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Electronic workplace monitoring: what employees think

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Abstract

It is estimated that at least 26 million Americans are electronically monitored in the workplace. Management insists that they have the right to monitor workers during time paid for by the company. Labor leaders and civil rights advocates argue that the practice violates the dignity and right to privacy of employees. In this study, 823 employees were surveyed. A great majority of the respondents felt that electronic monitoring might cause undesirable tension between managers and workers. Supervisors favor electronic monitoring more than non-supervisors do whereas non-supervisors believe to a greater extent than supervisors that electronic monitoring has a negative impact in the workplace. Supervisors and non-supervisors also differ in their beliefs about the ability of monitoring to reduce theft and create tension in the workplace, and the need to alert employees when monitoring takes place. Employees of organizations that practice monitoring object to it less than employees of organizations without electronic monitoring. Women, more than men, believe that electronic monitoring reduces theft and embezzlement. © 1999 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Modern technology enables employers to effectively monitor the workplace activities of their employees. In addition to video cameras and telephone tapping devices, computers are now used to track transaction entries, intercept electronic mail (E-mail), and record keystrokes and customer service activities. Nussbaum [14] estimates that 26 million American workers are subject to some form of electronic surveillance. Of these, four to six million are being monitored with the use of computers [15].

In recent years we have seen a dramatic increase in the use of computers in the workplace, especially in the service sector. Coincidentally there has been just as dramatic an increase in computerized performance monitoring. Airline reservation clerks are monitored

with computers to ensure prompt and polite response to customers. Employee keystrokes are counted and timed to determine the efficiency of data entry workers. Supervisors log on to subordinates' computers from their own offices without warning and follow the work activities of employees. A small hidden computer can be used to record the number and length of stops that a truck driver makes on his way to and from a destination [13]. If these illustrations are truly indicative of what is generally happening in American business today, it would seem that computers have taken on a new role, one with significant controversy.

Monitoring employees by checking their electronic mail messages has been a particularly sensitive issue. Employees have sued employers, claiming that supervisors have invaded their privacy by monitoring their E-mail. To date, the courts have supported employers' rights under statute to monitor private electronic mail systems. Since employees are paid for their work, it is seen as legitimate for an employer to have the right to monitor the activities of an employee during company

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time. Even artificial intelligence technology has been harnessed to this end. Citicorp uses expert systems that analyze data to see if any unusual activity has occurred which may indicate breach of security. One program they have implemented monitors employees responsible for processing vendor invoices. To create a processing pattern, the program is fed information on times of the week or month during which the employees are supposed to process the invoices. The actual data are then compared with these patterns and with other historical data. Discrepancies trigger further management investigation, as they may be an indication of mishandling of funds. Citicorp views the warning not so much as a legal shield, but more as a deterrent [10].

Employee reaction to computer-aided monitoring suggests a potential for negative employee perceptions of the monitoring activities and use of the data by management [1, 8, 11]. For example, the titles of many articles published on electronic employee monitoring contain negative terms such as 'Big Brother' and 'Electronic Sweatshops'. Also, the American Civil Liberties Union and Computer Professionals for Social Responsibility, as well as many individual professionals, oppose the use of computers and other electronic surveillance techniques for employee monitoring. Their main concern is that these surveillance activities are intrusive and violate a person's right to privacy. Others suggest that electronic monitoring sends a message to employees that they are not to be trusted to do their job. One study concludes: "Electronic monitoring may create adverse working conditions such as paced work, lack of involvement, reduced task variety and clarity, reduced peer social support, reduced supervisory support, fear of job loss, routinized work activity, and lack of control over tasks" [13]. On the other hand, management claims that electronic monitoring ensures proper use of time, timely and courteous response to customers, and prevention of criminal activity. They argue that electronic surveillance and monitoring leads to increased employee productivity.

There is a distinctive difference between 'over the shoulder' or 'walk around' monitoring and electronic monitoring. In the former, employees being monitored are aware of the supervisor's activity from the beginning to end. In the latter, they are aware of the monitoring only if a deliberate signal is given. While the former is visible or audible, the latter is not. Employers regard the unawareness of the employees as an advantage of electronic monitoring. While we recognize that there is a difference between the use of video cameras and eavesdropping on one hand and computer based monitoring on the other, in this study we look at electronic monitoring as a whole because any type of electronic monitoring may be used without the worker's awareness.

