What We Teach Students About the Hawthorne Studies: A Review of Content Within a Sample of Introductory I-O and OB Textbooks

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The research that took place at a Western Electric Company manufacturing plant near Chicago between the years of 1924 and 1933 represents one of the most important historical events in the development of I-O psychology. This body of research, collectively referred to as the *Hawthorne Studies* (named for the plant in which they took place), was influential in the development of the human relations movement and has functioned as a strong stimulus in I-O for discussing the intricacies of experimental design and debating the complexities of variables that drive human behavior at work.

As important historical events, the Hawthorne Studies are typically reviewed by authors of introductory textbooks in I-O and organizational behavior (OB). Such books serve the important function of introducing students to critical historical events and major areas of research and practice. Introductory textbooks sometimes provide the only historical information about the Hawthorne Studies that students will ever read. In addition to transmitting historical knowledge, textbook material about the Hawthorne Studies contributes to students' formative beliefs about human behavior in the workplace and acceptable approaches to studying it. The Hawthorne Studies enjoy primacy in these matters because the topic is typically covered early in textbooks and authors often add interpretive commentary about the complex causes of behavior and appropriate experimental design. Furthermore, the stories we tell about Hawthorne become part of our shared knowledge that is part of our unique professional culture. This shared knowledge begins with introductory textbook material, which should be as thorough, accurate, and instructive as possible.

It has been our impression that textbook authors' accounts of the Hawthorne Studies vary in points of emphasis and historical detail, and in some cases, provide simplistic and inaccurate accounts of the research. An example of a relatively benign type of variability across textbooks is that authors do not always discuss or define what has come to be called the *Hawthorne Effect.* Differences across textbooks of this type are to be expected; however, it is of concern when information about the Hawthorne Studies is presented in a misleading manner or in ways that create historically inaccurate impressions of the research. For example, some authors discuss only the illumination studies, which can give the incorrect impression that these studies were either the only research that took place or that they were the main focus of the project. An example of a common historical inaccuracy is

the assertion that the performance of participants in the illumination studies improved or increased with every manipulation of the independent variable. With regard to points of emphasis, we have observed the general tendency of authors to emphasize the influence of social variables within the Hawthorne Studies, when in fact, several secondary analyses of the research have highlighted the influence of several environmental variables on the performance of participants (e.g., Carey, 1967; Franke and Kaul, 1978; Parsons, 1974).

In our opinion, we should aspire to more diligent accounts of the Hawthorne Studies that (a) attend carefully to primary sources and important secondary sources, (b) review or at least recognize the full range of experimental manipulations across multiple Hawthorne experiments, (c) review or at least recognize the inconsistent nature in behavior-change patterns within and across experiments, (d) discuss important extraneous or confounding variables in the experiments in addition to "special attention" paid to participants or participants' "knowledge of being in an experiment," and (e) discuss the historical importance of the research from a modern perspective that qualifies original or traditional interpretations with contemporary knowledge. Simplistic accounts of the Hawthorne Studies that attend only to the illumination experiments and suggest that performance always improved due to the special attention paid to subjects should be avoided.

In order to learn more about the actual state of affairs in the literature, we obtained a sample of top-selling and conveniently available introductory I-O and OB textbooks and systematically reviewed content related to the Hawthorne Studies.

Method

Sample

The majority of textbooks in our sample ($N = 21$) were identified through a <www.amazon.com> book search of I-O psychology and OB textbooks with the results sorted by the best selling (April 2003). Books published prior to 1997 and case study-oriented textbooks were not considered for the sample. After obtaining an eligible book, the index was used to identify pages referring to the Hawthorne Studies, and if no index reference was made, chapters related to history, group processes, or other potentially relevant topics were searched manually before excluding a text from the sample. After excluding 3 OB textbooks that did not contain any Hawthorne-related material, our sample included 7 of the 10 best-selling I-O books, and 9 of the top 15 best-selling OB texts. The remaining 5 texts in the sample were included because they were conveniently available. The portions of each textbook that made reference to the Hawthorne Studies were then reviewed according to the procedures described below.

