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The Hawthorne Studies Revisited: Evidence From the U.S. Federal Workforce

Chan Su Jung¹ and Soo-Young Lee²

Abstract
Many organization theorists have recognized the Hawthorne studies as path-breaking demonstrations of the influence of social and psychological factors in the workplace. We provide evidence that important implications of the Hawthorne studies can be applied to the federal workforce. Our analysis shows that social relations and participative management style have stronger influences than physical conditions on public employees' perceived performance. This result is congruent with summary translations of the lessons of the Hawthorne studies: “Attention is gratifying!” and “The attention apparently raised morale, and morale raised productivity.” The present study indicates that the different approaches of management will show different effects on organizational performance according to the levels of performance.

Keywords
Hawthorne studies, social relations, participative management

Introduction
Many organization theorists have recognized the Hawthorne studies as path-breaking demonstrations of the influence of social and psychological factors in the workplace. We provide evidence that important implications of the Hawthorne studies can be applied to the federal workforce. Our analysis shows that social relations and participative management style have stronger influences than physical conditions on public employees' perceived performance. This result is congruent with summary translations of the lessons of the Hawthorne studies: “Attention is gratifying!” and “The attention apparently raised morale, and morale raised productivity.” The present study indicates that the different approaches of management will show different effects on organizational performance according to the levels of performance.

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factors in the workplace. According to Scott (2003), many reformers, influenced by the Hawthorne studies, have continued to stress the important role of supervisors (managers) for better relationships with workers and the importance of employee participation within the organization. As their first purpose, the Hawthorne studies, beginning in 1924, were intended to inquire into the relationship between workers’ performance and illumination levels (Mayo, 1933). Unexpectedly, they found that work performance and job satisfaction of workers increased regardless of the change of illumination. Thereafter, management scholars and social scientists set out to conduct experiments to explore the impacts of social as well as work environmental factors on work performance. However, controversies have been ceaseless over the interpretation and the values of the Hawthorne studies (Burrell & Morgan, 1980). Based on the results of the series of experiments, many researchers concluded that the quality of human relations of workers with peers and management (e.g., leader, supervisor, or manager) was more critical to performance improvement than the quality of physical variables (Jones, 1990).

As is well known, the Hawthorne studies provided a foundation for widespread acceptance of human relations as a critical factor affecting employee performance and emphasized the potential value of participative management and enhancing human relations (Rainey, 2003). In contrast, reexamining the Hawthorne studies, Franke and Kaul (1978) argued that external factors such as physical work environment and physical work requirements sufficed to explain the variation in workers’ performance found at the Hawthorne plant. In relation to the Hawthorne studies, Stillman (1999) argued that “human sentiments were real and powerful forces that managers, public or private, had to recognize and deal with inside organizations” (pp. 137-138). That is, the results of the Hawthorne studies have been recognized as applicable to all types of organizations even in the field of public administration and public management. However, the Hawthorne studies were conducted in the private sector and, as Rainey (2003) pointed out, there exist the distinctions between public and private sectors. Some scholars have thrown arguments that make us doubt the applicability of the results of the Hawthorne studies to the public sector, including federal government. Giblin (1976) concluded that “the unique constraints imposed on public organizations appear to render them almost immune from conventional OD interventions” (p. 116). In addition, Golembiewski (1976) suggested as the unique public-sector constraints legal restrictions, procedural regularity, and rigid personnel system, which limit the role of public managers and the change of the systems, and argued that these characteristics in the public
sector are severe than those in the counterpart. Furthermore, Rainey (2003) discussed that the private sector is superior in developing leaders, participativeness of employees and leaders, and other management issues. These arguments contribute to having us doubt the applicability of the main results of the Hawthorne studies to all types of organizations and, therefore, reexamine them in a different context from the private sector, that is, the contemporary U.S. federal government.

Against these backgrounds, we revisit the Hawthorne studies in the context of the U.S. federal workforce by using the variables considered as important in the original Hawthorne studies. Our revisitation is not for a replication of the Hawthorne experiments but for a corroboration of their main implications with a large survey data in a quite different context, that is, the 21st century public sector. Hence, this study cannot prove the causalities between the main independent variables and the dependent variable, as in the Hawthorne experiments, but can support the external validity of the results of the experiments. The independent variables of this research are not the same as but similar to those in the Hawthorne studies. In addition, the dependent variable of this study is different from that of the Hawthorne studies, in that the latter is an objective measure of work output, whereas the former is a perceived measure of work quality. We think it is meaningful to study the implications of the Hawthorne studies for the public sector, given that the most scathing criticism about the human relations was the lack of empirical evidence that the improvement of human relations would influence the improvement of organizational performance (Perrow, 1970). In addition, “although scholars of public administration paid little attention to this work after the Hawthorne experiments, the fields of industrial engineering and operations research continue within the tradition of Taylor and the Hawthorne experiments” (Meier & Krause, 2003, p. 3). It may be useful to replicate the Hawthorne studies and trumpet their findings again today because, even though they have been influential over the years, there is still considerable resistance to fully humanizing the workplace—especially in government. The timing is good for this reminder of the importance of humanistic values considering the emergence of New Public Management and increased emphasis that is being placed on economy and efficiency in government.