2. A look at electronic monitoring

While there exists a large body of research on employee monitoring, the research is fairly recent. In one survey, 700 electronically monitored office workers were questioned, and the findings generally corroborate opponents' claims of negative impact on monitored employees [13, 15]. Employees who were being monitored and who participated in the survey complained that the implementation of electronic monitoring in their workplace caused paced work, lack of involvement, reduced task variety and clarity, reduced peer social support, reduced supervisory support, fear of job loss, routinized work activity, and lack of control over tasks. In another study of 50 electronically monitored clerical workers and 94 non-monitored clerical workers Irving et al. [9] found that workers subject to electronic monitoring said the quality of work was underemphasized at the expense of quantity, the stress was too high, and the morale was low. Also, they reported that monitored workers experienced decreased job satisfaction and a decline in the quality of relationships with peers, supervisors, and senior management. In another comparative study of 461 electronically monitored workers and 283 non-monitored workers in the telecommunications industry, monitored workers reported higher levels of workload and work pressure [16]. Grant et al. [6] found that monitored employees felt quality was foregone for quantity. More than 75% of the monitored workers said production quantity was the most important factor in their performance ratings, while more than 75% of the non-monitored workers (performing the same job as monitored workers) reported that work quality was the most important factor.

A study by Grant and Higgins [5] reported that supervised employees were ambivalent about the practice of electronic monitoring. More than 40% of the 1498 respondents agreed with the statement "Management has the right to decide monitor design and use". More than half believed that employees should have the right to resist electronic monitoring, however the authors found that the practice was more acceptable to the respondents when the tasks monitored were quantifiable (e.g., pieces produced per given time, the length of breaks, etc.). The more frequently the system was used, the more acceptable monitoring was. Also, it was found that employees were more accepting of monitoring systems that gathered information on group performance than on individual performance, and even more accepting of systems that tracked performance of both groups and individuals. The researchers also found that employee acceptance was inversely correlated to the number of recipients of the collected data; they preferred the data be furnished only to them and to their immediate supervisors.

Some studies have revealed that electronic monitoring may not always be perceived negatively by employees. Chalykoff and Kochan [3] found that job satisfaction increased and intent to leave decreased when employees who were subjected to telephone monitoring perceived such monitoring as justified. They concluded that for some employees the negative effects of monitoring are inherent, but for other its negative impact can be mitigated by attention to feedback and performance appraisal processes. Griffith [7] conducted a lab experiment with forty-two women hired to perform a simple data entry task. The women were divided to work under three different conditions: (1) alone; (2) in the physical presence of the supervisor who monitored the work; or (3) computer-monitored. Subjects who worked alone or under computer monitoring demonstrated a steady performance pattern. Those monitored with the physical presence of a supervisor performed better than in the alone or computer-monitored conditions. The study found that there were no differences in job satisfaction among the three groups. Griffith ([7], p. 549) concludes that Big Brother “is not lurking inside every computer-monitored system”. In another experiment Nebeker and Tatum [12] found that computer monitoring and feedback led to increased output of keystrokes and there was little effect on work quality, satisfaction, and stress.

3. Research objectives

To a great extent, research on employee monitoring has focused on questions of whether or not the negative effects (stress, low job satisfaction, etc.) and positive effects (greater productivity) are related to the existence of electronic monitoring. This study seeks to discover (1) if there is a relationship between employee acceptance of the practice of electronic monitoring and employee belief on the impact on productivity, and (2) if this relationship is impacted by supervisory status and individual characteristics of sex and the prior existence of electronic monitoring in the workplace. To test these relationships, three propositions are suggested.

Proposition 1. Our first conjecture is that there is a relationship between employee acceptance of electronic monitoring and the employee perception of its impact on productivity. Hence, our first proposition is:

Resistance to electronic monitoring is positively associated with the perception that it is counterproductive.

Proposition 2. By and large, management insists on the right to implement electronic monitoring, and many actually use it. Supervisors are management’s agents vis-a-vis the employees whose work they monitor. Therefore, it is conjectured that supervisory

employees would support the practice more than non-supervisors would. Thus, our second proposition is:

Supervisors accept electronic monitoring significantly more than non-supervisors do.

