A Social Exchange Model of Employee Reactions to Electronic Performance Monitoring

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The primary goal of this study was to develop and test a social exchange model of employee reactions to electronic performance monitoring (EPM) to help managers use EPM more effectively. This study proposed that certain EPM practices are related to perceptions of interpersonal and informational justice, which in turn build trust in the manager, along with other important attitudes and outcomes. In a sample of 257 call center representatives, the purpose for using EPM, development versus control, was associated with interpersonal justice perceptions, but EPM-based feedback characteristics, whether the feedback was timely, specific, and constructive, were not. Furthermore, the presence of an explanation for EPM was positively related to perceptions of informational justice. Moreover, interpersonal and informational justice perceptions were positively related to trust in the manager, which in turn was positively related to job performance and job satisfaction.

Technological advances have led to profound changes in the way in which employees’ performance is assessed. Managers can now monitor subordinate activities through the use of electronic monitoring systems (Aiello, 1993). Electronic performance monitoring (EPM) can be defined as systems in which electronic technologies are used to collect, store, analyze, and report the actions or performance of people on the job (Nebeker & Tatum, 1993). The American Management Association and The ePolicy Institute (2005) reported that 76% of major U.S. firms monitor workers’ Web site connections; 51% monitor time on the phone and numbers called; and 36% track content, keystrokes, and time at the computer.

The proliferation of sophisticated monitoring technologies has triggered an intense debate (Ambrose & Alder, 2000). Opponents of electronic monitoring describe monitoring technologies as “electronic whips” that turn workplaces into “electronic sweatshops” (Alder, 1998). Critics assert that the close supervision of nonwork activities violates privacy (Ambrose, Alder, & Noel, 1998), increases stress (Nussbaum & duRivage, 1986; Smith, Carayon, Sanders, Lim, & LeGrande, 1992), and emphasizes quantity at the expense of quality (Grant, Higgins, & Irving, 1988). On the other hand, supporters argue that EPM increases productivity, improves customer service, and reduces costs (Ambrose et al., 1998). Alder and Tompkins (1997) also pointed out...
that electronic monitoring may improve the consistency, clarity, objectivity, and accuracy of performance measurement because electronic monitoring is relatively objective.

In light of such conflicting arguments, no simple answer exists to the controversy surrounding EPM. According to Kulik and Ambrose (1993), there does appear to be a middle ground. Most researchers agree that technology itself is neutral; it is not so much the monitoring technology that is a problem but how the system is designed, implemented, and used (Ambrose & Alder, 2000). As more employers rely on electronic technology and the types of available monitoring devices rises (American Management Association/ePolicy Institute, 2005), it becomes increasingly important to understand employee reactions to EPM, just as researchers have examined ratee reactions to other performance appraisal processes (Levy & Williams, 2004). In fact, Keeping and Levy (2000) argued that ratee reactions may be the best criterion for evaluating performance appraisal systems, and this could also apply to organizations using EPM systems. As a manager pointed out, “We need an understanding of how to manage an automated environment. I don’t think we understand the effects of certain things on employees. … There are unique problems and concerns here” (Chalykoff & Kochan, 1989, p. 810). As such, the purpose of this study was to develop and test a model of employee reactions to EPM.

Most researchers investigating EPM have focused almost solely on workers’ perceptions of procedural justice, defined as fairness regarding procedures (Thibaut & Walker, 1975). Ambrose and Alder (2000) hypothesized that certain EPM dimensions should influence procedural justice, and several of these EPM dimensions have been empirically tested. For instance, both Douthitt and Aiello (2001) and Alge (2001) found that monitored participants who were given the opportunity to voice their opinions about the design and implementation of monitoring systems had higher perceptions of procedural justice.

These studies indicate that EPM-related dimensions have important implications for procedural justice perceptions but other types of justice may also be relevant. Colquitt (2001) found evidence for not only distributive and procedural justice but also two newer justice constructs: interpersonal and informational. Interpersonal justice refers to the manner in which people are treated by an authority (e.g., supervisor) enacting a procedure and has been linked to important organizational outcomes such as job satisfaction, organizational citizenship behaviors, and negative reactions (Colquitt, Conlon, Wesson, Porter & Ng, 2001). Informational justice can be defined as the adequacy of the explanations given by an authority about a procedure and has been related to outcomes such as trust, organizational commitment, job satisfaction, and withdrawal (Colquitt et al., 2001). These two newer justice dimensions underscore the importance of the supervisor-subordinate relationship, which may be especially critical in electronically monitored environments.

Noting that organizational justice lacks a theoretical framework incorporating all of the various justice dimensions, Roch and Shanock (2006) proposed using social exchange theory to distinguish among the justice types and their differential effects on organizational outcomes. Drawing on Blau’s (1964) exchange theory, social exchange theory states that when one entity treats another well, the norm of reciprocity obliges the return of favorable treatment in the future. As Aryee, Budhwar, and Chen (2002) pointed out, social exchange may be initiated by the way the organization treats employees, and this may be especially true in electronically monitored environments. Therefore, we propose a model of employee reactions to electronic monitoring that draws upon social exchange theory and earlier justice based models of EPM (Ambrose & Alder, 2000; Kidwell & Bennett, 1994) to explore how practices associated with EPM may be related to inter-
personal and informational justice perceptions, which in turn may influence other organizational attitudes and outcomes (see Figure 1).

**EPM PRACTICES RELATED TO INTERPERSONAL JUSTICE**

**EPM-Based Feedback Characteristics**

Organizations may be able to enhance perceptions of interpersonal justice in electronically monitored environments by focusing on what is often considered the most significant advantage of EPM: feedback (Aiello & Shao, 1993). Chalykoff and Kochan (1989) argued that the negative effects of electronic monitoring can be mitigated by attention to good feedback principles. According to Baron (1993), constructive feedback is specific, does not make threats, does not make attributions for poor performance, is considerate in tone and content, and is delivered promptly in an appropriate setting. He found that the more managers perceived feedback as constructive (e.g., specific, considerate), the fairer they rated the feedback.