We provide evidence that important implications of the Hawthorne studies can be applied to the federal workforce. In other words, our analysis shows that social relations and management style have stronger influences than physical conditions on public employees’ work quality. This result is congruent with summary translations of the lesson of the Hawthorne studies:
“Attention is gratifying!” (Scott, 2003, p. 62) and “The attention apparently raised morale, and morale raised productivity” (Perrow, 1986, p. 80).

This study proceeds as follows. In the next section, we will offer our specification of a model for this study through a theoretical review of the literature. Then, we will test the model with the 2006 Federal Human Capital Survey, followed by the analysis of our findings. Finally, we will conclude this article with a discussion of implications.

**Model Specification**

The Hawthorne studies began from the simple attention to work environmental conditions in illumination experiments (Mayo, 1933). The studies expanded in the first relay experiment to investigate the effects of the physical work environment, physical work requirements, participative management, and human social relations on output, and all the issues dealt with in the subsequent relay experiments were initiated in the first relay experiment (Franke & Kaul, 1978). Thus, this study refers to the dependent and independent variables of the first relay Hawthorne experiment, as shown in Figure 1, to investigate whether social relations and management style have stronger impacts on public employees’ work quality than physical conditions.

![Figure 1. A model for the Hawthorne studies revisited in the public sector](image-url)
Performance in the Hawthorne Studies

The measure of performance in the Hawthorne studies was workers’ output. According to Franke and Kaul (1978), unlike the initial expectation in the Hawthorne studies, employees’ output inexplicably was heightened regardless of the increasing or decreasing degree of illumination. After these observations, social scientists at the Harvard School of Business Administration and Western Electric management scrutinized the effects of social as well as physical factors on work performance. As discussed above, the dependent variable of this study is different from that of the Hawthorne studies, in that the latter is an objective measure of work output, whereas the former is a perceived measure of work quality.

Human Relations and Performance

From the primary and the subsequent Hawthorne experiments, the researchers concluded that the human relations with the peer group and management had a significant and positive impact on improvement in output observed in the first four experiments (Franke & Kaul, 1978). According to Homans (1992), an employee who worked too much, too fast, or too little was exposed to merciless ridicule, being called rate-buster, speed king, or chiseler, respectively. As a representative of management, the group chief could accomplish a good output, when siding with the group members, that is, when having good human relations with subordinates (Homans, 1992). Some researchers attributed declining average productivity to the absence of close and healthy personal relations with peers (Landsberger, 1958). That is, the improvement in work group performance was not associated with employees’ dexterity or intelligence but correlated with social relations among employees and between the group leader and subordinates.

Since the Hawthorne experiments, many scholars have conducted studies on the relationship between human relations and group (or organizational) performance in various perspectives. First, trust has been recognized as a critical factor of work group performance. Some researchers argued that more trustworthy relationships among team members led directly or indirectly to higher work team performance (Dirks, 1999; Friedlander, 1970; Hughes, Rosenbach, & Clover, 1983; Klimoski & Karol, 1976). Put simply, group members can increase their ability to work together through trust between superiors and subordinates and among peers (Dirks, 1999). As distinct concepts from trust, familiarity (Goodman & Leyden, 1991) and friendship (Jehn & Shah, 1997) are also positively related to group productivity.
These empirical studies showed that two kinds of relationships improved group processes—information sharing and cooperating—thereby exerting positive influences on group performance. As we can see from the results of the Hawthorne experiments, conflict among group members was a significant determinant of low group productivity. Studies on conflict supported this conclusion of the initial experiments about human relations by showing that the low level of relationship conflict was one of the main characteristics of teams performing well (Amason, 1996; Amason & Schweiger, 1994; Jehn & Mannix, 2001).