Proposition 3. To further understand the role of organizational and personal characteristics, data will be analyzed to examine relationships between the following factors: employee gender, the existence or non-existence of electronic monitoring in the organization, and employee acceptance of electronic monitoring. We will then test the relationships between these characteristics and the employees’ perception of two types of benefits of electronic monitoring: prevention of crime and increasing productivity. Thus, we formulate the third hypothesis as a sweeping one, although we analyze the data for each characteristic separately:

Individual and organizational characteristics have an impact on the relationship between acceptance of electronic monitoring and on perceptions of electronic monitoring as contributing to increased productivity and crime prevention.

4. Research methodology

4.1. Data collection instrument

The primary research activity was data collection through the use of a survey instrument (questionnaire). Prior surveys have relied upon independently developed questionnaires to collect data rather than previously validated instruments. One reason for this may be that most research projects focused on different and unique issues. Therefore, in the absence of an appropriate instrument, we developed and tested our own questionnaire. Question statements were developed based on a careful review of similar instruments and were modified as a result of comments and feedback from a test sample. The modified questionnaire was then pre-tested for validity and for internal consistency.

The questionnaire contained eight statements. Participants were asked to consider each statement and indicate the degree to which they agreed or disagreed with the statement on a seven-point Likert scale with a response of 1 for ‘Strongly Disagree’ and 7 for ‘Strongly Agree’. Likert-type scales were used in all of the previous surveys on electronic monitoring. The questionnaire statements are presented in Fig. 1.

Statement 1 measures the participant’s attitude about the right of management to implement electronic monitoring. Statement 7 measures respondents’ attitude regarding the demand by labor unions, advocacy groups, and the supporters of bills in the 102nd and 103rd Congress to give workers an audible or visible signal whenever electronic monitoring starts and ends.

1. Since management pays the employees for their work, it is legitimate for management to monitor their activities in any way management wishes while they are at work
2. Even though employees are paid for their work, they are entitled to a certain degree of privacy, and should not be monitored by computers and other electronic devices.
3. Monitoring employees through computers and other electronic devices may create undesirable tension between managers and their subordinates.
4. Monitoring workers through computers and other electronic devices may effectively improve the workers' productivity.
5. Monitoring employees through computers and other electronic devices may have a negative effect on employee morale, and therefore reduce productivity.
6. Electronically monitoring employees may significantly reduce employee theft and embezzlement.
7. If electronic monitoring is used on a non-continuous basis, the employee has to be warned (by a flashing light or some audible signal) that the monitoring begins.
8. If electronic monitoring is used, managers, too, should be subject to such monitoring.

Fig. 1. Survey statements.

Statements 2, 3 and 5 have been used in previous surveys to measure workers' attitudes about the negative effects of electronic monitoring: violation of privacy, tension between supervisors and subordinates, and lowered morale. Statement 4 addresses the concern that monitoring has an impact on worker productivity. Statement 6 addresses an issue that has been often raised by employees but has received no attention in

previous electronic monitoring studies. The statement measures the respondents' attitudes about the justification of electronic monitoring for security and crime prevention. Even if a respondent disagrees with the use of electronic monitoring to improve productivity, they may agree with electronic monitoring for security and crime prevention. Statement 8 emanates from equity theory.

<u>Industry</u>	<u>Percentage</u>
Auto industry	22.13
Non-auto manufacturing	3.54
Insurance, bank, or other financial institution	13.08
Professional services (accounting, law, etc.)	5.75
Health Services	9.29
Retail	7.70
Engineering, electronics, or aerospace	3.06
Software development	1.83
Government	3.06
Education	7.58
Other*	22.98
<u>Position</u>	
Supervisor	43.70
Non-supervisor	56.30
<u>Gender</u>	
Male	57.56
Female	42.44
<u>Age Group</u>	
20-29	67.65
30-39	26.07
40-49	6.28

Fig. 2. Demographics of surveyed employees.