In their model of computer performance monitoring, Ambrose and Alder (2000) argued that feedback tone, or the extent to which EPM-based feedback is given in a constructive manner, should influence the interpersonal sensitivity rule, which at the time was thought to be related to procedural justice. Later, Alder and Ambrose (2005a) found that constructiveness was related to a general measure of monitoring fairness, but they also proposed that constructive feedback should enhance perceptions of interpersonal justice (Alder & Ambrose, 2005b). Taken together, these results suggest that the quality of managers’ EPM-based feedback may be influential in determining employees’ perceptions of fairness. It seems that giving high-quality feedback (i.e., timely, specific, constructive feedback) is likely to influence perceptions of interpersonal justice because...
people draw on interpersonal perceptions when deciding on how to react their supervisor (Colquitt et al., 2001). Social exchange theory would predict that if a supervisor takes the time to provide high-quality EPM-based feedback, the employee may feel obliged to return that favorable treatment with increased perceptions of interpersonal justice.

H1: Increasing positive perceptions of EPM-based feedback characteristics will be positively related to perceptions of interpersonal justice.

EPM Purpose

Managers may also be able to boost interpersonal justice perceptions by using EPM for the “right” reasons. Chalykoff and Kochan (1989) argued that employee responses to monitoring systems will differ depending on whether monitoring is used mostly to control employees or to give feedback. In their study, they found that 91% of respondents agreed with the statement “Monitoring is a good tool if used properly” (p. 824). In fact, many employees were less satisfied when supervisors used the system to control employees rather than aid in employee development. For instance, one worker reported that supervisors “only tell you what you do wrong, not what was good” (p. 811). Likewise, studies have shown that participants were more positive about the monitoring experience and reported less anxiety when monitoring was used to help people rather than “catch” low performers (Aiello & Shao, 1993; Griffith, 1993).

Ambrose and Alder (2000) proposed that feedback purpose (i.e., whether EPM-based feedback is used for mostly development or evaluation) should influence perceptions of procedural justice. Moreover, they argued that EPM would be perceived as more interpersonally sensitive “when the purpose for monitoring is adequately explained to employees” (p. 205). We propose that the purpose for EPM (whether monitoring is used mostly for development or controlling purposes) may be separate from whether an explanation is offered for the use of EPM. A manager might use EPM mostly for developmental purposes but not provide an explanation for EPM. Moreover, interpersonal sensitivity and procedural explanations are now considered separate justice components: interpersonal justice and informational justice, respectively (Colquitt, 2001; Colquitt et al., 2001).

Taken together, these findings suggest that employees are more likely to respond positively to electronic monitoring to the extent that a positive, developmental approach to monitoring is fostered. Consistent with Lind and Tyler’s (1988) group-value model, EPM purpose may be related to interpersonal justice perceptions because it may symbolize the manager’s desire to treat employees with dignity and respect during the monitoring process, and employees may reciprocate with enhanced perceptions of interpersonal justice.

H2: Increasing perceptions of EPM purpose as developmental will be positively related to perceptions of interpersonal justice.

CONSEQUENCES OF EPM WORKERS’ INTERPERSONAL JUSTICE PERCEPTIONS

According to social exchange theory (Blau, 1964), fair treatment on behalf of the organization may initiate a social exchange relationship with the employee. When EPM workers feel like they
are being treated with dignity and respect by a supervisor, they may reciprocate by trusting that person more. According to Tyler and Degoey (1996), trustworthiness is determined by the degree to which individuals feel they are treated with respect, and they found that relational characteristics explained 27% of the variance in trustworthiness. Shaw (1997) proposed that demonstrating concern for others is paramount to trusting relationships. Moreover, Kernan and Hanges (2002) found support for a positive relationship between interpersonal justice and management trust. However, Bies and Moag’s (1986) agent-system model predicts that interpersonal justice will be more strongly related to trust in the manager rather than trust in management because trust is usually referenced to a particular person (Colquitt et al., 2001), such as a manager. Colquitt et al. argued that interpersonal justice should predict trust, but they found that such studies were underrepresented and argued that further research is needed.

A model of managerial trustworthy behavior proposed by Whitener, Brodt, Korsgaard, and Werner (1998) may help explain how interpersonal justice may relate to trust in the manager. According to Whitener et al., certain managerial behaviors, such as “showing consideration and sensitivity for employees’ needs and interests” (p. 6), should influence employees’ perceptions of trustworthiness. It seems plausible that benevolence increases perceptions of interpersonal justice, and in exchange for treating people with respect, perceptions of trust in the manager are enhanced. Alder and Ambrose (2005b) theorized that the perceived interpersonal justice related to EPM-based feedback should be associated with trust in the feedback source but to our knowledge this has not been empirically tested.

H3: Perceptions of interpersonal justice will be positively related to trust in the manager.

In summary, both EPM-based feedback characteristics and purpose are expected to be positively related to interpersonal justice, and in turn, interpersonal justice is expected to be associated with trust in the manager, a key element in social exchange (Blau, 1964). It is also likely that EPM-based feedback characteristics and purpose are related to trust in the manager. When a manager gives specific and useful EPM-based feedback in a timely manner and uses EPM primarily to develop workers, this manager may be perceived as using monitoring in a respectful manner, which may enhance reciprocation of trust between employees and managers. Thus, interpersonal justice should play at least a partial mediating role between both of the EPM antecedents (EPM-based feedback characteristics and EPM purpose) and trust in the manager.