Through the Hawthorne studies, the researchers found that “the informal organization develops through unofficial social processes within the organization, but it can involve norms and standards that are just as forceful influences on the worker as formal requirements” (Rainey, 2003, p. 33). According to the results of the experiments, the employees’ productivity decreased, because the informal processes among employees were not cooperative but conflicting. Thus, the emphasis on informal processes was a new counterpoint against the scientific management approach (Rainey, 2003). In the same vein, most of the writings on cooperation in the organizations have tended to show a positive tone about its effect on organizational outcomes (Smith, Carroll, & Ashford, 1995), although some scholars pointed out some harmful consequences of cooperation, such as coordination of pricing (Scherer, 1970) and exclusion of noncooperators from positions of power (Pfeffer & Salancik, 1978), for others and for performance. More specifically, informal and formal cooperative mechanisms involving vertical links with management or horizontal links with peers lead to effective results (Astley, 1984; Axelrod, 1984; Ouchi, 1980; Ring & Van de Ven, 1994; Thompson, 1967). Through the flow of studies on human relations from the Hawthorne experiments to the more recent, we expect that employees perform better when they have better human relations with management or peers. Specifically, this study puts a focus on trust, cooperation, respect, and knowledge sharing with management or peers to revisit the Hawthorne studies in the public sector.

**Hypothesis 1:** Employees’ perception of human relations with peers will be positively associated with the perception of work group performance.

**Hypothesis 2:** Employees’ perception of human relations with management will be positively related to the perception of work group performance.
Participative Management and Performance

Observing that employees perform better when they receive considerate or participative treatment, the researchers have recognized the Hawthorne studies as constituting a major rationale for humane approaches in the work organization (Franke & Kaul, 1978). From this point, the mechanisms of Taylor’s (1911) scientific management have received less attention as critical factors of improving workers’ performance. Instead, participative management came into the spotlight from social scientists and managers. However, ignoring the beneficial effects of participation for employees and the organization, many leaders or managers have produced only minor changes from the traditional procedures that reinforce decision making at the top and deny the employees’ potential for responsibility, creativity, and productivity (Marrow, 1975).

Although a few studies in the management field showed that participative management has a positive impact on employees’ performance or organizational performance (Daley, 1986; Drucker, 1974; Likert, 1967; Miller & Monge, 1986; Wagner, 1994), few scholars in the public sector have conducted empirical studies on the relationship between participative management and performance (Kim, 2002). Especially, Miller and Monge (1986) conducted a meta-analysis on participation’s effects on productivity from three types of models: cognitive, affective, and contingency models. According to cognitive models, participation increases performance through increase of knowledge at times of implementation and through high-quality information for decisions. Affective models propose that participation will satisfy employees’ higher order needs and working in a participative culture is adequate for improving employees’ performance. Contingency models reject a single model appropriate for all workers in all organizations. Instead, they suggest that workers with higher order needs will be most affected by participative management. Vroom and Yetton (1973) argued that appropriateness of participative management depends on the types of decisions and required qualities. Although there were ostensible differences among the initial findings of some studies on the participation’s impacts on performance, further analysis from a meta-analysis indicated that they all supported the same conclusion that participation can have a statistically positive and significant effect on performance (Wagner, 1994). According to Wagner (1994), participatory management practices balance the involvement of managers and their subordinates in information–decision processing, decision making, or problem-solving endeavors. In addition, Spreitzer, Kizilos, and Nason
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(1997) suggested that the notion of empowerment is derived from participatory management. Theories of participative management assume managers’ sharing decision-making power with workers to enhance performance.

The effect of participative management on performance is another main point of this research, as in the Hawthorne studies. We focus on federal employees’ decision making or empowerment from the perspective of participative management. In line with the previous research, including the Hawthorne studies, on the relationship between participative management and performance, we propose the following hypothesis by revisiting the results of the Hawthorne studies on the U.S. federal agencies:

**Hypothesis 3:** Employees’ perception of participative management style will be positively associated with the perception of work group performance.

**Physical Work Requirements and Performance**

Following the dissemination of the results of the Hawthorne studies, previously accepted scientific management mechanisms tended to receive less emphasis as factors of work performance (Franke & Kaul, 1978). In addition to physical work environments, physical work requirements can be included in the scientific management mechanisms (Taylor, 1911), as Franke and Kaul (1978) pointed out. They included the benefits of fatigue reduction from rest pauses, hours of work per day, and days of work per week as physical work requirements in their statistical interpretation of the Hawthorne experiments. Following the empirical study of Franke and Kaul, the physical work requirements of this study are satisfactions with rest time, work schedule, workload, and work security (which is additionally included).

With respect to the effects of physical work requirements on improving performance, there have been contradicting arguments. The arguments have concentrated on the reduction of fatigue on increase in productivity. Landsberger (1958) argued that in the first relay experiment, fatigue reduction did not play a significant role, agreeing with the conclusion of the Hawthorne researchers. Carey (1967) and Argyle (1953), however, reviewed the same evidence and reached different conclusions. These scholars’ interpretations suggested that fatigue reduction through rest pauses and working fewer hours in the week was beneficial for production increase. Franke and Kaul (1978) supported these conclusions in their new statistical analysis of the Hawthorne experiments. Since the Hawthorne studies, there have been several empirical studies on the relationship between the physical work
requirements and performance. Mortagy and Ramsey (1973) focused on the effects of work and rest schedules as a means of retarding job fatigue, and their results showed that long work schedules and short rest schedules yielded performance decrement. In addition, “A high workload may violate the economic deal of pay for attendance implied in all employees’ expectations” (Nele & Hans, 2006, p. 445). As a result, a high workload will have a harmful influence on performance (Nele & Hans, 2006). The results of their empirical research showed that workload was negatively and partially related to all organizational outcomes. With regard to the effect of work security on performance, Schneider, Hanges, Smith, and Salvaggio (2003) argued that satisfaction with security was positively related to organizational performance. Thus, we suggest the following four hypotheses about the relationships between physical work requirements and performance:

Hypothesis 4: Employees’ satisfaction with rest time will be positively related to the perception of work group performance.

