

Unraveling the Hawthorne Effect:
An Experimental Artifact ‘Too Good to Die’

by

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*He who is only a traveler learns things at second-hand and by the halves, and is poor authority. We are most interested when science reports what those men already know practically or instinctively, for that alone is a true humanity, or account of human experience.*¹ (Thoreau, 1854)

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¹ Henry David Thoreau, Walden and Civil Disobedience (New York: Penguin Books, 1983). 258

INTRODUCTION

The famous series of experiments conducted at Western Electric's Hawthorne Plant in the late 1920's marks, both literally and symbolically, a moment of unparalleled shift in the values, assumptions, and initiatives that characterized the earliest years of the twentieth century. Historically situated in the formative era of the application of "reasoning and of those procedures that we call the *scientific method* to the understanding of human behavior," these experiments ultimately and powerfully underscore social psychologists' Ralph Rosnow and Robert Rosenthal's reflection, some sixty years later, that "the application of what we think of as scientific method has not simplified human behavior; instead, it has shown us just how complex human behavior really is."² The legacy of the revelation at Hawthorne of the complexity of human behavior is now packaged in the Hawthorne effect, a term that warns that the knowledge of being in an experiment may have a more powerful impact on participants' behavior than any single experimental variable. Since its introduction in 1953, this psychological term has pervaded psychological literature and attracted much critical scrutiny.

In *Manufacturing Knowledge: A History of the Hawthorne Experiments* (1991), scholar of the Hawthorne studies Richard Gillespie wrote that it would be "impractical to analyze the construction of each piece of scientific knowledge," yet the Hawthorne effect compels just such an examination.³ The introduction of this term almost 20 years after the experiments' completion reveals a shift in

² Ralph Rosnow and Robert Rosenthal, *People Studying People: Artifacts and Ethics in Behavioral Research* (New York: W.H. Freeman and Company, 1997). 2

³ Richard Gillespie, *Manufacturing Knowledge: A History of the Hawthorne Experiments* (Cambridge: Cambridge University Press, 1991). 267

understandings of the Hawthorne findings from their initial significance in undermining the then-dominant model of human behavior that conflated human with machine. Throughout its subsequent lifespan, the Hawthorne effect has taken on several identities.

These multiple identities of the Hawthorne effect have resulted in notable disagreement about its meaning and, in turn, have attracted much critical scrutiny to the term and to the experiments that ‘discovered’ it. However, as social scientists have attacked the validity of the Hawthorne effect from many angles, it has endured both as a tenable methodological consideration, and as a claim about a fundamental feature of human behavior. The pervasive appearance of this term in textbooks, academic dialogues, and journal articles evidences that the discipline of psychology continues to take the Hawthorne effect seriously. Why is it that the Hawthorne experiments and their effect, in the second half of the twentieth century, have been subject to such condemnation, and at the same time, are so remarkable and unforgettable?

As psychologists, social critics and others have expressed distinct readings of the Hawthorne effect, they have revealed problematic understandings of scientific experimentation and misguided expectations about scientific knowledge. By returning to the experimental and historical conditions through which the Hawthorne effect was discovered, we may uncover a story of scientific discovery, of the excitement of a group of experimenters who saw something of crucial importance in a set of experiments felt by others to be a complete failure, of how scientific activity produces knowledge claims, and charts the travels of such knowledge claims

throughout their life spans. At once a scientific term and yet so much more, the Hawthorne effect has had a colorful life, one that has at once imbued it with a plurality of meaning, has attracted to it fierce academic scrutiny, and, therefore, has much to teach us about tacit understandings of human behavior as well as about the nature of scientific experimentation.

By excavating the framework of the Hawthorne effect and the conditions of its production, this study examines the role of the social and experimental context in which knowledge is produced on shaping the implications of that knowledge, and on how that knowledge is consumed and utilized. This inquiry begins, in the first chapter, by reviewing the critical discourses that have been directed at the Hawthorne effect, and proposes a philosophical account of experimentation that helps to analyze that discourse. In the second chapter, I look at early twentieth century models of the human motor that the Hawthorne studies overturned, and in the third, I consider how events internal to the experiment later served to signal a more complex way of looking at the individual. The fourth chapter traces the trajectory of the Hawthorne findings from a loose set of positive claims about “human” and “social” factors to their articulation as an experimental artifact, a radical shift resulting from changes during World War II and the Cold War. And finally, in the fifth chapter, I consider the many dimensions of the Hawthorne effect, revealing how historical examination guided by a new conception of the experiment uncovers and unravels the paradox of the Hawthorne effect.

CHAPTER ONE

The Hawthorne Effect: Fact, Myth, Artifact?

*The ideological and methodological debates that often rage over the major field studies in social science...demonstrate how easily the gunsmoke of academic snipers can obscure the conceptual contribution of these pioneering efforts.*⁴ (Sonnenfeld, 1983)

*...the Hawthorne effect has a life of its own that seems to defy attempts to correct the record.*⁵ (Rice, 1992)

A study of the “Hawthorne effect” should rightly begin by introducing the phenomenon to which it refers, yet this is an interesting object of study precisely because it defies such a clear definition. In an essay published in Leon Festinger and Daniel Katz’s 1953 textbook, *Research Methods in the Behavioral Sciences*, experimental psychologist John French reflects on the Hawthorne studies, proposing: “the most interesting finding was what we might call the ‘Hawthorne effect.’” Describing of this finding that “it was the ‘artificial’ social aspects of the experimental conditions set up for measurement which produced the increases in group productivity,” French warns that field experiments, like laboratory

⁴ Jeff Sonnenfeld, "Shedding Light on the Hawthorne Studies," Journal of Occupational Behavior 6 (1985), 111

⁵ Berkeley Rice, "The Hawthorne Defect: Persistence of a Flawed Theory " Psychology Today (1992), 2

experiments, face the problem of “generalizing to real-life situations.”⁶ The Hawthorne effect, at its inception, precisely articulated a threat to the validity of experimental outcomes in field experiments.

A crisis in meaning has since surrounded the Hawthorne effect, due in large part to what are often subtle, but conceptually significant differences in subsequent definitions. This inconsistency is nowhere more clearly illustrated than in the definitions offered by textbooks, which differ on points so fundamental as the experimental variables, causal factors and agents, and even the direction of causality. Some textbook authors emphasize the psychological impact of receiving special attention, stating, for example, that “the favored group became superior because those workers developed a better attitude toward the company in consequence of their special treatment,”⁷ and that “one of the most effective ways of exerting pressure on individuals to do something is to show them we really care about them and want them to do this thing very much.”⁸ Others call attention to the impact of subjective, individual processes, making claims such as “the way workers *perceive* their situation may have more influence on their performance than the objective facts of the situation,”⁹ or “people are motivated not only by money and other objective states but also by their own needs and social relationships.”¹⁰ Still others attribute the experimental outcomes to the experimental intervention itself rather than to any of its precisely planned, unique features: “the demand characteristics were more important

⁶ Jr. John R. P. French, “Experiments in Field Settings,” Research Methods in the Behavioral Sciences, eds. Leon Festinger and Daniel Katz (New York: The Dryden Press, 1953). 100-101

⁷ Andrew Baum, ed., Social Psychology (New York: Random House, 1985).; 526-8

⁸ David O. Sears, ed., Social Psychology, Fifth ed. (New Jersey: Prentice Hall, Inc, 1985). 344

⁹ Richard R. Bootzin, Gordon H. Bower, Robert B. Zajonc and Elizabeth Hall, eds., Psychology Today: An Introduction, Sixth ed. (New York: Random House, 1986). 676

¹⁰ Saul Kassin, ed., Psychology Second ed. (New Jersey: Simon & Shuster 1998).293

in determining the workers' productivity than were the experimental manipulations."¹¹ The Hawthorne effect has also been placed in conceptually distinct categories, alternatively deemed to be an example of the uncertainty principle, a demand characteristic, a confounding variable, or an example of experimenter bias.

Such variations and consequent lack of clarity are further illustrated by a textbook survey of the Hawthorne studies published in a 2004 issue of *The Industrial-Organizational Psychologist*. The authors' examination of introductory textbooks in industrial organization and organizational behavior reveals 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." This absence of consensus is further exemplified by the extent to which "authors do not always discuss or define what has come to be called the *Hawthorne Effect*" and that "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."¹² As evidenced by this empirical review, the Hawthorne experiments, and their relationship to the Hawthorne effect, remain as problematically understood as the effect itself.

Finally, the variations in definitions of the Hawthorne effect are so extreme so as to have elicited an argument that there exist multiple Hawthorne effects.

Augustine Brannigan and William Zwerman posit in a 2001 article two distinct Hawthorne effects. The first, they propose, refers to "the potential change in

¹¹ David G. Elmes, Henry L. Roediger III, and Barry H. Kantowicz, ed, Experimental Psychology: Understanding Psychological Research, 3rd Edition (West Publishing Co.; St. Paul, 1998)., 74

¹²Ryan Olson, Jessical Verley, Lindsey Santos and Coresta Salas, ""What We Teach Students About the Hawthorne Studies: A Review of Content within a Sample of Introductory I-O and Ob Textbooks," The Industrial-Organizational Psychologist (2004). 23

industrial relationships made possible by the insights of scientific management of the sort proposed by Elton Mayo” in which is embedded “an understanding of the nature of industrial conflict based on a sophisticated understanding of human nature.” They attribute this Hawthorne effect to “the magic, first glimpsed in the illumination experiments” that “established to [the experimenters’] satisfaction that productivity was not slavishly linked to wages.”¹³ The second manifestation – “the small ‘h’ Hawthorne effect” – is the one they believe to be at the center of the academic controversy, one that represents the methodological artifact.¹⁴ This dual definition underscores the multiplicity of meanings that have been attributed to the Hawthorne effect and intimates a pervasive disagreement about how these different knowledge claims are rooted in the experiments that cultivated them.

As the Hawthorne effect has secured a presence in many of psychology’s sub-disciplines, the definitional inconsistencies challenge the development of a coherent, stable understanding of the phenomenon of which the Hawthorne effect is descriptive. Noting the variance contained in textbooks, a number of scholars have attempted to identify the effect’s ‘real’ meaning and in so doing, have suggested that the Hawthorne effect is based on a misinterpretation of the experimental data. In the 1980’s, for example, social psychologist John Adair reviewed textbook accounts of the Hawthorne effect, reporting both “objective errors of fact” and “disagreement in defining the artifact.” His striking characterization of the majority of these

¹³Augustine Brannigan and William Zwerman, "The Real "Hawthorne Effect"
," *Society* (2001)., 58

¹⁴ Brannigan and Zwerman, 58

definitions as “empty of meaning” indicates the erosion of conceptual precision that has likely effected from nearly thirty years of inconsistent definitions.¹⁵

Such examinations of the Hawthorne effect have not only focused on deciphering its exact content, but also raised doubts about its very existence. In the 1990’s, for example, Gordon Diaper determined from his review of academic literature and textbook definitions that “consensus of opinion would agree that the Hawthorne effect is the anomalous and enhanced performance of subjects participating in an experiment derived from the operation of an ill-defined intervening variable.” Yet, despite his apparently positive definition, Diaper questions the extent to which it is has real phenomenal correspondence, and looks for support of the Hawthorne effect’s existence in educational psychology studies that either included controls for the Hawthorne effect, or that specifically tested for its occurrence.¹⁶ In the first group of experiments, controls were devised for special attention, for awareness of experiment participation, and for novelty; only seven of forty such studies suggested the existence of a Hawthorne effect. In the second group of experiments, only four of thirteen studies were able to produce a Hawthorne effect.¹⁷ Diaper concludes from this project: “it would not be exaggerating to call [the Hawthorne effect] a myth.”¹⁸

The notion that the Hawthorne effect is a “myth” – or, not an empirical phenomenon – is suggested not just by the ambiguity of meanings and experimental

¹⁵ John G. Adair, "The Hawthorne Effect: A Reconsideration of the Methodological Artifact " Journal of Applied Psychology 69.2 (1984)., 3

¹⁶ Gordon Diaper, "The Hawthorne Effect: A Fresh Examination," Educational Studies 16.3 (1990)., 262

¹⁷ Diaper, 264

¹⁸ Diaper, 265

irreproducibility, but also by recurring critical scrutiny of the very conditions of its ‘discovery.’ The Hawthorne experiments have been subject to academic excavations and controversy so passionate as to be characterized by scholar of the Hawthorne studies Henry Landsberger as “as comprehensive an indictment of a theoretical system as could be imagined.”¹⁹ Critical analyses and outright attacks of the validity of the experiments and their effect constitute a notable portion of the roughly 750 articles that result from an online database search of “Hawthorne effect.” These critiques make compelling points against the meaning of the effect, as well as its very existence. Taken together, they even appear to be well-founded reasons for throwing the Hawthorne effect out of disciplinary literature, thereby preventing its future influence on professional practice.²⁰

Since the Hawthorne experiments’ completion, criticism has been directed at the integrity of the scientific method, the interpretations of the data, and the way the data was refigured in the Hawthorne effect. In his 1958 *Hawthorne Revisited*, scholar of the Hawthorne studies Henry Landsberger reviews the critical dialogue that emerged in the first twenty-five years after the Hawthorne studies. Among these attacks are such claims as “it is superficial and totally misses the point,” “it originates in the personal bias of its creators rather than in the facts it seeks to explain” and “it is deliberately formulated to favor one social group over another.” Identifying problems with the experiments’ design, execution, and interpretation, these early critics are primarily concerned with the integrity of the scientific method applied at Hawthorne.

¹⁹ Henry A. Landsberger, *Hawthorne Revisited: Management and the Worker, Its Critics, and Developments in Human Relations in Industry*, Cornell Studies in Industrial and Labor Relations vol. IX (Ithaca Cornell University 1958), 46

²⁰ Adair, 335

These accounts thus reveal the pressure on scientific activity to conform to rigid criterion advanced by the empiricist view of scientific activity: criteria that have a long-standing influence on notions about what science should be, but which, as we will later see, it may at times necessarily defy.²¹

Several critics have argued that this confusion about the Hawthorne effect is rooted in a problematic interpretation of the experimental data. Scholars Richard Franke and James Kaul, suspicious of the findings, conducted in 1978 a statistical reinterpretation of the experiments. Concluding that “quantitative analyses of the data from Hawthorne, as well as empirical studies of work groups in the decades subsequent, unfortunately do not support the contention that improvements in human relations lead to improved economic performance,” they intimate that the way the Hawthorne findings have been construed was influenced by factors other than experimental data.²² Social psychologists Dana Bramel and Ronald Friend extended this argument in 1981, specifically attributing what they perceive to be an incongruency between the data and their interpretation to the influences of class biases. Arguing that academic consultants Mayo and Roethlisberger were complicit in preserving “a view of workers as irrational and unintelligible and of the capitalist factor as nonexploitative and free of class conflict,”²³ these critics reflect a fear that any traces of non “objective” influences undermine the validity of interpretations, a discomfort rooted in the conventional scientific notion that the natural world presents

²¹ Landsberger, 46

²² Richard Herbert Franke and James D. Kaul, "The Hawthorne Experiments: First Statistical Interpretation " American Sociological Review 43.5 (1978)., 638

²³ Dana Bramel and Ronald Friend, "Hawthorne, the Myth of the Docile Worker, and Class Bias in Psychology " American Psychologist 36.8 (1981)., 867

itself unequivocally through the experiment, and the subsequent assumption that experiments yield data whose interpretation and implications are self-evident.

Later studies have corroborated these claims about the Hawthorne effect's lack of validity, but more constructively indicate areas of further inquiry. In particular, Stephen Jones conducted a detailed statistical analysis of the experimental data in 1992, and, indeed, concluded that there was "essentially no evidence of Hawthorne effects, unconditionally or with allowance for direct effects of the experimental variables themselves." Importantly, even claiming that "the original Hawthorne data are not adequate to the task of assessing this interpretation of what constitutes a Hawthorne effect," he does not call for its rejection from psychological science. Rather, he invites us to consider that factors other than the original data, such as the social context and experimenters' intellectual interests, have contributed to the construction of its meaning.²⁴ Acknowledging the possible contribution of factors other than the experiments and their data, however, requires carefully reconsidering the strict epistemological criterion typically placed on scientific knowledge.