H4a: Interpersonal justice at least partially mediates the relationship between EPM-based feedback characteristics and trust in the manager.

H4b: Interpersonal justice at least partially mediates the relationship between EPM purpose and trust in the manager.

EPM PRACTICES RELATED TO INFORMATIONAL JUSTICE

Not only interpersonal but also informational justice may be relevant in EPM contexts. Earlier work by Bies and colleagues found that adequate explanations enhanced procedural and interactional justice perceptions (Bies & Shapiro, 1987, 1988). Managers’ explanations may play a key role in justice perceptions, and this may be particularly true under conditions of EPM. For instance, Ambrose and Alder (2000) argued that organizations should provide a clear explanation
for why electronic monitoring is being used. Likewise, Stanton (2000b) found that adequate justifications for monitoring were related to perceptions of interactional justice but his measure did not separate interpersonal and informational justice.

According to Greenberg, Bies, and Eskew (1990), subordinates expect explanations for decisions that affect them. A manager’s explanation for monitoring may be a gesture of goodwill, which, according to social exchange theory, may be reciprocated by the employee through heightened feelings of fairness. Drawing on work from Bies and Shapiro (1987), the presence of an explanation might reduce the perception that the manager is acting inappropriately by engaging in electronic monitoring. Therefore, the presence of an explanation may provide employees with “the appropriate information needed to evaluate the structural aspects of the process” (Colquitt et al., 2001, p. 427), which enhances informational justice.

**H5:** Increasing perceptions of the presence of an EPM explanation will be positively related to perceptions of informational justice.

**CONSEQUENCES OF EPM WORKERS’ INFORMATIONAL JUSTICE PERCEPTIONS**

When employees feel that they have received appropriate information about procedures from their manager, they may be more likely to trust their manager. Colquitt et al.’s (2001) meta-analysis revealed a strong relationship between informational justice and trust ($r = .43$). Whitener et al.’s (1998) model of managerial trustworthy behavior can also demonstrate how trust in the manager can be a consequence of informational justice. One of their behavioral dimensions, communication between managers and subordinates, is particularly relevant to informational justice. According to Whitener et al., managers should provide explanations for their decisions, and these explanations should increase perceptions of trust. However, it is likely that Whitener’s communication factor actually enhances perceptions of informational justice, which in turn increases perceptions of trust in the manager. Providing an explanation for why monitoring is necessary may signal that the manager is devoted to communicating information in a fair manner, resulting in greater trust between the employee and manager.

**H6:** Perceptions of informational justice will be positively related to trust in the manager.

In summary, the presence of an EPM explanation should be related to perceptions of informational justice, and informational justice should be associated with trust in the manager. That is, one way that trust may emerge between managers and subordinates is through adequate communication. Providing an explanation for monitoring may symbolically convey benevolence toward the employee and in exchange, the employee may reciprocate by trusting the manager. Thus, it is likely that informational justice at least partially mediates the relationship between EPM explanation and trust in the manager.

**H7:** Informational justice at least partially mediates the relationship between EPM explanation and trust in the manager.
**CONSEQUENCES OF EPM WORKERS' TRUST PERCEPTIONS**

Blau (1964) argued that trust is a critical factor in the emergence of social exchange relationships. In fact, trust may be the mechanism through which justice perceptions affect employee outcomes (Aryee et al., 2002). In electronically monitored environments, trust in the manager may be of particular importance because of its relationship to important outcomes, but it has gone relatively unnoticed by EPM researchers (Stanton, 2000a). Indeed, Dirks and Ferrin’s (2002) meta-analysis found that trust in a direct leader is related to job performance and satisfaction. It seems that an employee may trust a manager based on his or her caring behaviors and efforts to provide adequate information regarding organizational procedures (e.g., monitoring). In turn, the employee may reciprocate in the form of desired behaviors, such as higher job performance. In addition, Dirks and Ferrin proposed that subordinates with higher levels of trust are likely to feel better about a manager having power over the important aspects of their job (e.g., pay, promotion), and consequently should be more satisfied.

**H8:** Trust in the manager will be positively related to job performance.

**H9:** Trust in the manager will be positively related to job satisfaction.

**THE PRESENT STUDY**

Using an exchange framework, this study examines a theoretical model that focuses on how EPM practices influence interpersonal and informational justice, which may be especially relevant in building trusting relationships between monitored employees and their supervisors, and in turn may influence other organizational attitudes and outcomes. Thus, we concentrate only on the two newer and yet relatively unexplored justice types because they may be particularly relevant in developing trust in a manager under conditions of EPM.

**METHOD**

**Participants**

Participants were 257 part-time employees (90 male, 162 female, 5 unknown) at eight call centers located on university campuses in the northeastern United States. Seven call centers were operated by an independent contractor and one call center was operated by a university. These employees contacted alumni to solicit donations over the telephone, and managers at these call centers used an EPM system to assess employees' performance. Thus, EPM was a feature of normal working conditions at all locations, and employees were informed of monitoring practices during the employment interview and training process. The majority of participants were between the ages of 18 and 25 (97.3%). Participants' backgrounds differed: Asian American (8.2%), African American (12.5%), Caucasian (59.4%), Latino (7.8%), other (11.3%), and unknown (2.3%). Participants were employed for varying lengths of time: 43.6% for 0 to 3 months, 22.6% for 4 to 6 months, 31.1% for longer than 6 months, with 2.7% unknown.
Measures

With the exception of the performance measure, all measures were presented in one survey with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). A pilot study was conducted to investigate the reliability of the measures before they were distributed to call center employees, especially for the three measures created by the authors (i.e., EPM-based feedback characteristics, EPM purpose, EPM explanation). All of the finalized measures demonstrated adequate reliability (α = .76 or higher) in the pilot study sample.

