% were college graduates). The average organizational tenure was 9.2 years ($SD = 8.2$). On average, supervisors managed 12.9 CSRs ($SD = 2.4$) and monitored 3.7 ($SD = 1.6$) calls per CSR per month.

In terms of monitoring procedures, both organizations followed similar processes of using electronic monitoring systems to continually collect information on performance metrics, such as average call handle time, total number of calls handled, and time on breaks. Both supervisors and CSRs had access to these performance metrics. Furthermore, supervisors monitored CSR calls through side-by-side sessions (supervisors sat next to the CSRs and listened while they spoke with customers), real-time remote listening (supervisors listened to CSR calls from their workstations), or digital voice recordings of prior CSR call transactions.

Both organizations also had separate quality departments that independently electronically monitored and evaluated CSRs; like the supervisors, quality departments could access the calls in real time or through recordings. These departments evaluated at least four calls per agent per month on customer service behaviors—a number consistent with industry standards (ICMI, 2005). Quality departments provided a summary call quality metric based on the ratings of service behaviors and the performance metrics (e.g., average call handle time). Quality departments consisted of multiple raters, although each call was rated by only one rater. To ensure consistency of evaluation across work units, quality departments had periodic calibration sessions. In addition to their monitoring assessments, supervisors used ratings from the quality departments to provide feedback to their subordinate CSRs on multiple dimensions of call quality. Supervisors generally valued quality department evaluations in addition to their own evaluations because quality department ratings provided independent and relatively objective assessments.

Measures

Using a paper-based survey, supervisors evaluated each CSR on the three performance dimensions and provided information on their use of monitoring for each CSR, as well as the complexity of their calls.

Supervisory use of EPM

Discussions with organizational representatives complemented Wilk and Moynihan's (2005) approach, which inquires about supervisory levels of monitoring in call centers, and helped identify the specific forms of electronic monitoring that supervisors could use. This is consistent with EPM research that lists a set of monitoring techniques to assess EPM use (Stanton, 2000). Thus, supervisors reported on EPM use of (a) call monitoring systems that allow supervisors to view, for example, call handle times and call loads; (b) voice recording systems that enable call playback; (c) quality assurance metrics to evaluate calls; and (d) other electronic systems that generate performance data; for the last item, examples of specific systems in the organization, such as schedule adherence and attendance monitoring, were provided. All supervisors had access to these EPM techniques and could choose the frequency for using them. These items were assessed on a five-point (1 = *never* to 5 = *always*) Likert-type scale. Coefficient alpha for this scale was .87.

Call complexity

Because experimental EPM research (Davidson & Henderson, 2000; Griffith, 1993) and agency theory (Eisenhardt, 1989) have highlighted the relevance of task complexity in estimating the EPM–performance relationship, I controlled for the complexity of the calls handled by the CSR in the analysis. Based on Dean and Snell (1991), supervisors assessed the complexity of calls a focal CSR handled by answering: “How complicated are the calls handled by this representative?” This item was assessed on a seven-point scale (1 = *among the most simple* to 7 = *among the most complex*).

Task performance

Task performance was assessed using four items from the “Job – doing things specifically related to one's job description” dimension of the role-based performance measure (Welbourne, Johnson, & Erez, 1998, p. 554). The items were assessed on a five-point scale (1 = *needs much improvement* to 5 = *excellent*). An example is “Quantity of work output,” and the coefficient alpha for this scale was .91.

Organizational citizenship behaviors

The Welbourne et al. (1998) measure was used to assess OCBs. Four items were assessed on a five-point scale (1 = *needs much improvement* to 5 = *excellent*). The items used were from the “Organization – going beyond the call of duty in one's concern for the firm” dimension (Welbourne et al., 1998, p. 554), which “parallels those behaviors associated with OCBs” (Welbourne et al., 1998, p. 543). An example: “Doing things that help others when it's not a part of his/her job.” The coefficient alpha for this scale was .95.

Counterproductive work behaviors

Five items that reflected loss in work productivity were selected from Bennett and Robinson's (2000) organizational deviance scale. The items were assessed on a five-point scale (1 = *never* to 5 = *always*). An example item is: “Takes an additional or longer break than is acceptable at your workplace.” To appropriately suit the call center context, the wording of one item about fantasizing and daydreaming at work was revised to “Spends time surfing the Internet or on private phone calls.” The coefficient alpha for this scale was .86.

A confirmatory factor analysis (CFA) to determine whether the three performance dimensions were empirically distinct indicated that a three-factor solution exhibited superior fit: $\chi^2(62) = 160.63$, comparative fit index (CFI) = .95, root mean square of approximation (RMSEA) = .08, standardized mean square residual (SRMR) = .05, compared with a single-factor solution $\chi^2(65) = 918.99$, CFI = .53, RMSEA = .22, SRMR = .16. Overall, the three-factor model provided a significantly better fit than the one-factor model ($\Delta\chi^2[3] = 256.46, p < .001$).

Call quality

To evaluate call quality, both organizations had multiple dimensions (restricted by confidentiality agreements). In general, these dimensions covered various aspects of the call such as greeting, probing, closing, providing value, helping the customer, and documenting the transaction. Thus, elements of task performance were incorporated into the call quality score, which provides an alternative assessment of task performance by a different data source: quality teams.

