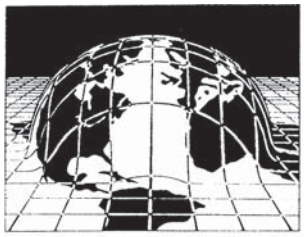
Organization Science
Vol. 19, No. 6, November–December 2008, pp. 907–918
ISSN 1047-7039 | EISSN 1526-5455 | 08 | 1906 | 0907

informs

DOI 10.1287/orsc.1080.0398



PERSPECTIVE

Making Doubt Generative: Rethinking the Role of Doubt in the Research Process

Karen Locke
Mason School of Business, College of William and Mary, Williamsburg, Virginia 23185,
karen.locke@mason.wm.edu

Karen Golden-Biddle
School of Management, Boston University, Boston, Massachusetts 02215,
kgbiddle@bu.edu

Martha S. Feldman
Department of Planning, Policy, and Design, University of California, Irvine, Irvine, California 92697-7075,
feldmanm@uci.edu

In this paper, we want to shift the attention of our scholarly community to the living condition of doubt and its underappreciated significance for the theorizing process. Drawing on Peirce's notion of abduction, we articulate the relationship between doubt and belief in the everyday imaginative work central to theorizing, and establish the role played by doubt as abduction's engine in these efforts. We propose three strategic principles for engaging and using doubt in the research process. In concluding, we explore our field's overemphasis on validation to the exclusion of discovery processes and to the detriment of excellence in theorizing. We call for a broadening of our notions of "methodology" to incorporate discovery processes and to begin their explication.

Key words: doubt; abduction; theorizing; research process; discovery
History: Published online in *Articles in Advance* October 22, 2008.

> Theory cannot be improved until we improve the theorizing process, and we cannot improve the theorizing process until we describe it more explicitly, operate it more self-consciously, and decouple it from validation more deliberately. (Weick 1989, p. 1)

Consistent with Weick's enjoinder above, our efforts in this paper originate in the observation that although the validation process is well documented in our field's discussions of theory and method, development of the discovery process is remarkably underdeveloped. This is a critical oversight in light of increasing awareness that it is the discovery process that enables us to see empirical conundrums and turn toward them to mobilize perhaps our most interesting theorizing (Alvesson and Karreman 2007, Bailyn 1977, Czarniawska 1999, Locke et al. 2004, Van Maanen et al. 2007, Weick 2007). We use Peirce's (1976) concept of abduction as a starting point for developing a fuller and more explicit account of the theorizing process and the role of doubt in generating new ideas. Our specific contribution relates to the important role of doubt in discovery.

Similar to Van Maanen et al. (2007, p. 1149), we believe that the concept of abduction from the pragmatist, Charles Peirce, is "perhaps the best answer we currently have to the problems of discovery . . . ." In addition to the long-accepted inferential forms of induction and deduction, which describe the processes through which we derive generalizations from specific observations and specific observations from generalizations, respectively, Peirce proposed abduction as necessary to indicate the inventive processes involved in inquiry. He argued, "Deduction proves that something *must* be; induction shows that something *actually is* operative; abduction merely suggests that something *may be*" (Peirce 1931–1958 (CP) 5:171; emphasis in original).[1] Our Peircian understanding of abduction is concerned with the generation of ideas. It is an ampliative and

conjectural mode of inquiry through which we engender and entertain hunches, explanatory propositions, ideas, and theoretical elements.

Increasingly, scholars in organizational studies focused on theorizing are reaching out to Charles Sanders Peirce's work on abduction to examine discovery (Alvesson and Skoldberg 2000, Czarniawska 1999, Hansen 2007, Van de Ven 2007, Weick 2005). Seeing abduction as comprising the conjectural or suppositional in the theorizing process, these authors highlight the role of surprise and anomalies in provoking us to see and form new ideas. For example, Czarniawska (1999) envisions abduction in research as much like detective processes, involving the recognition of puzzling observations that enable us to discern and construct new plots. She emphasizes that the process does not entirely conform to the scientific method, but instead involves a certain amount of mystery about how method produces the outcome. Weick (2005, p. 433) describes the abductive process as: "clues [giving] rise to speculations, conjectures, and assessments of plausibility rather than to a search among known rules to see which one might best fit the facts." Hansen (2007) identifies the process as embodied or sensory in nature, relating to aesthetics and requiring reflexivity in challenging one's previously held conceptions. Van de Ven (2007) describes the process as commencing with an anomaly or surprise that motivates researchers to generate explanations. Alvesson and Karreman (2007, p. 1266) incorporate the notion of breakdown through which mystery is generated to highlight the "the unanticipated and unexpected."

In this paper, we extend existing scholarship highlighting abduction's role in theorizing new ideas by explicating the role that the living sensation of doubt plays in energizing and enhancing the quality of abductive work. Doubt is the engine of abduction. The living state of doubt drives and energizes us to generate possibilities, try them out, modify, transform, or abandon them, try again, and so on, until new concepts or patterns are generated that productively satisfy our doubt. From this perspective, doubt is an essential, not aberrant, part of the research process: The question is not whether, but *how*, to engage doubt.

Although Peirce indicated the importance of doubt within abductive reasoning, he did not unpack how an understanding of doubt could enhance the experience and quality of theorizing. Focusing here on the role of doubt in abduction, we can ask: How might doubt be cultivated? In articulating this question, we envision the "eureka" moment when a productive abduction occurs as a generative domain potentially open to those who cultivate their ability to engage and use doubt in the theorizing process rather than as the exclusive domain of the brilliant or fortuitous.

To unpack the significance of doubt for our theorizing efforts, we draw on Peirce to articulate the relationship between doubt, belief, and abduction in the everyday imaginative work central to theorizing. We then explore possibilities for making engagement with doubt more generative in the research process, and offer three strategic principles to assist these efforts. We end with a discussion of how the scholarly community shapes the enactment of the cycle of belief, doubt, and abduction.

Doubt, Belief, and Abduction

Within Peirce's pragmatism, inquiry is defined as the activity of resolving genuine doubt in order to arrive at stable beliefs (Burks 1946). Framing inquiry through the articulation of belief, doubt, and experience, Peirce emphasizes that in all of our dealings through the course of our lives, all we have are ourselves, our beliefs, and our doubts interacting with our experience in the world (Chiasson 2001, 2007). Inquiry is initiated when, relative to our beliefs, some positive impingement or surprise generates doubt. Then, doubt—experienced as not knowing—motivates a search for understanding. Living doubt is necessary to energize inquiry.

Abduction is one form of reasoning (along with induction and deduction) comprising the living process of inquiry. Abduction is consequential because, among the forms of reasoning available to us, it alone originates possible explanations. It is the "only" operation that "introduces any new idea" (CP 5:171) and, therefore, the way in which "all the ideas of science come to it" (CP 5:145). Thus, doubt engenders the potential of theorizing creatively by motivating abduction's search for possible explanations to an experienced anomaly.