Dimensions Reviewed and Scoring Rules

Each text's Hawthorne-related content was reviewed along the following dimensions: (a) Hawthorne Studies discussed, (b) references cited, (c) independent variables reviewed, (d) dependent variables and changes in dependent variables reviewed, (e) definitions of the Hawthorne Effect, (f) extraneous independent variables reviewed, and (g) conclusions and caveats about the Hawthorne Studies made by the author(s).

A particular Hawthorne Study was counted as being discussed if the text referred to it specifically by name or to a specific feature of the study (e.g., if an author wrote about workers restricting productivity through social controls, this was counted as a reference to the bank wiring study). References cited within textbook selections were included in our analysis if they occurred directly in the portion of the text discussing the Hawthorne Studies. For selections with no in-text citations, reference lists were searched manually for Hawthorne-related material before scoring a sample as not having any references. For textbooks using end notes, all Hawthorne references in the cited endnote were counted. If the Hawthorne Effect was not explicitly referred to in the text we did not infer a definition from the written material, although endnotes and glossaries were searched manually before scoring a text as not defining the Hawthorne Effect.

All other dimensions of the review (e.g., independent variables discussed, dependent variables and changes in dependent variables reviewed, extraneous independent variables reviewed, and conclusions and caveats about the Hawthorne Studies made by the author[s]) were scored using a taxonomy of subcategories developed by the authors, with subcategories being added within each dimension when necessary over the course of the literature review. An effort was made to keep subcategories as objective and parsimonious as possible, with the underlying goal of limiting the need for making inferences about the literary intent of the author(s). For the sake of expositional clarity, lists of subcategories coded within each of the seven dimensions that we reviewed will be reported in the results section.

Data Collection

Each text selection was independently reviewed and coded by two data collectors using a paper data collection sheet created for the literature review, with the second author serving as the primary data collector in all cases. Other authors functioned as secondary data collectors. After both data collectors had independently scored a text selection, scoring disagreements were identified and resolved through a review process where primary and secondary data collectors reread relevant text selections together and came to agreement through discussion. The interobserver agreement (I-OA) percentage for items on the data sheet prior to the review process was 83% (where I-OA = # agreements/# agreements + disagreements).

Results

Hawthorne Studies Discussed

The total number of studies that took place between 1924 and 1932 at the Hawthorne Works of the Western Electric Company depends upon how a "study" is defined. For the purposes of our analysis, we created the following categories: (a) illumination studies, (b) relay assembly test room experiment one (RATR-1), (c) relay assembly test room experiment two (RATR-2), (d) mica splitting experiment, (e) bank wiring experiment, and (f) interviewing program and supervisor training. Additional categories of (g) personnel counseling and (h) other studies (nonspecific) were added as we conducted the review.

All of the texts in our sample discussed the illumination studies ($f = 21$). The frequencies with which the remaining studies were discussed, in order of most to least frequent, were as follows: RATR-1 ($f = 13$), bank wiring ($f = 12$), interviewing program ($f = 6$), other studies (nonspecific; $f = 3$), and personnel counseling ($f = 1$). None of the textbooks discussed the RATR-2 or the mica splitting studies. See Figure 1 to view a histogram of these data.

References

A total of 45 different references were cited by textbook authors, including eight primary sources (see Gillespie [1991] for a bibliography of 62 primary source references for the Hawthorne Studies). The most frequently cited primary sources were Roethlisberger and Dickson (1939; $f = 16$), Mayo (1933; $f = 9$), and Roethlisberger (1941; $f = 5$). The most frequently cited secondary sources were Carey (1967; $f = 7$), Franke and Kaul (1978; $f = 4$), Yorks and Whitsett (1985; $f = 4$), Bramel and Friend (1981; $f = 3$), and Parsons (1992; $f = 3$). All other references were cited two or fewer times, with the majority being cited only once. See Table 1 to view a summary of references cited more than once in the sample.[1]

Independent Variables

Manipulations of light illumination were discussed in every textbook ($f = 21$). Other independent variables discussed included rest breaks ($f = 13$), duration of work day or work week ($f = 9$), wages ($f = 5$), food ($f = 3$), humidity ($f = 3$), and temperature ($f = 3$). Supervision, ventilation, measures of participants' physiological states and reported personal behavior, and other independent variables (nonspecific) were each discussed once in the sample. Some of these independent variables were of the manipulated (i.e., experimental) type, while others were of the classification (i.e., nominal) type, although authors generally did not write about these distinctions. See Figure 2 to view histograms of the frequency with which each independent variable was discussed.