**EPM-based Feedback Characteristics.** A six-item measure was developed for the study, based in part on Baron’s (1988) work on constructive feedback. Participants were instructed to think of the feedback generated by the monitoring system and delivered by the manager. A sample item is, “My manager gives feedback that is useful.”

**EPM Purpose.** A five-item measure was created for the study. A sample item is, “My manager uses monitoring mostly to give feedback to employees.”

**EPM Explanation.** A three-item measure was developed. A sample item is, “My manager provided an explanation for how the organization will use the monitoring data.”

**Interpersonal Justice.** Colquitt’s (2001) four-item measure was used. Participants were instructed to think of their manager using data from the monitoring system. A sample item is, “My manager treats me with respect.”

**Informational Justice.** Colquitt’s (2001) five-item measure was used with similar instructions as interpersonal justice. A sample item is, “My manager explains the procedures thoroughly.”

**Trust in the Manager.** Kirkpatrick and Locke’s (1996) four-item “trust in the leader” measure was used. Leader was replaced with manager. A sample item is, “I have complete trust in my manager.”

**Job Satisfaction.** A three-item measure from House, McMichael, Wells, Kaplan, and Landerman (1979) was used. A sample item is, “Overall, I am satisfied with my job.”

**Control Variables.** Tenure was assessed to control for the amount of time that an individual worked at the call center. In addition, the location of the call center was dummy coded depending on whether it was operated by an independent contractor or the university. Finally, a measure of the length of the relationship between the participant and his or her manager was included because the length of a relationship may affect trust (Dirks & Ferrin, 2002).

**Demographics.** Age, ethnicity, gender, and year in school were assessed.

**Job Performance.** In this call center environment, a monitoring system allows managers to randomly listen in on employees’ phone calls with alumni. In other words, managers conduct real

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1 In the pilot study, 26 undergraduates (9 male, 17 female) from the psychology participant pool at a northeastern public university participated in an Internet survey in exchange for half an hour of research credit. Participation was restricted to those individuals who believed their employer used some type of electronic monitoring, mostly by video cameras (69.23%).
time monitoring by listening to calls as they occur, and as mentioned earlier, employees are informed that this monitoring takes place. In addition, the monitoring system produces statistics on workers’ performance, which managers distribute to employees on a weekly basis. The most important statistic generated by the monitoring system is employees’ average participation rate, calculated as the number of pledges divided by total decisions (pledges and no pledges).

We also asked managers to rate their employees’ overall job performance. Managers were told that their ratings were for research purposes to avoid the problems associated with ratings for administrative purposes (Jawahar & Williams, 1997). The rating consisted of a one-item measure created to assess how well, on average, each employee performed. To be consistent, managers rated each caller’s overall job performance using the scale that coincided with their existing evaluation forms. The university-operated call center (one call center) used a 3-point scale, whereas the call centers operated by the independent contractor (seven call centers) used a 5-point scale. Please see the appendix for more details. We converted the one call center’s 3-point scale to the 5-point scale mathematically. Both measures of performance were strongly correlated \( r = .61 \), therefore we combined both indicators (participation rate and manager rating) into one latent variable representing general job performance, which is consistent with Viswesvaran, Schmidt, and Ones’s (2005) finding of one overall factor of job performance.

Procedure

At the beginning of the work shift, managers invited employees to participate in the study. Participants were assured that the researcher would keep their responses confidential and their participation was strictly voluntary. Participants who agreed to participate were given an informed consent form and instructions on completing either a paper survey (for call centers without Internet access; 84 participants) or a Web-based survey (for call centers with Internet access; 173 participants). The paper survey contained the same items found on the Internet survey. Participants entered an experimental identification number and had the option of entering a lottery with a chance to win a $30 gift card. The survey items appeared next, followed by demographic information. After participants completed the survey, they clicked “submit” at the bottom of the computer screen (Internet survey only) or they sealed their survey in a postage-paid envelope and mailed it to the researcher (paper survey only). The survey lasted approximately 10 min. After administering the survey, managers completed a spreadsheet with each caller’s performance rating and average participation rate according to the employee’s experimental identification number.

Analyses

To examine the fit of the model, we used AMOS software (Arbuckle & Wothke, 1999) with maximum likelihood estimation. Based on recommendations by Byrne (1998), we tested the measurement model before exploring the proposed structural model. Thus, we first used confirmatory factor analysis (CFA) to compare several factor structures to provide support for our proposed factor structure (measurement model). After testing our measurement model, we investigated the influence of the control variables on the other variables. Finally, we tested the structural model with the hypothesized relationships. Consistent with current practice, model fit was assessed by examining the magnitude of several fit indices, including root mean square error of approximation (RMSEA; Browne & Cudeck, 1993), the comparative fit index (CFI; Bentler, 1990) and the Tucker–Lewis
index (TLI; Tucker & Lewis, 1973). Proposed models are considered adequate when the RMSEA is close to zero and the CFI and TLI are .90 or higher.

RESULTS

A summary of the means, standard deviations, internal reliabilities, and intercorrelations among the measures are displayed in Table 1.

Measurement Model

Using CFA, we compared the fit of the hypothesized eight-factor measurement model with an alternative five-factor model, which consisted of (a) EPM antecedent variables (combining EPM-based feedback characteristics, EPM purpose, and EPM explanation), (b) justice (combining interpersonal and informational justice), (c) trust in the manager, (d) job performance, and (e) job satisfaction, and a one-factor model, incorporating all of the constructs in the model. In all models the factors were allowed to correlate with each other. As shown in Table 2, the hypothesized eight-factor measurement model (CFI = .93, TLI = .91, RMSEA = .06) was a better fit than the five-factor model (CFI = .82, TLI = .80, RMSEA = .09) and the one-factor model (CFI = .52, TLI = .49, RMSEA = .14). Thus, the CFA results indicate support for the hypothesized eight-factor measurement model. See Table 3 for the correlations among the eight factors.