These critical writings certainly suggest flaws in collective understandings as well as problems of evidence of the Hawthorne effect. So pervasive are these problems that one critic concludes that the Hawthorne effect is "the biggest Rorschach blot in the behavioral and social sciences"²⁵ while another compares it to "a number of other once widely held but faulty theories in psychology, such as the

²⁴ Stephen R. G. Jones, "Was There a Hawthorne Effect?," *American Journal of Sociology* 98.3 (1992), 467

²⁵ Diaper, 1

belief in a racial basis for intelligence.”²⁶ Yet another critic is so convinced of these flaws that he faults his peers who take the Hawthorne effect seriously: “the story of this myth’s growth and its recent debunking contains a moral of caution for behavioral researchers and those who uncritically accept their pronouncements.”²⁷ Given the extent of these criticisms and the passionate rhetoric with which they are delivered, it would not be surprising if the Hawthorne case had drifted into what John Law describes as the “limbo of the might-have-beens,” a non-place where reside scientific statements that never garner sufficient authority to become embedded in dominant understandings.²⁸

Yet something about the Hawthorne effect has enabled its triumph over these attempts to stifle its influences: it has, since its inception, become a staple of psychological understanding, entering the disciplinary discourse of such fields as introductory, industrial, experimental, and social psychology. One scholar who examined textbook accounts of the Hawthorne findings noted: “more than half of the surveyed textbooks considered the Hawthorne studies significant enough to include some sort of special presentation feature to supplement the textual information or to draw the reader’s attention to the subject.”²⁹ Textbooks, a primary and telling vehicle through which disciplinary knowledge is codified and disseminated, provide a unique glimpse into the ideas embraced by and definitive of the scientific community. As philosopher of science Thomas Kuhn has explained, “textbooks themselves aim to

²⁶ Rice, 2

²⁷ Rice, 2

²⁸ John Law, *After Method: Mess in Social Science Research* (London: Routledge 2004), 29

²⁹ Fiona A E McQuarrie, "How the Past Is Present (Ed): A Comparison of Information on the Hawthorne Studies in Canadian Management and Organizational Behaviour Textbooks," *Canadian Journal of Administrative Sciences* 22.3 (2005), 9

communicate the vocabulary and syntax of a contemporary scientific language,” and the pervasive inclusion of the Hawthorne effect by textbooks evidences that it is part of that language, highlighting its conceptual contribution.³⁰ Likewise, the frequent mention of the Hawthorne effect in articles that discuss specific experiments as well as those discussing general methodological considerations suggest that effect has been taken seriously by the field.

Even the very criticisms of Hawthorne’s methodology, interpretative biases, and social agenda have often demonstrated an implicit acceptance of the findings. For example, Alex Carey’s critique of the lack of human subject controls in the Hawthorne experiments presumes the very existence of a Hawthorne effect. In claiming that “gross error and incompetence in the understanding and use of the scientific method... permeate the Hawthorne studies from beginning to end,” he places particular emphasis on the absence of human subject controls. However, such controls were only developed after the Hawthorne studies, and largely in response to them; Festinger and Katz’s 1953 text, in which the Hawthorne effect first appeared, was among the first of such initiatives.³¹ Likewise, Franke and Kaul, while rejecting the scientific basis of the experimental conclusions, cannot help but concede that these experiments “serve as the paradigmatic foundation of the social science of work,” underscoring the findings’ paradoxical persistence.³² Even the most vehement critics of Hawthorne are deeply situated in its conceptual thrall, showing how these experimental findings have certainly become embedded in what has been described as

³⁰ Thomas S. Kuhn, The Structure of Scientific Revolutions (Chicago: The University of Chicago Press, 1996)., 136

³¹ Alex Carey, "The Hawthorne Studies: A Radical Criticism," American Sociological Review 32.3 (1967)., 3

³² Franke and Kaul, 623

the *hinterland*, the body of established scientific statements and practices that “determine what it is to do science, or to practice a specific branch of science.”³³

Thus, the Hawthorne effect has had an ironic trajectory, plagued by an ambiguity in meaning, subject to frequent, critical, investigation, and yet maintaining a noteworthy presence in textbooks and experimental designs. Exalted and rejected, enduring and problematic, the Hawthorne effect presents an inquiry that is at once irresistible and frustrating. What are we to make of the evidence of Hawthorne’s strong conceptual hold on the one hand, and its apparently fundamental flaws, on the other?

The criticisms described earlier help us to unravel the Hawthorne effect’s ironic persistence; a common strain in these arguments is a sense that this case defies expectations of experiments and of the knowledge they produce. Highlighting the limiting role played by notions about experimentation and experimental knowledge in guiding our consideration of scientific activity, the critical discourse surrounding the Hawthorne effects lays the foundations for and reveals the importance of the biographical study that will unfold in the following pages. Drawing upon industrial psychologist Jeff Sonnenfeld’s proposal that “the ideological and methodological debates that often rage over the major field studies in social science” often “obscure the conceptual contribution of these pioneering efforts,” it will thus be fruitful to reconsider the deeply registered notions at the basis of this debate.³⁴ Restructuring the conventional view of experimentation against which this case has been assessed

³³ Law, 29

³⁴ Sonnenfeld, 111

reveals that the flaws lay not in this set of experiments or their interpretation, but in our very notions about scientific activity.

This study examines, through a biographical approach, why the conceptual underpinnings of the Hawthorne effect are at once ineffable, problematic, and unforgettable. I look at how a variety of conditions – social, human, and natural, some stable, others unstable – preceding and underlying its production have made it so. Following Jones’ suggestion that “a fruitful line of sociological enquiry... would explore the social and historical context of the reception of the Hawthorne experiments and the process whereby the Hawthorne effect has become enshrined as received wisdom in the social sciences,”³⁵ this biography will consider the following questions: What enables a psychological “object” to triumph over or persist in spite of or without the “evidence”? How do these objects form out of and render meaningful otherwise disparate sets of observations? And finally, how and why do particular scientific objects travel through time? It is only by asking these questions that we may understand the Hawthorne effect itself, and its relationship to the experiments that produced it.

In addressing these questions, this study will develop a new conception of the process through which members of the social world gain knowledge about the natural world, a conception that locates and attempts to know the human subject. This reconception of the scientific experiment will serve to unravel the paradox of the Hawthorne effect, revealing that its simultaneous endurance and what seems to be an inherently flawed meaning effected directly from the conditions of its ‘discovery’ and articulation. Rather than ask whether the Hawthorne effect is, in fact, a “myth,” this

³⁵ Jones, 467

study instead asks why it has been understood as such, and why, despite such claims, it has persisted as a “fact.” In its stubborn persistence, this artifact and the complex fabric of its lifespan have much to teach us about the nature of experimentation, of changing understandings of the experimental subject, and, finally, about the object that subject is meant to represent – that is, at once, the student, the scientist, the industrial worker, the self.

PHILOSOPHICAL INTERLUDE

Understanding the Experiment and Experimental Understandings

*In nature there is just complexity, which we are remarkably able to analyse.*³⁶
(Hacking, 1983)

*...particular realities do not exist without sets of practices that include
inscription devices and the networks within which these are located.*³⁷
(Law, 2004)

The scientific experiment has been, for several centuries, the primary medium through which members of the “social” world come to know the “natural” world they inhabit. With great authority gained from its promise to satisfy ideals of objectivity, the experiment is understood to produce knowledge about the world untainted by human actions or ideas, knowledge in organic correspondence with the natural world. This conventional view of the experiment ascribes specific criteria to scientific knowledge: it must be accrued through stringent application of the scientific method, contain no traces of human bias, be objective, and remain stable over time. Likewise, this view of experiments discounts the possible influence of factors outside of the experimental conditions by considering them to be fundamental flaws should

³⁶ Ian Hacking, Representing and Intervening: Introductory Topics in the Philosophy of Natural Science (Cambridge, UK: Cambridge University Press, 1983). 226

³⁷ Law, 27

they be detected. Yet, as we will come to see, these factors play an important role in raising the very questions asked by the experiment, directing the choice of observations, and guiding the interpretation of data.

Regard for the Hawthorne experiments and Hawthorne effect reveals that some experiments and the claims they produce defy the aforementioned criteria and yet still make contributions of great importance. The ironic persistence of and paradoxical meaning wrapped up in the Hawthorne effect, in fact, perfectly exemplify the complexity of scientific activity and, furthermore, underscore the importance of understanding and accepting this complexity. This case also enables seeing that to acknowledge the influence of factors other than the experimental data on the conclusions ultimately drawn is not to undermine scientific objectivity or to remove the pedestal from under scientific knowledge. Many of the phenomena typically set in opposition to what is regarded as ‘scientific’ are, in fact, those that signify and inform its practice. Recognizing this assists in developing a more accurate conception of the nature of experimental knowledge – a conception that is both resolving of and illuminated by the life of the Hawthorne effect.

In this sense, this account of experimentation neither aspires towards the social constructivist, nor the empiricist, view. Toeing the line between these two extremes enables conceding that scientific claims are not unmediated representations of the natural world while still maintaining that these claims are true, that they represent “a *reality that is out there* beyond ourselves.”³⁸ This understanding guides a later examination of the construction and reconstruction of the Hawthorne effect, allowing consideration of its claims as ‘true’ while also examining how a variety of

³⁸ Law, 24

social, historical, and scientific factors have contributed to its meaning and to the paradox characteristic of it. While unraveling the Hawthorne effect, this account will have further significance in shedding light on the complexity of experimentation more generally.

Experiments are informed by factors other than the natural reality at many points throughout their execution and interpretation, and their very inception is a particularly important example of this. The natural world does not present to scientists topics worthy of investigation, but these are rather raised by the interaction of the natural with a variety of social and cognitive interests and activities. As Hugh Miller and Charles Fox argue in “The Epistemic Community,” the signification of objects or phenomena in the natural world depends upon basic perceptual processes as well as higher cognitive ones. Positing that physiological drives, by “bringing aspects of our surroundings to figure,” focus attention on objects and ideas, they claim that it is human intentionality that “signals meaningfulness.”³⁹ In other words, the natural world carries no innate scientific significance; it is only once attended to by the human mind that particular topics are rendered as appropriate for scientific investigation.

The aforementioned intentionality that deems topics to be of scientific importance is deeply informed by and grows out of the “hinterland,” a space proposed by Bruno Latour and Steve Woolgar to consist of the body of inscription devices and practices, and the statements about and understandings of reality already produced. In order to become part of the hinterland, claims must be adequately supported to

³⁹ Hugh T Miller and Charles J Fox, “The Epistemic Community,” *Administration & Society* 32.6 (2001)., 5

garner interest in the scientific community. In the case of the Hawthorne experiments, we can see how already established understandings about human behavior and the contemporaneous psychological practices helped to determine the way experimental questions were raised and why they were understood to be significant. Constitutive of established scientific understandings and practices, the hinterland is so implicitly registered as to form what Law has described as “a backdrop of realities that cannot be wished away.” Necessarily rooted in this hinterland, each experiment is not an independent moment of scientific activity but, rather, part of an intricately interwoven system, one that continuously draws from and builds upon itself. The hinterland is constituted by the understandings and gaps in understanding against which experimental questions are raised, and it subsequently guides approaches to answering these questions and dictates how their findings are then understood. So an experiment is given both content and form by the hinterland, and, as we will later see, may in turn come to alter it.⁴⁰

Once experimental questions are formed, hypotheses developed, and methods designed, experimental activity is best understood as an intervention into reality. Experimenters must devise a means of disentangling their subject of interest from the messiness of the natural world, and in this sense, are at once productive of new phenomena. Ian Hacking aptly describes the experiment as a productive process – when scientists present “in the laboratory, pure, isolated, phenomena,” what they observe “did not exist until the creation of our part of the universe.”⁴¹ Scientific activity is in this sense a nuanced mediation in which experimenters must alter the

⁴⁰ Law, 31

⁴¹ Hacking, 226

world in order to know it, ultimately creating new events in the laboratory. In observing and interpreting these events, agents make scientific statements that are real, but that could not exist without the scientists' hand or the inscription devices through which research is enacted.

What this understanding of the experiment implies about the correspondence of our knowledge with the natural world is best exemplified by Hacking's discussion of "effects" (a sort of scientific claim that is, of course, of particular relevance here). Effects are phenomena that are created during the experiment – though descriptive of the natural world, such phenomena would not occur outside of the experimental bounds. As Hacking puts it, effects are a precise kind of phenomena that result when experimenters "intervene in the course of nature, to create a regularity which, at least at first, can be seen as regular (or anomalous) only against the further background of theory." In this sense, they are true claims, but they do not describe nature in an unmediated way. Further arguing that "we should not have the picture of God putting in the Hall effect with his left hand and another law with his right hand, and then determining the result," Hacking underscores the necessary role played by the experiment in producing, rather than simply gaining access to, knowledge about the world.⁴² So, claims such as the Hawthorne effect do "not exist outside of certain kinds of apparatus." Further explaining that "the effect, at least in a pure state, can only be embodied by such devices," Hacking gestures toward the necessary role of the experiment in producing, rather than simply gaining access to, knowledge about the world.⁴³

⁴² Ibid.

⁴³ Ibid.

By intervening in nature and producing particular phenomena, scientific activity thus creates knowledge that would be untenable without the hand of the experimenter. In this sense, many of the criticisms of the validity of the Hawthorne effect are not so far astray in their contention that the Hawthorne effect does not really exist, as it is, certainly, an experimental product, or artifact. This view does not, however, suggest that experimental knowledge is out of correspondence with reality. Latour and Woolgar support a realist perspective, contending that “we do not wish to say that facts do not exist or that there is no such thing as reality” but rather, that “‘out-there-ness’ is the *consequence* of scientific work rather than its *cause*.”⁴⁴ In other words, the experiment is productive of reality – what we come to understand is certainly ‘true’ or ‘fact’ but is deeply reliant upon the practical and cognitive activities underlying experimentation.

During the course of an experimental intervention, the assumptions and understandings which reside in the hinterland continue to actively shape emerging knowledge. The precise relationship between established understandings, the import and implications of the question at hand, and the way the experiment unfolds, all operate together to determine what the data is taken to mean, and how it travels. Laslett’s point that “new knowledge and new theories inevitably challenge older ones” and thus “are not accepted without contest,” underscores how the relationship of an experimental question to established theories may determine both the content of interpretations, and the nature of their acceptance.⁴⁵ Indeed, an examination of Hawthorne’s hinterland will reveal how it contributed to the particular salience of the

⁴⁴ Bruno Latour and Steve Woolgar in Law, 29

⁴⁵ Barbara Laslett, "Unfeeling Knowledge: Emotion and Objectivity in the History of Sociology," Sociological Forum 5.3 (1990)., 415

findings, and, in turn, to how they were packaged the Hawthorne effect, and to their enduring influence. The extent to which new knowledge claims support the character of the hinterland (or oppose it) raises the implications involved in accepting them and, in turn, informs their trajectory, as “intellectual work entails more than the production of knowledge; it also involves intellectual advocacy.”⁴⁶ In this sense, the intellectual and emotional commitments of experimenters – which may or may not be reflective of disciplinary consensus – come to play an important role in the way observations are interpreted, the extent to which they are signified, the shape they assume, and the way they travel out of the laboratory.

And so as the experiment mediates between the worlds outside and internal to the laboratory, and as it mediates between the interests and tools possessed by the scientists and the natural world s/he studies, it also serves as meeting ground or point of contention between past and future understandings. As realities are produced through the experimental intervention, they become registered in, and thus constructive of, a sort of collective reality, taking part in a feedback loop through which, as Law describes, “statements stabilize, and then recycle themselves back into the laboratory.”⁴⁷ Through this feedback process, a “scientific reality is produced,” one “that appears to be – and in a real sense is – independent of our particular scientific perceptions and actions.”⁴⁸ In other words, as statements and their implications about the world reenter the laboratory, they become part of the hinterland, providing the conceptual and practical foundations for future experimentation and becoming real through their application. If, as Law further

⁴⁶ Ibid.

⁴⁷ Law, 33

⁴⁸ Law, 36

argues, “the object of scientific practice is to make unqualified statements about reality” and that “it is important to routinize statements by turning them into taken-for-granted assumptions, instruments, or skills,” then as much as scientific questions and activity are rooted in the hinterland, they likewise alter and insert into it new understandings.

The story of the Hawthorne studies and the “effect” that is their legacy is a testament, above all, to the extent to which “when everything is going well experiments tend to produce traces that contradict one another and erode rather than strengthen putative accounts of reality.”⁴⁹ This study looks at the account of reality that the events at Hawthorne served to erode and what it was about these events that made the findings so powerful. Furthermore, it considers the new account of reality effecting from this process, and how this reality, in turn, shaped the later trajectory of the Hawthorne effect. This examination enables a better understanding of how the Hawthorne effect became part of the contemporary “backdrop of realities that cannot be wished away” – and why so many individuals have persistently attempted to do so. It shows that “*it is often surprisingly difficult to reproduce the novel findings of one laboratory in other laboratories*” and that this profound difficulty is a testament to the complexity and necessity of the factors intersecting to make such a scientific discovery possible.⁵⁰

Examination of the Hawthorne effect explicates how these characteristics of the experiment play out. Tracing which “things are not clear” before the Hawthorne experiments will help to identify the particular realities challenged by and created by

⁴⁹ Law, 29

⁵⁰ Law, 30

their findings. How the events at Hawthorne interacted with these realities, and thus registered it in the hinterland, illuminate why the Hawthorne effect has at once wielded notable conceptual influence and attracted stark academic scrutiny. This biography of an experiment must, therefore, begin with a close look at the hinterland against which the Hawthorne studies were conducted, before traveling down the route through which the findings came to challenge and reshape that hinterland.