4.2. Pre-test

A two part draft questionnaire was developed. The first part of the questionnaire collects demographic data. The second part consists of eight statements with 7-point Likert scales. Fifty-five full-time employees who were also part-time MBA students were used to test the initial questionnaire. All agreed to complete the questionnaire and to provide comments on the clarity of statements. Based on this input, minor changes and adjustments were made to the questionnaire to improve clarity. The pre-test participants were not included in the major study.

4.3. Data collection

A survey of people holding full-time jobs was administered. All participants worked full-time and were enrolled in a part-time MBA program at a Midwestern university at the time of the survey. The participants were asked to fill out the survey questionnaire at the beginning of class. It was made clear to them that the questionnaires had nothing to do with their classes, and that they could leave the response anonymous. Of the 878 potential respondents who were approached in classrooms, 825 agreed for a response rate of 93.7%. Two respondents were unemployed, and their responses were deleted from the study. The other 823 respondents held full-time positions.

For the first part of the survey the participants indicated their age, gender, and occupation. The data they provided about their organizations included industry, the number of employees, the number of employees they supervised, and whether electronic monitoring devices were used in their place of work. For this study we consider those who supervise any number of employees as 'supervisors', and those who do not supervise anyone as 'non-supervisors'. Participants who indicated that an electronic device was used in their workplace were asked to describe what was used. For part two of the questionnaire, the participants indicated their degree of agreement or disagreement with each statement by circling an appropriate number on the scale.

5. Analysis and interpretation

5.1. Participants' demographics

Fig. 2 provides a demographic profile of the participants by industry, supervisor/non-supervisor status, gender, and age group. Participants were relatively evenly split between supervisors and non-supervisors and between males and females. The demographic profile, of course, differs from that of the American workforce generally (example, 90% of the participants were less than 40 years old). This fact imposes an unavoidable limitation on the generalisability of our results, though it does not reduce their exploratory value. It may also be argued that since all the participants in the study were enrolled as part-time students in an MBA program they may relate more with management or supervisors' views of electronic monitoring. If this were the case then it may be expected that the results of the survey would indicate greater consensus among supervisors and non-supervisors than exists in the general work force. The fact that there were significant differences in the responses of supervisors and non-supervisors in the study suggests that there may be strong differences in opinions between supervisors and non-supervisors that generalize to the work force. Further research is needed to substantiate the external validity of the results of this study.

5.2. Monitoring methods

Four hundred forty six participants (54%) indicated that some electronic device was used in their workplace to monitor workers. Fig. 3 provides a summary of the devices and methods used.

Generally, the respondents agreed with the first statement. They agreed that management has the right to monitor in any way it wishes because it pays for on the job time. This is consistent with the findings of Grant and Higgins [5], where 43.3% of their respondents accepted this claim.

<u>Methods Used</u>	<u>Response Rate</u>
Video Cameras	28.25%
Computer Sampling	19.73%
E-Mail Interception	13.45%
Access Codes	11.66%
Expert Systems	10.54%
Transaction Audits	9.43%
Phone Taps	6.50%
Hidden Microphones	.45%

Fig. 3. Computer assisted electronic monitoring of respondents.

Statement	Average Response		
	1 = strongly agree 7 = strongly disagree		
	S	NS	ALL
1. OK for management to monitor while	3.47	3.25	3.3
2. Workers are entitled to privacy and should not be monitored	4.74	5.05	4.9
3. Monitoring may create tension between managers and subordinates	5.44	5.67	5.6
4. Monitoring may improve worker productivity	3.97	3.82	3.9
5. Monitoring may have a negative effect on morale and productivity	4.78	5.05	4.9
6. Monitoring significantly reduces theft and embezzlement	5.13	4.89	5.0
7. Signals should be given when monitoring begins	3.87	4.14	4.0
8. Managers as well should be subject to monitoring	5.81	5.95	5.9

S = supervisors, NS = non-supervisors ALL= supervisors and non-supervisors

Fig. 4. Average survey question responses.

5.3. Attitudes of the sample population

The averaged responses to the eight statements regarding respondent attitudes about employee monitoring are shown in Fig. 4.