Next, we assessed the importance of three control variables: (a) tenure, (b) location, and (c) length of the relationship between the manager and employee. To do so, we tested a model in which two control variables (tenure and location) were allowed to correlate with the exogenous variables (EPM-based feedback characteristics, EPM purpose, EPM explanation) as well as predict the two endogenous variables (job performance, job satisfaction). In addition, the length of the relationship between the manager and employee was allowed to correlate with the exogenous variables (EPM-based feedback characteristics, EPM purpose, EPM explanation) as well as predict trust in the manager.

The results showed that the model fit was marginal. The chi-square test was statistically significant, $\chi^2(538, N=257) = 1636.28, p < .01$. Goodness of fit indices revealed that the RMSEA value was .09, and the CFI and the TLI were .81 and .78, respectively, below their recommended levels. The standardized path coefficients between location and the endogenous variables (job performance, job satisfaction) were all nonsignificant. Similarly, the path between length of the relationship and trust in the manager was nonsignificant. The nonsignificant paths for location and length of the relationship were removed to maintain parsimony and to provide additional degrees of freedom. However, tenure was retained as a control variable because the standardized path coefficient between tenure and job performance was statistically significant ($\beta = .58$).

Structural Model

In the structural model, we allowed the three exogenous variables to correlate, and the intercorrelations ranged from .63 to .72. The average indicator loading was .73. We also conducted a

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2 We follow the recommendations of Kenny (2003), who argued that the goodness-of-fit index and the adjusted goodness-of-fit index are affected by sample size and should not be used.
TABLE 1
Descriptive Statistics and Correlations

<table>
<thead>
<tr>
<th>Measure</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EPM-based feedback characteristics</td>
<td>6.08</td>
<td>1.02</td>
<td>(.93)</td>
<td>.56**</td>
<td>.31**</td>
<td>.44**</td>
<td>.58**</td>
<td>.51**</td>
<td>.41**</td>
<td>.03</td>
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<tr>
<td>2. EPM purpose</td>
<td>6.00</td>
<td>0.85</td>
<td>(.77)</td>
<td>.40**</td>
<td>.42**</td>
<td>.42**</td>
<td>.43**</td>
<td>.35**</td>
<td>-.03</td>
<td></td>
</tr>
<tr>
<td>3. EPM explanation</td>
<td>5.58</td>
<td>1.21</td>
<td>(.70)</td>
<td>.34**</td>
<td>.40**</td>
<td>.36**</td>
<td>.24**</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Interpersonal justice</td>
<td>6.27</td>
<td>1.01</td>
<td>(.88)</td>
<td>.64**</td>
<td>.65**</td>
<td>.42**</td>
<td>.14*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Informational justice</td>
<td>5.99</td>
<td>0.88</td>
<td>(.76)</td>
<td>.61**</td>
<td>.37**</td>
<td>.03</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6. Trust in the manager</td>
<td>6.14</td>
<td>0.94</td>
<td>(.78)</td>
<td>.44**</td>
<td>.16*</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7. Job satisfaction</td>
<td>5.01</td>
<td>1.64</td>
<td>(.91)</td>
<td>.36**</td>
<td>(.38)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8. Job performance</td>
<td>1.74</td>
<td>0.51</td>
<td></td>
<td></td>
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</table>

Note. N = 257. Scale score correlations are given above the diagonal. Internal reliabilities (coefficient alphas) are given in the parentheses along the diagonal. EPM = electronic performance monitoring.

*The scales for manager rating and participation rate are very different, thus it is not surprising that the Cronbach's alpha is low. The range on manager rating is 1 to 5, whereas the range for participation rate is .02 to .82. Manager rating and participation rate are highly correlated (r = .61). When manager rating and participation rate are both converted to z-scores, Cronbach's alpha is .74.

*p < .05. **p < .01.

TABLE 2
Results of the Confirmatory Factor Analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>CFI</th>
<th>TLI</th>
<th>χ²</th>
<th>df</th>
<th>Difference</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-factor</td>
<td>.52</td>
<td>.49</td>
<td>2837.53*</td>
<td>465</td>
<td></td>
<td>.14</td>
</tr>
<tr>
<td>Five-factor</td>
<td>.82</td>
<td>.80</td>
<td>1358.26*</td>
<td>454</td>
<td>1479.27*</td>
<td>.09</td>
</tr>
<tr>
<td>Eight-factor</td>
<td>.93</td>
<td>.91</td>
<td>807.40*</td>
<td>436</td>
<td>550.86*</td>
<td>.06</td>
</tr>
</tbody>
</table>

Note. N = 257. The one-factor model includes all of the variables. The five-factor model consists of electronic performance monitoring variables, justice, trust in the manager, performance, and job satisfaction. The eight-factor model treats all of constructs as separate factors. CFI = comparative fit index; TLI = Tucker-Lewis index; Difference = difference in chi-square from the next model; RMSEA = root mean square error of approximation.

*p < .05.

TABLE 3
Interfactor Correlations for the Eight-Factor Model

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EPM-based feedback</td>
<td>—</td>
<td>.62</td>
<td>.36</td>
<td>.46</td>
<td>.66</td>
<td>.58</td>
<td>.46</td>
<td>.00</td>
</tr>
<tr>
<td>2. EPM purpose</td>
<td>—</td>
<td>.49</td>
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<td>3. EPM explanation</td>
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<td>4. Interpersonal justice</td>
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<td>5. Informational justice</td>
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<td>6. Trust in the manager</td>
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<td>7. Job satisfaction</td>
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<td>8. Job performance</td>
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Note. EPM = electronic performance monitoring.
power analysis using the SEM power calculator provided by Preacher and Coffman (2006), and the results of the power analysis indicated adequate power (.77) to explore the model. The fit indices for the proposed model were good. Although the chi-square test was statistically significant, $\chi^2(480, N = 257) = 991.61, p < .01$, the chi-square test is sensitive to sample size. Maruyama (1998) argued that the empirical fit of the model can be assessed by examining the ratio of the chi-square value to its degrees of freedom. In this case, the ratio was very favorable ($\chi^2/df = 2.07$).