Because the words doubt and belief are somewhat awkward in everyday language and, as Peirce comments, as "commonly employed [they] relate to religious or other grave discussions," it is useful to specify his use of these terms for inquiry. Peirce indicates (CP 5:394) that he uses "doubt" "to designate the starting of any question, no matter how small or great," and "belief" "to designate the resolution of it." Beliefs, as doubts which have been resolved, are the habits of interpretation and action ready for use, and in use, in our transactions with the world. As habitual and received, they represent continuance and are the steady state of our everyday understanding, living, and working; we engage the world with habit-laden ways of apprehending that are developed in the course of our lives. Doubts, on the other hand, arising when that continuance is interrupted, represent a potential inadequacy in these habitual ways of understanding and acting. Doubt is the "privation" of habits. As "privation," doubt represents a "condition of erratic activity" (CP 5:417); its irritation excites the "action of thought" that only ceases when "belief is attained" (CP 5:394), when the questioning is resolved.

The irritation of doubt provides an opportunity for abduction to generate inventive solutions, new ideas,

explanatory propositions, and theoretical elements. Importantly, this inventive activity is only suppositional because abduction produces "no conclusion more definite than a conjecture," (Peirce 1976 (NEM) 4:319). Rather, it is a mode of reasoning in which "the actual is interpreted and constructed in light of the possible" (Alexander 1990). Consequently, abduction's value and weakness are two sides of the same coin; although it is weak in the sense of being highly permissive (Paavola 2004)—in ordinary terms it is nothing more or less than conjecture—that very permissiveness loosens the boundaries on our thinking and is the source of its inventiveness.

Abduction depends on imagination to suggest the possible. Peirce is emphatic that when we are trying to understand something,

> . . . there is nothing but imagination that can ever supply [us] an inkling of the truth. [We] can stare stupidly at phenomena; but in the absence of imagination they will not connect themselves together in any rational way. (CP 1:46).

To emphasize the place of imagination in abduction, Peirce discusses the activity of musement as simultaneously a description of the character of imaginative work involved in abduction and an affirmation of the imagination's role in it (Seebeok 1981, Anderson 2005). Musement is the a-critical generation and exploration of ideas, a free-ranging and exploratory flow of thought and action in which we search into and entertain possibility. Lest we assume that musement is essentially an armchair activity, Peirce qualifies that exploration, "is not a conversation in words alone" (CP 6:461); it also involves action, ways of feeling out, trying out, and elaborating for ourselves the results of our free-ranging explorations.

In opening up abductive reasoning to the free play of musement, Peirce indicates that possibilities flowing from this process have the same character as perceptions; they belong to the same general class of operations (CP 5:173). Abduction and perception are part of a continuum in which abduction shades into perception (Anderson 1987). Perceptions are involuntary—we simply perceive—and abductions are continuous with perception in that they have the feeling of simply coming to us. Indeed, abductions and perceptions are indistinguishable until a certain point; "the separation between them only occurs at the end of the process . . ." when we organize them as conjectures and thereby make them available for criticism. Thus, "it would be as absurd to criticize a perceptive judgment as it would be to criticize the growth of our nails" (Santaella 2005, p. 195). It is only later in the process that they become objects of evaluation.

Although we are here considering the operation of belief, doubt, and abduction in the context of formal inquiry, it is important to underscore that for Peirce, abduction is also operative in the course of our everyday lives (Delaney 1993, Fann 1970, Joas 1996). For example, when driving home in the rain my car shimmies on the highway; the experience is unsettling, and ideas about what might be going on begin occurring to me. Likewise, when a research team receives news that their grant proposal has been turned down, in the weeks that follow, they explore why the proposal was not funded, how to continue doing the research, and what changes might be made in the next proposal. The activity to generate possibilities that explain these and other experiences represents everyday abduction and inquiry at work.

Lest one assume from the foregoing that belief is more common or that it constitutes the starting point of inquiry; we should be clear that the complexity of the world ensures that the interplay between belief and doubt is continuous. Doubt is not the interruption of action, although it may interrupt some specific actions. Both belief and doubt are necessary for creative action, for ordinary problem solving as well as problem solving in the research domain (Yanow 2006, 2007). Belief without doubt produces action that is unexamined and, therefore, often inappropriate to the specific context.

In concluding our discussion of the relationship of abduction, belief, and doubt, we would like to underscore three things germane to rethinking the role of doubt in the research process. First, understood within their pragmatist philosophical context, the elements of inquiry we have discussed—abduction, doubt, and belief—are living transactional processes involving human beings living and acting in a world. They are not purely subjective phenomena; rather, they mediate between the human organism and its environment (Raposa 1984, Anderson 2005). Belief is the way we take the world as given. It reflects the current organization of our experiences and observations. Doubt indicates the breaks and breaches in that organization, and abduction seeks to explore the breaches and to create new ways of acting in the world. Within this pragmatic transactional order, there are no Descartean, self-reflective, individualistic inquirers. Peirce's inquiry presupposes the context of beings pursuing interests in the world (Gregory 2000); these beings operate within a social world (Hildebrand 1996), and their inquiry is active and experimental.

Second, for Peirce, inquirers are distinctly sentient embodied beings. For him, doubt is a living sensation that is palpable; he points out, "we generally know when we wish to ask a question . . . for there is a dissimilarity between the sensation of doubting and that of believing" (CP 5:370). On this basis, Peirce differentiated his living doubt from Cartesian "counterfeit paper doubt" (CP:6:498), rejecting the possibility of doubting something that "we do not doubt in our hearts" (CP:2:265). With its irritation, the living sensation of doubt is "uneasy" (CP 5:372) when compared

with belief's "self-satisfied" (CP 5:417) and "calm" (CP 5:372) expression. It is a sensation felt in our bodies. This feeling of unsettledness causes us to start and sustain our inquiry. Doubt is an experiential signal that there is a need to reconsider and revise our ways of understanding (Anderson 2005, Hildebrand 1996).