Call quality data were provided for a 4-month period, and an average of these evaluations for each CSR was computed. Technical issues (e.g., if the quality department monitored fewer than four calls) and administrative issues (e.g., employee absence) caused data to be missing for each month so that complete call quality data for all 4 months were not available. To counteract the randomly missing data (7.47%), a multiple imputation procedure across the 4-month time period was performed to retain the maximum number of call quality assessments (see Carlin, Galati, & Royston, 2008). This procedure follows Newman's (2009, p. 11) advice that emphasizes using “all of the available data” and recommends multiple imputation procedures because they are unbiased and have greater power.

Analysis Strategy

In these field data neither supervisory use of EPM nor CSR performance are randomly assigned to experimental conditions. Thus, in estimating the relationship between supervisory use of EPM and performance, the potential exists for endogeneity, which may lie in the simultaneity of the monitoring–performance relationship. For instance, it may be unclear whether CSR performance is better because the

supervisor frequently uses electronic monitoring or whether the supervisor uses more electronic monitoring because of low CSR performance. When estimating a potentially simultaneous relationship, the ordinary least squares (OLS) regression results may be biased and inconsistent because the OLS assumption that the error term be independent of the predictor variable may be violated (Wooldridge, 2002); in this situation, the internal validity of the study could be compromised (see Antonakis, Bendahan, Jacquart, & Lalive, 2010). The Durbin–Wu–Hausman test empirically assesses whether the predictor variable and the error term are correlated; if they are it implies that OLS-based estimates may be inconsistent and that two-stage least squares (2SLS) estimates, which are consistent, should be used instead. Accordingly, the Durbin–Wu–Hausman test provided empirical evidence of the endogeneity of supervisory use of EPM ($\chi^2 = 15.17, p < .01$) and recommended the use of 2SLS methods for estimation (see Gujarati, 2003; Wooldridge, 2002). 2SLS procedures—a general solution to mitigate endogeneity—are widely used in the field of economics, have also been employed in organizational research (e.g., Glomb & Liao, 2003; Schmitt & Bedeian, 1982), and are recommended to increase internal validity (Antonakis et al., 2010). In 2SLS regressions, potentially endogenous variables are “replaced” with instrumental variables to mitigate endogeneity concerns (Wooldridge, 2002).

Instrumental variables

Four instrumental variables—assessed in a separate supervisor web survey—were created for supervisory use of EPM: the supervisor's tenure, dispositional propensity to trust, perceived usefulness of EPM, and perceived ease of use of EPM. The *supervisor's tenure* is indicative of their greater experience and familiarity with EPM systems and their use. *Propensity to trust* reflects a general willingness to trust others (Mayer, Davis, & Schoorman, 1995). Supervisors' propensity to trust would thus reflect their trust of employees prior to receiving any information on employees' ability or performance. Supervisors responded to Mayer and Davis's (1999) nine-item scale assessing propensity to trust (1 = *disagree strongly*; 5 = *agree strongly*). The coefficient alpha was .65. This alpha value, though somewhat low, was similar to Mayer and Davis's originally reported .66 value. Supervisors also reported their perceptions of ease of use and usefulness of EPM, which strongly determine behavioral intentions to use a technology (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). Supervisors responded to Venkatesh's (2000) four-item measures for both *perceived usefulness* (e.g., “Using the system improves my performance in the job”) and *perceived ease of use* (e.g., “I find the system easy to use”; 1 = *strongly disagree*; 7 = *strongly agree*). In consideration of one organization's request to use specific items for this scale, only three items could be used for each dimension. The coefficient alpha values were similar between the four-item and three-item versions of the scale. To ensure consistency across organizations, these three-item versions of the scale are used in the analysis. The coefficient alpha for perceived usefulness was .83 and for perceived ease of use was .77. The correlations of supervisory use of EPM with the instrumental variables were as follows: propensity to trust ($r = .25$), perceived usefulness ($r = .25$), perceived ease of use ($r = .44$), and supervisor's tenure ($r = .27$). These correlations were statistically significant ($p < .01$), and the average correlation of these four instrumental variables and supervisory use of EPM was .30.

Testing the validity of instruments

Valid instrumental variables must be (a) correlated with the endogenous variable that they are replacing and (b) uncorrelated with the error term in the equation (i.e., orthogonality condition).

The first condition can be tested using the fit of the first stage regression, which is the regression of the endogenous variable (supervisory use of EPM) on the set of instrumental variables (Baum, 2006; Wooldridge, 2002). The recommended statistic here is to examine the *F*-test of the joint significance of the instruments in the first-stage regression (Bound, Jaeger, & Baker, 1995) with the following rule: An *F*-test statistic below 10 potentially indicates that the first condition is not satisfied and that the

instruments have weak explanatory power (Staiger & Stock, 1997). Results supported adherence to the first condition of relevance of these instruments to explain the endogenous variable of supervisory use of EPM ($F [6, 181] = 21.06, p < .01; R^2 = .41$).

To test the second condition, the Sargan test for overidentification of instruments, where the null hypothesis suggests that the instrumental variables in the model are uncorrelated with the error term (Baum, 2006; Wooldridge, 2002), was performed for the outcome variable of task performance. By failing to reject the null hypothesis, results supported adherence to the second condition of orthogonality of the error term ($\chi^2 = 7.18, p > .05$) and provided additional evidence of the exogeneity of the instruments. Overall, these tests satisfied the two conditions of validity for instrumental variables (see Baum, 2006; Wooldridge, 2002, for additional methodological details).