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[1] For a complete list of all references cited in the sample, contact the first author at the Psychology Department, Santa Clara University, 500 El Camino Real, Santa Clara, CA 95053-0333.

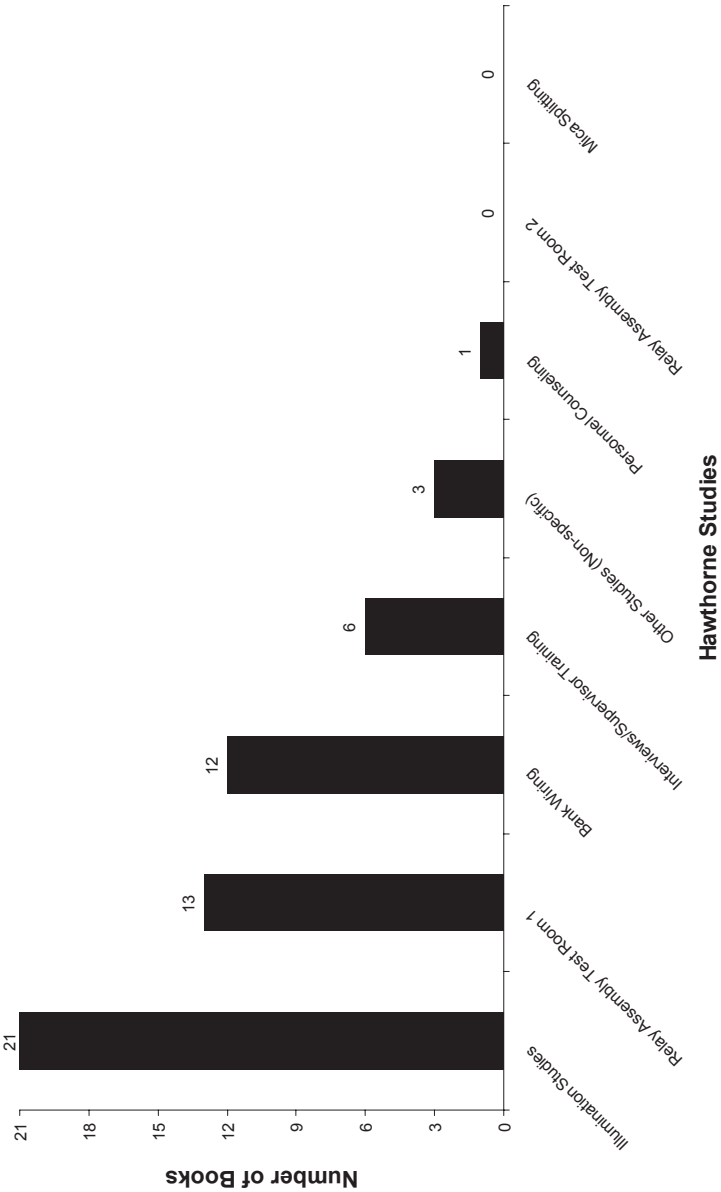

Figure 1. Hawthorne Studies Discussed.