Third, and most important, doubt is a positive condition because it provides the necessary sentient context to stimulate and sustain abductive reasoning and because it spurs creativity. It makes new action possible. This contrasts with a perspective our society has on doubt as negative, expressed in phrases such as a "doubting Thomas" or "self-doubt." Rather, our hesitancy, questioning, wonderings, feelings of curiosity about, dubiety, etc. represent doubt as a condition of possibility, as indicated in, "I have this nagging doubt that something is not quite right, and I can't quite put my finger on it." In these moments, the impingement of doubt on belief becomes fertile ground for imaginative work; doubt invites abduction and the beginning of imagining what "might be." The activity may be minimal, energetic, or turbulent; it may last a fraction of a second, an hour, or continue recursively for long years, but doubt energizes and drives our exploration until we find ourselves satisfactorily understanding the situation that occasions our hesitation (CP 5:394). As Shanley put it in the preface to his award-winning play:

> Doubt is nothing less than an opportunity to reenter the Present. (Shanley 2005, p. viii)

Doubt in the Research Process

Emphasizing the value of doubt in the research process, the prior discussion has called attention to the living experience of dubiety, which provides indications that our given ways of understanding and acting are not quite working. However, what meaning do we typically make of the experience of doubt? Consider the following excerpt from Emerson et al. (1995). In their discussion of qualitative coding, they tell the story of a student researching a public high school band program. Despite a strong sense from preliminary coding that she knew what she would eventually write about, she "lost" her way. They offer the student's description of what happened:

> I first thought I would explain how, in the face of budget cuts, somebody could keep a program, an extracurricular program like this going. And then in listing the ways that the teacher does that, I came across the idea that he has to do things to get all of those kids to be friends together. And, then I thought, wait a minute; that could be a whole topic of its own. There's so many things going on. How do I explain in my paper the different social cliques with 110 kids; there's so many social cliques? And then I just started looking at the relationships that students have with each other inside band and outside. It was just the weirdest thing—I lost my paper! The more I coded, the more I lost my paper. (1995, p. 158)

The student sets out with a specific purpose to understand how a program can be sustained in the context of reduced resource commitments. However, in interacting with the data generated to answer her question and seeing the role played by relationships in this, the student's clearly articulated question disintegrates. Confused and muddled, she has "lost" her project through her efforts to realize it. What is the feeling of having lost her project? Feeling stuck? Feeling at a loss for what to do next? Feeling exasperated at having to try out another reformulation of her understanding of the band program? How might she respond to these feelings?

We draw on this example to highlight doubt as a positive condition for stimulating abductive work in the life of this student's research project. Similarly, Emerson, Fretz and Shaw comment that "what was reported negatively as 'having lost her paper' really indicates an openness to new meanings and ways of putting things together" (1995, p. 159). This experienced loss points to the beginnings of a potential shift in the student's understanding and thinking, because her confusion may compel her to imagine her notions of program sustainability in different ways. Fine and Deegan affirm the value of disintegration in how we understand what we are about in our research as part and parcel of the process. They state, "the initial moment of discovery in clinical or field-bound situations (for those fortunate enough to have this experience) invariably evokes the sense that the whole project is turning to dust" (1996, p. 435).

The opportunities for doubt to arise during the process of research are multiple. In her account of how the idea of "Crafting Selves" emerged, Dorrine Kondo (1990) describes how deep participation brought about a questioning of her understanding of the concept of a discrete "self" that was the basis for her initial research question. She comments, "Selves and society did not seem to be separate entities; rather the boundaries were blurred. This realization, coming as it did through intense participation in social life, led me to shift my research problem," (Kondo 2001, p. 199). Specifically, she recounts:

> An awareness of this person-centered universe *impressed itself* upon me in myriad ways. Certainly anyone who lives in the Shitamachi (downtown) district cannot help but be aware of the constant presence of others. In my neighborhood, the houses were so densely packed that the walls almost touched. Though I lived in my own apartment, I shared a wall with Akemi-chan, Mrs. Hatanaka's daughter, and we would try to be solicitous of each other's daily routines: I was especially careful to refrain from typing when she was practicing the piano. (Kondo 2001, p. 195, italics added)

Over time, as Kondo responded bodily to the social obligations of Japanese life, for example, perhaps hesitating and then turning away from the typewriter with Akemi-chan's playing in her ears, the details of these obligations impinged on her, disrupting how

she understood her research question. Doubt about her apprehension of selfhood as something individual and distinct fueled a search to compose a perspective that captured the "blurred boundaries" in her daily experience of selfhood and society, one which she eventually articulated as the socially embedded self-making obligations of Japanese life.

As well, an experience that can rapidly induce doubt and which many researchers share is the dreaded "so what" question or the request to know "what is new here." These simple questions coming from a dissertation advisor, from an audience at a presentation, from journal reviewers, or even from oneself or coauthors are often capable of producing at least a momentary crisis of confidence, a feeling of having the rug pulled out from under. What was obvious becomes problematic. Why can't "they" see why this matters? Maybe it doesn't? Have I got it all wrong? Alternatively, what don't they understand that I/we need to articulate? Or what don't I/we understand?

The questions articulated above illustrate a panoply of responses, from denial that there is anything that needs to be addressed other than the audience's ignorance, to concern that there is something fundamentally wrong with the project, to questions about how to think about what has not yet been explored and articulated. These responses correspond to three reactions to experiencing doubt: (1) Ignore doubt or dismiss it as unimportant; (2) turn it into self-doubt—there's something wrong with me; there something wrong with my project; (3) engage it, explore it, use it.

The importance of the third reaction—engaging doubt—has been recognized recently in analyses of organizational operations (Kramer 2007, Perin 2005). Building on Weick's call for attention to the importance of doubt for organizational adaptability (1979), Kramer argues that there are "better and worse ways in which operators can doubt" (2007, p. 95) and that for organizations that operate in complex environments, organizing the ability to use doubt constructively should be a central feature of organizational design. Perin argues for cultures of control to be "focused as much on knowledge and meanings as on departments and parts" (2005, p. xvi) and suggests the "principle of doubt shadowed by discovery" as a way to turn the ambiguity of complex systems such as nuclear plants into useful information (213ff). The process is related to sensemaking (Weick 1995), but the emphasis is on stimulating doubt and using it constructively. "The trick is to be attentive to . . . differences and not to treat them as essentially in the family of events known well" (Weick 2006, p. 768).

We argue that "doubt shadowed by discovery" would be useful for research as well and that designing research in ways that enable us to use doubt constructively as it arises should be a central feature in research design. Certainly, the complexity that brings doubt forward in these organizational studies also brings doubt forward in the research context. As we have already noted, doubt may arise in a number of places in the research process. And doubt can be both debilitating and exhilarating. We are reminded of a student's response in one of our classes that explored the constructive nature of doubt. The student was nearing the completion of her dissertation, but could not make herself sit down to write. During class she burst out "Oh! I get it!" and brought her head down on the table in emphasis. What had she gotten? Simply that it was all right, even good, to be experiencing doubt at this stage of her research. That her research was raising questions she could not answer was not a sign of the deficiency in the research or her abilities, but rather a sign of the interesting nature of the question and the complexity of the phenomenon she was studying. In the weeks following, she reported an increased excitement about her research, eagerness to engage, and ability to accomplish it.

Cultivating the Generative Potential of Doubt

The generative potential of doubt can be fostered and developed both by individual researchers and by the research community. In this section of the paper, we draw attention to some strategic principles that researchers can cultivate. We focus on how understanding the embodied and lived nature of abductive work can help us recognize the bodily signs of doubt and learn to turn toward these signs as a way of using them to enliven our interest in and our engagement with our research. Then, in the discussion section, we explore how the community of researchers could engage in ways to support doubt as a positive condition, elevating the generative nature of doubt.