In testing the hypotheses, the nested structure of the data must also be accounted for: CSRs are nested within supervisors. Such nested models were estimated using the “cluster” function in STATA 10.0, which estimates a variance–covariance matrix with interdependent error terms across groups (supervisors) and independent error terms within groups (supervisors; Rogers, 1993; Wooldridge, 2002). That is, these models were estimated based on 2SLS procedures while simultaneously accounting for nested effects (for a similar application of the cluster procedure using 2SLS, see Glomb & Liao, 2003).

Results

Descriptive results

As seen in Table 3, supervisory use of EPM was positively related to task performance ($r = .18, p < .05$) and OCB ($r = .23, p < .05$), but was unrelated to call quality ($r = .05, p > .05$) and CWB ($r = -.03, p > .05$). The correlations between the performance dimensions were as expected: task, OCB, and call quality were positively related to each other, and all were negatively related to CWB.

Table 3. Study 2 Descriptive Statistics and Bivariate Correlations

	<i>Mean</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.
1. Task performance	3.97	.82	(.91)					
2. CWB	1.71	.73	-.29	(.86)				
3. OCB	3.87	.87	.73	-.27	(.95)			
4. Call quality	90.43	4.55	.42	-.20	.37	–		
5. Supervisory use of EPM	4.28	.91	.18	-.03	.23	.05	(.87)	
6. Call c omplexity	5.32	1.14	.29	-.20	.27	.10	.31	–
7. CSR tenure	5.25	5.83	.07	-.15	.13	.02	.03	.05

Note

$N = 186-204$ (*Listwise* $N = 172$). CWB = counterproductive work behaviors; OCB = organizational citizenship behaviors; EPM = electronic performance monitoring; CSR = customer service representative. Task performance, CWB, OCB, and supervisory use of EPM were assessed on a five-point scale; call complexity was assessed on a seven-point scale. Internal consistency reliabilities are on the diagonal in parenthesis. Correlations greater than $|.14|$ are significant at $p < .05$.

2SLS results

Hypothesis 2 proposed a positive relationship between supervisory use of EPM and task performance (Table 4). The 2SLS estimate for supervisory use of EPM was positive and statistically significant ($b = .36, p < .05, 95\% \text{ CI } [.02, .71], \beta = .41$), providing support for Hypothesis 2. As mentioned previously, the performance outcome of call quality uses a different data source (i.e., quality departments) to test objectively the relationship between supervisory use of EPM and performance. The coefficient estimate for the relationship between supervisory use of EPM and call quality ($b = 2.97, p < .05, 95\% \text{ CI } [.53, 5.42], \beta = .53$), was positive and statistically significant, providing additional support for Hypothesis 2.²

Table 4. Study 2 Results of 2SLS Regression Analysis on Performance Outcomes

	Task performance	CWB	OCB	Call quality
Call complexity	.10	-.08	.05	-.31
CSR tenure	.01	-.02*	.02*	-.00
Supervisory use of EPM	.36**	-.02	.41**	2.97**
F^1	21.06**	21.19**	21.22**	16.16**
F	3.82**	3.43**	6.85**	3.08**
N	188	187	186	174

Note

Unstandardized regression coefficients are reported. The intercept is included in each model but omitted from the table. Supervisory use of EPM is instrumented through supervisor's tenure, dispositional propensity to trust, perceived usefulness of EPM, and perceived ease of use of EPM. F^1 represents the F -test for the joint significance of the instruments in the first stage regression; an F -test statistic above 10 provides evidence of the relevance of the instruments (see Baum, 2006). F represents the F -test for the overall 2SLS model. EPM = electronic performance monitoring; CWB = counterproductive work behaviors; OCB = organizational citizenship behaviors; CSR = customer service representative.

* $p < .10$. ** $p < .05$.

² Results for call quality for the raw data (nonimputed) were similar to those for the imputed data. The coefficient for supervisory use of EPM was positive and statistically significant for call quality ($b = 5.19, p < .05, 95\% \text{ CI } [.66, 9.73], \beta = .65$).

Hypothesis 3 proposed a negative relationship between supervisory use of EPM and CWB. The coefficient estimate for supervisory use of EPM was negative but not statistically significant, $b = -.02$, $p > .05$, $\beta = -.02$, thus failing to support Hypothesis 3. Research Question 1 sought to understand the relationship between supervisory use of EPM and OCB. The coefficient of supervisory use of EPM was positive and statistically significant ($b = .41$, $p < .05$, 95% CI [.08, .74], $\beta = .44$), indicating that supervisory use of EPM was associated with higher OCB.

Discussion

In this study, I examine how supervisors' use of information from EPM systems relates to subordinates' performance. Consistent with agency theory predictions, positive associations surface for supervisory use of EPM with task performance for different operationalizations of task performance: through supervisory evaluations of a CSR's performance, as well as through call quality evaluations based on EPM system data by a separate quality team. All else being equal, for each additional unit increase in supervisory use of EPM, task performance increases by .36 (on a five-point scale), and call quality increases by 2.97 points (on a 100-point scale).

Monitoring is considered a key mechanism to alleviate agency problems that are represented in CWBs. Although I anticipated a negative relationship between supervisory use of EPM and CWBs, the results failed to support such an association. Based on agency theory, I expected monitoring to be negatively related to OCBs. But the wider OCB literature and some prior empirical findings of EPM research suggested that supervisory use of EPM may be positively related to OCBs. Results indicated a positive relationship between supervisory use of EPM and OCBs, which align with this latter view. Although this result is desirable from an organizational perspective, I address the finding in the general discussion.