Other fit indices indicate that the data were consistent with the proposed model. The model had a RMSEA of .07, which is slightly above Hu and Bentler’s (1999) recommended value of .06. The model had a CFI of .90 and a TLI of .89, also at or very close to the desired level of .90. For ease of presentation, the model with the standardized path coefficients is presented in Figure 2 rather than the full measurement model. As shown in this figure, all hypothesized paths were significant except the path from EPM-based feedback characteristics to interpersonal justice (H1).

It should also be noted that the combination of EPM-based feedback characteristics and EPM purpose accounted for 20% of the variance in interpersonal justice, EPM explanation accounted for 58% of the variance in informational justice, the combination of informational and interpersonal justice accounted for 69% of the variance in trust, and trust accounted for 40% of the variance in job performance and 28% of the variance in job satisfaction. Cohen (1988) mentions that

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Figure 2: Standardized path coefficients for hypothesized model. **$p < .01$, one-tailed test. Note. EPM = electronic performance monitoring.

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3Given that the path between EPM explanation and informational justice was particularly strong in the proposed model, we conducted a principal components analysis which revealed two factors with eigenvalues over one, accounting for 57.49% of the variance. The break in the scree plot was also indicative of a two-factor solution. The first factor explained 41.15% of the variance and the second factor explained 16.34% of the variance. The first factor taps the informational justice measure, and the expected items all have loadings in excess of .5 without indications of cross loading. On the other hand, the second factor taps into EPM explanation, and once again, the expected items all have loadings over .5. In addition, the zero-order correlation between EPM explanation and informational justice was .40. Taken together, these results indicate that the presence of an EPM explanation and informational justice are distinct but closely related constructs.
an *r* of .30 represents a medium effect size and that an *r* of .50 represents a large effect size. Thus, an *R*² of 9% would represent a medium effect, and an *R*² of 25% or higher would represent a large effect. The effect sizes in this study thus range from medium to large.

**Mediating Role of Interpersonal and Informational Justice**

We followed the four steps put forth by Kenny, Kashy, and Bolger (1998) to assess mediation. The first step specifies that the exogenous variable should be related to the outcome variable, and support for this step can be demonstrated by examining the pattern of correlations found in Table 1. In the second step, the exogenous variable should be related to the mediator, which can be assessed by examining the standardized path coefficients found in Figure 2. In the third step, the mediator should be related to the outcome variable, and this can also be demonstrated by reviewing the standardized path coefficients (Figure 2). Finally, in the last step, the association between the exogenous variable and the outcome variable should be reduced when the mediator is included in the model. This condition can be satisfied by calculating the Sobel test. The Sobel test produces a test statistic that is distributed as a *Z*, along with accompanying significance levels.

**TABLE 4**

Partial Mediation Results—Proposed Model

| Step 1: Relationship between EPM-based feedback characteristics and Trust in the manager | *r* = 0.51** |
| Step 2: Relationship between EPM-based feedback characteristics and Interpersonal justice | β = 0.06 |
| Step 3: Relationship between Interpersonal justice and Trust in the manager | *r* = 0.43** |
| Step 4: Sobel test | *Z* = 2.98** |
| Step 1: Relationship between EPM purpose and Trust in the manager | *r* = 0.43** |
| Step 2: Relationship between EPM purpose and Interpersonal justice | β = 0.41** |
| Step 3: Relationship between Interpersonal justice and Trust in the manager | β = 0.30** |
| Step 4: Sobel test | *Z* = 4.90** |

**Note.** EPM = electronic performance monitoring.

**p** < .01.

We tested two alternative models. First, we examined whether EPM antecedent variables (feedback characteristics, purpose, and explanation) were directly related to trust in the manager. The

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4The Sobel test multiplies the unstandardized path coefficients and then divides by the standard error (Baron & Kenny, 1986). The Sobel test produces a test statistic that is distributed as a *Z*, along with accompanying significance levels.
only significant path was from EPM-based feedback characteristics to trust in the manager (.19) and the fit of the model was identical (CFI = .90, TLI = .89, RMSEA = .06).

Given that EPM-based feedback characteristics were not associated with interpersonal justice, we investigated whether EPM-based feedback characteristics were related to informational justice because our feedback characteristics measure focused on how information was delivered, which can also be interpreted as informational justice. Thus, we ran the structural model, except EPM-based feedback characteristics loaded onto informational justice rather than interpersonal justice, $\chi^2(480, \ N = 257) = 922.78, p < .01$. Two of the fit indices improved (CFI = .91, TLI = .90); RMSEA remained the same (.06). The $p$ value for test of close fit was .00, suggesting a lack of close fit, but the lower bound of the 90% confidence interval was .05, indicating that neither close fit nor not-close fit are ruled out (MacCallum, Browne, & Sugawara, 1996). Moreover, the expected value of the cross-validation index was lower in the alternative model (4.24) compared to the proposed model (4.51), thus favoring this alternative model. As shown in Figure 3, all hypothesized paths were significant in the alternative model. EPM-based feedback characteristics were significantly associated with informational justice (.51), and even though the presence of explanation was still significantly related to informational justice, its standardized coefficient was smaller (.37 instead of .76). In addition, we found that informational justice partially mediated the relationship between EPM-based feedback characteristics and trust in the manager (see Table 5).