We use the term strategic principles to denote support for making doubt generative. Our proposed strategic principles are consistent with Weick's enjoinder that the process of theorizing be decoupled from validation. Specifically, the strategic principles reflect a position that in order to cultivate excellence in theorizing we need to develop an approach that is both permissive and guiding in nature. This is consistent with a growing concern within the philosophy of science that metatheories of logic have developed in ways that have focused on the avoidance of mistakes rather than on excellence in reasoning (Garver 2001; Hintikka 1999, 2001; Jung 1996).

In one articulation of this concern, Hintikka (1999) makes a distinction between definitory and strategic rules of reasoning to lament the inattention paid to the latter. Drawing on an analogy to chess, " 'You can't castle once you've moved your king' is a definitory rule, while 'Avoid having isolated pawns' is a strategic rule" (Garver 2001, p. 7). As Hintikka notes, it is familiarity with the strategic rules that enables us to play chess well

(an idea taken up by scholars of abduction, e.g., Paavola 2004); furthermore; he argues that because strategic rules cannot be applied mechanically, they should "be called principles rather than rules. In teaching, they might take the form of things that the student should keep in mind . . . (2001, p. 39)."

The strategic principles we offer are intended to help researchers recognize doubt and use its generative potential in the abductive process. These principles should not be considered exhaustive. As researchers come to recognize the importance of doubt for abduction and engage in cultivating doubt's generative potential, we look forward to additional strategic principles coming to light.

Turn Toward/Embrace Not Knowing

Cultivating doubt requires, in part, the ability to turn toward or embrace not knowing. Although many of us who engage in research have been rewarded for knowing and have been encouraged to show that we know and that we know quickly, the experience of not knowing may be less familiar and more difficult to cultivate because we have to unlearn how we typically respond to doubt. Often, turning toward not knowing takes a form of body work to inhibit our sense that we have understood or that we have seen all that we will see. In the following examples, we see that responding to the lived experience of doubt can take many forms.

Barley describes dealing with the "spiral of complacency and doubt" as one of the challenges he faced while engaged in a longitudinal field study. He describes,

> I was constantly plagued by the fear of overlooking important social dynamics. The desperate and irrational thought that I might complete the study empty-handed led me to spend far too many hours questioning the "real" meaning of what I had seen or heard. Halfway through the project, boredom reared its head. I began to think that I had seen all there was to see . . . . I even found myself nodding off as I watched exams or listened to conversations. On the heels of boredom, however, came guilt which renewed my anxiety about overlooking important details. *Thus a spiral of complacency and doubt arose*. (Barley 1990b, p. 240, emphasis added)

He could have interpreted his boredom as an indication that he already knew all there was to know and that he should stop. Driven by fear, anxiety, and guilt, however, Barley worked actively to continue to observe and to inquire beyond the range of his immediate presenting sense that he had already seen what was to be seen. The worry that he would not have enough material for his study and guilt, perhaps, induced by his training as an ethnographer, compelled him to fight against belief in areas directly related to his study.

Barley presents his experience as "having spent far too many hours questioning . . . ." It was this questioning, however, that provided him with the insights that he articulated in his now classic articles (Barley 1986, 1990a). This becomes clearer as he discusses an arena in which complacency won out over doubt. In the following excerpt, there is a tone of regret about the lost opportunity of saying something of sociological importance about the patients he observed but did not really see.

> . . . A final difficulty, partially associated with the experience of boredom, was a phenomenon that anthropologists term "going native." . . . By the end of the year I had certainly gone native on several fronts . . . I had become numb to patients and their emotional outbursts. . . . The upshot of the conversion was that I now have little of sociological importance to say about the patients I observed. (Barley 1990b, p. 240)

With his focus on the organizational members, the radiologists and technicians learning to use a new technology, he allowed belief to become his dominant orientation with respect to the patients. Although this made sense within the context of the study he conducted, nonetheless he recognizes that it was this acceptance of unexamined belief or the turning away from doubt that left him with little of significance to say about the patients.

Samuel Hubbard Scudder's (1997) allegorical account of learning to see as a student naturalist through his engagement with a haemulon presents his initial resistance to turning toward what he does not know.

> "Take this fish," said [my professor], "and look at it; we call it a haemulon; by and by I will ask what you have seen." . . . In ten minutes I had seen all that could be seen in that fish, and started in search of the Professor—who had, however left the Museum . . . nothing was to be done but to return to a steadfast gaze at my mute companion. Half an hour passed—an hour—another hour; the fish began to look loathsome. I turned it over and around; looked it in the face—ghastly, from behind, beneath, above, sideways, at a three-quarters' view—just as ghastly. I was in despair; at an early hour I concluded that lunch was necessary, so, with infinite relief, the fish was carefully replaced in the jar, and for an hour I was free.
>
> [After many more hours of looking at the fish, the professor returned and asked,] "Well what is it like?" . . . He listened attentively to my brief rehearsal . . . . When I had finished, he waited as if expecting more and then, which an air of disappointment: "You have not looked very carefully; why," he continued more earnestly, "you haven't even seen one of the most conspicuous features of the animal, which is as plainly before your eyes as the fish itself; look again, look again!" and he left me to my misery.

When the professor's disappointment forces him to embrace doubt, he finds that there is, indeed, much that he had not seen.

> I was piqued; I was mortified. Still more of that wretched fish! But now I set myself to my task with a will, and discovered one new thing after another, until I saw how just the Professor's criticism has been. (Scudder 1997, p. 144)

Scudder's experience illustrates the physicality of both the resistance to doubt and the feeling of doubt itself. The fish was "ghastly" and he was in "despair" about having to continue looking at it. Then, following the professor's expression of disappointment, he was "piqued" and "mortified" and the fish was "wretched." Accepting, however reluctantly, the professor's charge, he came to realize the inadequacy of his earlier efforts at seeing.

Although it may be common to resist doubt, not all researchers do so, and indeed, some commence with courting doubt. An account offered by Keller (1984) about Barbara McClintock, the geneticist who won the Nobel Prize in medicine for the discovery of genetic transposition, exemplifies a body conditioned to embrace not knowing, perhaps even delighting in not knowing. In the following comment, note her excitement about and alertness to the possibility of any differentiating detail in her subject, maize plants:

> No two plants are exactly alike. They're all different, as a consequence, you have to know that difference. I start with the seedling and I don't want to leave it. I don't feel I really know the story if I don't watch the plant all the way along. (Keller 1984, p. 137)

Boredom and despair are the dominant feelings discussed by Barley and Scudder. Excitement and connection are indicated by Keller's description of McClintock's engagement with her plants. These accounts have in common the strength of the physical feelings engendered by the research experience and the importance of working with that experience in the research process to move beyond what they presumed to know. The strength of the physical feelings is intrinsic to the importance of the abductive process. Abduction is not just something that we do; it is a consequential process. The physical feelings of doubt are signals that we have some work to do. It is no wonder that researchers may, at times, resist engaging these feelings.