5.4. Acceptance of electronic monitoring and perception of productivity

Proposition 1 suggests that there is a correlation between negative opinions on electronic monitoring and the belief that electronic monitoring has a negative effect on productivity. To test the proposition, we calculated a Pearson correlation coefficients matrix of responses to Statements 1 and 2 with responses to Statements 3 through 5. The first group of statements refers to the acceptance of using electronic monitoring in the workplace. The next three statements solicited the participants' opinion regarding the impact of electronic monitoring on supervisor–employee tension, employee productivity, and employee morale. Statement 4 was worded in a reverse manner, so we expected a negative correlation between its responses and the responses to the first two statements. Table 1 presents the correlation matrix and the corresponding *p*-value.

Evidently, there is a notable positive relationship between the response to Statement 1 concerning man-

agement's right to monitor employees during paid time and statement 4, the belief that such monitoring can improve the employees' productivity ($R = 0.321$). Considering the responses of the supervisors and non-supervisors, not surprisingly, the correlation coefficient in the supervisors group was higher ($R = 0.343$) than in the non-supervisors group ($R = 0.304$). Apparently, supervisors tend to tie the acceptance of electronic monitoring to improvement of productivity more than the non-supervisors do.

Statement 2 argues that employees are entitled to privacy and should not be electronically monitored. Statement 3 argues that electronic monitoring may create undesirable tension between managers and their subordinates. The strong correlation between the responses to the statements ($R = 0.376$) indicates that many employees reject the practice because of the sour atmosphere it may create in the workplace. As expected, non-supervisors tie their objection to the practice more strongly ($R = 0.386$) than do supervisors ($R = 0.361$).

There is a notable negative correlation coefficient between agreement with Statement 2 and agreement with statement 4 ($R = -0.348$). This is not surprising in light of Statement 2 being the opposite of Statement 1. Here, too, the supervisors tie management's right to monitor with productivity improvement ($R = -0.373$) more than do the non-supervisors ($R = -0.330$).

Statement 5 asserts that electronic monitoring may negatively affect employee morale and therefore reduce productivity. The strong relationship between agreement with this statement and Statement 2 ($R = 0.393$) indicates that objection to the practice on privacy grounds is related to the expected negative result of low morale and reduced productivity. Supervisors ($R = 0.387$) and non-supervisors ($R = 0.391$) do not differ much in this case.

In summary the significance and the direction of the relationships between statements 1 and 4, 2 and 3, 2 and 4 and 2 and 5 support Proposition 1: *Resistance to*

Table 1
Correlation coefficients

Between statement... and statement...	Coefficient	<i>p</i> -value
1 and 3	-0.259	0.0001
1 and 4	0.321	0.0001
1 and 5	-0.295	0.0001
2 and 3	0.376	0.0001
2 and 4	-0.348	0.0001
2 and 5	0.393	0.0001

Table 2
ANOVA of supervisor/non-Supervisor status and acceptance of electronic monitoring

	DF	Sum of squares	Mean square	F-test	p-value
Statement 1:					
Between groups	1	10.654	10.654	3.347	0.0677
Within groups	817	2437.248		2.969	
Total	818	2438.695			
Statement 2:					
Within groups	817	1880.601	2.302	8.219	0.0043
Between groups	1	18.918	18.918		
Total	818	1899.519			

Table 3
ANOVA of supervisor/non-supervisor status and beliefs about work atmosphere and productivity

	DF	Sum of squares	Mean square	F-test	p-value
Statement 3:					
Between groups	1	10.971	10.971	7.116	0.0078
Within groups	817	1259.601	1.542		
Total	818	1270.571			
Statement 4:					
Between groups	1	5.521	5.521	2.248	0.1342
Within groups	817	2006.588	2.456		
Total	818	2012.110			
Statement 5:					
Between groups	1	13.84	13.84	6.948	0.0086
Within groups	817	1627.466	1.992		
Total	818	1641.306			

electronic monitoring is positively associated with the perception that it is counterproductive.

5.5. Supervisors vs. non-supervisors

The first two statements address the acceptance of electronic means to monitor employees. Proposition 2 was that supervisors accept the practice more than subordinates do. To find if the proposition is valid, we conducted an ANOVA where the independent variable was the status of the respondent, supervisor or non-supervisor, and the dependent variables were the responses to the first two statements. Table 2 reflects the results¹.