Hypothesis 5: Employees’ satisfaction with their work schedules will be positively associated with the perception of work group performance.

Hypothesis 6: Employees’ satisfaction with workload will be positively related to the perception of work group performance.

Hypothesis 7: Employees’ satisfaction with work security will be positively associated with the perception of work group performance.

Physical Work Environments and Performance

The initial purpose of the Hawthorne studies in 1924 was to inquire into the relationship between illumination as physical work environment and worker’s productivity. However, physical work environments including illumination and raw materials did not play much of a role in improving employees’ performance (Franke & Kaul, 1978). To reexamine the meanings of the Hawthorne studies in the context of the present federal organizations, this study also includes physical conditions and resources as physical work environments. In answer to the original question posed by the Hawthorne studies, the results of empirical research on the effect of illumination suggested that the level of illumination in work settings did positively influence performance (Baron, 1994; Boyce, Berman, Collins, Lewis, & Rea, 1989). In addition, Baron (1994) argued that temperature and noise as physical work settings also had significant effects on task performance. With regard to the resources’ effects on performance, Hockey (1997) argued that performance would be protected by the use of further resources under stress in a cognitive
model. According to multiple resource theory, the value of resources lies in their ability to account for task performance (Wickens, 2002). Therefore, we suggest the two following hypotheses:

Hypothesis 8: Employees’ satisfaction with physical conditions will be positively related to the perception of work group performance.

Hypothesis 9: Employees’ satisfaction with resources will be positively associated with the perception of work group performance.

Data and Method

Data

This study used the data from the 2006 Federal Human Capital Survey, which was conducted by the Office of Personnel Management (OPM), to reexamine the meanings of the Hawthorne studies in the current U.S. federal workforce, focusing on human relations and participative management style. Of the 390,657 federal employees receiving surveys, 221,479 completed them for a government-wide response rate of 57%. It is important to note that the present research excluded respondents in supervisory or management positions because the main participants of the Hawthorne studies were employees and the main arguments were about the effects of their human relations and participative management on performance. Therefore, in this study, the number of respondents in nonmanagement status is 149,990.

The dependent variable of this study is the work quality of public workforce. For this variable, we used the following: “How would you rate the overall quality of work done by your work group?” (Appendix provides the questionnaire items for all the main variables in this study). This item was measured by a 5-point Likert-type scale from 1 (very poor) to 5 (very good). One may be concerned about common methods bias, as self-report methods were used as the sole means of data collection in this study (Brewer, 2005; Crampton & Wagner, 1994; Walker & Boyne, 2006). That is, there may be a possibility that “self-report methods artificially elevate measures of covariation, producing percept-percept inflation in published correlations” (Crampton & Wagner, 1994, p. 67). For example, employees who feel good (or bad) about work relationships and other features of their agencies also tend to feel good (or bad) about their agencies’ performance. However, many research studies have used data collected from self-report methods such as the Federal Human Capital Survey, the Merit Principles Survey, and the National Administration Studies Project Survey (e.g., Bozeman & Feeney, 2007; Brewer, 2005; Brewer & Selden, 2000; Feeney, 2008; Lee & Whitford,
In addition, we note that these concerns about common methods bias can be somewhat allayed in that, although certain amounts of common methods bias can exist and influence our research, the impact of this problem is small, not broad or comprehensive, as Crampton and Wagner (1994) and Walker and Boyne (2006) pointed out.

As previously mentioned, we selected four groups of independent variables: human relations in an organization (relations with peers and relations with management), management style (participative management), physical work requirements (rest time, work schedule, workload, and work security), and physical work environments (physical conditions and resources).

For relations with peers, we used the average of two survey items: “The people I work with cooperate to get the job done” and “Employees in my work unit share job knowledge with each other.” These items were measured by a 5-point Likert-type scale: 1 (strongly disagree) to 5 (strongly agree, Cronbach’s alpha = .65). We made the relation with management variable by combining and averaging three items from the survey: “I have trust and confidence in my supervisor,” “Managers/supervisors/team leaders work well with employees of different backgrounds,” and “I have a high level of respect for my organization’s senior leaders.” The reliability coefficient of the three items scaled from 1 (strongly disagree) to 5 (strongly agree) is .75.