CHAPTER TWO

The ‘Hinterland’

One day (a hundred years ago)... man went from the immemorial speed of walking to the unlimited speed of machines. Everything was called in question. The limits of control, imperturbable in its course, continued to mark the rhythm of our work.⁵¹ (LeCorbusier, 1964)

The triumph of Hawthorne’s legacy over a plethora of attempts to reject its empirical and theoretical bases can only be understood in terms of the hinterland from which it emerged. As defined by Latour and Woolgar, the hinterland is a body of consensual or established understandings: those “statements that carry authority, that tell about the outside world.”⁵² Subsequent experiments are signified and shaped by the extent to which they either contribute to or threaten to overturn statements of the hinterland. Of particular significance here are the notions offered by the hinterland preceding the Hawthorne experiments – notions about human behavior and, in particular, about the factors driving worker productivity. These notions were implicit in the questions posed at Hawthorne and informative of how the experimental data was understood. In fact, the revelation at Hawthorne of the irrational and invisible social and psychological processes driving human behavior was primarily important

⁵¹ LeCorbusier, When the Cathedrals Were White (New York: McGraw-Hill Book Company 1964). , xix

⁵² Law, 27

because it was held to have directly opposed the then-dominant behavioristic conception of the individual. The narrative of discovery that characterizes the Hawthorne experiments in both the initial and subsequent reports dramatically charts the extent to which the experiments undermined dominant thought about the individual; it was the triumph of this new view that was ultimately packaged in the Hawthorne effect. What the unfolding events at Hawthorne were taken to suggest, and how their interpretation has traveled during the past seventy-five years, needs to be understood in terms of their relation to the hinterland in which the experimenters' initial design and expectations were deeply rooted.

The Hawthorne studies were conducted near the end of a period of massive social change, one driven by a pervasive exaltation of the ideals of efficiency and rationality. As the application of rational, scientific ideas proved to be the most fruitful means of maximizing industrial efficiency, American society at once became increasingly industrialized and also more stringently centered upon and dedicated to these ideals. Although initially directed towards maximizing the performance of machines, this rational mechanical approach eventually was applied to the very social organization of industrial plants; after all, the palpable progress effecting from this rational approach to the workplace compelled its extension to all functions of society. In turn, the individuals likewise were reconceived as mechanical units of a system that would operate seamlessly if rationally controlled.

The rational, mechanically inspired notion of the individual, "the human machine," residing in the hinterland of Hawthorne was influenced by advances made by the physical sciences throughout the half century preceding the experiments.

Increasingly sophisticated understandings of energy and conservation were extended, first, to understanding the operation of machines, and soon thereafter to their physiological correlates, to the way these laws of energy impacted human performance. In turn, understandings of human behavior were translated into the language of industry. Just as the laws of energy – and explanations about its conservation and depletion – were central to rhetoric about the machine and construed as the limits to maximizing mechanical efficiency, the human correlates of ‘idleness’ and ‘fatigue’ were tagged as the limits to human production.⁵³ As a result of a reconception of the worker in these terms, “controversies over the length of the workday, occupational accidents, and military training, the science of work sought to deliver an objective and nonpartisan answer to the most vexing social issues” were guided by assumption that “the body was a motor, and that scientific objectivity and expertise were sufficient to provide an objective solution to the worker question.”⁵⁴ And so just as the maximization of mechanical efficiency had been placed in the domain of rational thought, so too was the maximization of human production construed in terms of straightforward, mechanical relationships between external working conditions and the worker’s internal physiological drives.

Seeing the worker as a human machine was appealing for proponents of industrial progress, for it suggested how limits of industrial production could be overcome. As Anson Rabinbach describes, the result of so “attributing an objective basis to highly subjective states” was the “utopian ideal of transcending it,” a promise

⁵³ Jeroen Jansz and Peter van Drunen, eds., *A Social History of Psychology* (Malden, MA: Blackwell Publishing, 2004), 135

⁵⁴ Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Basic Books, 1990), 11

that gave a sense of control over what, conceived in more subjective states such as the morally laden experience of *ennui*, would be uncontrollable.⁵⁵ This approach to individual workers as motors, who experienced limits of fatigue that could be overcome much like those facing machines, was presumed in the hinterland from which the Hawthorne experiments emerged. Implicit in this reconception of the individual as a vehicle of the emerging ideals of production and efficiency was an active neglect of the “individual motivational factors” and “social influences on the individual” to which the investigators at the Hawthorne plant would later return.⁵⁶ The understanding of human behavior as a direct and thus controllable process was institutionalized in this hinterland as it was adapted by models of social management, of which Frederick Taylor’s doctrine of scientific management is particularly relevant.

The most enthusiastically embraced and widely practiced theory of management at the time of the Hawthorne studies, Taylor’s approach was an important force behind the conflation of worker with machine. Taylor modeled his approach not on understandings developed by psychology but rather on those central to the field of engineering. Having spent time as chief engineer of one of the most prominent US steel companies, Taylor based his theory of management on the expertise he had gained through his extensive training and experience in technical engineering.⁵⁷ Noting the tension between employees’ desire for high wages and employers’ desire for cheap labor as a central obstacle to workplace harmony, Taylor focused on economic incentives for increasing worker effort and thus productivity.

⁵⁵ Rabinbach, 44

⁵⁶ Landsberger, 86

⁵⁷ Jansz, 138

He slowly introduced a scheme for managerial control over the work process as well, effectively publicizing his theory of scientific management *Shop Management* (1903) and *The principles of scientific management* (1911).⁵⁸ Reflecting and perpetuating the central belief that social and mechanical engineering could be approached in a similar manner, Taylor's scientific management was both theoretically indicative and literally an important part of Hawthorne's hinterland.

Although Taylor's background as an engineer significantly informed his conflating of worker with machine, the logic had proponents with more explicitly psychological orientations. The emerging field of industrial psychology relied upon a behavioristic perspective that deemphasized the complexity and irrationality of internal drives in favor of more direct physiological relationships.⁵⁹ It was successful in some realms – starting with Henry Hollingsworth's research for Coca Cola in 1909, psychology was regarded potentially useful for industry. However, the initial work in industrial psychology served to reinforce efforts to maximize efficiency, likely because psychologists were hired by, and thus had to satiate, managerial authorities.⁶⁰

The construction of the Hawthorne plant in 1905 was part of the Western Electric Company's aim to keep abreast of these industrial trends. The company's placement of the plant in Cicero, Illinois, near Chicago was strategic; Chicago, due to a particularly rapid pace of urban growth, and as one of the nation's two communications centers, was both practically and symbolically a bastion of industrial

⁵⁸ Jansz, 141

⁵⁹ Landsberger, 87

⁶⁰ Jr Ludy T. Benjamin and David B. Baker, From Séance to Science: A History of the Profession of Psychology in America (Belmont, CA: Wadsworth/Thomson Learning 2004)., 123

power, and this location situated Western Electric at the forefront of the industrial realm. The pragmatic location of the new plant was just one part of a larger scheme to reinforce the modern and progressive identity of Western Electric.

Between 1908 and 1926, under the leadership of DuBois and Thayer, Western Electric followed contemporaneous trends in industry of scientific management. A comprehensive account of the company's history describes that by the 1920s, the Hawthorne Works:

had become a virtual city unto itself, complete with restaurant, hospital, library, credit union, powerhouse, ballpark, gymnasium, news media (the *Hawthorne Microphone*), band shell, and a band in blue uniforms and brass braid.... At Hawthorne, one could pursue the arts (from dancing to photography) or education (from English to circuits). Hawthorne even offered the sort of groups and rituals a society uses to convey membership and to recognize passages... For Western Electric, Hawthorne represented a departure... from the way the company once did business.⁶¹

The Hawthorne Works, then, represented the epitome of the modern factory and, in turn, symbolized as it enabled the new ideals of industry and progress. It was, importantly, in this symbolically and literally innovative industrial environment that the Hawthorne experiments were executed.

With the construction of the Hawthorne plant, Western Electric had already made an important step in ensuring efficient production, and by 1923 consolidation had been effectively realized through changes to the company's organization in line with the period's conceptual changes. Keeping up to speed with the new ideal of the modern factory, the use of skilled workers with varying responsibilities was phased out and replaced by semiskilled and unskilled workers responsible for operating

⁶¹ Stephen B. Adams and Orville R. Butler, Manufacturing the Future: A History of Western Electric (Cambridge, UK: Cambridge University Press, 1999)., 84

machinery or for a single aspect of product assembly.⁶² Reactive to and reflective of contemporaneous industrial trends, the company pursued goals of increased efficiency in production and management, and in shifting emphasis to the machine, took part in the pervasive mechanizing of society.⁶³

The Hawthorne studies, which may even be said to mark the first tangible marriage of academic psychology with industrial progress, were thus initially framed by a sort of Taylorist mechanical perspective, but, importantly, emerged at a time in which the shortcomings of Taylorism were becoming apparent. Although the approach encouraged by scientific management had great resonance for American industry – for whom, as Jansz points out, ‘efficiency’ was the universal slogan – workers were becoming increasingly dissatisfied, and this was having a negative impact on production via the growing influence of labor unions. Pioneer of industrial psychology Hugo Münsterberg thus promoted the use of psychology in industry by identifying this unrest as a consequence of Taylor’s neglect of the “behavior, motives, and mental life of workers.”⁶⁴ Further encouraged by the revelations by World War I that human motives, attitudes, and emotions played an important role in human management, the use of psychological research for industrial ends was gaining increasing social appeal in the 1920’s.⁶⁵

Western Electric, although in many ways dependent upon the Taylorist perspective, drew especially heavily on scientific expertise and inquiry to reach its prime operation. The company had first established an industrial research program in

⁶² Gillespie, 14

⁶³ Adams and Butler, 77

⁶⁴ Jansz, 142

⁶⁵ Benjamin and Baker, 139

the late nineteenth century in hopes of improving upon its communications technologies, directing science towards securing a competitive edge by employing the most up-to-date communications techniques. The utility of the social sciences became apparent to the company's management after participating in a research project in which proponent of industrial psychology Walter Dill Scott illuminated for them "the art of human engineering."⁶⁶ By 1920, personnel managers had been appointed to the Hawthorne Works' major branches, and in 1922 a General Personnel Committee was established at the company's main office in New York.⁶⁷ The company's preexisting association with and enthusiasm about the application of scientific inquiry to industry would play an important role in the unfolding of the Hawthorne experiments – because the Bell System had longstanding engagement with and was a notable proponent of scientific inquiry and its application to industry, it seemed natural for Western Electric to maintain this commitment in its attempts to secure progress.⁶⁸ Western Electric's previous success with using this approach to maintain a competitive edge and an innovative approach paved the way, both in terms of its practical/logistical readiness, and the ideological openness of the management, for the experiments with which we are primarily concerned.⁶⁹ The company's awareness of the benefits of using scientific research for industrial progress, then, prepared it to employ scientific research in creative ways and, thus, laid the foundations for the unique unfolding of the Hawthorne experiments.

⁶⁶ Adams and Butler, 119

⁶⁷ Gillespie, 25

⁶⁸ Adams and Butler, 119

⁶⁹ Gillespie, 29

Characterization of the hinterland leading up to Hawthorne is important not just because it was complicit in a very specific notion of the individual, but because its ascendance was paralleled by anxieties. Stuart Chase, a proponent of social science frequently published in the popular *Reader's Digest*, specifically identifies the crisis imposed by this model – a crisis marked by the struggle to “remain human” in the face of increasingly dehumanizing techniques of social control. Arguing in his *Men at Work* (1941), “the machine process directly threatens the individual, as when human robots are created by stop-watch methods, by monotonous, repetitive tasks, by the belt or its equivalent,” Chase aptly articulates the negative side of this industrially based model of the individual.⁷⁰ At once a salient model for the masters of industry and a problematic one for the individuals described therein, the human motor model prioritized industrial progress over individual well being through its evasion of the complexity of human reactivity.

⁷⁰ Stuart Chase, *Men at Work: Some Democratic Methods for the Power Age* (New York: Harcourt, Brace and Company 1941), 5

CHAPTER THREE

The Hawthorne Experiments

*Despite the criticisms, this pioneering research will long be remembered as a 'classic' – by failing to prove its point.*⁷¹ (Zimbardo, 1985)

As one scholar aptly noted, the scientific experiment is best understood as “a dance not behind or beyond, but in ‘the between’, where knowledge and being meet.”⁷² Through this dance scientific practice walks the line between the natural and the social; between what we control and what controls us; between the agency of the experimenter and the agency of the object of the experiment. In the choreography of this dance at the Hawthorne plant, the multiplicity of meaning embedded in the Hawthorne effect, and the symbolic import of its contemporary use, are fashioned.

The many connections between the precise nature of the experiments at the Hawthorne plant, the knowledge they produced, and the impact of that knowledge compels us to adopt what scholar Richard Whitley has termed the ‘translucid box’ approach to the study of knowledge. This approach, Whitley explains, looks at “the conditions under which different research programmes are, and become, popular” and asks the following question: “how do social and cognitive factors interact to produce

⁷¹ Philip Zimbardo, ed., *Psychology & Life* (Illinois: Scott, Foresman & Company, 1985), 35

⁷² Karen Barad, "Meeting the Universe Halfway," *Feminism, Science and the Philosophy of Science*, eds. Jack Nelson and Lynn Nelson (Kluwer, 1996), 185

knowledge and what effect do they have on society?”⁷³ It is only by taking this approach, and underscoring “relations between scientists’ behavior, products and social institutions while allowing for scientists’ rationally increasing knowledge,” that we may move closer towards “understanding how different forms of knowledge arise, are accepted and change relations between such knowledge and the wider culture.”⁷⁴

This chapter examines the activities internal to the Hawthorne experiments, revealing the range of scientific and social factors that transformed an experiment initially conceived to support existing notions about human behavior into one that soon came to challenge them. By examining this transformation, we better understand that the very activity internal to the experiment itself, in addition to its inputs and outputs, have contributed to the revolution in meaning of the Hawthorne findings. Opening of the translucent box ultimately reveals much not only about the social and historical significance of the Hawthorne findings and the process through which the knowledge was constructed, but also about how understandings about the internal complexities of human behavior taken for granted today are rooted in this initially modest experiment.

Discovering the Human Factor: *The illumination experiments*

The Hawthorne studies began in 1924 as a series of three illumination experiments conducted by the National Research Council of the National Academy of Science.⁷⁵ This research initiative, at its outset, did not prioritize – or even explicitly

⁷³ Richard Whitley, "Black Boxism and the Sociology of Science; a Discussion of the Major Developments in the Field," *The Sociological review monograph* 18 (1972), 64

⁷⁴ Whitley, 86

⁷⁵ Gillespie, 38

seek – psychological insight but was rather expected to contribute to what has been described as “a major campaign in the early 1920s to encourage the use of artificial rather than natural lighting.”⁷⁶ As technological innovation increasingly provided ways to achieve comparable levels of lighting using less electrical power, the electrical industry grew concerned about the waning demand for its product. The industry’s subsequent desire to maintain this interest catalyzed the research at Hawthorne, which was expected to provide scientific evidence emphasizing to companies the benefits of using adequate lighting. These benefits, it was thought, would include preserving workers’ sight, preventing accidents, maximizing productivity and increasing profits – a hypothesis based in the popular assumption that the relationship between workplace environment and worker behavior was a strictly physiological, or mechanical, one.⁷⁷

Western Electric’s longstanding commitments to research and to programmatic innovation made the Hawthorne plant a viable location for the research program, and facilitated the experiments’ later continuation and expansion in scope. Superintendent Clarence G. Stoll was so enthusiastic about the research program that he not only agreed to participate but also offered to provide financial support for the installation of lighting and the maintenance of production records.⁷⁸ The experiments were, therefore, driven by and expected to serve corporate interests. Though they were not, at the outset, driven by a quest for new understandings, Stoll’s enthusiasm about research and subsequent involvement in the project was a central catalyst for the bulk of experiments that ultimately comprised the renowned Hawthorne studies.

⁷⁶ Adams and Butler, 120

⁷⁷ Ibid.

⁷⁸ Gillespie, 40

The research program thus commenced in the illumination experiments with a very specific question, and sought specific ends – it was only as these initial trials unfolded that the ultimately central research questions developed. The experiment began by progressively increasing illumination in three distinct departments, and the impact on worker productivity was measured. The results were erratic and inconsistent across departments. Because the visiting investigators sought to document a specific direction of causality, they conducted a second line of inquiry focused on a single department. This time, production of both the test group and the control increased notably, and experimenters were, again, dissatisfied with the results.

Because the experimenters were deeply committed to verifying their hypothesis and reinforcing the notion that productivity was related to a direct, physiological relationship between worker and workplace conditions, they devised yet another experimental stage. In order to eliminate what they expected might have been a confounding factor, they used only artificial lighting where they had previously used both artificial and natural lighting. Again, both groups exhibited increased productivity – only extremely low illumination caused decreases in the levels of production of the test group.⁷⁹

Though these results seemed to have demonstrated a significant relationship between illumination and productivity, these three experiments were proclaimed to be too contradictory for valid interpretation.⁸⁰ Perhaps fearing that the results would undermine their corporate agenda, or simply suspecting that something must have gone wrong in the experiment, the executing Committee on Industrial Lighting

⁷⁹ Landsberger, 7

⁸⁰ Landsberger, 5-7

abandoned the project, declining to even issue a report of the findings. Having only sought evidence in favor of the hypothesis to which they were committed - that “industry needed to use more artificial lighting”⁸¹ – they were either blinded to, or purposefully ignored the extent to which the results revealed faults in the dominant mechanistic model of the worker. So deeply convinced of, and historically situated in, the earlier described conception of the human motor implicit to industrial and social thought at this period, the Committee was not interested in pursuing this notable evidence suggesting otherwise.