The accounts also underscore that doubt is more than just a signal. Arising in transaction with a particular situation, doubt has information value. Although each of the researchers were cued in different ways, they all responded by turning toward, rather than away from, not knowing, and toward the situations that engendered it, and they each gained important information as a result. It takes a certain orientation to "bring our attention to those elements of experience which are continually present" (CP1:134) in our world. By turning toward not knowing, it becomes more difficult for our received ways of understanding to overdetermine our perceptions and more likely that we will explore, modify, or transform our prevailing beliefs.

Nurture Hunches

For Peirce, abduction invited by doubt does not conjure up fully articulated possibilities for "what may be"; rather, these possibilities begin as felt. Emphasizing the importance of pursuing notions that may only express themselves as an intuitive feeling about something, Einstein, for instance, said that he thought with his stomach for 15 years while working on the theory of relativity (reported in Moen 1991). The hunch of abductive work, then, is an undifferentiated sense of something. "Abduction . . . is an imaginative effort of understanding beginning with an '*aesthetic*-hypothetic' response to the world" (Alexander 1990, p. 329, emphasis added). " 'Hypothesis substitutes, for a complicated tangle of predicates attached to one subject, a single conception' (CP 2:643). This involves a 'complicated feeling' says Peirce, because we must see all the predicates inhering in one subject and this is achieved by 'a single feeling of great intensity' " (Alexander 1990, p. 328).

In focusing on hunches, we emphasize the importance of pursuing what may present as vaguely felt notions in our abductive work. A hunch is a sense of something we are omitting in what we are currently capable of articulating and verifying, as is suggested in Perin's articulated principle of "doubt *shadowed* by discovery" (2005, p. 214, emphasis added). Hunches are one form in which this shadow of discovery is felt. As an undifferentiated sense of something, hunches have a decidedly unscientific character; their meaning and value are not clearly discriminated. Mills, however, thought that original ideas almost always find expression in such forms, and he stressed the importance of embracing rather than resisting notions that at first seem "loose and even sloppy" (1959, p. 212). Hunches help researchers feel their way through doubt toward knowing something new.

Indeed, the character of creative associative thought is such that it will bring into play seemingly distantly relevant or even irrelevant associations (Dartnell 1993, Dennett 1978). Also, they may appear in any modality. The classic example, of course, is Kekule's dream about a serpent biting its tail as suggestive of the ring-shaped structure of the benzene molecule (Rothenberg 1995). In organization studies, an example is the association of organizational decision making with factory garbage cans (Cohen et al. 1972). One of the participants in the project tells a story of the collective abductive work that threw up this unlikely association; it was fueled by discrepancies between their field observations and how decision making was generally understood:

> We were in Jim's office at UCI talking about how to characterize the kind of process that all of us had noticed in field observations of decision making. We had a sort of informal list of what things were supposed to be like and how real processes were (it seemed usually) not like that. Someone—I don't believe any of us remembers who—said choices are sort of like trash cans in a factory that fill up with whatever people who happen to be there need to throw away that particular day. (Cohen 2004)

This hunch, in the form of an association, was evocative in ways that could have either been dismissed as silly or nurtured as a way of exploring its potential. The association was ultimately transformed into the "garbage can theory of decision making" (Cohen et al. 1972, March and Olsen 1976), and nurturing the hunch allowed the researchers to illuminate some of the features of decision making in an organizational context that had been obscured by other ways of understanding this important organizational process.

Such hunches need to be protected and worked on so that their implications can be articulated. Indeed, protecting the felt unarticulated hunches and ideas that we have about things is an important way researchers explore. For example, in reference to the garbage can hunch, Cohen emphasized how James March would protect hunches and keep them alive. He recounts:

> He often would get a student (Jones) to say something about how a puzzling observation (X) could be explained, then for the rest of the term he'd refer to it as "Jones' Model of X." So either because he practiced that strategy of using the label, or the ethos of working around him encouraged us, we soon settled into carrying the label along for that topic.

Consider another example in how Abbott allowed himself to entertain, and thereby protect, the idea possible in "things of boundaries," which he could have easily dismissed as silly and not worth developing.

> I was once asked to write a paper for a special journal issue on the subject of boundaries. Boundaries and boundary crossing had become very fashionable, so I was bored with the idea. "Boundaries, boundaries of things, of boundaries of things, of boundaries of things," I sang to myself in the shower one day. Suddenly, the commas moved and I had the phrase, "things of boundaries." What could that mean? I puzzled over it (after I got out of the shower) and tried to give it a real sense. Maybe social things like professions (groups I've spent much of my life studying) are "created" out of boundaries. The edges come first, then the things, as if we created nations by having a border with place A and another discontinuous border with place B, and yet another with C, and so on, and then we hooked them up to make something continuous, and all of a sudden there was an inside and an outside, and we called the inside a nation.
>
> The resulting paper—titled "things of boundaries," of course—grew out of that simple reversal. I made up the phrase, then tried to think of phenomena that fit it. (Abbott 2004, pp. 126–127)

In his account, Abbott invites us as readers to pay attention to the particular character of the move, a reversal of a taken-for-granted idea, that led to something interesting. We, however, are more interested in underscoring that an apparently nonsensical phrase arising from a parsing slip in the shower one day constituted a possibility—the beginnings of an idea. Furthermore, rather than dismissing his sung notion, he first entertained and then tried to develop it, and in the development, it came to make sense not only to him, but to others as well.

Having hunches is part of the experience of conducting our research, and over the course of a project we may experience bad, strange, and occasionally insightful possibilities. Of course, these are all only understood as such retrospectively, as we try them out, modify them, or set them aside. Thus, what starts out as a hunch may (looking backward) be the beginnings of an important insight and conceptualization, or it may be a blind alley. Whereas a hunch has the potential to be a satisfying answer, the blind alley has turned out not to be. Typically, we regard blind alleys as unproductive and time-wasting ventures. However, we see the opposite in a recommendation letter Henri Poincare wrote supporting Einstein for a position at the Swiss Federal Institute of Technology. In his letter he remarked:

> Einstein is one of the most original thinkers that I have ever met . . . . Since he seeks in all directions, one must expect the majority of the paths on which he embarks to be blind alleys. (cited in Miller 2000, p. 340)

Even though we may regard them as tangential and even as apparently irrelevant, blind alleys are part and parcel of the discovery process. They are also quite useful in helping us get a feel for the "object" of study and in sanctioning a process not bounded by a specified and defined end. Blind allies provide information useful in understanding a situation. "[I]n order to understand a situation we must not only grasp its actualities but its possibilities" (Alexander 1990, p. 339). Blind alleys are useful in gaining insight into why one avenue may not be promising, trying out new hunches as prior ones do not prove satisfactory, and assisting in generating more fertile guesses (Paavola 2004). The idea of blind alleys illuminates vividly that "the selected course does not simply stand on its own, but exists surrounded by a penumbra of other options, other possibilities, which have been rejected—'roads not taken' " (Alexander 1990, p. 338). The ideas that do not work out, blind alleys, are nevertheless resources and exploring why these ideas come up short are a means to generate new ways of thinking.