Study 2 has some limitations. First, it was not possible to independently evaluate the validity of the call-quality metrics, and so it was necessary to defer to organizational assessments of their suitability. Also unavailable was direct access to performance metrics, such as the average call time or number of calls handled by CSRs. But both supervisors and quality assessment teams had access to these metrics, which the quality assessment teams explicitly incorporated into their evaluations of call quality.

Second, from a methodological standpoint, rather than the cross-sectional design employed here, a randomized field experiment design would mitigate the endogeneity problem discussed earlier (Antonakis, et al., 2010). Furthermore, because this study assesses supervisor perceptions of how extensively they monitor subordinates, this indicator of the frequency of monitoring is not objective. In addition, no objective measure identifies the time between monitoring assessments or indicates how this issue may relate to performance. Research indicates that effective supervisors monitor their subordinates' performance more frequently than do noneffective supervisors (Komaki, 1986), and so precise measurement of time lags between monitoring assessments would strengthen these findings. Because Study 1 addresses these methodological limitations by objectively measuring time lags between monitoring assessments, it provides complementary evidence to Study 2 results.

General Discussion

Drawing on Adam Smith's metaphor, wherein the pursuit of individual self-interest stimulates the greater good through the social mechanism of an "invisible hand" (Smith, 1776/2003), in these studies I examine whether EPM functions as an "invisible eye" in aligning intraorganizational interests and facilitating employee performance. Consistent with predictions based on agency theory and social facilitation theory, EPM use and task performance show positive associations, as revealed in Study 1. Results indicate that as EPM is performed less frequently (i.e., more time lapses between EPM assessments), employees perform more poorly. This finding lends credence to Cottrell's (1972) social comparison explanation that

evaluation apprehension may heighten employees' drive levels. Put simply, call center representatives, concerned about their performance assessments, are driven to work harder. This result dovetails Komaki's (1986) work in traditional monitoring demonstrating that frequent monitoring is effective supervisory behavior. This reasoning is also consistent with feedback research that emphasizes the criticality of timely feedback for employee performance (Ilgen, Fisher, & Taylor, 1979). If more time passes between EPM assessments, employees will fail to receive prompt feedback that they may need to improve performance (Ilgen et al., 1979; Komaki, 1986).

Study 2 explicitly focuses on supervisory EPM use and reveals a positive relationship for different operationalizations of task performance (through supervisory evaluations of a CSR's performance and call quality evaluations based on EPM system data by a separate quality team). Overall, these results support prior experimental work (e.g., Davidson & Henderson, 2000; Kolb & Aiello, 1997) and are in accordance with agency theory: The better the ability to monitor employees, the better their task performance.

Monitoring is considered a key mechanism to alleviate agency problems represented by CWBs, and thus I anticipated a negative relationship between EPM and CWBs. My study results, however, fail to support such an association. Empirical and contextual considerations potentially explain this result. Similar to other work on CWBs (e.g., Gruys & Sackett, 2003), the base-rate of CWBs was low ($M = 1.71$ on a five-point scale) and so was the related variance ($SD = .73$). This modest variation could be an underlying reason for the lack of statistical significance. Also possible is that the lower base rate of CWBs is neither a rating error nor a statistical artifact but merely indicates lower manifestations of CWBs in this work environment. An examination of specific CWBs reveals that the most frequently observed counterproductive behavior is "spending time on the Internet or on private phone calls" (only 9.1%). Other CWBs observed are even lower, from 3.3% to 6.6%. These results suggest that electronic monitoring, coupled with the structured nature of work in a call center environment, would make it more difficult for employees to engage in CWBs. Of course, the prospect remains that observability of CWBs—"the Achilles' heel of counterproductivity research" (Sackett, 2002, p. 7)—is limited; perhaps this electronically monitored setting fails to detect unique and unmeasured CWBs (see also, Hulin, 1991).

Two divergent perspectives suggested alternate directions for the supervisory use of EPM-OCB relationship. Based on agency theory, I expected supervisory use of EPM to be negatively related to OCBs. Considering that CSRs must perform specific in-role behaviors, agency theory suggests that they would attend more acutely to the highlighted in-role behaviors and reduce their proclivity to perform OCBs. Research findings from the OCB and EPM literatures, however, suggested that supervisory use of EPM would be positively related to OCBs. Contrary to agency theory predictions, the results indicate a positive relationship between supervisory use of EPM and OCBs. Thus, because EPM systems highlight performance expectations, when emphasizing task performance they may also stress the importance of other performance facets, which is consistent with related EPM research findings (e.g., Davidson & Henderson, 2000; Grant & Higgins, 1989). Similar to results from traditional observational monitoring, therefore, supervisory use of EPM to monitor task performance may signal to employees the importance of performing OCBs (Larson & Callahan, 1990; Salancik & Pfeffer, 1978). This positive relationship between supervisory use of EPM and OCBs is also consistent with self-presentation theory that EPM's "electronic presence" would drive impression management behaviors (Baumeister, 1982). Simply by instituting EPM systems, organizations communicate the desired work behaviors to employees and induce processes of social comparisons that underlie social facilitation effects.