It was, therefore, of great historical chance that Hawthorne’s management, having expressed some interest in research outcomes, was kept up to date on the experimental developments. The interests of Stoll, now Vice President, and Technical Superintendent George Pennock were sparked when they were “quickly alerted to the role that supervision appeared to be playing in the experimental results.”⁸² Stoll and his staff decided to continue the experiments, redirecting inquiry into the relationship between work conditions and worker productivity to “determining the impact of various lighting levels on workers’ attitudes, behavior, and productivity.”⁸³ And so it was in departing from the initial agenda pursued by the Committee on Industrial Lighting, and taking an approach guided by less strict hypotheses, that the now classic Hawthorne studies were born.⁸⁴

Although the experiments continued through 1933 under the control of Hawthorne’s management and outside academic expertise, these initial studies were

⁸¹ Adams and Butler, 122

⁸² Gillespie, 45

⁸³ Adams and Butler, 122

⁸⁴ Adams and Butler, 121

almost wholly responsible for informing what was to become the persisting perception of the Hawthorne experiments and of their findings. By defying initial expectations, the findings were understood to have triumphed over faulty understandings and so signified these experiments, for those involved and for the public, an occasion of genuine scientific discovery, a status whose import cannot be overstated. It was this sense of the illumination experiments as a moment of, as scholar Alex Carey put it, “‘*éclairissement*’ about the predominant importance of social satisfactions”⁸⁵ that has imbued the findings, and particularly their articulation in the ‘Hawthorne effect,’ with their most pervasive and persistent meaning as indicating that individual behavior cannot be understood as a mechanically driven phenomenon.

It is undeniably difficult for the contemporary reader, psychology student, or critic to relate to this sense of surprise, as these so-called human or social factors are today implicit to understandings of human behavior. To understand the ideological magnitude of the illumination experiments for their contemporaries, it is worthwhile to put ourselves in their shoes. As one scholar has put it:

the difficulty, or so I believe, lies in our twenty-first century eyes. We have seen too many costume dramas in which people from other times and places think and behave just as we do. They didn’t. Talk to someone who lived through the 1920s, and the strangeness will not at first be apparent – for them the landscape has moved at the same speed as the train – but sooner or later they will say ‘things were very different then.’ Things *were* very different then... Seen from this perspective, the excitement of the Hawthorne investigators becomes easier to understand.⁸⁶

⁸⁵ Carey, 404

⁸⁶ E.A.M. Gale, "The Hawthorne Studies - a Fable for Our Times?," *Q J Med* 97.7 (2004), 444

To the management at Hawthorne, the mechanical model of worker conduct had seemed so self-evident that these emerging suggestions otherwise seemed like an unavoidable signal to continue research.

The extent to which these findings were startling, and challenged the dominant ideology of the time, is evidenced in their reception by the experimenters as well as the general public. Chase exemplifies the tone with which these initial experiments were received, writing that:

The output of both groups was carefully measured. It all looked very scientific. Now watch the props being knocked out from under the original assumptions! The test group is given increased light. Its output goes up. Good; this was to be expected. But the output of the control group – without a candle power of extra light – goes up too! This was *not* expected. It is contrary to common sense – indeed, it is completely screwy. But screwier results are to follow. Light for the rest group is now decreased below that of the control group. Its output goes up again! So does that of the control group! What in heaven’s name is going on?”⁸⁷

That these results were understood to be ‘scientific’ and thus ‘true’ became an important feature of later accounts of the experiments. Gillespie, for example, describes the lighting tests “as a triumph of the human factors studied by psychologists and sociologists over the mechanistic assumptions of engineers and managers” and characterizes the rhetoric reporting and discussing the findings as a “narrative of scientific defeat transformed into victory by a leap of insight.”⁸⁸ That the results were so deeply contrary to conceptions pervasively ingrained in the collective social knowledge gave the experiments – at least at the time of their execution – the valuable weight of scientific validity. The qualification of these results as ‘scientific’ would compel Hawthorne’s management to take on the project after it was abandoned by the Committee, and would also contribute to the growing

⁸⁷ Chase, 14

⁸⁸ Gillespie, 47

social authority and role of the behavioral sciences. Finally, this narrative of discovery would not only be important in spawning the ‘Hawthorne effect,’ but would also take on new implications throughout the artifact’s life.

While the ensuing inquiries were productive of a range of understandings about human, and particularly social, behavior, it was these initial moments that have been preserved as the so-called Hawthorne effect, and which constitute the bulk of conversation about and influence of the experiments to this day. This sense of scientific discovery, identified as the triumph of human and social factors over the dominant physiological model of workers’ motivation, compelled further investigation. By doing so, the illumination experiments set in motion the transformation of our very conception of the relationship between internal and external conditions, and, in turn, of the individual – a transformation whose literal enforcement and ideological dominance are symbolically illuminated in the lifespan of the Hawthorne effect.

Recasting the Human Motor as Social Actor:

The relay assembly test room, the mica splitting test room, the interview program, and the bank wiring observation room

Drawing upon the scientific significance established by the illumination experiments, the remainder of the Hawthorne studies was conducted though 1933 in collaboration with Harvard University, drawing particular guidance from Professor Elton Mayo and several of his associates.⁸⁹ Responding to the extent to which the findings were “so contrary to the doctrines of scientific management and common

⁸⁹ Eugene Louis Cass and Frederick G. Zimmer, eds., Man and Work in Society: A Report on the Symposium Held on the Occasion of the 50th Anniversary of the Original Hawthorne Studies, Oakbrook, Illinois, November 10-13, 1974 (New York: Van Nostrand Reinhold Company 1975)., 278

sense,” Chase describes, the management at Hawthorne, “groping for an answer... planned a new and more ambitious experiment.”⁹⁰ This portion of the experiments marked a clear departure from the illumination experiments – of particular importance was the shift from studying the impact of illumination of productivity to unraveling the social and individual factors that seemed to have confounded the initial trials.

Although described by one scholar as “in important ways subordinate”⁹¹ to the illumination experiments, the subsequent experimental stages certainly contributed to the multiplicity of meanings ascribed to the Hawthorne effect – those responsible for many of the earlier described inconsistencies in its definitions. These experiments not only confirmed that social and psychological factors played an important role in worker motivation, but also revealed that the precise nature and consequence of these factors defied measurable causality. Simultaneously producing and complicating understandings of the psychological reactivity driving human behavior, the latter years of the Hawthorne studies have had pervasive and lasting impact on varying social institutions, understandings, and practices incredibly wide in scope.

The influence of the illumination experiments was, as earlier discussed, preserved as their findings shaped the rest of the experimental work in important ways. Particularly compelling was the suggestion of important social factors operating in the workplace environment, and the subsequent intimation that these factors deserved, and could be adequately subject to, further inquiry using the same experimental method that had been directed towards the technological aspects of industry. As Gillespie describes, “The lighting

⁹⁰ Chase, 14

⁹¹ Carey, 404

tests demonstrated to these Western Electric engineers that the experimental method so successfully applied to technology in the Bell System could also be directed at the social organization of production.”⁹² Thus, the experiments turned towards scientifically investigating social and psychological phenomena that had not previously been studied in this way. The subsequent lack of methodological precedent granted experimenters the flexibility to follow their interests as the experiments progressed. However, this would also render the experiments vulnerable to later scrutiny.

The illumination studies were followed by several subsequent trials: the “*relay assembly test room*” (1927 – 32), the “*mica splitting test room*,” the “*interviewing program*” (1928-30), and the “*bank wiring observation room*” (1931-32).

Investigators conceived the **relay assembly test room**, commenced in April 1927, to evaluate in greater depth what seemed to be a confounding effect of the workers’ feelings about what they were doing on the experimental outcomes. Initially expected to have a short duration of several months, this experiment was an extension of those into lighting and supervision.⁹³ Pennock and his assistants prepared the following list of questions they hoped to illuminate through these experiments:

- (1) Why does output drop in the afternoon?
- (2) Do operators actually get tired out?
- (3) Desirability of establishing rest periods
- (4) Changes in equipment
- (5) What is the attitude of operators?
- (6) Effects of a shorter working day on output.⁹⁴

⁹² Gillespie, 48

⁹³ Gillespie, 48

⁹⁴ Quoted in Gillespie, 49

These factors would be explored by the introduction of experimental controls that had not been included in the initial experiments (because they had not anticipated so many confounding factors!). These controls entailed utilizing small and separate groups; limiting changes in personnel, type of work, and inexperienced operators; and establishing mutual confidence between investigators and operators.⁹⁵

Several months into this portion of the experiments, Clarence Stoll and George Pennock decided that it would be valuable to engage outside expertise in the research program, a decision that reflects their growing belief that ‘human factors’ are so complex as to warrant more sophisticated consideration. Two academic consultants joined the group of researchers - in 1928, Clair Turner from MIT and Elton Mayo from the Harvard Business School joined the group of researchers.⁹⁶ Mayo was selected because he had impressed several Western Electric executives with a speech he gave to a group of personnel directors from varying corporations – the speech was entitled “What Psychology Can Do for Industry in the Next Ten Years.” Pennock had preexisting ties to MIT that led him to Turner. These two consultants made at least fifteen documented visits to Hawthorne, and Mayo is largely responsible both for the interpretation and public visibility of the experiments.⁹⁷ The appeal to academic expertise not only reflected the growing social authority of such figures, but also shaped the way the experimental data would be interpreted, packaged, and advocated.

⁹⁵ Cass and Zimmer, 280

⁹⁶ Gillespie, 69

⁹⁷ Gillespie, 70

This experiment revealed a steady increase in output across the two-and-a-half-year long experiment. The investigators proposed four hypotheses to account for the increased productivity:

- (1) relief from fatigue – the rest periods,
- (2) relief from monotony,
- (3) increased wage incentive – the fact that in a small payment group their earnings more closely reflected the amount of their output, and
- (4) change in the method of supervision – the more informal relationship with the test room supervisors diminished the girls' suspicion of management, and allowed them more freedom in their relationships with each other."⁹⁸

This component of the research program had both the longest course and the most notable impact on the ultimate conclusions of the experiments, and is also the portion of the experiments whose interpretation and execution has been the source of continuing controversy about the Hawthorne experiments and their findings. Official accounts of the experiments reported that the relay assembly test room showed that humane supervision had a positive impact on production. Although critics have attributed the notable increases in production to economic factors (the system of payment, more rigorous supervision, effects of the depression) this set of experiments ultimately served to further emphasize the effect of the human factor.⁹⁹

The second experiment was conducted in the **mica splitting test room**. Here, working conditions were manipulated while wages remained stable. This decision stemmed from the hypothesis that wage incentives has influenced worker attitudes, and from the desire to test for that influence. The experimental changes in this room involved introducing rest periods, eliminating overtime work, and modifying 40-hour week. From the results of these studies, the investigators concluded that:

⁹⁸ Cass and Zimmer, 288

⁹⁹ Gillespie, 37

- (1) the steady increase in the Relay Assembly Test Room was not due to the change in wage incentive only
- (2) the effect of this change in wage incentive was so much tied up with the effects of so many other factors that it was impossible to tell how much influence it had.¹⁰⁰

Again, the researchers were surprised to find that factors previously assumed to be the most important were cast into doubt, and the less tangible factors appeared to have a greater influence. Chase describes that investigators “were knocked galley west by what happened to these six girls with flying fingers in the relay room,” and goes on to explicate this script of genuine surprise and discovery:

Things didn’t happen the way they were expected to happen. Assumptions as to cause and effect were found to be completely false. As the weeks grew into months and years, the mystery became deeper and deeper. What was the matter with these girls? Why didn’t they do what the efficiency books said they ought to do? Being true scientists, however, the investigators kept doggedly on, recording faithfully what happened, even if they did not know what caused it or what it meant.¹⁰¹

Although still providing no definite or readily applicable answers, the experiments evidently continued to convince researchers of previously unforeseen influences on human behavior, and that further inquiry would be fruitful.

These unforeseen influences were more closely examined during the next phase of the experiments; from 1928 to 1930 the **interviewing program** explored the invisible social and psychological factors influencing worker productivity. During this phase of research, interviewers sought to compile information about workers’ general attitudes about issues such as the nature of their jobs, their supervision, and their working conditions. The interviews started as informal discussions wherein the experimenter tried to gear conversations towards specific areas of interest, but were ultimately altered so that the experimenter stated the purpose of the interview and

¹⁰⁰ Cass and Zimmer, 289-290

¹⁰¹ Chase, 17

then recorded the employees monologue verbatim. These interview were then classified by a group of analysts and grouped with similar accounts, ultimately sent along in these groups to the relevant branch or department of the Hawthorne works. This program was extraordinarily wide in its scope – 21,000 employees had been interviewed by the end of 1930. Importantly, because so many workers were interviewed and because they were allowed to report or discuss any factors they wished, this experimental phase revealed, once again, that the invisible processes driving human behavior and experience were infinite¹⁰²

Revealing the scope these influences, the interviewing program began to convince the researchers that the underlying factors driving human behavior defied measurement or precise articulation. The official report of the experiments asserts: “the attitude of the workers was such an important variable that those changes in working conditions which were introduced did not produce by themselves any predictable effect capable of measurement in terms of output.”¹⁰³ Furthermore, as one industrial psychologist has contended, “while the interviews had initially been meant to provide an overall quantitative picture of worker attitudes, Mayo became more interested in qualitative information about the workers as individuals.”¹⁰⁴ In this sense, the interview program further complicated understandings of human behavior by drawing attention to the impact of attitudes and perceptions.

¹⁰² Cass and Zimmer, 292

¹⁰³ F.J. Roethlisberger and William J. Dickson, Management and the Worker: An Account of a Research Program Conducted by the Western Electric Company, Hawthorne Works, Chicago (Cambridge, Massachusetts: Harvard University Press, 1939)., 572

¹⁰⁴ Kevin T. Mahoney and David B. Baker, "Elton Mayo and Carl Rogers: A Tale of Two Techniques " Journal of Vocational Behavior 60 (2002). 440

Of course, the desire to understand these factors with more precision prevailed, and experimenters so conceived the next phase of the experiments; in the **bank wiring observation room** from 1931-1932, the investigators' sought to more accurately study the social aspects of the work environment whose importance had been revealed through the interviewing program. Here, investigators sought, first, "to develop a method of studying group behavior which would supplement interviewing with actual observations of behavior in the working group," and second, "to obtain more exact information about social groups within the company by making an intensive study of one group under normal shop conditions."¹⁰⁵ By doing so, they could more fruitfully observe employees on-the-job behavior by specifically attending to the sorts of feelings and attitudes mentioned in the course of the interviews. In particular, they wanted to look at how the effect of these feelings and attitudes on work activities, on the extent to which the groups maintained group standards, and how these group standards affected individual worker efficiency.¹⁰⁶

In 1933, the experiments at Hawthorne met their end, albeit one that was unplanned and did not result from a sense of completion or closure. The precise reason for their termination is unknown – some have attributed this to the Depression and a subsequent lack of funding, others to the seemingly inconclusive nature of the studies. In a sense, they never could have been truly complete – the experiments had never posed a singular, clearly defined research question, and consequently moved towards no definite end point. Yet the way the initial research question was answered – that is, that the correlation between illumination and productivity was revealed to be

¹⁰⁵ Cass and Zimmer, 296

¹⁰⁶ Cass and Zimmer, 296

far more complex than initially expected and deeply desired – was sufficient to have a longstanding impact.

This complexity, which at the time suggested the scope of the challenge of developing effective approaches to human management, would later be reconfigured as a central dilemma facing experimental psychologists. However, for the time being, scientific evidence that the worker was a social and psychology, rather than mechanical being, was enthusiastically welcomed by social critics and others situated in Hawthorne's historical moment.

Hawthorne interpreted: Mayo, Roethlisberger, and Dickson

*Data – even as represented in descriptions of observations and experimental results – do not on their own indicate that for which they can serve as evidence... Data are never naïve, but come into contact with theories already selected.*¹⁰⁷ (Longino, 1992)

The experiments, taken together, did not reveal any specific causal relations regarding productivity, but rather produced a range of vague and ambiguous findings that more or less affirmed the role of social and human factors in the workplace. Yet today, textbooks describing the Hawthorne experiments and/or the “Hawthorne effect” as well as literature applying that knowledge, continue to assert definitive – albeit inconsistent – claims about what the experiments indicated. How did this happen and why did it continue?

Understanding the construction of the Hawthorne effect from the set of vague and ambiguous observations made in the experiments requires, first and foremost,

¹⁰⁷ Helen Longino, "Essential Tensions - Phase Two: Feminist, Philosophical and Social Studies of Science," *The Social Dimensions of Science*, ed. Ernan McMullin (University of Notre Dame Press, 1992), 204

rejecting the assumption that experimental data in and of itself provides the content of knowledge. As philosopher of science Karen Barad has claimed, the deep-seeded misconception that “that the well-prepared scientist can read the universal equations of Nature that are inscribed on G-d’s blackboard” leads to the sense that “Nature has spoken”¹⁰⁸ – a notion that the history of the Hawthorne experiments and the effect attributed to them strongly discredits. Examining the way the Hawthorne findings were initially construed, and drawing upon our discussion of the way the Hawthorne experiments unfolded provides a route toward better understanding how the existing ideology, social tensions, and intuitive appeal intersect and contribute to the construction of scientific knowledge from the ‘natural world’ it is understood to describe.