For participative management, we used the average of two items also measured by a 5-point Likert-type scale: “I feel encouraged to come up with new and better ways of doing things” and “Employees have a feeling of personal empowerment with respect to work processes.” The Cronbach’s alpha of these items is .76.

The physical work requirements include four independent variables, which were also measured by a 5-point Likert-type scale. For rest time, we calculated the average of the two items that focused on leave for illness and vacation (Cronbach’s alpha = .82): “How satisfied are you with paid vacation time?” and “How satisfied are you with paid leave for illness (for example, personal), including family care situations (for example, childbirth/adoption or eldercare)?” For work schedule and workload of physical work requirements, we used a single item, respectively: “How satisfied are you with alternative work schedules?” and “My workload is reasonable.” This study measured the work security variable by the average of the two items (Cronbach’s alpha = .68): “Employees are protected from health and safety hazards on the job” and “My organization has prepared employees for potential security threats.”

For the two variables (physical conditions and resources) of the physical work environments, we used a single item that was also measured by a 5-point Likert-type scale, respectively: “Physical conditions (for example,
noise level, temperature, lighting, and cleanliness in the workplace) allow employees to perform their jobs well” and “I have sufficient resources (for example, people, materials, and budget) to get my job done.”

The model of this study also included three dummy variables to control for the effects of gender, race, and agency on work group performance. Unlike the original Hawthorne studies, our research is not an experimental design. Therefore, we need to eliminate rival hypotheses or alternative explanations by adding control variables to produce more rigorous results. This is the reason why we included three control variables. Table 1 shows the descriptive statistics of the variables in the present research.

**Method**

Although the perceived performance as the dependent variable ranges from 1 (*very poor performance*) to 5 (*very good performance*) in an ordinal way, we did not use an ordered logistic model but instead a multinomial logistic model to test all the hypotheses. The reason is that our model did not pass the test of parallel regression assumption. That is, the null hypothesis that the slope coefficients are identical across response categories was rejected (Feeney, 2008; Long, 2006). According to Long (2006) and Liao (1994), if we are concerned about the ordinality of the dependent variable, avoiding potential bias outweighs the potential loss of efficiency in using models for nominal outcomes. Thus, this study uses a multinomial logistic regression that has weaker and fewer assumptions than an ordered logistic regression (Feeney, 2008). The results of our model are based on the overall

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### Table 1. Descriptive Statistics for the Dependent and the Independent Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>4.154</td>
<td>0.805</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Relation with peers</td>
<td>3.889</td>
<td>0.832</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Relation with management</td>
<td>3.494</td>
<td>0.953</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Participative management</td>
<td>3.302</td>
<td>1.013</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Rest time</td>
<td>4.183</td>
<td>0.746</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Work schedule</td>
<td>3.844</td>
<td>1.091</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Workload</td>
<td>3.416</td>
<td>1.100</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Work security</td>
<td>3.795</td>
<td>0.812</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Physical conditions</td>
<td>3.678</td>
<td>1.098</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Resources</td>
<td>3.202</td>
<td>1.190</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
relationships, that is, sign, significance, and estimated odds ratio (i.e., exponentiated beta).

**Results**

Results presents the factors of performance perceptions compared with one another with very poor performance perception as the base category. Relation with peers is the most consistent and strongest predictor on four higher performance perception groups compared with the lowest performance perception group. For overall higher performance, participative management, relation with peers, and relation with management are more important variables than other physical variables. These results are consistent with those of the Hawthorne studies.

First, compared with very poor performance, a one unit increase in perception of relation with peers increases the odds of a response of poor performance, a little higher performance response than very poor performance response, by 19%. The odds of slightly higher performance, from very poor performance to poor performance, are increased by 20% and 26% for a one unit increase in change of satisfaction with rest time and work security, respectively. These results indicate that physical work requirements, rest time and work security, are more critical than relation with peers for increased performance in the relatively lower performances.

Compared with very poor performance perceptions, the fair performance group has just two statistically significant variables. Relation with peers, however, exerts the strongest impact on higher perceived performance. While the increased magnitude of the odds of reporting better performance for public employees is 16% for a unit increase of respondent’s perception of work security, that of the odds of having increased performance perception is 50% for a unit increase of respondent’s perception of relation with colleagues. This comparison shows that human relations become more crucial for higher performance, as the performance perception gap from the lowest performance perception becomes bigger.