Another possible reason for the positive relationship between supervisory use of EPM and OCBs is that the rater, in this case the supervisor, may influence results. Supervisors are likely to commit halo errors when evaluating their subordinates' OCBs, in considering a "unitary" view of performance. That is, supervisors may assume a singular performance dimension to classify subordinates as either "good" or "bad" performers across other job dimensions (Campbell, 1990). This view, reflected in the high bivariate correlation between task performance and OCB ($r = .73$), is consistent with Hoffman and colleagues' meta-analytic reports that OCB, though a separate dimension, is strongly related to task performance

(Hoffman, Blair, Meriac, & Woehr, 2007).³ Such an explanation is also consistent with the reasoning that task performance and OCBs are intertwined; OCBs contribute to a positive organizational context for facilitating task performance (Motowidlo, 2000; Organ, 1997; Rotundo & Sackett, 2002).

Implications for Future Research

The findings of this study offer theoretical refinements for EPM research from an agency theory perspective. Results suggest differences in how supervisors use information from EPM systems to ensure that CSR performance accords with the supervisor's desires. Because EPM systems grant all supervisors the same potential levels for information generation, this implies that supervisors vary in their information processing needs and/or in their judgment and decision making. Incorporating judgment and decision-making aspects in an agency theory framework would be in accordance with research advances of modifying rational choice theory by integrating behavioral assumptions (see Mellers, Schwartz, & Cooke, 1998, for a review). In terms of future research, this indicates that supervisors' judgment and decision-making attributes potentially influence the monitoring–performance relationship. A related need is to understand the roles of supervisory motivations (autonomy supportive or controlling; Deci, Connell, & Ryan, 1989) and personality traits such as the Dark Triad (machiavellianism, narcissism, and psychopathy; O'Boyle, Forsyth, Banks, & McDaniel, 2012) that may influence supervisors' use of EPM.

From an organizational design perspective, it will be opportune to more closely examine the different roles between supervisors and quality teams to understand how monitoring responsibilities should be distributed and how to best observe different aspects of employee performance (task, OCB, and CWB). Doing so may be particularly pertinent when investigating different dimensions of OCB (e.g., altruism, courtesy, conscientiousness, sportsmanship, and civic virtue; Podsakoff, MacKenzie, Moorman, & Fetter, 1990) and CWB (e.g., interpersonal deviance and organization deviance; Bennett & Robinson, 2000). At the same time, we must pay greater attention to levels of EPM use. Although the results of this study indicate a positive association between supervisory use of EPM and employee performance dimensions, excessively high levels of EPM use may be detrimental to employee performance on account of fairness and autonomy concerns (see Alder & Ambrose, 2005; Stanton & Barnes-Farrell, 1996). Examining potential nonlinear relations between EPM use and employee performance is therefore important (see Larson & Callahan, 1990).

Another area for future research is to elucidate the dimensions and nature of providing EPM feedback, including feedback control, feedback constructiveness, and feedback medium (see Alder & Ambrose, 2005). Although frequent feedback is considered useful, the construct of *frequency* must be more thoroughly understood in light of some other related questions, such as whether frequent feedback is useful for performance improvement or whether a cognitive burden exists for both employees and supervisors based on the frequency of the feedback (whether daily, weekly, or monthly). An event-contingent experience sampling study would provide an avenue for examining the dynamic between a supervisor's EPM assessment and an employee's response. Specifically, assessing employee attitudinal and performance reactions based on a supervisor's specific monitoring assessment in “real time” may inform issues related to cognitive loads and their effects.

³ Note that measures of task performance and OCB were drawn from an established scale (i.e., Welbourne, et al., 1998). In addition, confirmatory factor analysis—based on only these two performance dimensions—provided evidence that the two dimensions were empirically distinct. A two-factor solution was a superior fit, $\chi^2(19) = 61.70$, CFI = .96, RMSEA = .09, SRMR = .05, compared with a single-factor solution $\chi^2(20) = 229.29$, CFI = .82, RMSEA = .20, SRMR = .09.

Implications for Practice

The findings of this study offer practical suggestions for organizations seeking to balance the efficiencies of information collection through EPM systems and the sharing of information about employee performance. The variation in supervisory use of EPM information suggests that organizational efforts in generating data through EPM are not matched by resources for using and processing data, especially across different user groups within organizations. Supervisors are likely to face information overload from the data generated, thereby creating an additional cognitive burden when they use EPM systems. Additional organizational efforts should be directed at interpretation of performance data (see also, Kulik & Ambrose, 1993).

To avoid information overload, organizational initiatives could focus on developing a key set of metrics combining different dimensions drawn from EPM data to create performance dashboards, or scorecards, for ease of data interpretation. Supervisory training in ensuring consistent data interpretation is also important from the perspective of ensuring equitable outcomes for CSRs. For this purpose, supervisory training could also encompass areas such as improving decision-making and coaching skills (see Liu & Batt, 2010). Finally, given the performance-driven culture in call center environments and economic pressures to reduce costs without compromising service quality, specific feedback will also be helpful for goal-setting (Locke & Latham, 1984) and achieving organizational performance objectives. Thus, another area for supervisory training would be interpreting and communicating feedback on employee performance.

In conclusion, findings from two field studies provide evidence that EPM functions as an “invisible eye” in aligning intraorganizational interests and facilitating performance. Results indicate that the use of EPM systems is associated with performance benefits for organizations, specifically for increasing employees’ task performance and OCBs.