The data collected and the meaning of experimental observations depend in important ways on the eye of the beholder – the experimenter brings with him a range of assumptions and experiences that dictate what he or she will attend to (or not) and how he or she will channel that attention. As Barad asserts, “as a matter of principle, there is no unambiguous way to differentiate between ‘object’ and the ‘agencies of observation’ – no inherently/naturally occurring/ fixed/ universal/ Cartesian cut exists” and so “*observations do not refer to objects of an independent reality.*”¹⁰⁹ Her assertion emphasizes the extent to which the knowledge accrued through scientific activity is necessarily informed by these ‘agencies of observation,’ who, in this case, in advocating their findings through the evocative rhetoric, transformed the ambiguous collection of observations into strongly made assertions about the role of

¹⁰⁸ Barad, 188

¹⁰⁹ Barad, 170

human and social factors in the workplace through the evocative rhetoric with which they advocated their findings.

Academic consultants Mayo, Roethlisberger, and Dickson were primarily responsible for interpreting, reporting, and publicizing the results of the Hawthorne studies; they were left to construct a coherent meaning from what might have otherwise remained an ambiguous collection of workplace observations. Collectively, their reports of the Hawthorne experiments, published respectively in *The Social Problems of an Industrial Civilization* and *Management and the Worker*, assert most of all, as Gillespie describes, “a story of scientific discovery and claims of an increasingly sophisticated understanding of the social relations of work.”¹¹⁰ Never fully articulating a specific causal relationship between these social relations and productivity, these reports depart from the initial line of inquiry, the industrial interests which had motivated it, and the notion of the human motor which had been complicit in it. Harvard University Press published the official account of the experiments, Roethlisberger and Dickson’s *Management and the Worker*, in 1939. The report criticized contemporary industrial practices with particular emphasis on their failure to consider and treat the worker as a social being. The authors claimed to have, through their work at Hawthorne, reconceived the problems facing industry and management as *social* and *individual*, rather than *economic*.

Closer examination of Roethlisberger and Dickson’s report reveals their perception of the environment in which the Hawthorne experiments were rooted, as well as their understanding of how the findings might transform it. They asserted that the existing, or traditional, discussion of the challenges facing industry “distorts the

¹¹⁰ Gillespie, 35

actual human situation in the industrial plant” because of the extent to which “the workers, supervisors, or executives are often considered apart from their social setting and personal history.”¹¹¹ They claimed that this distortion has both resulted from and effected in a faulty conception of the worker; according to them, industry treated its workers as “economic men,”¹¹² a term that reflects the wholly mechanized approach to the individual that was advanced by the statements and practices then stabilized in the hinterland.

The authors aptly identify that this conception of the worker had emerged from the emphasis on productivity that drove and ultimately became a dominant characteristic of industry. They differentiate two discrete functions of any industrial organization; “that of producing a product” and “that of creating and distributing satisfactions among the individual members of the organization,”¹¹³ and claim to have realized through their involvement at Hawthorne the problematic neglect of the latter. Society’s overemphasis on production, they claim, had overemphasized “the economic function... scientific controls have been introduced... much of this advance has gone on in the name of efficiency or rationalization.”¹¹⁴ At its core, the Hawthorne studies, as reported in *Management and the Worker*, urge society to lessen its central emphasis on goals of efficiency, rationality, production and inspire a returned attention to the humanity of its members in place of regarding them as merely units of a machine.

¹¹¹ Roethlisberger and Dickson, 569

¹¹² Roethlisberger and Dickson, 569

¹¹³ Roethlisberger and Dickson, 552

¹¹⁴ Roethlisberger and Dickson, 553

Roethlisberger and Dickson do not claim to have discovered any particular human phenomenon, nor do they offer any specific way to increase productivity by taking the human factor into account. Rather than make any particular claims about industrial practices, they conclude from the experiments that there is a pressing need for further study of these “human” and “social” factors. Historian Loren Baritz describes the two primary strains of advice throughout *Management and the Worker*: first, that “management should introduce in its organization an explicit skill of diagnosing human situations” and, second, that with this skill management should advance “the *continuous* process of studying human situations – both individual and group – and should run its human affairs in terms of what it is continually learning about its organization.”¹¹⁵ Implicit in these recommendations is, first, the sense that no specific understanding had been gleaned, second, that the quest for such understanding need to be constantly in mind, and, third, that approaches needed to be constantly transformed in terms of this never ending object of study. The human factor revealed by the Hawthorne experiments, as asserted in its official report, was of such great magnitude, and such deep complexity, that its study would never be complete and could never be ignored.

Though *Management and the Worker* was the official report of the experiments, Elton Mayo’s conclusions from Hawthorne, as expressed in his monographs *The Social Problems of an Industrial Civilization* and *The Human Problems of an Industrial Civilization*, were of equal or perhaps greater importance in embedding and signifying these findings in collective knowledge. Mayo warns of

¹¹⁵ Loren Baritz, *The Servants of Power: A History of the Use of Social Science in American Industry* (Middletown, CT: Wesleyan University Press, 1960). 109

serious consequences if society does not adapt to or take into account these findings.

He states, for example:

We have undertaken to transform an economy of scarcity into an economy of abundance, and the technicians are showing us the way. We are committed to the development of a high human adaptability that has not characterized any known human society in the past, and it is our present failure in this respect that finds reflection in the social chaos which is destroying civilized society. Can this present failure be translated into future success? The way forward is not clear, but certain starting points can be discerned: we are in need of social skills, skills that will be effective in specific situations.¹¹⁶

For Mayo, “social chaos,” the result of the rapid and unprecedented pace of social change, could only be resolved by attending to the very factors revealed at Hawthorne. In suggesting that the Hawthorne findings indicated a solution to society’s most pressing problem, Mayo imbues his claims with incredible significance that has certainly contributed to their continuing influence, as explicated in the examination of the trajectory of the Hawthorne effect presented in the following chapters. Importantly, this precise interpretation of the resonance of these findings with tensions pervading that social moment would not have been self-evident; rather, it is dependent upon the powerful rhetoric with which Mayo advocated this reading.

In short, the Hawthorne studies gave these academic consultants scientific evidence for a tension they may have previously supposed, but never had sufficient incentive to pursue. In the counterintuitive results of the illumination changes, these men found a means of articulating what was problematic in modern society. For them, the findings pointed above all to the resilience of social and psychological

¹¹⁶ Elton Mayo, The Social Problems of an Industrial Civilization (Boston: Harvard University, 1945), 15

factors over attempts to overcome them with rationalistic models. Chase poignantly illustrates this belief in the power of social and psychological factors:

I should do these scientists a grave disservice if I concluded that they had found all the answers to factory work in the machine age. They have found some answers, some hopeful leads, and a lot of blind alleys. Since the industrial revolution began, managers of plants have been concentrating on output, forgetting that under the factory roof is a human society.¹¹⁷

Proposing that the findings would provide a means of reconciling individuals' complex needs with society's impetus towards maximizing efficiency and production, Chase reveals why these findings would be met with great relief: they suggest that society neither had to sacrifice the wellbeing of its members nor its prized goal of efficient production; compromise was possible, if within its rational endeavors society also attended to the irrationalities of human nature. The promise of these findings to reconcile deeply evident problems in the course of social progress, and the resonance of the narrative of discovery with a scientifically oriented society, significantly informed the way these experiments were advocated to and thus received by the public.

Hawthorne consumed: the human factor at last!

There is an idea here so big that it leaves one gasping. (Chase, 1941)¹¹⁸

The interpretation of the Hawthorne data as evidencing powerful, complex “human” and “social” factors depended on the way they were received by observers, but we need not concede that the Hawthorne experiments were bad science or that the experimenters put forth faulty scientific claims. Despite the pervasive misconception

¹¹⁷ Chase, 27

¹¹⁸ Chase, 27

that, as Barad put forth, data stand on their own and will be similarly observed and interpreted by any observers, scientific work still corresponds with some sort of natural truth. Perhaps an experiment may be best understood as a place in which the experimenter mediates between the social and the natural, constructing knowledge that corresponds with an existing reality in a way that is socially meaningful and intellectually sustainable. This does not mean that such knowledge is faulty or biased; it is only with the contribution of such agencies of observation that observations about the natural world may be coherently unified in a meaningful theoretical system.

Indeed, the public response to Hawthorne reveals that though the personal characteristics of Mayo, Roethlisberger, and Dickson may have guided their perception and interpretation of the findings, the knowledge produced was also intuitively felt by others to be on par with reality. As articulated by the reporting academics as well as journalists and social critics, the findings provided a much needed indication of how to resolve the pervasively experienced tension between the modern conception of and subsequent demands placed on the individual, and the reality of human nature. After all, science had, since the scientific revolution, been granted notable social authority, and so the provision by Hawthorne of a scientific explanation for what was intuitively felt by many offered a rhetoric of compromise, at once based in the scientific method and yet revealing an aspect of human nature defiant of its rational design. The extent to which this tension was, at least implicitly, sensed in the general public fueled the public's exaltation of the Hawthorne studies, and, in so doing, their lasting and pervasive influence. The immediate exaltation of

the findings by social critics underscores the extent to which they resonated with concerns emerging during the era of the Hawthorne studies, and certainly contributed to their lasting and pervasive influence.

The socially resonant presentation of these findings to the public is exemplified by Albert Edward Wiggam's 1931 article entitled "What the Scientists are Doing in Personnel Research." In this piece, Wiggam invokes the Hawthorne studies to highlight the way human factors should be accounted for and closely considered in the workplace. Describing that "Putnam and Pennock investigated the weight of such factors upon the worker's happiness and effectiveness but found one single factor that out-weighed them all," Wiggam attributes "the improvement in the mental attitude and the resultant increase in output of the workers" to "freedom from traditional exacting supervisory practice" rather than "improved physical working conditions."¹¹⁹ Wiggam's rhetoric illustrates the restrictive impact of the physiological model of the worker, but of more importance, suggests that the work done at Hawthorne provides a means of liberation from that model. Proclaiming the work at Hawthorne as "one of the happiest and most fruitful studies going on in industry,"¹²⁰ Wiggam's article underscores the extent to which recognition of these factors was expected to be welcomed by members of the social world.

The findings were not just well received because of their emotional or intuitive resonance, but because they provided a new framework for considering the social unrest that had developed throughout the beginning of the century – and importantly, one that corresponded with the American democratic ideal. A review of

¹¹⁹ Albert Edward Wiggam, "What the Scientists Are Doing in Personnel Research," Personnel Journal 9.5 (1931), 397

¹²⁰ Wiggam, 398

Roethlisberger's *Management and Morale* reveals how the assertion by the Hawthorne experiments of "the view that business is a social as well as an economic problem" recast the problems that had plagued society and thus promised that there might be some hope of resolution. The reviewer emphasizes that the labor unrest, signified by lockouts, walkouts and jurisdictional disputes that had intensified since the outbreak of World War I, may be better resolved by the attention to the "human situations affecting cooperation and morale among workers," an approach that "is in accord with democratic tradition and deserves wide consideration."¹²¹ Thus Hawthorne provided a distinctly American solution to the problem, supporting the ideals of democracy that many felt had been lost in the urgency of industrial progress.

However, the conceptual influence of the Hawthorne experiments may not have been paralleled by comparable practical changes to industrial practice. Beyond their influence on the conception of the human relations department, which is now ubiquitous in business practice, their actual ideological impact has been questioned. Baritz, for example, noted in the 1960s that "to date, the greater part of the American labor movement has not been seriously concerned with the Hawthorne result, and it is possible that most of labor's leadership is even unaware of the research."¹²²

Similarly, in their renowned critique of business practice *In Search of Excellence*, authors Peters and Waterman criticize the lack of attention to the Hawthorne findings. Writing in 1981, it is notable that they characterize American labor practice as rooted in a rationalist perspective, one that they assert "is, in our opinion, a direct descendent of Frederick Taylor's school of scientific

¹²¹ Edward L. Jenks, "Questions of Morale in Industry," *New York Times* 1942., BR18

¹²² Baritz, 114

management and has ceased to be a useful discipline.”¹²³ Urging a paradigmatic shift driven by Mayo’s finding that “the simple act of paying positive attention to people has a great deal to do with productivity,”¹²⁴ the rhetoric here reveals that 50 years after the Hawthorne studies and 20 after Baritz’s initial criticism, the so deeply exalted and socially resonant findings at Hawthorne have traveled far but have perhaps had influence distinct from what was originally intended.

And here we may begin to understand the fundamental paradox of the Hawthorne experiments. The ‘Hawthorne effect,’ as we have already seen, is a pervasive idea in contemporary society, yet the actual impact of the Hawthorne experiments on industrial practice, and the precise nature of the phenomenon indicated by the effect, have been passionately questioned over nearly seventy years. As this review of the experiments and their interpretations has revealed, above all, that the Hawthorne findings contributed far more to our social understanding than to any new approach to increasing workplace productivity— a distinction that sheds light on the ways the ‘Hawthorne effect’ was interpreted and constructed, and in turn transformed how it has traveled.

What was found at Hawthorne therefore, was not a new approach to industry, but, rather, a new way of thinking about the individual. Science, having gained much social authority in the preceding centuries, honestly revealed a problem within itself that was symbolic of much of the tension created by the rationalization of society. As one scholar, Gale, powerfully articulates, Hawthorne showed, above all, “that human

¹²³ Thomas J. Peters and Robert H. Waterman Jr, In Search of Excellence: Lessons from America's Best Run Companies (New York: Harper & Row, 1982)., 42

¹²⁴ Ibid.

behavior never is, never was, and never will be a spectator sport.”¹²⁵ This understanding, though deeply ingrained in our contemporary understandings of our selves and others, was once obscure. With the understanding that it once was not, “the excitement of the Hawthorne investigators becomes easier to understand” – this excitement was figured with the notion of the human motor still palpable on this horizon.¹²⁶

By revealing this fundamental feature of the self and its relation to the external environment, the Hawthorne studies “bridged a social abyss and discovered a new alchemy.”¹²⁷ The experiments’ assertion of a new conception of the individual, and the relation of this conception to the contemporaneous environment, is what is primarily embodied in the Hawthorne effect, both symbolically and in practice. By exploring how these assertions were rendered into the Hawthorne effect, we will be able to better understand how these ambiguous findings become packaged into a psychological fact, and how that fact has since become ingrained in our collective social knowledge.

¹²⁵ Gale, 448

¹²⁶ Gale, 444

¹²⁷ Ibid.

CHAPTER FOUR

Accepting Subjectivities and Constructing Objectivity: The rebirth of modern psychology and the birth of the Hawthorne effect

*Unfortunately, this insight... does not end the problem for the psychologist.
His problems rather begin here.*¹²⁸ (Lewin, 1939)

A new page was turned in the legacy of the Hawthorne studies when social psychologist John French introduced the term “Hawthorne effect” in an essay published in Festinger and Katz’s 1953 research methods textbook. The extent to which this represents a shift in understandings of the Hawthorne experiments is perhaps most poignantly exemplified in French’s claims that the changes in productivity resulted from “artificial” aspects of the experimental setting, leading to later classifications of the Hawthorne effect as an *experimental artifact*, a source of experimental flaw rather than a tenable finding. As described nearly 75 years later by social psychologists Ralph Rosnow and Robert Rosenthal, experimental artifacts are “inconsequential effects in a research design” that “jeopardize the validity of the research situation,” and thus need to be “isolated, measured, considered, and, sometimes, eliminated.”¹²⁹ So naming the Hawthorne effect as the product of artificiality suggests that the Hawthorne studies were dominated by methodological

¹²⁸ Kurt Lewin, *Field Theory in Social Science* (New York: Harper & Brothers 1951), 131

¹²⁹ Rosnow and Rosenthal, 3

error, and, as the authors of a 1990 research methods textbook claim, their outcome was “a relatively trivial methodological event.”¹³⁰

Of course, the findings, both at the outset and subsequently, were predominantly understood to be anything *but* trivial. The coinage of the “Hawthorne effect” not only departs from the experimenters’ industrial focus and agenda, but also importantly disrupts the narrative of scientific discovery through which the experiments were explained, interpreted, and received. Indeed, the discussion of the Hawthorne findings presented by French diverges notably from that provided by figures such as Mayo, Roethlisberger, and Dickson nearly two decades earlier. This new and alternative understanding seems to underscore arguments examined in the first chapter positing that the Hawthorne effect lacks evidential support.

This apparent revolution in understandings of the Hawthorne findings does not, however, confirm unsound collection and interpretation of data as suggested by critics, but rather is a testament to the instability of scientific knowledge. We have already seen that experimental findings were signified during and immediately after the experiment by their challenges to the dominant view of the human motor, underscoring Gillespie’s contention that “all knowledge claims will bear the imprint of the social context in which they are constructed.”¹³¹ The reconfiguration of the Hawthorne findings accomplished with the introduction of the Hawthorne effect reveals that the social context may continue to operate, by offering new conceptual frameworks that change how data are understood.