Recognizing the constraints of our interaction with the world, the practice of nurturing hunches is an important way to foster musing. In granting license and holding our ponderings lightly in hunches, we grant permission to explore actively in our imaginative endeavor and worry less about making or trying to avoid mistakes. In permissive and expansive musement, good associations and ideas come with the bad, and fruitful interactions may occur among the strange ones. In the end, we cannot really know which ideas will prove useful until later (Elbow 1981). Thus, whether through intentional experimentation or unintentional and perhaps not obviously related playfulness, when we nurture hunches we cultivate the generative potential of doubt.

Disrupt the Order

Fostering the generative potential of doubt in analytic research processes requires, in part, our willingness to disrupt belief, represented as the prevailing order. Abbott suggests that the failure to disrupt belief causes researchers to have "trouble seeing puzzles:"

> If your first instinct with any unusual fact is to jam it into a category or to rationalize it in terms of your favorite idea, you are going to have trouble seeing puzzles. Our minds are powerful rationalizers, and seeing puzzles means, in part, shutting down that powerful pattern-making machine or, more precisely, letting it drift a bit . . . idling often helps in seeing puzzles; *not* having the instant answer is what leads to success. (Abbott 2004, pp. 244–245)

Disrupting the impulse to accept that you already know how to understand the facts or observations that come to you throughout the research process provokes doubt. It is a useful skill to learn (Vaughan 2004). Without this skill, researchers exhibit the complacency that Barley describes fighting.

Researchers have advocated and illustrated disrupting order in a variety of ways. C. Wright Mills, for instance, suggests that a deliberately haphazard rearrangement of memos and files invites imaginative exploration by creating strange and perhaps fruitful associations amongst the ideas expressed in them. He proposes,

> you simply dump out heretofore disconnected folders, mixing up their contents, and then re-sort them. You try to do it in a more or less relaxed way . . . try to be passively receptive to unforeseen and unplanned linkages. (Mills 1959, p. 212)

As another example, Ragin describes the role Becker played in a workshop and symposium held to explore the ambiguities present in social scientists' use of the term "case" and in their practices of case analysis. Here he recounts how Becker repeatedly wreaked havoc with the participants' prevailing conceptions.

> In the workshop, and later in the symposium where the essays in this volume were first presented, he [Becker] persistently pulled the rug out from under any possible consensus about "What is a case?" From his perspective, to begin research with a confident notion of "What is a case?" (or more precisely, what *this*—the research subject—is a case of) is counterproductive. Strong preconceptions are likely to hamper conceptual development. (Ragin 1992, pp. 5–6)

Becker persistently upended thinking in order to generate the doubt that would expand and enlarge their understanding. In short, Becker wanted to make the participants continually question not just what is a case, but any ideas they had about what *this* is a case of.

This specific instance displays a more general strategy that Becker advocated. Taking as his project the ability to challenge convention in social thought, Becker describes a series of tricks, including the creation of "imagery" to facilitate the exploration of ideas (1998, p. 2). He explains,

> these tricks . . . suggest ways of interfering with the comfortable thought routines academic life promotes and supports . . . [They] suggest ways to turn things around, to see things differently, in order to create new problems for research, new possibilities for comparing cases and inventing new categories and the like. (1998, pp. 6–7)

Similarly, Feldman (1995) proposes the use of multiple and various metatheories to disrupt order and stimulate a variety of interpretations of the research context. Using metatheories in this way not only provides new angles for interpretation, but also encourages the extension of ideas. Their purpose in use is to disrupt the received order and create a deeper feel for the object of study by seeing it through many different theoretical perspectives. She points out that "clusters of data tend to stick together," and that "some of the challenges at this point of the research involve how to loosen the boundaries of these clusters, how to encourage clusters to interact with one another, and how to access clusters that have potential for interacting" (1995, p. 2).

Another approach to disrupting order, stimulating variation in conjectures, has been suggested by many scholars. For instance, in portraying the theorizing process as imagination disciplined "by evolutionary processes analogous to artificial selection," Weick (1989, p. 516) shows us how deliberate introduction of diversity into problem statements, thought trials, and selection criteria can enhance the quality of imaginative theorizing efforts. With similar intent, Abbott (2004) provides analytic heuristics that aid idea generation by providing additive rules for creating variations in existing ideas (for example a reversal), ways to generate topics as stimuli to point us in new directions, and guides to differently manipulate arguments and descriptions.

Any of these approaches may be read as ways to produce a new order rather than as ways of disrupting order. Using them this way, however, does not incorporate doubt. Indeed, when confronted by the vast number of ways to analyze situations, many researchers seek the one best method of analysis and emphasize avoiding mistakes. Our focus on disrupting order is oriented to stimulating, rather than closing down, doubt. The focus on efficiency in locating the right analysis misses the importance of disrupting the order as a part of doing research. To make doubt generative, it is often necessary to disrupt order and to put oneself in the position of courting doubt.

Discussion

In this paper we have drawn attention to the living condition of doubt and its generative potential in the theorizing process. Drawing on Peirce's notion of abduction to

articulate the cycle between belief, doubt, and abduction, we developed the role played by doubt as abduction's engine in theorizing efforts and the value gained in turning toward situations that engender not knowing. We have offered three strategic principles that provide initial guidance to help researchers cultivate doubt's potential in the inquiry process and foster an approach to theorizing that is both permissive and guiding in nature. Our presentation of these principles underscores that opportunities to foster doubt—like having an advisor or audience member ask the "so what" question or finding that your coding process is raising questions more than resolving them—are commonplace in the research experience. We have highlighted these everyday occasions for doubt in order to emphasize the opportunity of using these experiences generatively.

Furthermore, our discussion of strategic principles has underscored the process of developing new ideas as bodily conducted and bodily felt, and they highlight the saliency of sensing in the research process. For instance, although heuristics of various forms are a useful component of abductive reasoning, discussions of their use rarely incorporates the body. However, when we see the body as pointing the way, indicating where we need to pay attention, then heuristics become important ways to provoke the body into this work. The body helps us feel doubt in our ways of understanding. Additionally, the bodily sensation of possibility experienced as a felt hunch indicates the presence of an idea to explore. Though neither the living sensation of doubt nor of hunches is self-explicating, they do provide an opportunity for exploration, if we turn toward them. By underscoring the living sensation of doubt, the paper more broadly accords physical feelings in the body a prominent role in inquiry. Having opened a window on the body in research and scholarship, we wonder more generally how we might notice and tap affective experience, including general feelings and specific emotions such as anger, fear, excitement, etc., to enrich our theorizing in the context of the research process.

The principles of turning toward not knowing, nurturing hunches, and disrupting the order also highlight the temporal character of theorizing. Although our phenomenological experience of insights may be conceived as coming to us in a flash—a conception mythologized by the "eureka" experience—this description collapses, hides, and minimizes the important process of growing theory. For example, in highlighting only a moment, we obscure the work necessary in creating the conditions for insights to occur, including the occasions in which observations are made, hunches occur, ideas are developed, tried out, set aside, transformed, and so on. By opening up the story behind an insight, such as those profiled in this paper, we can appreciate the layered temporal dimension of the inquiry process.