Table 1

Multiply Cited Hawthorne-Related References in the Textbook Sample

Reference	Citations
Roethlisberger, F. J., & Dickson, W. J. (1939). *Management and the worker: An account of a research program conducted by the Western Electric Company, Hawthorne Works, Chicago.* Cambridge, MA: Harvard University Press.	16*
Mayo, E. (1933). *The human problems of industrial civilization.* New York: Macmillan.	9*
Carey, A. (1967). The Hawthorne Studies: A radical criticism. *American Sociological Review, 32,* 403–416.	7
Roethlisberger, F. J. (1941). *Management and morale.* Cambridge, MA: Harvard University Press.	5*
Franke, R. H., & Kaul, J. D. (1978). The Hawthorne experiments: First statistical interpretation. *American Sociological Review, 43,* 623–643.	4
Yorks, L., & Whitsett, D. A. (1985). Hawthorne, Topeka, and the issue of science versus advocacy in organizational behavior. *Academy of Management Review, 10,* 21–30.	4
Bramel, D., & Friend, R. (1981). Hawthorne, the myth of the docile worker, and class bias in psychology. *American Psychologist, 36,* 867–878.	3
Parsons, H. M. (1992). Hawthorne: An early OBM experiment. *Journal of Organizational Behavior Management, 12*(1), 27–43.	3
Adair, J. G. (1984). The Hawthorne effect: A reconsideration of the methodological artifact. *Journal of Applied Psychology, 78,* 413–432.	2
Greenwood, R. G., Bolton, A. A., & Greenwood, B. A. (1983). Hawthorne a half century later: Relay assembly participants remember, *Journal of Management 9*(2), 217–231.	2
Mayo, E. (1945). *The social problems of industrial civilization.* Boston: Harvard University, Graduate School of Business Administration.	2*
Rice, B. (1982). The Hawthorne defect: Persistence of a flawed theory. *Psychology Today, 16*(2), 70–74.	2
Whitehead, T. N. (1938). *The industrial worker: A statistical study of human relations in a group of manual workers* (2 vols.). Cambridge, MA: Harvard University Press.	2*

* Indicates a primary source about the Hawthorne Studies

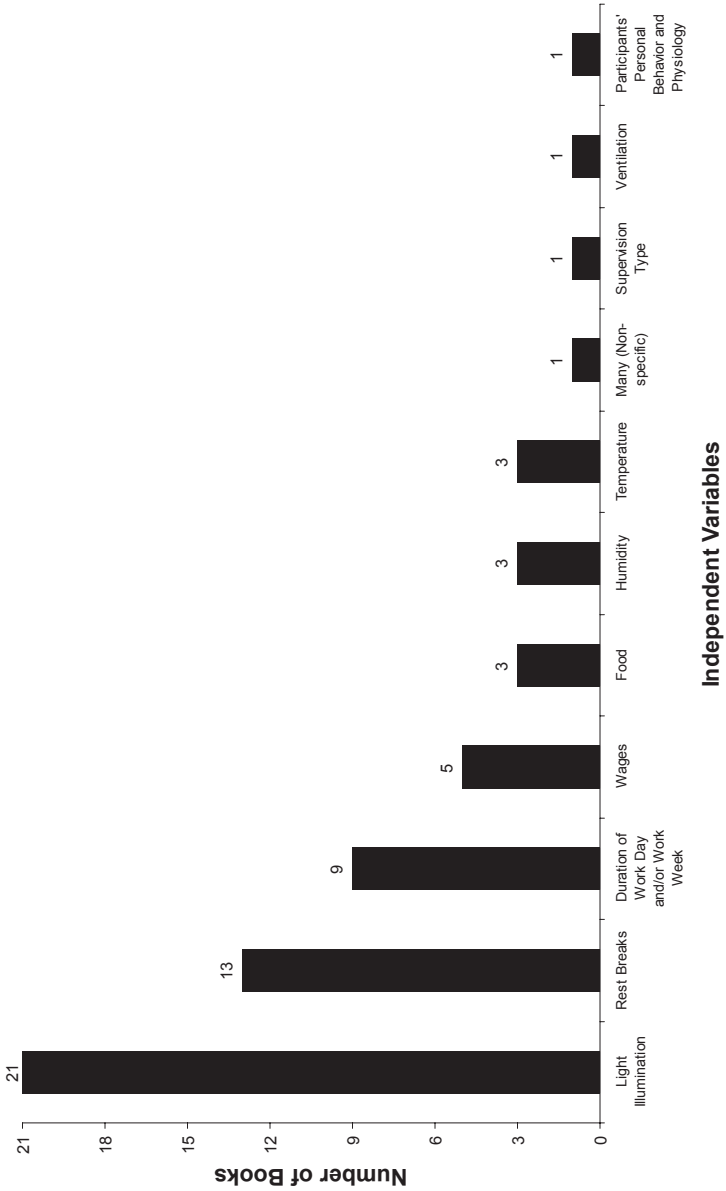

Figure 2. Independent Variables Discussed.