¹³⁰ Elliot Aronson, Phoebe C. Ellsworth, J. Merrill Carlsmith and Marti Hope Gonzales, Methods of Research in Social Psychology Second ed. (New York: McGraw Hill Publishing Company, 1990), 25

¹³¹ Gillespie, 267

Indeed, during the middle of the twentieth century, several dimensions of social and psychological changes, occurring in tandem, laid the foundations for contemporary psychology and changed what it meant for psychologists to take social and psychological factors seriously. These changes compelled a reassessment of the importance and implications of the Hawthorne findings. Of particular importance was the extent to which the Second World War both called attention to human irrationalities and subjectivities and gave the discipline of psychology a renewed identity, as a science charged with excavating the hidden and irrational, not merely the visible behavioral expressions, of humans. With the onset of the Cold War, the amplified social demand for objective psychological knowledge paralleled the ascending recognition of subjectivities inherently at odds with objectivity. In its disciplinary reorganization psychology was thus burdened with the task of reconciling its practical and methodological agenda within the conceptual framework that threatened to undermine them.

The revised meaning of the Hawthorne findings, and the naming of the Hawthorne effect, resulted from and so reflects these conceptual and practical shifts in American psychology. A new professional identity and agenda recast the unexpected appearance of subjectivities at Hawthorne as an artificial, problematic, or confounding product of the experimental design, compelling researchers to consider the limitations of behavioral science experimentation. Reconceptualizing the once exalted revelation of the almost intangible human factor as merely an experimental artifact, or “effect,” was at once embedded in, symbolic of, and served to advocate new conceptual paradigms and practical goals.

Irrationality, Control, and the Second World War

Regarding psychologists' contribution to World War II, historian of psychology James Capshew reflected that "one can only wonder what [William James'] reaction would have been to the fact that these global conflicts were not only fought with the aid of tools provided by his fellow psychologists but that they stimulated and shaped the discipline he did so much to establish." His reflection underscores the important role of psychological understandings and applications in the Second World War, as well as the lasting influence of that war on the discipline of psychology.¹³² Via its unprecedented application during World War II, psychology developed and advanced a new conceptual framework and in so doing, accrued heightened social authority. Though Mayo proclaimed in 1945 that "*if our social skills had advanced step by step with our technical skills, there would not have been another European war,*"¹³³ wartime psychology, in fact, compelled recognition of the irrationalities underlying human behavior.

Although the value of psychological research and expertise had been illuminated by its use in the First World War, the distinct psychological undertones of the Second World War both called precise attention to human subjectivities and demanded that they be more precisely understood. In particular, fears of totalitarian behavior, such as that demonstrated by leaders of the Nazi and Communist parties, and bewilderment at the acquiescence of their subjects underscored the role of

¹³² James Capshew, Psychologists on the March: Science, Practice, and Professional Identity in America, 1929 - 1969 (Cambridge, UK: Cambridge University Press, 1999), 1

¹³³ Mayo, Social Problems, 23

invisible and irrational processes in driving human behavior.¹³⁴ These revelations pushed forward the view that “the human factor was, as always, ubiquitous,” and similarly advanced understandings of the extent to which “emotional appeals worked more effectively than rational ones and that chaotic irrationality infected human motivation to a much greater extent than orderly and thoughtful ideals.”¹³⁵ The Hawthorne findings took on a new conceptual resonance as psychologists acquiesced a relatively novel regard for the complexities or irrationalities of human behavior – the very factors felt by Hawthorne’s management and social critics writing during the 1930’s to have been problematically neglected during the early years of the 20th century.

Recognition of the ubiquity of the so-called human factor confirmed the potential benefits of applying psychological understandings and practices to wartime endeavors. With the quickly ascending view that “if war was fundamentally a matter of conflict among humans, then insofar as psychology was a human science it was conceivably relevant to nearly every aspect of defense mobilization,” psychological expertise was soon sought to guide many facets of wartime activity.¹³⁶ Channels for psychologists’ involvement included conducting research and developing policy proposals in the areas of personnel administration, morale, propaganda, man-machine engineering, and mental health.¹³⁷ Psychologists quickly mobilized in response to these new professional opportunities, and as their wartime research supported the thesis that human behavior was driven by “irrational attitudes, highly distorted and

¹³⁴ Capshew, 54

¹³⁵ Ellen Herman, The Romance of American Psychology: Political Culture in the Age of Experts (Berkeley: University of California Press 1995)., 31

¹³⁶ Capshew, 54

¹³⁷ Capshew, 5

subjective perceptions,”¹³⁸ psychologists underscored the extent to which effective human management “necessarily embodied a sophisticated psychology, since managing people effectively entailed managing their feelings and attitudes.”¹³⁹ In this sense, the recognition and control of human subjectivity, though earlier not self-evident concepts, grew, ultimately becoming a dominant framework for understanding human behavior.¹⁴⁰ The resulting commitment to the sense that “moods, attitudes, and feelings were not simply appropriate objects of military policy; they were the *most* appropriate” represents a striking departure from the strictly mechanical or physiological model of human behavior implicit in the earlier approach to human management typical of Hawthorne’s hinterland.¹⁴¹

As wartime psychology overturned the notion of the psychological object as a human motor operating through strictly physiologically-dictated reactions to stimuli, psychologists were faced with the challenge of finding a new means of satisfying the enduring ideals of efficient and rational human management. This task is poignantly exemplified in the attempts to match “human capacities to the technologies of modern warfare”: psychological experts working in the realms of human management and equipment design played a crucial role in reconceiving the notion of the psychological object.¹⁴² The ascending view that humans were driven by complex and irrational internal processes complicated the idea of mechanical efficacy, and compelled psychologists to develop ways to control those subjectivities. As Capshew describes, psychologists met this challenge through “the systematic study of the

¹³⁸ Herman, 71

¹³⁹ Herman, 29

¹⁴⁰ Herman, 25

¹⁴¹ Herman, 29

¹⁴² Capshew, 145

interface between physical characteristics of the equipment and the psychological characteristics of its human operator” in order to “narrow the margin for human error, which could be achieved through improved training procedures, better equipment design, or both.”¹⁴³ As historian of American psychology Ellen Herman describes, “the naïve idea that wars could be won simply by perfecting weapons technology to kill one’s opponents” was replaced by a sense that “there could be no higher military priority than the control of human subjectivity.”¹⁴⁴ Whereas such work had previously been done with little if any regard for human subjectivities (either they were not conceptually recognized or it was thought that modern technologies could supercede them), they were now being seen. Human subjectivities thus had to be mediated in order to make further social progress.

Guided by the simultaneous persistence of modernizing incentives to maximize human efficiency, efficacy, and rationality and emerging understanding of the need to acknowledge and contend with human subjectivities, psychologists began to think about *controlling* subjectivity. This dual embrace of the human factor and its construction as a problem psychologists needed to overcome has persisted in psychological research and practice to this day – the Hawthorne effect poignantly articulates the concern that invisible processes operate against the use of ‘rational’ technologies to control or mediate human behavior, a sort of control increasingly pervasive in modern society. In this sense, the discipline was inserting into its conceptual foundations a regard for human subjectivity that would have notable importance for these later accounts about the Hawthorne studies. The very notion

¹⁴³ Capshew, 147

¹⁴⁴ Herman, 29

that human/social factors existed was no longer a sufficiently exciting discovery, but was now refigured as a source of experimental error. Against a hinterland that now had pervasive regard for the existence and impact of these factors, the findings were reinterpreted as something challenging scientifically driven social progress.

The consequences of these conceptual shifts cannot be overstated, yet their ultimate impact was contingent upon psychology's emergence from the war with a much stronger disciplinary organization and collective identity. During the war, the government had provided the funding and also an infrastructure for the creation of organizations, such as the Emergency Committee in Psychology in August of 1940, which represented nearly every U.S. psychology department, and the Office of Scientific Research and Development's establishment of the Applied Psychology panel in October 1943. These organizations facilitated inter-disciplinary communication, provided unprecedented unity within the field, facilitated accessibility for consumers of psychological expertise, and heightened the discipline's public visibility.¹⁴⁵ These opportunities, in thus compelling the articulation of shared intellectual commitments, so served to register the new conceptual framework in psychology's developing collective professional identity. At an intersociety convention in May of 1943, for example, prominent psychologist E.G. Boring advocated for the simultaneous development of "scientific" and "technical" aspects of psychology, importantly highlighting the concern with methodological integrity.¹⁴⁶ At this convention, psychology also developed a common goal: a profession that would be "capable of revealing universal laws about

¹⁴⁵ Capshew, 47, 53

¹⁴⁶ Capshew, 65

human experience, personality, social life, and subjectivity,” reflecting the discipline’s move away from the behavioristic assumptions underlying the model of the human motor.¹⁴⁷

The institutionalization of psychology’s goals during World War II contributed to their post-war persistence and perpetuation as the discipline worked to establish a stable identity. As psychology emerged from World War II with a renewed collective identity, and a heightened recognition of the complexity of human behavior it commenced down the route leading to the revolution in meaning of the Hawthorne findings. The recognition of these complex, invisible, and subjective factors – by the postwar period embedded in popular understandings of psychology – was no longer characterized with the positive narrative of discovery, but rather reflected the concerning paradox of behavioral research. These developments would soon intertwine with the ascending culture of the Cold War period to render their shared purpose the ethical and methodologically sound mediation and control of that complexity, powerfully inserting the Hawthorne effect into the hinterland of scientific understandings and practices and contributing to its continuing endurance.

The Post-War Period, the Cold War, and the Hawthorne Effect

No longer involved with wartime commitments, psychological professionals made concerted attempts to maintain the discipline’s role in post-war society and to more firmly develop its identity. Many psychologists now recognized individuals as “biosocial entities” and urged further study of human and social factors, reflecting

¹⁴⁷ Herman, 23

Mayo, Roethlisberger, and Dickson's appeals twenty years earlier, but extending them outside of the industrial realm. However, other psychologists remained committed to the "framework of reductionist behaviorism," and argued that such factors could not be scientifically studied.¹⁴⁸ This debate played out particularly strongly in the struggle between cognitive and behaviorist psychologists. Here, the subjectively mediated, invisible factors driving human behavior and thought were recognized; the two groups disagreed, however, about whether their study should be incorporated into the discipline's practice.¹⁴⁹

The Cold War provided proponents of cognitive psychology with compelling arguments for the need to carefully study the subjective processes driving human behavior. Concerns about Communism were framed in psychological terms, and fears that Communism would infiltrate American society by means of subversive psychological manipulation highlighted the complexity and manipulability of human behavior. Historian of Cold War culture Ron Robin has described, for example, that popular films from the period depict "the unwilling transformation of human beings into machines, the seeping in of alien, dehumanizing powers into the psyche."¹⁵⁰ In such films, "surfaces were preserved, but the soul was destroyed," revealing how concerns about Communism brought attention to invisible, internal processes, rather than to observable behaviors.¹⁵¹ This framing of Communism as a psychological or ideological threat advanced support for cognitive psychology by linking the scientific

¹⁴⁸ Capshew, 218

¹⁴⁹ Jamie Cohen-Cole, "The Reflexivity of Cognitive Science; the Scientist as Model of Human Nature," *History of the Human Sciences* 18.4 (2005), 119

¹⁵⁰ Ron Robin, *The Making of the Cold War Enemy: Culture and Politics in the Military-Industrial Complex* (Princeton: Princeton University Press, 2001), 169

¹⁵¹ *Ibid.*

study of invisible, internal psychological processes to the preservation of democracy. As historian of science Jamie Cohen-Cole has argued, distinguishing among different “thinking styles,” proponents of cognitive psychology argued that the study of “specific forms of human subjectivity” both reflected democratic thinking, and would produce understandings that would further advance democratic practices.¹⁵²

Although objectivity and methodology have always been central considerations for professionals engaging in scientific activity, psychologists who wanted to study the internal workings of the mind were under particular pressure to prove that they could satisfy these ideals. Because experimental psychology was guided by the belief that “human behavior was determined by the environment and could be described completely by the stimulus-response chains,” cognitive psychologists were under extraordinary pressure to prove that they could incorporate the new subject matter in a scientific manner.¹⁵³ Cohen-Cole explains, for example, that “the more psychologists were concerned with mind, the less they qualified as scientists within the discipline.”¹⁵⁴

The ever-present demand for objective knowledge was further signified by fears about ideological invasion, which underscored the need for neutrality in policy making and amplified what Robin has retrospectively described as “a widespread craving for rational and orderly thought modes to replace myth, superstition and unverified beliefs.”¹⁵⁵ Implicit in this “craving” was the exaltation of what historian David Hollinger has described as a “code of science and rationalism” as the means to

¹⁵² Cohen-Cole, 112

¹⁵³ Cohen-Cole, 113

¹⁵⁴ Cohen-Cole, 114

¹⁵⁵ Robin, 23

achieving the ideal society, one that would be “based on verifiable norms and critical ‘evidence-based, universalistic, antiauthoritarian, and hence ‘scientific’ conduct.’”¹⁵⁶

In this sense, objectivity, though always the ideal of scientific work, gained new cultural significance as the means for America to advance the integrity of its democracy, and thus to further identify itself in opposition to the Soviet Union.

Psychologists who wanted to study the internal workings of the mind thus had to demonstrate that such processes could be objectively understood, advancing this agenda through methodological considerations. This incentive was largely conceived and executed by Kurt Lewin and his contemporaries at MIT, where the focus on engineering illuminated particularly strongly the predicament posed by new understandings about human nature. Lewin, like Mayo, identified a “cultural lag” resulting from the inattention to social and human factors cultivated by the modern emphases on rationality and efficiency.¹⁵⁷ Locating this lag within psychology rather than industry, Lewin identified in 1947 a “taboo against believing in the existence of a social entity” and argued that this would be “most effectively broken by handling this entity experimentally.”¹⁵⁸ Claiming that “psychological atmospheres are empirical realities and are scientifically describable facts,” he confronted the paradox of objectively studying the inherently subjective: a paradox that plagues the human sciences to this day.¹⁵⁹

For Lewin, the tendency of subjective factors to triumph over rational controls – so lauded in Mayo’s accounts of the Hawthorne studies – was a source of deep

¹⁵⁶ Robin, 178

¹⁵⁷ Herman, 71

¹⁵⁸ Lewin, 193

¹⁵⁹ Lewin, 241

concern. Albeit a staunch advocate of studying the social and psychological factors influencing human behavior, he demanded that they be subject to systematic scientific study. In his 1943 essay “Problems of Research in Social Psychology,” for example, Lewin proposed that “the first task of science is to register objectively and describe reliably the material one wishes to study.” Claiming that this had been successfully achieved in the study of “*physical* aspects of behavior,” he suggests that this may be accomplished “in regard to the *social* aspects of behavior.”¹⁶⁰ Of utmost importance, Lewin did not believe that the study of subjective matter prevented the possibility of accruing objective knowledge, but rather urged a disciplinary wide commitment to their quantification. In this appeal, Lewin suggested that the key to the discipline’s success lay in the development of new research instruments and techniques.¹⁶¹

After Lewin’s death in 1947, George Miller, a staunch proponent of the cognitive perspective, more concretely enacted the development of experimental methodology to control for human subjectivities.¹⁶² He explicitly articulated this goal in terms of MIT’s focus on engineering, stating that by integrating “psychology with engineering through a focus on common technical goals,” they might achieve “the generalization of the scientific method to include people as well as machines.”¹⁶³ Miller’s precise articulation of what psychology needed to do in order to situate itself in the modern world and maintain scientific integrity laid the groundwork for incorporation by psychologists of the inherent subjectivities in their work in a way that seemed to reconcile them, precisely what is represented by the Hawthorne effect.

¹⁶⁰ Lewin, 155

¹⁶¹ Capshew, 193

¹⁶² Cohen-Cole, 123

¹⁶³ Ibid.