In addition to strategic principles, we see the scholarly community as playing a significant role in realizing the generative potential of doubt in theorizing. The cycle of belief, doubt, and abduction is a collective endeavor enacted in our community. For example, we introduce doubt as we converse with each other about ideas and insights. Consider the colleagues who listen to us compared to those who shut down discussion by dismissing our ideas. The former group of colleagues stays with us and helps us figure out what we are pondering and puzzling over in our work as we share our hunches and ideas in hallway conversations, seminars, and other venues. Often, most helpful are the comments such as "What I hear you saying over and over again is . . ." or "Maybe this article might be useful in your processing . . ." or "What about this possibility?" or "How might you interpret this data differently?" or "What seems so vivid for me in your telling is . . ." These are significant conversations in helping us continue to court doubt; continuing to ponder, nurture our hunches, and to avoid premature closure.

However, in spite of these rich conversations, many of our community's institutional mechanisms continue to overemphasize validation and the avoidance of mistakes to the exclusion of exploring discovery processes and excellence in theorizing. In this respect, our remarks are consistent with Weick's (1989) enjoinder, at the beginning of this article, to decouple the process of theorizing from validation. The living condition of doubt in the research process, and its positive potential for theorizing, remains underappreciated. Our community has relegated doubt to the crevices of our papers, saving its fuller articulation for only the most informal tellings.

In encouraging signs, a growing number of scholars are converging on the importance of better understanding the discovery process in research (Abbott 2004, Alvesson and Skoldberg 2000, Becker 1998, Langley 1999, Locke and Golden-Biddle 1997, Van de Ven 2007, Weick 1995, Zbaracki 2006). And, as mentioned earlier, some authors in organizational studies are using Peirce's concept of abduction to explore discovery in theorizing (Alvesson and Skoldberg 2000, Czarniawska 1999, Hansen 2007, Van de Ven 2007, Weick 2005). As well, several relevant journals now exist with space devoted to explicating the theory and practice of research, such as *Journal of Management Inquiry*, *Organizational Research Methods*, *Psychological Methods*, and *Qualitative Inquiry*.

What is needed now are resources that build on this growing work to help researchers and mentors of those learning research cultivate doubt as a central and generative feature in research designs. Specifically, we need to create ways for researchers to value and engage surprises, hunches, insights, blind alleys, and disorder. Methodological textbooks could bring discovery into partnership with validation to allocate full attention to

each in the design of research. Authors could write method sections paying attention to discovery experiences as well as validation protocols.

We end the paper with a call for our community in organizational studies to broaden the notions of "methodology" to incorporate doubt and the processes of discovery. Alongside validation, discovery needs to be illuminated. We offer this paper in the hope that it will legitimate the experience of doubt in the research process. In particular, we encourage our scholarly community to think about how to use doubt productively and generatively, to read the embodied signs of doubt, and to turn toward doubt with expectancy of the opportunity to "re-enter the present," and find puzzles in the familiar.

Acknowledgments

The authors would like to thank Jean Bartunek, Samantha Cross, Jane Dutton, Alexandra Michel, Wanda Orlikowski, Leslie Perlow, Kathryn Quick, Claus Rerup, Renee Rottner, John Van Maanen, Monica Worline, and Dvora Yanow, as well as colleagues from the Boston University Sociology department, the MIT Organization Studies Group, the University of Massachusetts Isenberg School of Management, the University of Michigan I.C.O.S. group, and participants in the UC Irvine and Boston University qualitative methods courses for their comments and insights on drafts of this paper. The authors would also like to thank Jason Azuma and Heather Goldsworthy for their assistance during this project. Finally, they would like to acknowledge Deborah Dougherty and the three anonymous reviewers whose comments improved the quality of their arguments. This has been a thoroughly collaborative process, with all authors contributing substantially to the project.

Endnote

[1]Our citations to writings by Peirce follow customary conventions in Peirce scholarship. Identifying letters indicate the published work (CP for "Collected papers of Charles Sanders Peirce" and NEM for "New elements of mathematics"). These are followed by volume number and paragraph number in which the reference appears.

References

Abbott, A. 2004. *Methods of Discovery: Heuristics for the Social Sciences*. W. W. Norton & Co., Inc, New York.

Alexander, T. M. 1990. The pragmatic imagination. *Trans. Charles S. Peirce Soc.* **26**(3) 325–348.

Alvesson, M., D. Karreman. 2007. Constructing mystery: Empirical matters in theory development. *Acad. Management Rev.* **32**(4) 1265–1281.

Alvesson, M., K. Skoldberg. 2000. *Reflexive Methodology*: *New Vistas for Qualitative Research*. Sage, London.

Anderson, D. R. 1987. *Creativity and the Philosophy of C. S. Peirce*. Martinus Nijhoff Publishers, Dordrecht, The Netherlands.

Anderson, D. R. 2005. The esthetic attitude of abduction. *Semiotica* **153**(1) 9–22.

Bailyn, L. 1977. Research as a cognitive process: Implications for data analysis. *Quality Quantity* **11** 97–117.

Barley, S. R. 1986. Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Admin. Sci. Quart.* **31** 78–108.

Barley, S. R. 1990a. The alignment of technology and structure through roles and networks. *Admin. Sci. Quart.* **35** 61–103.

Barley, S. R. 1990b. Images of imaging: Notes on doing longitudinal field work. *Organ. Sci.* **1**(3) 220–247.

Becker, H. S. 1998. *Tricks of the Trade: How to Think About Your Research While You're Doing it*. University of Chicago Press, Chicago.

Burks, A. 1946. Peirce's theory of abduction. *Philos. Sci.* **13**(4) 301–306.

Chiasson, P. 2001. *Peirce's Pragmatism: The Design for Thinking*. Rodopi, Atlanta.

Chiasson, P. 2007. The role of optimism in abduction. http://www.digitalpeirce.fee.unicamp.br/rolchi.html. Sourced, January.

Cohen, M. 2004. Personal communication.

Cohen, M., J. G. March, J. Olsen. 1972. A garbage-can model of organizational choice. *Admin. Sci. Quart.* **17** 1–25.

Czarniawska, B. 1999. *Writing Management: Organization Theory as a Literary Genre*. Oxford University Press, New York.

Dartnell, T. 1993. Artificial intelligence and creativity: An introduction. *Artificial Intelligence Simulation of Intelligence Quart.* **85**.

Delaney, C. F. 1993. *Science, Knowledge, and Mind*: *A Study in the Philosophy of C. S. Peirce*. University of Notre Dame Press.

Dennett, D. 1978. *Brainstorms*: *Philosophical Essays on Mind and Psychology*. Bradford Books, Montgomery, VT,

Elbow, P. 1981. *Writing with Power*. Oxford University Press, New York.