**DISCUSSION**

The use of electronic technologies to monitor employees’ activities is increasing (American Management Association/ePolicy Institute, 2005), and this practice is not likely to be discontinued soon. As such, a key question becomes whether EPM-based feedback characteristics to trust in the manager (.19) and the fit of the model was identical (CFI = .90, TLI = .89, RMSEA = .06).

Given that EPM-based feedback characteristics were not associated with interpersonal justice, we investigated whether EPM-based feedback characteristics were related to informational justice because our feedback characteristics measure focused on how information was delivered, which can also be interpreted as informational justice. Thus, we ran the structural model, except EPM-based feedback characteristics loaded onto informational justice rather than interpersonal justice, $\chi^2(480, \ N = 257) = 922.78, p < .01$. Two of the fit indices improved (CFI = .91, TLI = .90); RMSEA remained the same (.06). The $p$ value for test of close fit was .00, suggesting a lack of close fit, but the lower bound of the 90% confidence interval was .05, indicating that neither close fit nor not-close fit are ruled out (MacCallum, Browne, & Sugawara, 1996). Moreover, the expected value of the cross-validation index was lower in the alternative model (4.24) compared to the proposed model (4.51), thus favoring this alternative model. As shown in Figure 3, all hypothesized paths were significant in the alternative model. EPM-based feedback characteristics were significantly associated with informational justice (.51), and even though the presence of explanation was still significantly related to informational justice, its standardized coefficient was smaller (.37 instead of .76). In addition, we found that informational justice partially mediated the relationship between EPM-based feedback characteristics and trust in the manager (see Table 5).
it can be used in a fair manner. In our social exchange model of EPM, we investigated practices related to how managers use the EPM system that may signal to employees whether they are being treated fairly. In exchange for being treated fairly while being monitored, employees may reciprocate with increased trust, performance, and job satisfaction. Overall, the results were supportive of the proposed model.

Our model demonstrated that EPM purpose, but not EPM-based feedback characteristics, had a significant relationship with interpersonal justice. As expected, employees who perceived managers as using EPM mostly for developmental purposes were more likely to feel that they were being treated in an interpersonally just manner. Consistent with Lind and Tyler’s (1988) group-value model, managers may demonstrate their desire to treat employees with dignity and respect by using EPM to develop and improve employees, and in exchange, employees’ interpersonal justice perceptions are enhanced. On the other hand, an EPM explanation was strongly related to informational justice perceptions. It makes sense that an EPM explanation would be related to workers’ perceptions about the fairness of the information they are given. This result demonstrates that employees want an explanation for monitoring procedures.

Unexpectedly, the extent to which EPM-based feedback characteristics were perceived as positive was not related to perceptions of interpersonal justice. Feedback is often considered the biggest advantage of EPM (Aiello & Shao, 1993), but in this case, the characteristics of the manager’s EPM-based feedback were not related to whether people felt as though they were being treated in an interpersonally just manner. Consistent with Alder and Ambrose’s (2005b) assertion that constructive EPM-based feedback should be associated with higher levels of interpersonal justice. We did, however, test an alternative model and found that EPM-based feedback characteristics were associated with informational justice. In retrospect, this makes sense because the focus of our EPM-based feedback characteristics measure was on how the information was delivered, arguably an important part of informational justice. Thus, it seems that employees who perceive managers as using EPM to communicate high quality performance feedback are more likely to think the information is conveyed in fair manner.

Furthermore, both interpersonal and informational justice were related to trust in the manager. The results of the mediation analyses indicate that interpersonal justice partially mediated the relationship between employees’ perceptions of the manager’s purpose for monitoring and trust in the manager. In addition, we found that the extent to which an explanation for EPM was perceived to be present and the quality of manager’s EPM-related feedback were related to trust in the manager through informational justice in the proposed and alternative model, respectively. Thus, interpersonal and informational justice appear to be key mediating mechanisms through which EPM practices can influence trust in the manager.

### TABLE 5
Partial Mediation Results—Alternative Model

| Step 1: Relationship between EPM-based feedback characteristics and Trust in the manager | $r = 0.51^{**}$ |
| Step 2: Relationship between EPM-based feedback characteristics and Informational justice | $\beta = 0.51^{**}$ |
| Step 3: Relationship between Informational justice and Trust in the manager | $\beta = 0.60^{**}$ |
| Step 4: Sobel test | $Z = 5.43^{**}$ |

*Note.* EPM = electronic performance monitoring.

**$p < .01$.**
This study not only examined employee perceptions but also examined job performance, using both a subjective and objective measure of job performance. As expected, trust in the manager was significantly related to job performance, which is aligned with Dirks and Ferrin’s (2002) meta-analysis on trust in the leader. Our findings also expand upon Dirks and Ferrin’s results by demonstrating that a high degree of trust in the manager is related to performance, even when controlling for the employee’s tenure. The strength of this relationship is rather small, but this is expected given that performance outcomes are typically a function of many contextual factors (Katzell, Thompson, & Guzzo, 1992). Nonetheless, these findings support social exchange theory such that when a leader demonstrates care and concern for the employee, the employee may respond by engaging in desired behaviors (e.g., working harder), which ultimately improves their performance. Likewise, monitored employees with higher levels of trust in their manager tend to be more satisfied with their jobs overall perhaps because they trust their leader to make good decisions about outcomes that will affect them (Dirks & Ferrin, 2002).