The 1953 research methods text in which the Hawthorne effect first appeared represents Leon Festinger and Daniel Katz's response to Miller's appeal. Festinger had been a member of the MIT staff under the leadership of Lewin and Miller, evidencing that the term's inception was directly responsive to their articulation of these emerging concerns and the manner in which they sought to resolve them. Daniel Katz, was also deeply aware of the current issues facing the discipline, as he had belonged to the Society for the Psychological Study of Social Issues during World War II.¹⁶⁴ In the introduction to *Research Methods in the Behavioral Sciences*, Festinger and Katz reflect the aforementioned problems and the new approach to resolving them, identifying "a lack of detailed treatment of behavioral observation, of the quantitative analysis of qualitative materials, and of such major research settings as field studies and field experiments."¹⁶⁵ Writing, for example, that "in industrial psychology, precision measures of isolated motor performance were inadequate to cope with problems of fatigue and motivation" they specifically criticize the sort of approach executed by the Committee on Industrial Lighting at Hawthorne, and suggest a "need for measures of cognitive and motivational structure."¹⁶⁶ They set out to resolve the problems associated with the study of human behavior by developing new methodological approaches that account for the unique nature of the human subject. The radical refiguring of the Hawthorne findings presented in this text contains both the recognition of the complexities of human behavior, and a desire to methodologically resolve their consequences for psychological practice and

¹⁶⁴ Capshew, 192

¹⁶⁵ Leon Festinger and Daniel Katz, eds., *Research Methods in the Behavioral Sciences* (New York: The Dryden Press, 1953), vi

¹⁶⁶ Festinger and Katz, vii

knowledge. Festinger and Katz's work would have a large influence on the field; the authors of a 1990 textbook *Methods of Research in Social Psychology* exalt Festinger "the greatest teacher of how to do experiments." Further stating that "he blazed a magnificent trail for those of us who followed him, by finding ways to ask important questions in a scientifically precise manner," these authors underscore the importance of these early efforts to contend with psychology's tricky subject, a legacy of which the Hawthorne effect was an integral part.¹⁶⁷

The introduction of the Hawthorne effect within this volume asserts that the conceptual placement of observers of Hawthorne – even though not always firsthand observers – dictated their relationship to the data. For those contending that subjective aspects of human thought and experience could be scientifically studied, the Hawthorne experiments presented a theoretical challenge. The unanticipated and undesired interference of "human" and "social" factors was now conceived as a central problem, one that would come to plague any research involving human subjects. As Rosnow and Rosenthal usefully highlight, the Hawthorne effect at its inception "implied that many participants responded not just to the experimental treatment, but also to uncontrolled factors, including the belief that they were being administered a treatment intended to have a particular effect."¹⁶⁸ Psychologists engaging in thought about how to study the mind, and debating whether this mind was even an appropriate object of study, thus perceived a singular 'fact' or 'artifact' in the originally ambiguous, inconclusive set of observations produced by the Hawthorne experiments.

¹⁶⁷ Aronson, Ellsworth and Gonzales, xviii

¹⁶⁸ Rosnow and Rosenthal, 7

Of course, recognizing the Hawthorne effect was only a first step in preventing it from undermining experimental outcomes, a paradox that continues to follow the term. Rosnow and Rosenthal illuminate this paradoxical quality, describing not only that the “direction and magnitude of the resulting artifacts were unclear,” but also that “it was even unclear whether any artifacts were present at all.” Nevertheless, the possible impact of its threat was so great that, as they further describe, “researchers were warned to be wary of unleashing a Hawthorne effect by their manipulations, observations, or measurements, a warning that was dutifully communicated to several generations of researchers even while the ship of behavioral science stood its steady course.”¹⁶⁹ It was as this new interpretation of the Hawthorne studies was so communicated that the Hawthorne effect became deeply embedded in the hinterland that followed it.

The trajectory of interpretations of the Hawthorne experiments reveals how even after an experiment is complete, experimental data can be the source of many different ‘observations’ about the natural world. Specifically, context continues to dictate how data are understood – not undermining the validity of their interpretation, but rather resignifying them. The extent to which this revolution in meaning was reflective of the shift in psychological understandings effecting from wartime psychology is revealed in Rosnow and Rosenthal’s further claim that artifacts such as the Hawthorne effect “presupposed the active influence of conscious cognitions.”¹⁷⁰ In turn, what *Psychology Today* editor Berkely Rice describes as the “promise” from the initial experiments that “social engineering, supported by enlightened

¹⁶⁹ Rosnow and Rosenthal, 7

¹⁷⁰ Rosnow & Rosenthal, 10

management and cooperative workers, could usher in a new era of industrial peace and prosperity”¹⁷¹ gave way. That “promise” was replaced by what Jones describes as “the central idea” of the experiments that “behavior during the course of an experiment can be altered by a subject’s awareness of participating in the experiment.”¹⁷² As Jones further claims, “though not obviously more than an incidental and intermediate finding for the early researchers, the Hawthorne effect has come to occupy a central role in the methodology of experiments...”¹⁷³ – a role opened by the aforementioned developments during World War II and more deeply signified throughout the Cold War.

Festinger and Katz’s codification of methodological concerns would become increasingly unforgettable for the discipline of psychology throughout the 1950’s as psychologists adopted what can be called a “reflexive” approach. If the experimental subject was so subjectively driven, then so to was the experimenter, and psychologists began to take into account what historian of psychology Jill Morawski has described as “the multiple manifestations of human nature that transpire in its scientific practices.”¹⁷⁴ Through these considerations, psychologists produced what Morawski has referred to as “defined and well-managed subjectivities”; by developing methodological approaches with regard for reflexivity, it seemed, psychology could “avoid problems of reflexivity in experimentation and theorizing.”¹⁷⁵ Providing, as Capshaw has suggested, “the key to the productive tension... that characterized

¹⁷¹ Rice, 7

¹⁷² Jones, 451

¹⁷³ Jones, 451

¹⁷⁴ Jill G. Morawski, "Self-Regard and Other-Regard: Reflexive Practices in American Psychology, 1890 - 1940," *Science in Context* 5.2 (1992)., 282

¹⁷⁵ Morawski, "Self-Regard and Other Regard," 304

postwar psychology,” this “incorporation of personal experience into the realm of science” became an important legitimizing activity, further signifying French’s re-interpretation of the Hawthorne findings.¹⁷⁶

So as the equation of technology with progress, the recognition of human irrationalities, and the exaltation of psychology endured and were resignified throughout the Cold War period, the Hawthorne findings became reconceived as methodologically problematic. In light of Gillespie’s claim in his examination of the Hawthorne experiments that “scientific facts and technological artifacts are not determined by ‘reality’; certainly the natural world constrains the kinds of facts and artifacts we construct, but the process of construction is an essentially social activity”¹⁷⁷ we may understand that the interaction of social, natural, and artificial conditions in the experiment continues to operate, often re-determining the content and form of knowledge produced. None of this is to say that the appearance of social and psychological influences on worker productivity at Hawthorne did not reflect natural aspects of human behavior – notably, their exaltation at the time was precisely because it was felt to be such a natural discovery. Yet the way these were understood – as a discovered fact or an irritating problem – depended upon more deeply rooted cultural and disciplinary assumptions and needs.

In the next chapter, we will look at how these shifts in meaning have endured, transformed, and become embedded in our view of human nature. Attributing to the individual – in the form of psychological object, research subject, as well as, more generally, any social participant – irrational inner processes triumphant over rational

¹⁷⁶ Capshew, 6

¹⁷⁷ Gillespie, 264

innovations of modernity, the Hawthorne effect has been the Hawthorne studies most pressing legacy. It has endured precisely because its central implication threatens to undermine many of the ideals upon which modern American society is based - both in principle and in practice - and the way this effect is today used, understood against the historical backdrop that made it a necessary consideration, reveals much about contemporary psychology and about the social factors that contribute to the shape and endurance of this experimental legacy.

A 'Scientific Taboo'

*...we can no longer delude ourselves into thinking that the observer is independent of and distinct from the object being observed... this assumption has been under severe scrutiny since the Hawthorne effect.*¹⁷⁸ (Miller & Fox, 2001)

Because the epistemological implications of the Hawthorne effect resonated with the concerns about methodology already rampant in the historical moment in which it originated, psychologists were compelled to take it seriously and to advocate that their peers do the same. The impact of this revolution in understandings of the Hawthorne findings, and the endurance of the Hawthorne effect as the experiments' central legacy is illuminated by philosopher of science Barbara Laslett's explanation that "the emotional meaning of certain ideas and intellectual innovations heightens the energy to advocate them," and that, likewise, "emotional salience also helps explain audiences' responses to them."¹⁷⁹ Indeed, the implications of this interpretation of the Hawthorne studies hit close to home, both for individual

¹⁷⁸ Miller and Fox, 7

¹⁷⁹ Laslett, 414

experimenters plagued by anxiety about the threat posed by human subjectivity to the integrity of their knowledge claims, and for a discipline in the midst of developing a coherent methodological approach.

Importantly, these anxieties transcended purely epistemological concerns – an important factor in the call for objectivity was the belief that only objective knowledge would provide salient practical guidance, and thus advance social progress. For example, one journal article author discussing the Hawthorne effect, as well as other methodological concerns, states that to “ensure accurate conclusions, the evaluator must recognize the Halos, Horns and Hawthorne effects and consciously strive to eliminate their impact. Accurate conclusions lead to correct decision making and ultimately to true safety program performance improvements.”¹⁸⁰ He continues to argue, with specific regard for the Hawthorne effect, that “one must make sure the mere process of being evaluated is not the reason a measured characteristic changes from baseline measurements. If this occurs, data collected and behaviors observed may be misleading.”¹⁸¹

This sense that the Hawthorne effect undermines the integrity and thus the practical use of scientific knowledge gave it the force both to overturn the enthusiastic rhetoric with which Mayo and his contemporaries had presented the resiliency of human and social factors, and to triumph over the critical discourse seeking to de-legitimize it. It was thus through their methodological connotations that the Hawthorne findings gained enough staying power – or, in Law’s words,

¹⁸⁰ C Herbert Shivers, "Halos, Horns & Hawthorne: Potential Flaws in the Evaluation Process," Professional Safety 43.3 (1998), 43

¹⁸¹ Shivers, 42

became “routinized”¹⁸² – to enter into that body of understandings and inscription devices that he calls the hinterland. The Hawthorne effect’s presence in the hinterland – which, Law tells us, “determines what it is to do science, or to practice a specific branch of science”¹⁸³ – is evidenced as it serves to mediate the boundaries of what is considered ‘scientific.’ This is powerfully illuminated by one scholar, who in reviewing an experiment and identifying that “the observed changes resulted from a Hawthorne effect,” proclaimed that “under no circumstance should one attempt to sell such a design as science,”¹⁸⁴ setting up an opposition between the Hawthorne effect and the qualification of a claim or line of inquiry as scientific.

Textbook discussions of the Hawthorne effect further assert this opposition, reverberating with apprehension about the triumph of human factors over experimental design. In a section entitled “Potential Design Pitfalls,” for example, one textbook author claims that “the Hawthorne effect is likely to threaten internal validity,”¹⁸⁵ while another more strongly warns that “the Hawthorne effect has been known to backfire!”¹⁸⁶ Other textbook claims more specifically address the magnitude of this threat and suggest there is little that can be done to avoid it. One author, for example, qualifies the explanation that “researchers are now admonished to control for the *Hawthorne effect*” by suggesting that “how to heed that warning is sometimes the most challenging part of the task of designing psychological

¹⁸² Law, 31

¹⁸³ Law, 29

¹⁸⁴ Selwyn W. Becker, "The Parable of the Pill," *Administrative Science Quarterly* 15.1 (1970), 96

¹⁸⁵ Clifford J. Drew, Michael L. Hardman and Ann Weaver Hart, eds., *Designing and Conducting Research: Inquiry in Education and Social Science* (Boston: Allyn & Bacon, 1996), 217

¹⁸⁶ Norman L Munn, L Dodge Fernald, and Peter S. Fernald. *Introduction to Psychology, 3rd Edition*, (Houghton Mifflin Company; Boston, 1974); 375

research.”¹⁸⁷ Others present readings of the Hawthorne effect that are disempowering to the experimenter, making claims such as that “there is little that can be done to eliminate the Hawthorne influence”¹⁸⁸ that erode the experimenter’s sense of control over the experimental environment. And finally, many textbook authors, in suggesting that the most carefully designed experiment may still be vulnerable to confounding factors, compel experimenters to take a reflexive approach to their practice. For example, one author’s advice that “in considering our results... one must take into account the possibility that what is called the Hawthorne effect might have been involved,”¹⁸⁹ suggests that the only way for experimenters to minimize this threat is to constantly remain aware of and look out for its occurrence.

These definitions are illuminating; as textbooks literally vehicle the discipline’s collective knowledge, they provide access into how the Hawthorne effect has registered in the scientific community. Indeed, journal article discussions of experiments with human subjects reflect that these methodological concerns are disempowering to the researcher; they do not only pose a problematic threat, but are also pervasive and uncontrollable. For example, one set of investigators, observing that “a variation of the Hawthorne effect, can be observed in most advertising campaign” admitted that their results were “attributable more to the fact of experimentation than to the efficacy of the intervention.”¹⁹⁰ In conceding that the change occurred “because the intervention takes place, and not because the approach

¹⁸⁷ William N. Dember, James J. Jenkins, and Timothy Teyler. General Psychology, Second Edition. (Lawrence Erlbaum Associates: Hillsdale, New Jersey, 1984), 22

¹⁸⁸ Drew, Hardman, and Hart, 220

¹⁸⁹ Richard C. Atkinson, ed., Contemporary Psychology (San Francisco: WH Freeman & Company 1971), 452

¹⁹⁰ Roberto Cuca and Catherine Pierce, "Experimentation in Family Planning Delivery Systems: An Overview " Studies in Family Planning 8.12 (1977), 303

being tested is in any way effective” this discussion reverberates with a sense of experimental failure. Furthermore, concluding that “all experiments, regardless of duration, are subject to the Hawthorne effect” and underscoring “the need for as unobtrusive a measurement as possible” these authors at once suggest that the Hawthorne effect has triumphed over them and reinforce that their peers must look out for it.¹⁹¹

Because of the fundamental and seemingly irreconcilable nature of the problem posed to experimentation by the Hawthorne effect, it would seem that psychologists would eagerly accept arguments that it does not exist, happy to be faced with one less source of methodological anxiety. However, it has persisted in light of this critical discourse as it has been rendered, in Lewin’s words, a ‘scientific taboo.’ As Lewin describes, “like social taboos, a scientific taboo is kept up not so much by a rational argument as by a common attitude among scientists,” and “any member of the scientific guild who does not adhere to the taboo... is suspected of not adhering to the scientific standards of critical thinking.”¹⁹²

Educational psychologist Ann Brown powerfully exemplifies the consequences of this construction of the Hawthorne as a taboo. Stating that “the Hawthorne effect has been dogging my trail for a long time,” Brown explains that the possible impact of the Hawthorne effect is often used to trivialize experimental outcomes. She describes some of the criticisms that have been launched against her research, for example, that “reciprocal teaching’s success has been called ‘*only* a Hawthorne effect,’” and that “the success of [her] interactive classrooms is ‘*merely* an

¹⁹¹ Cuca and Pierce, 303

¹⁹² Lewin, 190

example of the Hawthorne effect.” Further stating that “everywhere I go I can predict that someone will tell me that my results are *just* a Hawthorne effect,” Brown reveals both the pressure placed on experimenters to control for the Hawthorne effect, and the extent to which results believed to be the product of the Hawthorne effect may be trivialized or deemed unscientific by peers.¹⁹³

As the Hawthorne effect has become registered in the hinterland, it thus symbolizes a fundamental concern facing experimental psychologists and acts as a criterion according to which claims may be deemed “unscientific.” Perhaps because they expect to attract criticism if they neglect to look for the Hawthorne effect, or because they have internalized these concerns about it, psychological professionals have continued to contend with this artifact despite attempts to undermine its existence. Now part of that “backdrop of realities that cannot be wished away” that Law describes as the hinterland, the epistemological stakes are too high to ignore the Hawthorne effect, and attempts to eradicate the term will likely continue to be unsuccessful. “As the process goes along,” Law proposes, it becomes increasingly difficult to “ignore or to undo the routines and create others and alternative realities.”¹⁹⁴

The resulting approach to the Hawthorne effect resonates with Cook’s comparison of the term to the “legendary Yeti,” a dangerous animal that is suspected to be the product of urban myth, but like this experimental artifact, remains deeply feared. In extending this comparison, Cook notes that “the researcher need not go in active search of the beast, but neither should he leave his camp unprotected as if the

¹⁹³ Ann L. Brown, "Design Experiments: Theoretical and Methodological Challenges in Creating Complex Interventions in Classroom Settings " The Journal of the Learning Sciences 2.2 (1992)., 155

¹⁹⁴ Law, 34

‘Snowman’ did not exist,” urging experimental vigilance against the effect despite the pervasive doubts about its existence.¹⁹⁵ Attempts to determine the factuality of the Hawthorne effect are futile or misguided, as it has, in a sense, become real through its incorporation into experimental practice. This artifact certainly qualifies as a ‘true statement’ in the sense described by philosopher of science Isabelle Stengers, who describes that, “no scientific proposition describing scientific activity can... be called ‘true’ *if it has not attracted ‘interest’*” and that “to interest someone in something means, first and above all, to act in such a way that this thing – apparatus, argument, or hypothesis... - can concern the person, intervene in his or her life, and eventually transform it.” She clarifies the form of this interest: “an interested scientist will ask the question: can I incorporate this ‘thing’ into my research?”¹⁹⁶ Scientists have certainly expressed such interest in the Hawthorne effect, and in this sense, Stenger’s claim suggests that if the Hawthorne effect was not true when it was coined, and even if it was not true during the initial experiments, it has, through its pervasive incorporation in methodological considerations, and inclusion in textbooks, experimental discussions, and philosophical considerations of science, become true.

¹⁹⁵ Cook quoted by Robert Baker, 343

¹⁹⁶ Law quoting Isabelle Stenger, 40

CHAPTER FIVE

And you may ask yourself, what is the Hawthorne effect?