From the good performance perceptions, more variables have a statistically significant influence on the comparisons with the lowest performance perceptions, as the perceived performance becomes higher. In the case of the good performance group versus the very poor performance group, human relation variables and participatory management show distinctive influences on increased performance. The strongest impact on performance is still exerted by relation with peers, followed by relation with management and participative management in that order. A one unit increase in these variables
Table 2. Multinomial Logistic Regression Results for Perceived Performance

<table>
<thead>
<tr>
<th>Variables</th>
<th>Poor performance versus very poor performance</th>
<th>Fair performance versus very poor performance</th>
<th>Good performance versus very poor performance</th>
<th>Very good performance versus very poor performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
<td>Exp(B)</td>
<td>β</td>
</tr>
<tr>
<td>Human relations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relation with peers</td>
<td>0.175***</td>
<td>0.067</td>
<td>1.191</td>
<td>0.404***</td>
</tr>
<tr>
<td>Relation with management</td>
<td>−0.210*</td>
<td>0.086</td>
<td>0.810</td>
<td>0.023</td>
</tr>
<tr>
<td>Management style</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participative management</td>
<td>−0.012</td>
<td>0.084</td>
<td>0.988</td>
<td>0.030</td>
</tr>
<tr>
<td>Physical work requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest time</td>
<td>0.186*</td>
<td>0.076</td>
<td>1.204</td>
<td>0.027</td>
</tr>
<tr>
<td>Work security</td>
<td>0.234**</td>
<td>0.071</td>
<td>1.263</td>
<td>0.146*</td>
</tr>
<tr>
<td>Workload</td>
<td>0.014</td>
<td>0.055</td>
<td>1.014</td>
<td>0.049</td>
</tr>
<tr>
<td>Work schedule</td>
<td>0.024</td>
<td>0.050</td>
<td>1.025</td>
<td>0.001</td>
</tr>
<tr>
<td>Physical work environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>0.012</td>
<td>0.059</td>
<td>1.012</td>
<td>0.024</td>
</tr>
<tr>
<td>Physical conditions</td>
<td>0.072</td>
<td>0.051</td>
<td>1.075</td>
<td>0.036</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (male)</td>
<td>0.288*</td>
<td>0.126</td>
<td>1.334</td>
<td>0.069</td>
</tr>
<tr>
<td>Race 1 (White)</td>
<td>−1.79</td>
<td>1.97</td>
<td>0.167</td>
<td>−1.40</td>
</tr>
<tr>
<td>Race 2 (African American)</td>
<td>−1.97</td>
<td>1.98</td>
<td>0.139</td>
<td>−1.30</td>
</tr>
<tr>
<td>Race 4 (Asian)</td>
<td>−0.589</td>
<td>2.12</td>
<td>0.555</td>
<td>−0.555</td>
</tr>
<tr>
<td>Race 5 (Indian or Alaskan)</td>
<td>−2.11</td>
<td>1.99</td>
<td>0.121</td>
<td>−1.60</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.757</td>
<td>2.278</td>
<td>2.779</td>
<td>2.190</td>
</tr>
</tbody>
</table>

Note: Adjust count R-square = 0.283; goodness of fit (Pearson deviance:chi-square) = 557162.952***; sample size = 43,151. Agency-specific effect is included. The reference category is very poor performance perception.

*p < .05. **p < .01.
increases the odds of reporting better performance perception by 220%, 46%, and 40%, respectively. In terms of physical work requirements and physical work environments, work security, and resources are statistically significant, although their impacts are weaker than those of human relation variables and participatory management.

The fourth case, the very good performance group versus the very poor performance group, has more statistically significant variables than the other cases. That is, six out of our nine hypotheses are supported, except for hypotheses about rest time, workload, and work schedule. Higher satisfactions with these six variables, increases the odds of having increased perceptions from very poor performance to very good performance. Out of all the four cases and all the variables, relation with peers shows the strongest impact in this case, Exp(B) = 10.758. A one unit increase in the respondent’s perception of relation with management and participatory management increases the odds of reporting higher performance by 110% and 78%, respectively. Their impacts are stronger than those of the physical work requirement and the physical work environment variables under the same condition. Among the physical condition variables, resources is the most important. To sum up, positive perceptions of human relations and participative management are more influential on higher performance perceptions than positive attitudes of physical work conditions.

Discussion

Revisiting the Hawthorne studies is to suggest the meaningfulness of comparing the impacts of human relations and management style with those of physical work conditions on organizational performance. The unexpected results of the Hawthorne studies underscored the importance of social relations and employees’ participation in an organization for improving output in the private sector. It is worthwhile to revisit the Hawthorne studies in the public sector, given that there have been some public–private distinction literature making us doubt whether the significant meanings of the Hawthorne studies can be applicable to the public sector, few studies have been conducted on this topic, and public employees are less motivated by monetary or physical rewards than their counterparts in the private sector (Rainey, 1982). Our research question of this study is, “Can the main results of the Hawthorne studies in the private sector be applicable to the public sector, specifically the U.S. federal government?” That is, “Are the impacts of human relations and participative management more critical than those of external factors on work group performance even in the public sector?” Our answer for this question is
yes. The comparison of the influences on performance of human relation-related variables including participative management and physical work condition variables in the public workforce underlined the importance of human relations and management style in assessing how well public employees perform in the organizational context. As Barzelay (1992) pointed out, public managers and leaders should pay attention to the spectrum of working relationships in their organizations to overcome the hierarchical thrust of accountability in the bureaucratic paradigm.