Apparently, supervisors and non-supervisors differ in their response to Statement 2 (employees are entitled to privacy and thus should not be electronically moni-

tored, $p = 0.0043$). As non-supervisors are the ones who are subject to electronic monitoring, they agree with the statement more firmly than supervisors do². However, the groups did not differ with their response to Statement 1 (since management pays for their time, it is legitimate to monitor the employees during work time, $p = 0.0677$).

Statements 3 through 5 address the effects of electronic monitoring on the work atmosphere and productivity. Table 3 presents the ANOVA for the two groups, supervisors and non-supervisors. Supervisors did not agree as firmly with Statement 3 (electronic monitoring may create tension between supervisors and subordinates, $p = 0.0078$) as the non-supervisors. There was no significant difference between the response of the groups to Statement 4 (electronic monitoring may improve productivity, $p = 0.1342$), but there was a significant difference in their response to Statement 5 ($p = 0.0086$). Note that Statement 5 is a reversed version of Statement 4 but also provides that the adverse impact on productivity may be the result of low morale. Supervisors were not as staunch as non-supervisors about the negative effect of electronic

¹ The degrees of freedom in the ANOVA tables may total less than $n = 823$ due to missing data.

² See Fig. 4 for a comparison of supervisor and non-supervisor response means to questionnaire.

Table 4
ANOVA of supervisor/non-supervisor status and belief about monitoring for security purposes

	DF	Sum of squares	Mean square	F-test	p-value
Statement 6:					
Between groups	1	10.967	10.967	5.2	0.0228
Within groups	817	1723.028	2.109		
Total	818	1733.995			

monitoring on productivity due to low morale (Statement 5).

Often, electronic monitoring is implemented for security purposes. This is usually the purpose of the ubiquitous video camera, but also of more sophisticated means such as expert systems that detect transactions out of the ordinary to detect fraud. Statement 6 solicited the participants' belief that electronic monitoring can reduce theft and embezzlement. While the overall average response was quite agreeable, 5.0, there was a difference along supervisor/non-supervisor lines, as Table 4 shows. Supervisors expressed a stronger belief in the ability of electronic monitoring to reduce employee theft and embezzlement ($p = 0.0228$).

In public debates, even among proponents of electronic monitoring in the workplace there are many who demand that the employees be warned audibly or visually before the monitoring starts. Management argues that warning defeats the very purpose of monitoring; if the employees are warned, they may step up their performance just for the period the devices are on. As expected, supervisors side with this argument.

Table 5 shows the ANOVA of the groups with respect to Statement 7 (if monitoring is non-continuous, early warning should be given). There was a significant difference between the groups regarding warning before monitoring starts. Non-supervisors justified an early warning more than the supervisors did.

Based on previous studies [5,16] which illuminate the adverse effect of electronic monitoring on employees, it is assumed that people prefer not to be monitored to being monitored. Also, it was expected that supervisors would tend to disagree with electronic

Table 5
ANOVA of supervisor/non-supervisor status and attitude toward warning

	DF	Sum of squares	Mean square	F-test	p-value
Statement 8:					
Between groups	1	14.319	14.319	4.953	0.0263
Within group	816	2359.192	2.891		
Total	817	2373.511			

Table 6
ANOVA of supervisor/non-supervisor status and attitude toward monitoring of managers

	DF	Sum of squares	Mean square	F-test	p-value
Statement 10:					
Between groups	1	3.651	3.651	2.445	0.1183
Within groups	817	1220.107	1.493		
Total	818	1223.758			

monitoring of managers, while based on equity theory [2] supervised employees would support monitoring of their superiors so that the practice be equitable and universal. The participants' reaction was somewhat surprising: supervisors supported slightly more the subjecting of managers to electronic monitoring than the non-supervisors, but the large p -value in Table 6 ($p = 0.1183$) indicates that the two groups do not differ significantly in their acceptance of the suggestion.

5.6. Analysis by gender

As is evident from Table 7, men and women differ significantly only with respect to Statement 6 ($p = 0.0473$). Women believe more than men that electronic monitoring reduces employee theft and embezzlement. Men's average response was 4.871 while women's average response was 5.080. Responses to other statements did not differ along gender lines.