*After all, what the psychologist observed were human beings.*¹⁹⁷ (Lewin, 1939)

*For it is the intractability of the human factor, and not our technologies, that has spoiled the American dream...*¹⁹⁸ (Lynd, 1939)

Progressing from a loose set of claims about the need for industry to take psychological and social factors seriously to the imprecise but significant methodological concern intimated by the Hawthorne effect, the unstable and enduring legacy of the Hawthorne experiments underscores arguments put forth by philosophers of science Miller and Fox: “what are commonly called facts are not things in themselves but things as we perceive and express them”¹⁹⁹ and “a fact does not become a fact until it is valued by humans.”²⁰⁰ Indeed, throughout this thesis we have witnessed the transformation of a single set of scientific observations into a fact (or artifact), one that has been shaped and reshaped as it has been distinctly perceived, and thus valued in different ways, by humans receiving the findings at different historical moments.

¹⁹⁷ Lewin, 3

¹⁹⁸ Robert S. Lynd, *Knowledge for What?: The Place of Social Science in American Culture* (New York: Grove Press, Inc., 1939)., 5

¹⁹⁹ Miller and Fox, 2

²⁰⁰ Miller and Fox, 4

Having revealed that experimental psychologist John French purposefully introduced the term “Hawthorne effect” to indicate a methodological concern, one scholar’s claim that it is, above all, “a confounding variable occurring in much research with human subjects which requires explanation” seems to saliently resolve confusion about this artifact’s meaning.²⁰¹ However, in turning to another scholar’s claim that “the Hawthorne effect is to be praised, not damned,”²⁰² it becomes clear that the first reckoning is not sufficient; the revolution in meaning traced throughout the last chapter contributed to only one, albeit a powerful, part of this experimental legacy.

The initial importance of the Hawthorne studies in liberating the individual from the limiting and intuitively problematic model of the human motor has endured, even as the Hawthorne effect recast the social and psychological factors as problematic. Accounts of the discovery at Hawthorne of what Mayo called the “existence of untouched human problems at depths far below the superficials of current industrial organization” circulate through textbook definitions, revealing the lasting and fundamental importance of these claims.²⁰³ For example, one textbook author, in writing that “the conclusion finally forced upon the investigators” was the need to consider the workers “as *individuals* rather than as cogs in an industrial machine,” returns to the narrative of discovery characteristic of the early accounts.²⁰⁴ Another author explicates the role of these experiments in opposing the mechanical model of human behavior, describing: “the researchers concluded that the

²⁰¹ Diaper, 4

²⁰² Brown, 135

²⁰³ Mayo, Human Problems, 101

²⁰⁴ Munn, Fernald, and Fernald, 374

psychological element was more important to the workers than the physical variable being manipulated.”²⁰⁵ While the Hawthorne effect now has become registered in the hinterland as a ‘scientific taboo,’ enduring traces of the moment of “*éclairissement*”²⁰⁶ (presented in the first account of the illumination experiments) about invisible, complex psychological processes during the illumination experiments have invested the Hawthorne effect with its multiple identities.

Consequently, while for many researchers the Hawthorne effect stands as a source of experimental anxiety, for others it resonates with their experiences and goals in studying human behavior. For these latter scientists, the Hawthorne effect suggests that because human behavior is mediated by many, and often irrational factors – unlike the rational working of machines – approaches to changing that behavior may not be logically mediated. Educational psychologist Ann Brown, taking as her goal that students “act as consultants,” and “take charge of their own learning environment to the extent possible,” proposes that there is something to be learned when her experimental manipulations seem to result from the Hawthorne effect rather than from other experimental variables. In fact, she even claims: “the Hawthorne effect is exactly what I am aiming for in my classrooms.”²⁰⁷ Another educational psychologist similarly observes that, as “instructional changes are nearly always reported as resulting in improvement...the ‘Hawthorne effect’... evidently goes hand in hand with educational innovation.” Further describing that “students and faculty alike can be rejuvenated by a fresh effort and by the warmth of the

²⁰⁵ Zimbardo, 1985

²⁰⁶ Carey quoting Roethlisberger, 404

²⁰⁷ Brown, 165

community spirit which develops when a group is testing new ground,”²⁰⁸ Henry Brickell reflects a positive take on the impact of supervision, special treatment, and social environment on productivity evidenced in the Hawthorne studies. Taken together, these arguments reflect the sort of conclusions made by Mayo, Roethlisberger, and Dickson, that human management might not simply entail an input-output relationship

In other areas of research, a perceived Hawthorne effect has been welcomed because it offers insights not initially expected by experimenters, a reading that, again, returns to the narrative of discovery initially characteristic of the Hawthorne studies. For example, researchers Kraut and McConahay, in reviewing a study in which voters were interviewed about their candidate preferences and whose ultimate voting behavior was recorded, found that voters who are interviewed are more likely to go to the polls. They posited that this result was the result of the Hawthorne effect, welcoming the findings that “*something* happens to increase the likelihood that the contacted individual will go to the polls” even though their initial agenda was not to determine how to encourage voting behavior.²⁰⁹ Stating that “the empirical finding, regardless of its cause, has important implications for both public opinion research and practical politics,” these researchers underscore the value of this finding: “sample surveys used to predict the outcome of an election may conceivably not only predict but also determine the outcome of the election.”²¹⁰

²⁰⁸ Henry M. Brickell, "The Dynamics of Educational Change," *Theory into Practice* 1.2 (1962), 84

²⁰⁹ Robert E. Kraut and John B. McConahay, "How Being Interview Affects Voting: An Experiment " *The Public Opinion Quarterly* 37.3 (1973), 400

²¹⁰ Kraut and McConahay, 406

In a subsequent work on voting behavior, researchers Granberg and Holmberg more precisely, and optimistically, articulate this productive, liberating view of the Hawthorne effect. Acknowledging that the outcome of their experimental manipulations had been confounded, they argue that this need not be considered “a scientific dilemma.” Arguing that “at another level our results are encouraging to people who have invested time, energy and resources in election studies,” these researchers they suggest that although “one might regard this Hawthorne effect as an unintended consequence,” it also might indicate a range of means of increasing voting behavior, as well as producing other changes.²¹¹ Specifically conjecturing that “with the aid of modern technology, people could be reminded by the computerized telephone messages about deadlines for registration, poll hours, where to vote and the like” they add that, more generally, “asking people to predict whether they will perform a socially desirable act, such as voting, may increase the probability that the person will do the act.”²¹²

Many researchers gesture to the practical applications of this alternative interpretation, suggesting that the Hawthorne effect should be *produced* rather than *controlled*. Social psychologist John Adair, for example, proposes that the Hawthorne effect need not be regarded as “an artifact to be controlled or removed from the experiment” but that it might, instead, “form the substance of behavior that directs responses and thereby may demand a more phenomenological approach than the prevailing behavioristic or objectivist philosophy has encouraged.”²¹³ This

²¹¹ Donald Granberg and Soren Holmberg, "The Hawthorne Effect in Election Studies: The Impact of Survey Participation on Voting " British Journal of Political Science 22.2 (1992)., 246

²¹² Ibid.

²¹³ Adair, 343

productive reading of the Hawthorne effect has been more frequently advocated as further studies have suggested that it might provide the key to effecting behavioral change. A study of hand washing behavior reported, for example, that “attempts to change hand washing behavior seem to illustrate the Hawthorne effect,” more so than any precise environmental or programmatic changes.²¹⁴ Likewise, a study on sunscreen use reported that “the Hawthorne effect appears to be responsible for the increased frequency of sunscreen use in the intervention group compared with the control group over the entire 5 years of the trial.” From their conclusion that “this underlying Hawthorne effect is augmented when the intensity of observation is increased” and its corroboration with “studies of diet showing that the requirement to prospectively record food intake leads to marked modification of the usual diet,” researchers consider how to purposefully produce such a Hawthorne effect. Suggesting, for example, that “diaries could be considered as an adjunct to other methods used to maintain adherence” these authors propose that many questions about how to change human behavior might be answered by the Hawthorne effect.²¹⁵ This affirmative, even liberating reading of the Hawthorne effect bears the imprint of Mayo, Roethlisberger, and Dickson’s appeals for industry to depart from the sort of approach put forth by Taylor’s scientific management.

Such attempts to harness the Hawthorne effect, however, may still be frustrated by its paradoxical meaning: if producing a Hawthorne effect is the key to effective educational change, or to the promotion of socially desirable behavior, then

²¹⁴ Mary B. Mallison, "Editorial: The Staph That Eats Hospitals," *The American Journal of Nursing* Vol. 92.2 (1992).7, 1992

²¹⁵ Rachel E. Neale and Adele C. Green, "Measuring Behavioral Interventions by Questionnaires and Prospective Diaries: An Example of Sunscreen Use," *Epidemiology* 13.2 (2002)., 226

there is a need for precise understandings about how to measure and provoke it. However, the Hawthorne effect itself suggests that this might be impossible, a difficulty exemplified by several scholars hoping to produce it. For example, Kraut and McConahay, after identifying that “a Hawthorne effect was operating in our experiment,” and suggesting the practical benefit of this finding, further argue that “the problem, then, is to explain what makes the Hawthorne effect work, something upon which various social scientists cannot agree.”²¹⁶ Likewise, Granberg and Holmberg admit that “we cannot claim to know precisely how the stimulus effect is produced, but it is worthy of speculation.”²¹⁷

Clearly, the subjective processes represented by the Hawthorne effect defy precise understanding and control. In this sense, the effect itself, and the path it has traveled, support scholar Richard McKeon’s reflection that “the paradoxes involved in the need to consider mankind and encountered in the effort to take mankind into account,” are, at once, “the definitive characteristics of the concept of mankind.”²¹⁸ Indeed, the productive interpretation of the Hawthorne effect at once makes important claims about the factors influencing behavioral change, but also cycles back to the methodological conundrum. Revealing that subjective processes mediate human behavior, that these processes need to be subject to further inquiry, and that such inquiry is threatened by the very factors it seeks to study, the Hawthorne effect tells a story about the complexity of human behavior and the frustrating nature of studying that behavior.

²¹⁶ Kraut and McConahay, 406 (footnote 18)

²¹⁷ Granberg and Holmberg, 246

²¹⁸ Richard McKeon, “Mankind: The Relation of Reason to Action,” *Ethics* 74.3 (1964), 174

In this sense, the paradoxical nature of the Hawthorne effect also raises competing conceptions about what we seek in the experiment: do we hope to contain human complexity or more carefully understand that complexity? In many ways, as revealed by different understandings of the Hawthorne findings, more generally, and the Hawthorne effect, more specifically, the answers to these questions depend on the sort of solutions we seek. Do we want to control human behavior in the experiment so that we can produce information and solutions resonant with modern ideals, or do we want to let other conceptions of human nature guide us in our study of it? This question has many dimensions – philosophical, sociological, and psychological, to name a few – but what is important here that the Hawthorne studies played a large role in posing that question, and in suggesting the scope of considerations involved in asking it. The many identities of the Hawthorne effect and the many ways in which social agents relate to it reveal that this question has not yet, and may never be, resolved.

A Paradox Unraveled

Although in many ways, one scholar’s claim that “the moral of this tale, referred to as the Hawthorne effect, is that people change their behavior when they think you are watching it,” is correct, more telling is his further qualification: “compelling though this fable maybe, it conceals something of greater interest.”²¹⁹ Indeed, behind this experimental artifact is a story about several generations of psychologists identifying a fundamental tenet of human behavior, of their struggle to articulate what they both observed and intuitively understood, and of their thought

²¹⁹ Gale, 439

about how their discipline might appropriately integrate this new perspective into experimental practice.

This inquiry began by questioning the meaning of the Hawthorne effect, and it will end by answering it, but not with the sense of closure we might expect. The meaning of this artifact is best illuminated through consideration of its many dimensions. The Hawthorne effect is at once representative of the triumph of the new understandings about human nature over those advanced by the hinterland from which the studies emerged, and of the implications of these understandings for psychologists who undertook reflexive examination of their experimentation during the 1950's. It is symbolic of the reminder provided by the Hawthorne studies that human beings do not operate as machines, and, in turn, of the inherent challenge facing attempts at their rational management or objective study. It speaks, above all, to what sociologist Robert Lynd has called the "intractability of the human factor" and it endures because it reminds us of our persistent humanity in an age in which the application of technological innovation and rational thought threaten to undermine it.²²⁰ Finally, it serves as a linguistic tool for speaking about this "intractability" characteristic of our nature, for identifying its role in the experimental setting, and for considering how we might control it.

In unraveling the meanings of the Hawthorne effect, this study also explicated important features of scientific activity. It revealed how the assumptions preceding an experiment shape both how experimental questions are conceived and what findings are taken to mean; that the experiment does not simply involve the collection and interpretation of data but that within each experiment, events unfold in a unique

²²⁰ Lynd, 5

and informative way; that observers situated in different historical moments and for whom knowledge claims have different emotional and intellectual implications will have distinct relationships to and thus diverging interpretations of the same data. As Whitley suggests, “The study of change in science involves the study of change in ‘tacit knowledge,’” and indeed, this case study of the scientific study of human subjects reveals both how the Hawthorne findings were figured in terms of tacit knowledge about the human subject, and in turn, how they came to become an important part of that tacit knowledge.²²¹ Finally, through this case the intertwining qualities of the scientific experiment are revealed to be as important in determining the content of knowledge claims as are the data supporting those claims.

Revealing, above all, that a single set of data may be subject to multiple interpretations and that these interpretations may evolve and shift over time, our historical examination of the Hawthorne findings at once unravels the paradoxical nature of this case, and suggests that attempts to identify the *real* Hawthorne effect or to prove or disprove its existence are misguided. Psychologist Philip Cushman’s claim that in defining psychological phenomena, “the problem is not (only) that we are being too sloppy or imprecise; the problem is that we are trying to do something that cannot be done” helps to alleviate confusion about the meaning of the Hawthorne effect as well as its ironic persistence.²²² Stating that “human experience and behavior are multidetermined, contextual, and reflexive,” Cushman’s further suggestion that “we cannot begin to adequately capture or mirror the complexities of

²²¹ Whitley, 82

²²² Philip Cushman, "Psychologic or Psychological Esperanto?," *Psychological Inquiry* 2.4 (1991), 340

social reality in language” compels considering that what has been criticized as an ambiguity in meaning may instead be exalted as an ineffable one.

In spite, or perhaps because of, this ineffability, the Hawthorne effect has been of crucial importance; its enduring influence is nowhere more poignantly evidenced than in its triumph over the critical discourse that has erupted around it. The Hawthorne effect urges reconsideration of the popular assumption that “the openness to dialogue and debate, the messy loose ends” are “not good news for science.” In appealing to the perspective that “good scientific storytelling is not about uncertainty, but about closure,” both scientists and the public obscure the nuanced and significant conceptual contributions of experiments such as the Hawthorne studies.²²³ Although one might conclude from the Hawthorne effect itself and from the biography of its life “that knowledge gained from experiments is fatally flawed,” this case wonderfully illuminates the complexity of the process through which scientific understandings are produced, as well as the richness of understandings that are thus embodied in scientific claims.²²⁴ Though as Cushman claimed, language may be too “tricky a medium to precisely represent reality”²²⁵ underlying the Hawthorne effect’s multiple identities are importantly understandings about the complexity of human behavior and experience, understandings largely uncovered, or, at least, articulated, through the Hawthorne studies.

Although what the Hawthorne experiments revealed about the complexity, reactivity, and subjectivity driving the experience and behavior of students, workers,

²²³ Spears, Russell and Heather J. Smith. “Experiments as Politics,” *Political Psychology*, Vol. 22, No. 2, Special Issue: Psychology as Politics. (Jun., 2001); pp. 309 – 330., 325

²²⁴ Spears and Smith, 324

²²⁵ Reed Larson, "Constructing Social Science (Please Read All Warnings before, During, and after Use)," *Journal of Marriage and the Family* 64.4 (2002), 1058

patients, and experimental subjects may defy articulation in “a logical, clean, scientific language,” the emerging understandings have been of such fundamental importance that they may have even effected in what Thomas Kuhn calls a “scientific revolution.”²²⁶ Such revolutions, Kuhn argues, occur when “a normal problem, one that ought to be solvable by known rules and procedures, resists the reiterated onslaught of the ablest members of the group within whose competence it falls.” Just as the findings in the illumination experiments refused to align with the model of the human motor, these revolutions occur with the recognition of “an anomaly that cannot, despite repeated effort, be aligned with professional expectation” and have such pervasive influence that they ultimately serve to “subvert the existing tradition of scientific practice.” Though characterizing this case as a scientific revolution would in itself constitute an entire study, behind the Hawthorne effect is certainly one of the “extraordinary episodes” that lead to a “shift in professional commitments,” Reflected in the multiple identities of the Hawthorne effect, as well as in the term’s triumph over pervasive critical scrutiny is, certainly, a “‘tradition-shattering’ impact.”²²⁷

If we must close with a more complicated rather than simple understanding of the Hawthorne effect, we have at least illuminated why, as *Science Times* contributor Gina Kolata reflected, this is one of those “stories that refuse to die no matter how many times they are roundly debunked.” The Hawthorne effect is, really, “too good to die.”²²⁸

²²⁶ Ibid.

²²⁷ Kuhn, 6

²²⁸ Gina Kolata, "Scientific Myths That Are Too Good to Die," New York Times December 6 1998.

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