Dependent Variables

Dependent variables discussed in textbooks included productivity ($f = 21$), fatigue ($f = 1$), attendance ($f = 1$), and morale ($f = 1$). Authors elaborated primarily on changes in productivity, and in this regard, changes in productivity during the illumination studies were analyzed separately from changes in productivity across all other Hawthorne Studies. With regard to the illumination studies, the authors of 16 textbooks asserted that productivity always maintained or increased while 5 accurately reported that changes in productivity were inconsistent. The authors of 16 textbooks discussed additional Hawthorne studies beyond the illumination studies, of which 11 correctly reported that changes in productivity across all studies were inconsistent, 2 asserted that productivity across all studies always maintained or increased, and 3 provided no comment on the nature of productivity changes across all studies.

The Hawthorne Effect

Of the 21 textbooks reviewed, 13 included an explicit definition of the Hawthorne Effect. All definitions included some reference to a performance or behavior change. Only two definitions indicated that this change was temporary and/or brief, with one definition of this sort being followed by the elaboration that "The psychological literature indicates that Hawthorne effects may last anywhere from a few days to 2 years, depending on the situation" (Muchinsky, 2003, p. 12). Most definitions implicated certain variables as being the cause of Hawthorne Effects, with 9 of 13 definitions implicating participants' knowledge of being observed or of being in an experiment (i.e., reactivity), and 6 of 13 definitions implicating favorable or novel treatment, and/or special attention paid to subjects. See Table 2 to view full text definitions of the Hawthorne Effect by source.

Extraneous or Confounding Variables

A major theme of textbook material covering the Hawthorne Studies is the presence of multiple confounding or extraneous variables in the experiments. All 21 texts discussed the presence of confounding or unplanned social variables, which we labeled *social processes and/or norms* for coding purposes. The next two most frequent extraneous variables discussed were special attention paid to subjects ($f = 16$) and subject reactivity to experimental conditions or knowledge of being observed ($f = 10$). Other extraneous variables discussed in more than one text included financial incentives ($f = 5$), supervisor training or management style ($f = 4$), employee attitudes or feelings ($f = 3$), and subject expectations ($f = 2$). See Table 3 to view a summary of all extraneous variables discussed in the sample.

Table 2

Definitions of the Hawthorne Effect by Source

Source	Hawthorne effect definition
Bowditch & Buono (2001)	"...when people know they are being observed they often act differently from 'normal.' This tendency is often referred to as the *Hawthorne effect"* (italics in original, p. 361)
Champoux (2003)	"The effect on people's behavior because they are part of an experiment is known as the 'Hawthorne Effect.'" (p. 23)
Ivancevich & Matteson (2002)	"...the workers felt important because someone was observing and studying them at work. Thus, they produced more because of being observed and studied." (pp. 12–13)
Jewell (1998)	"...changes in behavior that are brought about through special attention to the behavior." (p. 4)
Jex (2002)	"...the idea that people will respond positively to any novel change in work environment." (p. 13)
Krumm (2001)	"...(the influence of observation on behavior)..." (p. 16)
Luthans (2002)	"Many social scientists imply that the increases in the relay room productivity can be attributed solely to the fact that the participants in the study were given special attention and that they were enjoying a novel, interesting experience. This is labeled the *Hawthorne effect.*" (italics in original, p. 18).
Muchinsky (2003)	A positive change in behavior that occurs at the onset of an intervention followed by a gradual decline, often to the original level of the behavior prior to the intervention." (p. 12, 490)
Nelson & Quick (2003)	"…peoples' knowledge that they are being studied leads them to modify their behavior." (p. A-4)
Newstrom & Davis (2002)	"The Hawthorne effect means that the mere observation of a group—or more precisely, the *perception* of being observed and one's interpretation of its significance—tends to change the group. *When people are observed, or believe that someone cares about them, they act differently."* (italics in original, p. 340)
Riggio (2003)	"Changes in behavior occurring as a function of participants' knowledge that they are being observed and their expectations concerning their role as research participants" (p. 9).
Schultz & Schultz (2002)	"...employee behavior changes just because something new has been introduced into the workplace" (p. 32).
Spector (2000)	"...knowledge of being in an experiment...caused increases in performance" (p. 10).