Possible Limitations and Implications

Overall, this study makes several important contributions, but some limitations do exist. First, we relied on self-report data for most of the variables in the model, which increases concerns for common method bias. However, a major strength of the study was that the performance data were not self-report. We collected not only an objective measure of performance (participation rate) but also a subjective measure of job performance (manager rating), which is an improvement over the majority of past studies. Second, conclusions cannot be drawn about causality among the variables because the data were gathered at one point in time. As such, reverse causality cannot be ruled out. Third, the results might not apply to work environments that use electronic monitoring devices to capture a broad array of work and non-work-related information (e.g., video cameras). For instance, McNall and Roch (2007) found that electronic monitoring type (i.e., computer monitoring, telephone monitoring, surveillance) had differential effects on perceptions of procedural and interpersonal justice as well as privacy. Consequently, this study may generalize best to work settings with telephone monitoring systems that emphasize work quality over work quantity. In this particular work environment, managers encouraged employees to foster relationships with the alumni, and thereby improve customer service. A large number of organizations have adopted organizational development programs such as Total Quality Management, which emphasize quality (George & Weimerskirch, 1998), and thus this work environment may not be unlike other work environments that emphasize quality over quantity. Future research is needed to determine the generalizability of our findings, but this is the case for all research, in the field or the lab (Dipboye, 1990).

Despite these potential limitations, the results of this study have important implications for both researchers and practitioners. Most important, this study offers a comprehensive social exchange model of employee reactions to electronic monitoring. This study found evidence for three different constructs (EPM-based feedback characteristics, EPM purpose, and EPM explanation), each associated with different types of justice, interpersonal and informational justice, respectively. Thus, our model contributes to the organizational justice literature by demonstrating that interpersonal and informational justice have different correlates, supporting Colquitt’s (2001) assertions that organizational justice is best conceptualized as multidimensional. Researchers
should continue to use different measures of the four justice constructs to uncover important differences that might otherwise go unnoticed.

Furthermore, our model also shows how EPM practices not only have consequences for interpersonal and informational justice but also for trust. In particular, this study highlights the relationship between justice and trust in the manager and provides evidence that fair treatment by a supervisor may invoke more trusting relationships. Of interest, the relationship between informational justice and trust in the manager was stronger than the relationship between interpersonal justice and trust in the manager in both the proposed and alternative models. Informational justice is the least studied type of organizational justice, and these results suggest that it may be worthy of further study.

These findings also have practical implications for organizations thinking about implementing an EPM system to improve quality. It seems that an EPM system may not necessarily create an “electronic sweatshop” filled with unhappy workers. Rather, organizations and in particular, managers, can take steps to create fair monitoring systems. First, managers should use monitoring mostly to help employees achieve their full potential rather than catching them in the act of doing something wrong. Organizations may need to train managers on how to use monitoring devices for development purposes. In addition, managers should be held accountable if they use the monitoring system for inappropriate reasons. Second, managers need to communicate an explanation for monitoring early (e.g., new employee orientation). Finally, managers should openly communicate performance feedback from monitoring systems to employees.

This study opens avenues for future work. It would be interesting to explore whether interpersonal and informational justice could be both a cause and consequence of, for example, trust in the manager. Future research is needed to pinpoint the direction of causality. A longitudinal design would be a rich source of information for understanding the effects of monitoring on employees, and to our knowledge, this type of design has not been used.

In conclusion, this study provides support for Alder and Tompkins’ contention (1997) that contingencies exist under which EPM may be beneficial to both employers and employees. The primary contribution of this research was to test a social exchange model of employee reactions to EPM systems. This study, consistent with Eisenman (1986), underscores the critical role that managers play in buffering the potentially negative effects of monitoring on employees. When managers use EPM for mostly developmental purposes, offer an explanation for monitoring, and communicate high quality feedback based on monitoring data, employees’ perceptions of interpersonal and informational justice may increase, and many important outcomes are likely to ensue.

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REFERENCES


APPENDIX

At these call centers, managers have discretion about how often they listen in on phone calls. Managers reported that each employee could expect to have his or her calls listened in on about twice per week, but the managers would often listen in more frequently for underperforming employees who may not be following directions on how to obtain pledges from alumni. Approximately twice per week, managers completed formal evaluation forms for each employee after using the monitoring system to randomly listen in on a call. Afterward, the manager would meet with the employee to review the form and discuss what went well on the call and what areas for improvement, such as what a caller could do differently to secure a pledge.

The monitoring software would capture a variety of statistical information about each employee (e.g., average pledge amount in dollars, number of credit card transactions). Managers were interviewed to determine what statistical information was considered most essential for job performance. The managers unanimously agreed that average participation rate was the most important performance dimension, so this was the sole objective performance measure in this study.

We asked managers to rate each caller’s overall job performance using a scale that coincided with the scale used on the call centers’ formal evaluation sheet. One call center was operated by the university and used an evaluation form with the following performance dimensions: (a) build rapport, (b) make the case, (c) ask, (d) confirm, (e) close, and (f) objection countering. These dimensions were rated on the following scale on the formal evaluation sheet: 0 (did not hear [the behavior in question]) to 3 (excellent). As such, the scale on our subjective job performance measure was 1 (poor; on average, this person typically gets 0s on phone evaluations) to 3 (above average; on average, this person typically gets 3s on phone evaluations). The remaining seven call centers were operated by an independent contractor and used an evaluation form with the following per-
formance dimensions: (a) introduction (building rapport, script information, acknowledging comments), (b) message (script use, correct objections, listening, negotiating), (c) ask (correct ask amounts), and (d) close (commitment, credit card, matching gift, e-mail/address, upgrade). These dimensions were rated on the following scale on the formal evaluation sheet: 1 (unacceptable) to 5 (excellent). Consequently, the scale for our job performance measure was 1 (poor; on average, this person typically gets 1s on phone evaluations) to 5 (outstanding; on average, this person typically gets 5s on phone evaluations). In other words, our subjective performance measure was an aggregate of the manager’s perceptions of employees’ performance across a number of evaluation forms.