Emerson, R. M., R. I. Fretz, L. I. Shaw. 1995. *Writing Ethnographic Fieldnotes*. University of Chicago Press, Chicago.

Fann, K. T. 1970. *Peirce's Theory of Abduction*. Martinus Nijhoff, The Hague, The Netherlands.

Feldman, M. S. 1995. *Strategies for Interpreting Qualitative Data*. Sage Publications, Thousand Oaks, CA.

Fine, G., J. Deegan. 1996. Three principles of Serendip: The role of chance in ethnographic research. *Qualitative Stud. Ed.* **9** 434–447.

Garver, E. 2001. Science and teaching reasoning. *Argumentation* **15** 1–7.

Gregory, M. 2000. The status of rational norms: A pragmatist perspective. *Analytic Teaching* **21**(1) 53–64.

Hansen, H. 2007. Abduction. D. Barry, H. Hansen, eds. *The Sage Handbook of the New and Emerging in Management and Organization*. Sage Publications, London.

Hildebrand, D. L. 1996. Genuine doubt and the community in Peirce's theory of inquiry. *Southwest Philos. Rev.* **12**(1) 33–43.

Hintikka, J. 1999. *Inquiry as Inquiry*: *A Logic of Scientific Discovery*. Kluwer Academic Publishing, Dordrecht, The Netherlands.

Hintikka, J. 2001. Is logic the key to all good reasoning. *Argumentation* **15** 35–57.

Joas, H. 1996. *The Creativity of Action*. The University of Chicago Press, Chicago.

Jung, S. 1996. *The Logic of Discovery*: *An Interrogative Approach to Scientific Inquiry*, Vol. 168. American University Studies, Series 5, Philosophy. Peter Lang, New York.

Keller, E. F. 1984. *A Feeling for the Organism*: *The Life and Work of Barbara McClintock*. W. H. Freeman, San Francisco.

Kondo, D. K. 1990. *Crafting Selves*. University of Chicago Press, Chicago.

Kondo, D. K. 2001. How the problem of "crafting selves" emerged. R. M. Emerson, ed. *Contemporary Field Research*: *Perspectives and Formulations*, 2nd ed. Waveland Press, Prospect Heights, IL, 188–202.

Kramer, E. 2007. *Organizing Doubt: Grounded Theory, Army Units and Dealing with Dynamic Complexity*. Liber & Copenhagen Business School Press.

Langley, A. 1999. Strategies for theorizing from process data. *Acad. Management Rev.* **24**(4) 691–710.

Locke, K., K. Golden-Biddle. 1997. Constructing opportunities for contribution: Structuring intertextual coherence and problematizing in organizational studies. *Acad. Management J.* **40** 1023–1063.

Locke, K., K. Golden-Biddle, M. Feldman. 2004. Imaginative theorizing. D. H. Nagao, ed. *Best Paper Proc. 64th Annual Meeting of the Acad. Management*, New Orleans.

March, J. G., J. P. Olsen. 1976. *Ambiguity and Choice in Organizations*. Universitetsforlaget, Bergen, Germany.

Miller, A. I. 2000. *Insights of Genius*: *Imagery and Creativity in Science and Art*. MIT Press, Cambridge, MA.

Mills, C. W. 1959. *The Sociological Imagination*. Oxford University Press, New York.

Moen, M. 1991. Feeling, body, thought. B. den Ouden, M. Moen, eds. *The Presence of Feeling in Thought*. Peter Lang Publishers, New York, 215–243.

Paavola, S. 2004. Abduction as a logic and methodology of discovery: The importance of strategies. *Foundations Sci.* **9**(3) 267–283.

Peirce, C. S. 1931–1958. C. Hartshorne, P. Weiss, A. Burks, eds. *Collected Papers of Charles Sanders Peirce*, Vols. 1–8. Cambridge University Press, Harvard, MA.

Peirce, C. S. 1976. C. Eisele, ed. *The New Elements of Mathematics*, Vol. 1–4. Mouton Publishers, The Hague.

Perin, C. 2005. *Shouldering Risks*. Princeton University Press, Princeton, NJ.

Ragin, C. C. 1992. Introduction: Cases of "What is a case?" C. Ragin, H. Becker, eds. *What Is a Case? Exploring the Foundations of Social Inquiry*. Cambridge University Press, New York and Cambridge, 1–17.

Raposa, M. L. 1984. Art, religion, and musement. *J. Aesthetics Art Criticism* **42**(4) 427–437.

Rothenberg, A. 1995. Cognitive creative processes in Kekule's discovery of the structure of the benzene molecule. *Amer. J. Psych.* **108**(3) 419–438.

Santaella, L. 2005. Abduction: The logic of guessing. *Semiotica* **153**(1) 175–198.

Scudder, S. H. 1997. Learning to see. J. Hatton, ed. *Science and Its Ways of Knowing*. Prentice-Hall, Englewood Cliffs, NJ, 143–146.

Sebeok, T. 1981. *The Play of Musement*. Indiana University Press, Bloomington, IN.

Shanley, J. P. 2005. *Doubt*: *A Parable*. Theatre Communications Group, New York.

Van de Ven, A. 2007. Building a theory. *Engaged Scholarship*: *A Guide for Organizational and Social Research*, Chapter 4. Oxford University Press, New York, 100–142.

Van Maanen, J., J. B. Sorensen, T. R. Mitchell. 2007. The interplay between theory and method. *Acad. Management Rev.* **32**(4) 1145–1154.

Vaughan, D. 2004. Theorizing disaster: Analogy, historical ethnography and the challenger accident. *Ethnography* **5**(3) 315–347.

Weick, K. E. 1979. *The Social Psychology of Organizing*, 2nd ed. Addison Wesley, Reading, MA.

Weick, K. E. 1989. Theory construction as disciplined imagination. *Acad. Management Rev.* **14** 516–531.

Weick, K. E. 1995. What theory is not, theorizing is. *Admin. Sci. Quart.* **40** 385–390.

Weick, K. E. 2005. Organizing and failures of imagination. *Internat. Public Management J.* **8**(3) 425–438.

Weick, K. E. 2006. Review of shouldering risks by constance Perrin. *Acad. Management Rev.* **31**(3) 766–769.

Weick, K. E. 2007. The generative properties of richness. *Acad. Management J.* **50**(1) 14–19.

Yanow, D. 2006. Thinking interpretively: Philosophical presuppositions and the human sciences. D. Yanow, P. Schwartz-Schea, eds. *Interpretation and Method: Empirical Research Methods and the Interpretive Turn*. M. E. Sharpe, Armonk, NY.

Yanow, D. 2007. "And when I am only for myself…" Ways of knowing, reflective practice and passionate humility. Inaugural Address at the Vrije Universiteit, Amsterdam, The Netherlands. Available at http://dare.ubvu.vu.nl/handle/1871/10835.

Zbaracki, M. J. 2006. Success, failure, and the race of truth. *J. Management Inquiry* **15** 336–339.