Conclusions and Caveats

Textbook authors often summarize main conclusions or lessons learned from the Hawthorne research. We observed the following types of conclusions and caveats with the highest frequencies: the importance of social processes and/or norms ($f = 21$), organizational behavior is complex and/or multiply determined ($f = 16$), beware of extraneous variables and/or experimental design flaws ($f = 13$), and beware of participant reactivity when conducting experiments ($f = 7$). All other conclusions or caveats were observed only once. A summary of all conclusions and caveats discussed in the sample are also presented in Table 3.

Table 3

Extraneous Variables and Conclusions/Caveats Discussed in the Textbook Sample

Dimension and subcategory reviewed	Frequency
Extraneous variables discussed	
Social processes/social norms	21
Special attention (novel or favorable)	16
Reactivity to experimental conditions	10
Incentives	5
Management style	4
Participant attitudes or feelings	3
Participant expectations	2
Participant interest in the experiment	1
Small work group size	1
Performance feedback	1
Replacement of 2 participants in RATR-1	1
Conclusions and caveats	
Social processes/social norms are important	21
Organizational behavior is complex/multiply determined	16
Beware of extraneous variables/experimental design flaws	13
Beware of participant reactivity to experimental conditions	7
Incentives affect behavior	1
Measurement validity is important	1
Supportive supervision is important	1
Employee attitudes affect behavior	1

Discussion

Hawthorne Studies Discussed

Based on our sample, the illumination studies have become the central locus of textbook material about the Hawthorne Studies; however, this degree of attention is probably not warranted. Parsons (1974) asserted that empirical information about the illumination studies is actually very limited, with the primary account of three formal and additional informal illumination studies coming from a relatively brief news report (Snow, 1927). Moreover, Roethlisberger and Dickson (1939), the most frequently cited primary source in our sample, dedicated only 4 of 604 total pages of text to describing the illumination experiments and discussing main conclusions about them. In the current project, we used a classification system that recognized at least six distinctive phases of Hawthorne research. In our view, students should be taught about these several experiments and projects at Hawthorne because each had its own complex goals, methods, results, and conclusions. More than half of the textbooks in our sample ($f = 13$) discussed Hawthorne research projects other than the illumination studies. However, some of this material was vague or misleading, with authors occasionally allowing events related to the RATR-1 experiment to blend with what they had written about the illumination studies.

References

The most frequently cited references within our sample provide a few good resources for both students and professors of I-O psychology and OB who wish to improve their understanding of the Hawthorne Studies. We believe it would be difficult to write or teach a simplistic account of the Hawthorne Studies after reading a primary source book like Roethlisberger and Dickson (1939) or secondary source articles like Carey (1967), Parsons (1992), or Franke and Kaul (1978). The first author uses an article by Parsons (1974) as a supplement to textbook material when teaching an introductory I-O psychology course. This particular article exposes students to data from the RATR-1 experiment and to information gathered from interviews with people who participated in the Hawthorne research. Parsons (1974) was cited only once in the sample, but it is referred to here because it functioned as an important stimulus for conducting this project.

Changes in Dependent Variables

When reporting on the effects of lighting manipulations on performance during the first formal illumination experiment that took place at Hawthorne, Snow (1927) wrote that "The corresponding production efficiencies by no means followed the magnitude or trend of the lighting intensities. The output bobbed up and down without direct relation to the amount of illumination" (p. 272). Contrary to the assertions of the authors of 76% of the textbooks in our sample ($f = 16$), performance did not always increase in the illumination stud-

ies. The myth of continuous improvement is also relevant to the RATR-1 experiment. Parsons (1974) noted that while the general trend in performance across the more than 2 years of research in the RATR-1 study was upward, performance did clearly decrease for at least 3 of 5 participants when lunch and rest breaks were suspended during phase 12 of the study. Moreover, in the bank wiring study, work groups actually restricted productivity through social consequences for working too fast. At any rate, beginning I-O or OB students can be misled when an account of the Hawthorne Studies asserts that changes in measures of productivity during the Hawthorne Studies were all upward regardless of experimental manipulations.