5.7. Analysis by existence of electronic monitoring

Grant and Higgins [5] found that the more frequently electronic monitoring was used, the more acceptable it was. This is not exactly the same as *existence* of electronic monitoring versus non-existence of electronic monitoring but may indicate that the previous existence of electronic monitoring in a workplace has some impact on the attitudes and beliefs of the employees regarding the practice. ANOVAs were calculated for the factor 'Existence of Monitoring' with two treatments: exist and does not exist. The ANOVAs with $p = 0.05$ are presented in Table 8.

Employees at workplaces where electronic monitoring does not exist agreed with Statement 2 (objection to the practice) more than employees from places with electronic monitoring. The mean responses are 5.031 and 4.730, respectively. This finding agrees with what Grant and Higgins [5] found in their study: resistance to electronic monitoring decreases over time. In this light, the response to Statement 1 (management should have the right to use electronic monitoring) is not surprising. Employees working in organizations with the

practice agree more than employees from organizations without the practice. The response means are 4.915 and 4.558, respectively. It also seems that people who are already subject to electronic monitoring are less concerned that electronic monitoring will cause undesirable tension between managers and their employees. The first group's response mean is 5.395, while the second group's mean is 5.667. The greater resistance to electronic monitoring among employees who have not been subjected to it is also evident in the response to Statement 7. The bills in both houses of the two previous U.S. Congresses required employers to give workers a visual or audible signal before monitoring starts. It is likely that similar bills will be presented before Congress in the future. Employees at organizations without electronic monitoring agreed with this requirement significantly more than those who are monitored. The response means are 4.132 and 3.776, respectively.

The interaction effects of the ANOVAS yielded no surprising results. That is, no ANOVA showed a significant interaction effect of main effects that were not significant.

6. Implications

Previous researchers focused on the impact of electronic monitoring on productivity, morale, job satisfaction, stress, and related employee feelings and perceptions. This study focused on: (1) the relationship between employee acceptance of electronic monitoring and perception of productivity, and (2) differences of perceptions along individual and organizational characteristics. While previous studies were performed with workers in specific industries (e.g., insurance workers [6], IRS employees [3], telecommunications operators [16]), this study surveyed workers from a

Table 7
ANOVAs of gender and responses to the statements

Source	DF	Sum of squares	Mean square	F-test	p-value
Statement 1:					
Between groups	1	5.67	5.67	1.79	0.1831
Within groups	782	2476.268	3.167		
Total	783	2481.938			
Statement 2:					
Between groups	1	3.795	3.795	1.671	0.1965
Within groups	782	1776.387	2.272		
Total	783	1780.182			
Statement 3:					
Between groups	1	2.252	2.252	1.453	0.2284
Within groups	782	1211.498	1.549		
Total	783	1213.75			
Statement 4:					
Between groups	1	0.909	0.909	0.367	0.5449
Within groups	782	1937.987	2.478		
Total	783	1938.897			
Statement 5:					
Between groups	1	0.287	0.287	0.145	0.7039
Within groups	782	1552.569	1.985		
Total	783	1552.856			
Statement 6:					
Between groups	1	8.364	8.364	3.948	0.0473
Within groups	782	1656.574	2.118		
Total	783	1664.938			
Statement 7:					
Between groups	1	10.2	10.2	3.578	0.0589
Within groups	782	2229.473	2.851		
Total	783	2239.673			
Statement 8:					
Between groups	1	3.116	3.116	2.134	0.1445
Within groups	782	1141.899	1.46		
Total	783	1145.015			

Table 8
ANOVAs of existence of electronic monitoring and response to the statements (only ANOVAs with $p = 0.05$ are presented)

Source	DF	Sum of squares	Mean square	F-test	p-value
Statement 2:					
Between groups	1	16.525	16.525	2.134	0.0075
Within groups	793	1822.947	2.299		
Total	794	1839.472			
Statement 3:					
Between groups	1	13.471	13.471	8.761	0.0032
Within groups	793	1822.947	2.299		
Total	794	1839.472			
Statement 7:					
Between groups	1	23.089	23.089	8.066	0.0046
Within groups	793	2269.879	2.862		
Total	794	2292.969			

variety of industries and organizations of different sizes.