References

- Aiello JR, Kolb KJ. (1995). Electronic performance monitoring and social context: Impact on productivity and stress. *Journal of Applied Psychology*, 80, 339–353.
- Aiello JR, Svec CM. (1993). Computer monitoring of work performance: Extending the social facilitation framework to electronic presence. *Journal of Applied Social Psychology*, 23, 537–548.
- Alder GS, Ambrose ML. (2005). An examination of the effect of computerized performance monitoring feedback on monitoring fairness, performance, and satisfaction. *Organizational Behavior and Human Decision Processes*, 97, 161–177.
- Alge B, Ballinger GA, Green SG. (2004). Remote control: Predictors of electronic monitoring intensity and secrecy. *Personnel Psychology*, 57, 377–410.
- American Management Association. (2005). 2005 Electronic monitoring and surveillance survey. Retrieved from <http://www.amanet.org/research/index.htm>.
- Antonakis J, Bendahan S, Jacquart P, Lalive R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21, 1086–1120.
- Bates RA, Holton EF. (1995). Computerized performance monitoring: A review of research issues. *Human Resource Management Review*, 5, 267–288.
- Batt R, Moynihan L. (2002). The viability of call center production models. *Human Resource Management Journal*, 12, 150–154.
- Baum CF. (2006). *An introduction to modern econometrics using Stata*. College Station, TX: Stata Press.

- Baumeister RF. (1982). A self presentational view of social phenomena. *Psychological Bulletin*, 91, 3–26.
- Bennett RJ, Robinson SL. (2000). Development of a measure of workplace deviance. *Journal of Applied Psychology*, 85, 349–360.
- Bolino MC. (1999). Citizenship and impression management: Good soldiers or good actors? *Academy of Management Review*, 24, 82–98.
- Bolino MC, Turnley WH. (2003). Going the extra mile: Cultivating and managing employee citizenship behavior. *Academy of Management Executive*, 17, 60–70.
- Bound J, Jaeger DA, Baker R. (1995). Problems with instrumental variables estimation when the correlation between the instruments and the endogeneous explanatory variable is weak. *Journal of the American Statistical Association*, 90, 443–450.
- Brewer N, Ridgway T. (1998). Effects of supervisory monitoring on productivity and quality of performance. *Journal of Experimental Psychology: Applied*, 4, 211–227.
- Burnham K, Anderson D. (2002). *Model selection and multi-model inference*. New York, NY: Springer-Verlag.
- Campbell JP. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In Dunnette MD, Hough LM (Eds.), *Handbook of industrial and organizational psychology* (Vol. 1, 2nd ed., pp. 687–732). Palo Alto, CA: Consulting Psychologists Press.
- Campbell JP. (1999). The definition and measurement of performance in the New Age. In Ilgen DR, Pulakos ED (Eds.), *The changing nature of performance: Implications for staffing, motivation, and development* (pp. 399–429). San Francisco, CA: Jossey-Bass.
- Carlin JB, Galati JC, Royston P. (2008). A new framework for managing and analyzing multiply imputed data in Stata. *Stata Journal*, 8, 49–67.
- Cavanaugh J. (2005). *The application of model selection criteria*. Iowa City, IA: Department of Biostatistics, College of Public Health, University of Iowa.
- Chalykoff J, Kochan TA. (1989). Computer-aided monitoring: Its influence on employee job satisfaction and turnover. *Personnel Psychology*, 42, 807–834.
- Combs JG. (2010). Big samples and small effects: Let's not trade relevance and rigor for power (From the Editors). *Academy of Management Journal*, 53, 9–13.
- Cottrell NB. (1972). Social facilitation. In McClintock CG (Ed.), *Experimental social psychology* (pp. 185–236). New York, NY: Holt.
- Crosby P. (1980). *Quality is free: The art of making quality certain*. New York, NY: Mentor.
- Dalal RS. (2005). A meta-analysis of the relationship between organizational citizenship behavior and counterproductive work behavior. *Journal of Applied Psychology*, 90, 1241–1255.
- Davidson R, Henderson R. (2000). Electronic performance monitoring: A laboratory investigation of the influence of monitoring and difficulty on task performance, mood state, and self-reported stress levels. *Journal of Applied Social Psychology*, 30, 906–920.
- Davis FD. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13, 319–340.

- Davis FD, Bagozzi RP, Warshaw PR. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982–1003.
- Dean JW, Snell SA. (1991). Integrated manufacturing and job design: Moderating effects of organizational inertia. *Academy of Management Journal*, 34, 776–804.
- Deci EL, Connell JP, Ryan RM. (1989). Self-determination in a work organization. *Journal of Applied Psychology*, 74, 580–590.
- Deckop JR, Mangel R, Cirka CC. (1999). Getting more than you pay for: Organizational citizenship behavior and pay-for-performance plans. *Academy of Management Journal*, 42, 420–428.
- Eisenhardt KM. (1985). Control: Organizational and economic approaches. *Management Science*, 31, 134–149.
- Eisenhardt KM. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14, 57–74.
- Ellis PD. (2010). *The essential guide to effect sizes*. New York, NY: Cambridge University Press.
- Fama E. (1980). Agency problems and the theory of the firm. *Journal of Political Economy*, 88, 288–307.
- Fayol H. (1916). General principles of management. In Shafritz JM, Ott JS (Eds.), *Classics of organization theory* (4th ed., pp. 52–65). Orlando, FL: Harcourt Brace.
- Feldman JM. (1981). Beyond attribution theory: Cognitive processes in performance appraisal. *Journal of Applied Psychology*, 66, 127–148.
- George JF. (1996). Computer-based monitoring: Common perceptions and empirical results. *MIS Quarterly*, 20, 459–480.
- Glomb TM, Liao H. (2003). Interpersonal aggression in work groups: Social influence, reciprocal, and individual effects. *Academy of Management Journal*, 46, 486–496.
- Goffman E. (1959). *The presentation of self in everyday life*. New York, NY: Doubleday-Anchor.
- Grant RA, Higgins CA. (1989). Monitoring service workers: The effect on employees, productivity, and service. *National Productivity Review*, 8, 101–112.
- Grant RA, Higgins CA, Irving RH. (1988). Computerized performance monitors: Are they costing you customers? *Sloan Management Review*, 29, 39–45.
- Griffith TL. (1993). Monitoring and performance: A comparison of computer and supervisor monitoring. *Journal of Applied Social Psychology*, 23, 549–572.
- Gruys ML, Sackett PL. (2003). Investigating the dimensionality of counterproductive work behavior. *International Journal of Selection and Assessment*, 11, 30–42.
- Gujarati DN. (2003). *Basic econometrics*. Madison, WI: McGraw-Hill.
- Hesketh B, Neal A. (1999). Technology and performance. In Ilgen DR, Pulakos ED (Eds.), *The changing nature of performance: Implications for staffing, motivation, and development* (pp. 21–55). San Francisco, CA: Jossey-Bass.
- Hoffman BJ, Blair CA, Meriac JP, Woehr DJ. (2007). Expanding the criterion domain? A quantitative review of the OCB literature. *Journal of Applied Psychology*, 92, 555–566.