We also feel that it is important to emphasize with students that changes in dependent variables at Hawthorne took place over many months and even years. This is especially relevant when Hawthorne Effects are defined as temporary or brief in nature. While only 2 textbooks explicitly asserted that Hawthorne Effects are temporary, it is odd to think that any work-related variable could remain "novel" or "special" for as long as 2 years. Consider this issue in relation to the RATR-1 experiment. As discussed previously, performance did not always increase with each manipulation of the primary independent variables of rest breaks and duration of the work day; however, there was a general molar upward trend in performance across the months and years of the study. It seems logical that other variables, besides participants' awareness of being in an experiment or receiving special or novel treatment, must have been relevant to this molar upward trend in performance over such a long period of time. A few relevant variables of this type could have been learning or skill acquisition, the presence of several sources of performance feedback unique to the RATR-1 experiment, and the change in incentive pay for the group of 5 subjects in the RATR-1 experiment.

The full scope of changes in behavior and performance of subjects during the Hawthorne studies was complex, and considering this complexity can help prevent the development of mythical beliefs among students about the Hawthorne Studies. Data from primary sources can reveal performance changes both within and across conditions in the several experiments. The first author uses trends in performance during the RATR-1 experiment to introduce issues related to experimental control and decision making when using single-case style research designs, which can be usefully employed to evaluate the effects of management interventions within organizational settings.

Independent Variables

Excessive focus upon lighting manipulations can obfuscate other relevant independent variable manipulations made by Hawthorne researchers, including duration of rest and lunch breaks, length of work day, and the type of incentive pay. Rest breaks were a primary independent variable in the RATR-1 experiment but were only discussed in 13 of the 21 books in our

sample. Incentive pay was rarely discussed in our sample of textbooks (*f* = 5) as an intentionally manipulated independent variable at Hawthorne. In this regard, it is important to note that none of the textbooks in our sample reviewed the RATR-2 experiment, which was largely designed to try and isolate the effects of the change in incentive pay implemented during the RATR-1 experiment. Many students would be surprised to learn these facts and that participants' in the RATR-1 experiment ranked "earnings" among the top three reasons why they preferred the test room over regular working conditions (Turner, 1933).

The Hawthorne Effect

Perhaps one reason why the Hawthorne Effect was not discussed or defined by all textbook authors is the recognition that there has been some debate about the appropriateness of doing so. Brannigan and Zwerman (2001) argued that if the Hawthorne Studies are considered in their entirety, there must be more than one type of Hawthorne Effect. Other authors have argued that the evidence from the Hawthorne Studies, specifically the illumination studies, is just not good enough to draw weighty conclusions about a predictable effect or phenomenon (e.g., Parsons, 1974; Rice, 1982).

In spite of any controversies about defining the Hawthorne Effect, we were pleased to find some degree of consistency across definitions presented by different authors. However, in our view, the common themes of definitions (changes in behavior due to special or novel treatment or subject knowledge of being in an experiment) are not clearly distinct from either the concept of subject reactivity to experimental conditions or from the issue of confounding variables in experiments. Using the phrase "Hawthorne Effect" to describe reactivity or confounding variables in an experiment is probably unnecessary and may perpetuate other difficulties due to interpretive problems. One such difficulty is the tendency for students to reify the Hawthorne Effect and use it inappropriately as an acceptable explanation for behavior changes in organizations.

A primary report about the illumination studies written by Snow (1927) is primarily a description of efforts to gain experimental control over the subject matter rather than a story about a serendipitous discovery of the power of special, novel, or favorable treatment of subjects. The emphasis on social variables at Hawthorne within textbooks is probably due to a variety of subsequent reinterpretations of the illumination research made by both primary and secondary sources. If the original researchers could not isolate the effects of lighting on performance by controlling relevant extraneous variables during the actual Hawthorne experiments, the tradition of assigning causes to the historically observed changes in productivity post hoc within definitions of the Hawthorne Effect is probably an unfortunate tradition.

The evolution of terminology within a professional culture is probably never a perfect match with either history or the laws of nature; however, our language can improve in precision as our understanding of each of these variables advances. Our professional culture will benefit from teaching students about the historical and experimental context from which the current definition of the Hawthorne Effect has grown.