Disagreement between supervisors and their subordinates on electronic monitoring may cause tension in the workplace, reduce productivity and increase turnover. In this study, we analyzed the responses of a large sample of both supervisors and non-supervisors from different industries. As expected, there were significant differences in the attitudes of members of the two groups toward the practice. Non-supervisors agreed more firmly than supervisors that employees are entitled to privacy and thus should not be electronically monitored. The supervisors and non-supervisors also expressed significantly different beliefs regarding the possible negative impact of electronic monitoring. Supervisors did not agree as firmly as non-supervisors that electronic monitoring may create tension between managers and subordinates. Similarly, supervisors were not as staunch as non-supervisors about electronic monitoring's negative effect on morale and productivity. Thus we found general support for Proposition 2: *Supervisors accept electronic monitoring significantly more than do non-supervisors.*

However, in the entire sample, we found a strong correlation between the negative attitude toward electronic monitoring and the belief about its effects. The assertion that employees are entitled to privacy was highly correlated to the perception that electronic monitoring may adversely affect morale and reduce productivity. Electronic monitoring is often implemented to reduce theft and embezzlement. While the overall average response of the participants was quite agreeable, there was a difference along supervisor/non-supervisor lines. Supervisors expressed a stronger belief in the ability of electronic monitoring to

reduce employee theft and embezzlement. In this study we found that monitored workers are more accepting of electronic monitoring than non-monitored workers. This may suggest either that the organizations from which our monitored respondents came have done a good job explaining the merits of electronic monitoring and its non-threatening character, or that once workers are subject to electronic monitoring they change their minds about its threatening nature. It may also be that employees simply become used to the practice and accept it as part of the work environment. To validate this, a longitudinal research should be conducted with the same employees over a sufficient period of time. Thus we found general support for Proposition 1: *Resistance to electronic monitoring is positively associated with the perception that it is counterproductive.*

As expected, the non-supervisors justified an early warning of monitoring more than the supervisors do. Apparently, the supervisors in this study agreed with what management has argued for a long time: an early warning defeats the purpose of electronic monitoring.

With respect to proposition 3, the results also show that there is no significant difference in the ethical views between men and women regarding electronic monitoring. Women differed from men only in their stronger belief that electronic monitoring can reduce theft and fraud, which indicates they would be more receptive of the practice if convinced that its main purpose is security. The existence of electronic monitoring within an organization did result in employees within those organizations having significantly more favorable views of electronic monitoring than employees who worked in organizations that did not employ electronic monitoring. This result is consistent with the findings of Grant and Higgins [5].

7. Limitations and direction for further research

This study is not without limitations. We did not distinguish among different types of electronic monitoring. Employees may react differently to eavesdropping than to video cameras. It is reasonable to assume that the use of expert systems to monitor disbursement patterns is less intrusive, and thus evokes less resistance by employees than computer programs that monitor the rate of keystrokes or telephone conversations. Even the same electronic monitoring technology may be used differently in the same industry [4]. Thus, future research should try to draw conclusions with regard to specific electronic monitoring methods within well defined purposes of its implementation.

As pointed out earlier, there may also be limitations regarding the sample. One of the more important limitations is that all of our respondents were college graduates who in addition to being full-time employees in the workforce were pursuing a part-time graduate degree in business at the time they completed the survey. An educationally diversified sample might have yielded different responses. In particular, it may be expected that a more diversified sample may be less favorable towards electronic monitoring than the sample utilized in this study. On the other hand, the differences between supervisory and non-supervisory employees found in this study may be even more pronounced in the general workforce.

We measured perception of productivity rather than actual productivity. Although other researchers have employed this method, it would be preferable to measure actual productivity. This is especially true because some of the referenced studies found that electronic monitoring does increase productivity even when the employees reported negative impacts. Further studies in which actual productivity is measured along with acceptance of electronic monitoring may shed more light on the relationship between the two variables.

Further research is needed to find out why women perceive electronic monitoring as an effective security measure more strongly than men. In addition, we need to research which method of electronic monitoring (e.g., monitoring of e-mail or keystroke count) is more acceptable and which is less acceptable, and why. Better understanding will enable organizations to prepare their employees for electronic monitoring and craft it in a manner that will not alienate the employees.

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