Taking a closer look at the results of our analysis, it is also important to note that physical work requirements (e.g., rest time, work security, workload, and work schedule) and physical work environments (e.g., resources and physical conditions) are still important factors for higher performance. Such results provide support for the previous arguments that organizational effectiveness or economic developments result from humanitarian activities in an organization (Franke & Kaul, 1978; Parsons, 1978). For instance, we can understand the humanitarian activities of physical conditions when we consider the possible benefits of fatigue decrease through rest time and danger reduction through better work security. Especially in the lower level of performance, these variables exert stronger effects on improvement of performance than in the higher level of performance.

Our major finding, however, is that public employees in nonmanagement status perform well, when they have positive attitudes or perceptions toward human relations with their colleagues and superiors, and their participation in organizational management. This finding is consistent with the contention that organizational employees are better able to have higher performance when they have better ties, trust, collaboration, and communication with other members (see Aram, Morgan, & Esbeck, 1971; Dirks, 1999; Pandey & Garnett, 2006). For example, Dirks (1999) found that interpersonal trust with peers and superiors has a positive influence on organizational effectiveness. In terms of participative management, some scholars also argued through empirical research that empowerment and balanced involvement of managers and their subordinates in decision making and information sharing through employees’ participation lead to higher job satisfaction and work performance (Kim, 2002; Wagner, 1994). Thus, from a practical perspective, we notice that organizational management approaches to higher performance need to proceed from materialistic methods through rest time, workload, and so on about employees’ motivation to more complex human social relations, which could be seen more difficult but more democratic and effective for improving performance and building bureaucratic accountability.

Our analysis results are also congruent with McGregor’s Theory Y. Influenced by Maslow’s (1954) higher order needs, McGregor (1960)
proposed “Theory X” and “Theory Y.” Whereas Theory X was based on McGregor’s observation of management practices focused on controlling employees through mechanistic approach at that time, Theory Y advocated a new management style allowing more participative management, self-control, and human relations, such as decentralization of authority, job enrichment, and management by objectives (Rainey, 2003). Hence, our conclusion is closely associated with the Theory Y, which has been recognized as providing insights about the importance of social factors, such as employee participation and human relations, in the workplace. Many behavioral scientists investigating the Hawthorne studies have provided these views related to Theory Y: management by participation or human relations (Fiedler, 1975; Heckman, 1975; Jones, 1990; Kahn, 1975; Lawler, 1975; Leavitt, 1975; Marrow, 1975; Roethlisberger & Dickson, 1967; Sanford, 1977; Vroom, 1975; Walton, 1975). The management focusing on human relations and participative management would be more effective, because the self-discipline based on Theory Y is a more effective type of control than centralized direction and supervision (Fiedler, 1975; Rainey, 2003). By the same token, Argyris (1957) argued that healthy employees would feel frustration and conflict when they are controlled and supervised by the classical principles of administration.

Conclusion

According to Stillman (1999), the general emphasis of human relations movement, “when applied to public administration, placed priorities on understanding human problems of complex organization and the effective use of people, human groups, and public service personnel for enhancing overall organizational effectiveness and performance” (p. 138). To investigate this argument, we chose the Hawthorne studies as a theoretical hook. The conclusion of this study leads to the acceptance of human relations and participation of employees as primary factors for better organizational performance in the public sector, as did the results of the Hawthorne studies. The present study also indicated that the different approaches of management will show different effects on organizational performance according to the levels of performance. Our research can provide the following practical implications.

We found that for higher improvement of organizational performance, trust, information sharing, and improved network among organizational members can be more effective than investment of material resources and improvement of physical work conditions. In this regard, organizational managers in the public sector need to put a more focus on building organizational culture, in which employees can have better empowerment and ties with others. Humane and democratic attention to organizational employees
will result in higher motivation, satisfaction, organizational performance, and bureaucratic accountability. In terms of improving bureaucratic accountability in the postbureaucratic paradigm (Barzelay, 1992), the Hawthorne studies can be equally important to public management and to private management.