Extraneous or Confounding Variables

All of the textbooks in our sample emphasized the role of social processes and/or norms and special attention paid to subjects as potential confounding variables present in the Hawthorne Studies. Some accounts of the Hawthorne research seem to suggest that the industrial world was oblivious to the possibility that such "human factors" could affect work performance until the dramatic illumination experiments at Hawthorne. Hawthorne experimenters themselves were not naive to the fact that human variables, beyond environmental factors like illumination or incentive systems, could affect performance. In fact, Gillespie (1991) argued that experimenters *predicted* that coil workers would maintain their productivity when faced with inadequate lighting. Hawthorne researchers attempted to isolate the effects of intentionally manipulated independent variables from confounding variables, although most would agree that they were often unsuccessful. Researchers' failure to control confounding variables is different from a lack of awareness that such variables might be present and operative. It is misleading to give students the impression that humans working in industry before 1924–32 were completely ignorant of the relevance of complex human variables to work performance, although the Hawthorne Studies have certainly been used to shine the spotlight on such variables for many years.

The full range of confounding variables that the Hawthorne researchers struggled with is fascinating and can stimulate students to think about both human *and* environmental variables that can affect human performance at work. So while it was encouraging that so many textbooks made references to the bank wiring study ($f = 12$), where workers used a self-organized system of social consequences to restrict group productivity, it was discouraging that references to other confounding variables within the environmental type were comparatively rare. As previously mentioned, changes in incentive pay during the RATR-1 experiment were mentioned in only five textbooks. The fact that 2 of the 5 participants in the RATR-1 study were replaced several months into the RATR-1 experiment was mentioned only once. Changes in the quality and quantity of performance feedback during the same experiment were also mentioned only once in the sample.

Conclusions and Caveats

Congruent with material about extraneous variables, the majority of texts included Hawthorne-related conclusions or caveats about the potential influ-

ence of social processes and/or norms in work environments. In addition, many texts warned readers about flaws in experimental design that can introduce confounding variables and make it difficult to draw conclusions about an experiment. In our view, these conclusions and caveats are reasonable and worthy lessons to be gleaned from the Hawthorne Studies. However, the results of the current review suggest additional discussion points about the research, including the influence of environmental factors on work performance. It seems reasonable, even when discussing Hawthorne, to emphasize the truism that work performance is a function of both personal and environmental factors. Franke and Kaul (1978), who conducted statistical analyses of the original Hawthorne data, commented on this traditional unbalanced emphasis on human variables over environmental variables when discussing their empirical conclusions about the Hawthorne data:

> The experiments drew attention to small group processes, and the studies' conclusions led to widespread acceptance of human relations as a primary factor in worker performance. Following dissemination of the findings, previously attempted and conceptually simpler mechanisms such as those of scientific management (Taylor, 1911) tended to be given less emphasis as determinants of work performance. These variables include the possible benefits of fatigue reduction, use of economic incentives, the exercise of discipline, and other aspects of managerial control. *But it is precisely such factors to which we are directed by empirical analyses of the Hawthorne data.* (p. 638, italics added)

Modern interpretations of independent and confounding variables within the Hawthorne Studies are important because (a) original interpretations were influenced by both the ideology of the researchers and the zeitgeist or "spirit of the times" and (b) students should be apprised of important developments in their field, including new knowledge and interpretations of important historical events.

With regard to common caveats regarding experimental design flaws in the Hawthorne Studies, students are likely to benefit from greater specificity. Authors could point out such things as the value of unobtrusive measurement methods, the need to allow performance to stabilize before changing conditions in single case-style research designs, or the limited conclusions that can be made when more than one independent variable is manipulated simultaneously.

Conclusion

The breadth of the Hawthorne Studies makes them a difficult topic to review and summarize in introductory textbooks. We learned a great deal about the Hawthorne Studies as we conducted this review and are grateful for the hard work that went into writing each of these introductory I-O and OB textbooks. Some authors provided especially thorough and informative

material about the Hawthorne Studies (e.g., Luthans, 2002). It is through these books that many people are inspired to join our professional discipline, and we simply hope to contribute useful information toward this end with the current project.

What we teach about the Hawthorne Studies matters. When students are exposed to information about the Hawthorne research they begin forming beliefs about the complex causes of work performance and start to develop important critical thinking skills about experimental design and scientific methodology applied to organizational problems. What we teach about Hawthorne can also foster good scholarship and accurate shared knowledge among future members of our professional culture. We hope that the results of our review will be useful to those who write and teach about this important historical influence of our professional discipline.

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