- Holman D, Chissick C, Totterdell P. (2002). The effects of performance monitoring on emotional labor and well-being in call centers. *Motivation and Emotion*, 26, 57–81.
- Hox JJ. (2010). *Multilevel analysis* (2nd ed.). New York, NY: Routledge.
- Hulin CL. (1991). Withdrawal, persistence, and commitment in organizations. In Dunnette MD, Hough LM (Eds.), *Handbook of industrial and organizational psychology* (Vol. 2, 2nd ed., pp. 445–505). Palo Alto, CA: Consulting Psychologists Press.
- ICMI. (2005). *ICMI call center monitoring Study III final report*. Annapolis, MD: Call Center Press.
- Ilgén DR, Fisher CD, Taylor MS. (1979). Consequences of individual feedback on behavior in organization. *Journal of Applied Psychology*, 64, 349–371.
- Ilgén DR, Pulakos ED. (1999). Introduction: Employee performance in today's organization. In Ilgén DR, Pulakos ED (Eds.), *The changing nature of performance: Implications for staffing, motivation, and development* (pp. 1–18). San Francisco, CA: Jossey-Bass.
- Irving RH, Higgins CA, Safayeni FR. (1986). Computerized performance monitoring systems: Use and abuse. *Communications of the ACM*, 29, 801–994.
- Jensen MC, Meckling WH. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3, 305–360.
- Johns G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review*, 31, 386–408.
- Juran JM. (1974). *The quality control handbook* (3rd ed.). New York, NY: McGraw-Hill.
- Kamdar D, McAllister DJ, Turban DB. (2006). All in a day's work: How follower individual differences and justice perceptions predict OCB role definitions and behavior. *Journal of Applied Psychology*, 91, 841–855.
- Kim J. (2009). Multilevel analysis: An overview and some contemporary issues. In Millsap RE, Maydeu-Olivares A. (Eds.), *The Sage handbook of quantitative methods in psychology* (pp. 337–361). Thousand Oaks, CA: Sage.
- Kolb KJ, Aiello JR. (1997). Computer-based performance monitoring and productivity in a multiple task environment. *Journal of Business and Psychology*, 12, 189–204.
- Komaki JL. (1986). Toward effective supervision: An operant analysis and comparison of managers at work. *Journal of Applied Psychology*, 71, 270–279.
- Kulik CT, Ambrose ML. (1993). Category-based and feature-based processes in performance appraisal: Integrating visual and computerized sources of performance data. *Journal of Applied Psychology*, 78, 821–830.
- Landy FJ, Farr J. (1980). Performance rating. *Psychological Bulletin*, 87, 72–107.
- Larson JR, Callahan C. (1990). Performance monitoring: How it affects productivity. *Journal of Applied Psychology*, 75, 530–548.
- LePine JA, Erez A, Johnson DE. (2002). The nature and dimensionality of organizational citizenship behavior: A critical review and meta-analysis. *Journal of Applied Psychology*, 87, 52–65.
- Liu X, Batt R. (2010). How supervisors influence performance: A multilevel study of coaching and group management in technology-mediated services. *Personnel Psychology*, 63, 265–298.