In addition, this research can shed a new light on the study of effective collaboration within an organization. While a number of collaboration studies focused on collaboration among organizations, Whitford, Lee, Yun, and Jung (2010) found that horizontal and vertical interpersonal collaboration among employees within an organization has a positive impact on agency performance. We argue that employee relations and human situations in the workplace are the preconditions for a better collaboration among employees within an organization. To enhance employees’ relations and participation as the preconditions for interpersonal collaboration, managers need to consistently think about their methods of handling employees to check whether they treat employees as social animals, not isolated individuals. As Roethlisberger (1941) pointed out, this suggestion—that is, treat employees as social animals—is simple, but the consistent practice of this view is not.

The original Hawthorne studies provided unanticipated evidence for widespread acceptance of human relations and participative management as a critical factor affecting employee performance, and their findings were interpreted as a reaction to Taylor’s scientific management trend. Yet, this well-known research is still offering important implications for the government these days. The reason why we revisited the Hawthorne studies is to remind people in the managerial level in the government not to forget the importance of employees’ relations and participation, given the fact that the worldwide government reform movement by the New Public Management trend has increased the emphasis on economy and efficiency in government. Intangible values such as human relations or humanistic values can easily be replaced or neglected by computable and tangible values such as efficiency or economy. This research can contribute to emphasizing the importance of human relations and participative management in the federal government by providing empirical evidence that the people we work with and the way we are treated at work influence productivity.

We close this study with discussion of limitations and suggestions for the future research. Our measures of variables may be viewed as incomplete because we are using an existing Federal Human Capital Survey data set, but this is an oft-happening problem present in using data from secondary sources. Better measures may be devised. Future research may concern the impacts of human relations and participative management on organizational and individual performance, and the comparison of the impacts of human
relations and other important variables for public managers and supervisors. We can expect that the positions in an organization will affect the influences of determinants on organizational or individual performance because, as Kettl (1993) argued, public management may vary by level of the bureaucracy. Such studies can contribute to theoretical and practical implications by showing different managerial approaches to better performance according to employees’ organizational positions.

**Appendix**

*Measurement Items for All Variables*

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Organizational performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate the overall quality of work done by your work group?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human relations with peers</td>
</tr>
<tr>
<td>The people I work with cooperate to get the job done.</td>
</tr>
<tr>
<td>Employees in my work unit share job knowledge with each other.</td>
</tr>
<tr>
<td>Human relations with management</td>
</tr>
<tr>
<td>I have trust and confidence in my supervisor.</td>
</tr>
<tr>
<td>Managers/supervisors/team leaders work well with employees of different backgrounds.</td>
</tr>
<tr>
<td>I have a high level of respect for my organization’s senior leaders.</td>
</tr>
<tr>
<td>Participative management</td>
</tr>
<tr>
<td>I feel encouraged to come up with new and better ways of doing things.</td>
</tr>
<tr>
<td>Employees have a feeling of personal empowerment with respect to work processes.</td>
</tr>
<tr>
<td>Rest time</td>
</tr>
<tr>
<td>How satisfied are you with paid vacation time?</td>
</tr>
<tr>
<td>How satisfied are you with paid leave for illness (for example, personal), including family care situations (for example, childbirth/adoPTION or eldercare)?</td>
</tr>
<tr>
<td>Work schedule</td>
</tr>
<tr>
<td>How satisfied are you with alternative work schedules?</td>
</tr>
<tr>
<td>Workload</td>
</tr>
<tr>
<td>My workload is reasonable.</td>
</tr>
<tr>
<td>Security</td>
</tr>
<tr>
<td>Employees are protected from health and safety hazards on the job.</td>
</tr>
<tr>
<td>My organization has prepared employees for potential security threats.</td>
</tr>
<tr>
<td>Physical conditions</td>
</tr>
<tr>
<td>Physical conditions (for example, noise level, temperature, lighting, cleanliness in the workplace) allow employees to perform their jobs well.</td>
</tr>
<tr>
<td>Resources</td>
</tr>
<tr>
<td>I have sufficient resources (for example, people, materials, budget) to get my job done.</td>
</tr>
</tbody>
</table>
Declaration of Conflicting Interests

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Notes

1. For example, the notion of rest periods in the Hawthorne studies made a lot of sense to the original assembly-line workers and meant leaving the line and doing something else for about 10 to 15 min. Considering that the working environments of the federal employees of the present study are somewhat different from those of assembly-line workers of the Hawthorne studies, we used satisfaction with vacation and leave as a proxy for the rest time.

2. However, not all the independent variables in the original Hawthorne studies are included in this study.

3. Cooperation is defined as the process by which individuals and groups interact, work together, and make psychological relationships for reciprocal benefits or gains (Smith, Carroll, & Ashford, 1995).

4. Feeney (2008), in her Journal of Public Administration Research and Theory article, used a multinomial logistic model due to the same reason, although her dependent variable is ordered responses.

5. We ran a model without three control variables and compared its results with those in Table 2. Two models (i.e., with control variables vs. without control variables) showed almost the same results. The results are available from the authors on request.

References


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