- Locke EA, Latham GP. (1984). *Goal setting: A motivational technique that works!* New York, NY: Prentice Hall.
- Lund J. (1992). Electronic performance monitoring: A review of research issues. *Applied Ergonomics*, 23, 54–58.
- Mayer RC, Davis JH. (1999). The effect of the performance appraisal system on trust for management: A field quasi-experiment. *Journal of Applied Psychology*, 84, 123–136.
- Mayer RC, Davis JH, Schoorman D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20, 709–734.
- Mellers BA, Schwartz A, Cooke ADJ. (1998). Judgment and decision making. *Annual Review of Psychology*, 49, 447–477.
- Meyer RD, Dalal RS, Hermida R. (2010). A review and synthesis of situational strength in the organizational sciences. *Journal of Management*, 36, 121–140.
- Milgrom P, Roberts J. (1992). *Economics, organization and management*. Upper Saddle River, NJ: Prentice-Hall.
- Morrison EW. (1994). Role definitions and organizational citizenship behavior: The importance of the employee's perspective. *Academy of Management Journal*, 37, 1543–1567.
- Morrison EW. (1996). Organizational citizenship behavior as a critical link between HRM practices and service quality. *Human Resource Management*, 35, 493–512.
- Motowidlo SJ. (2000). Some basic issues related to contextual performance and organizational citizenship behavior in human resource management. *Human Resource Management Review*, 10, 115–126.
- National Workrights Institute. (2004). *Privacy under siege: Electronic monitoring in the workplace*. Report retrieved from http://www.workrights.org/issue_electronic/NWI_EM_Report.pdf.
- Nebeker DM, Tatum BC. (1993). The effects of computer monitoring, standards, and rewards on work performance, job satisfaction and stress. *Journal of Applied Social Psychology*, 23, 508–536.
- Newman DA. (2009). Missing data techniques and low response rates: The role of systematic nonresponse parameters. In Lance CE, Vandenberg RJ (Eds.), *Statistical and methodological myths and urban legends* (pp. 7–36). New York, NY: Routledge.
- Niehoff BP, Moorman RH. (1993). Justice as a mediator of the relationship between methods of monitoring and organizational citizenship behavior. *Academy of Management Journal*, 36, 527–556.
- O'Boyle EH, Jr., Forsyth DR, Banks GC, McDaniel MA. (2012). A meta-analysis of the Dark Triad and work behavior: A social exchange perspective. *Journal of Applied Psychology*, 97, 557–579.
- Ones DS. (2002). Introduction to the special issue on counterproductive behaviors at work. *International Journal of Selection and Assessment*, 10, 1–4.
- Organ DW. (1997). Organizational citizenship behavior: It's construct clean-up time. *Human Performance*, 10, 85–97.
- Ployhart RE, Hakel MD. (1998). The substantive nature of performance variability: Predicting interindividual differences in intraindividual performance. *Personnel Psychology*, 51, 859–901.

- Podsakoff PM, MacKenzie SB, Lee J, Podsakoff NP. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903.
- Podsakoff PM, MacKenzie SB, Moorman RH, Fetter R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *Leadership Quarterly*, 1, 107–142.
- Raudenbush SW, Bryk AS. (2002). *Hierarchical linear models* (2nd ed.) Thousand Oaks, CA: Sage.
- Robinson SL, Bennett RJ. (1995). A typology of deviant workplace behaviors: A multidimensional scaling study. *Academy of Management Journal*, 38, 555–572.
- Rogers WH. (1993). Regression standard errors in clustered samples. *Stata Technical Bulletin*, 1, 19–23.
- Rotundo M, Sackett PR. (2002). The relative importance of task, citizenship, and counterproductive performance to global ratings of job performance: A policy-capturing approach. *Journal of Applied Psychology*, 87, 66–80.
- Sackett PL. (2002). The structure of counterproductive work behaviors: Dimensionality and relationships with facets of job performance. *International Journal of Selection and Assessment*, 10, 5–11.
- Salancik GR, Pfeffer J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, 23, 224–253.
- Schmitt N, Bedeian AG. (1982). A comparison of LISREL and two-stage least squares analysis of a hypothesized life job satisfaction reciprocal relationship. *Journal of Applied Psychology*, 67, 806–817.
- Simon HA. (1946). The proverbs of administration. In Shafritz JM, Ott JS (Eds.), *Classics of organization theory* (4th ed., pp. 112–126). Orlando, FL: Harcourt Brace.
- Smith A. (1776/2003). *An inquiry into the nature and causes of the wealth of nations*. New York, NY: Bantam.
- Staiger D, Stock JH. (1997). Instrumental variables regression with weak instruments. *Econometrica*, 65, 557–586.
- Stanton JM. (2000). Reactions to employee performance monitoring: Framework, review, and research directions. *Human Performance*, 13, 85–113.
- Stanton JM, Barnes-Farrell JL. (1996). Effects of electronic performance monitoring on personal control, task satisfaction, and task performance. *Journal of Applied Psychology*, 81, 738–745.
- Surprenant CF, Solomon MR. (1987). Predictability and personalization in the service encounter. *Journal of Marketing*, 51, 86–96.
- Tepper BJ, Lockhart D, Hoobler J. (2001). Justice, citizenship, and role definition effects. *Journal of Applied Psychology*, 86, 789–796.
- US Congress, Office of Technology Assessment. (1987). *The electronic supervisor: New technology new tensions* (OTA-CIT-333). Washington, DC: US Government Printing Office.
- Venkatesh V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, 11, 342–365.
- Wallace CM, Eagleson G, Waldresee R. (2000). The sacrificial HR strategy in call centers. *International Journal of Service Industry Management*, 11, 174–184.

Welbourne TM, Johnson DE, Erez A. (1998). The role-based performance scale: Validity analysis of a theory-based measure. *Academy of Management Journal*, 41, 540–555.

Wilk SL, Moynihan LM. (2005). Display rule “regulators”: The relationship between supervisor and worker emotional exhaustion. *Journal of Applied Psychology*, 90, 917–927.

Wooldridge JM. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: The MIT Press.

Zajonc RB. (1965). Social facilitation. *Science*, 149, 269–274.

Zhou J. (2003). When the presence of creative coworkers is related to creativity: Role of supervisor close monitoring, developmental feedback, and creative personality. *Journal of Applied Psychology*, 88, 413–422.

Zweig D, Scott K. (2007). When unfairness matters most: Supervisory violations of electronic monitoring practices. *Human Resource Management Journal*, 17, 227–247.