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## DISCOVERY AS AN ABDUCTIVE MECHANISM FOR REORIENTING HABITS WITHIN ORGANIZATIONAL CHANGE

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**Process studies of organizational and strategic change have drawn attention to the dynamics that generate such change, but we still know little about how discovery unfolds within change. A field study of efforts to create a new system for delivering inpatient medical care revealed that surprises and discoveries, and constructively oriented responses to them, occurred continuously throughout organizational change, not merely at the outset. Seeking to understand this empirical puzzle, I drew on the concept of abduction from pragmatism and organizational studies. This study makes two contributions to theory about the relation between discovery and change. First, I develop a framework that explicates the central role of discovery as an abductive mechanism that enables participants to reorient prevailing habits. Analyses reveal discovery to operate through what I call “abduction sequences,” or loosely connected and overlapping episodes of creative social activity. Three key motors and their attendant feelings drive discovery via abduction sequences: surprise, doubt, and inquiry. Second, I provide a methodology for use in future research on discovery. Specifically, I propose abduction sequences as a useful analytic means for examining discovery within change and other inquiry processes, such as innovation and learning, that generate fundamentally new ways of working.**

Organizational scholars have long acknowledged the daunting challenges of creating change that involves a fundamental reorientation in prevailing practices and beliefs (Bartunek, 1984; Greenwood & Hinings, 1996; Huy, Corley, & Kraatz, 2014; Tushman & Romanelli, 1985; Weick & Quinn, 1999). Recognition of these challenges has led to extensive research to identify and overcome obstacles to change and, in particular, resistance from frontline employees and occasionally from middle managers (Huy et al., 2014) in conflict over meanings or resources. Resistance is generally viewed in negative terms as an obstacle to implementing plans for change (Battilana & Casciaro, 2013; see Huy et al., 2014, and Sonenshein, 2010, for reviews). Research

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has also suggested that deliberate planning and strong leadership—for example, change agents and “prime movers” (Weick & Quinn, 1999: 373)—can overcome obstacles to change presented by employees. This work tends to characterize employees as “targets ... [and] the means for management-chosen ends” (Michel, 2014: 1082, citing March & Simon, 1958; see also Simon, 1976).

Scholarly attention to identifying and overcoming obstacles to change makes sense, in that doing so is seen as enabling change in structures and processes. However, this orientation has prevented the pursuit of understanding about how people can—and do—reorient their habits of practice and belief during organizational change. Indeed, a process study by Jarzabkowski, Lê, and Balogun (2019: 852, emphasis in original) noted that, in most research on radical change, “the way people’s actions shape the actual *process of reorienting* are not examined in detail.”

From a pragmatist perspective, the process of reorienting habits is a creative achievement, in that “something new enters the world: a new mode of acting, which can gradually take root” (Joas, 1996: 129). The founder of pragmatism, Charles Sanders Peirce, defined “habit” as a disposition to act in certain ways: “I do not say that it is the single deeds that constitute

the habit. It is the single ‘ways’ which are conditional propositions ... that constitute the habit” (Peirce, Hartshorne, & Weiss, 1934: CP 5.510).<sup>1</sup> However, because habits are dispositional (Joas, 1996; Lorino, 2018), they are potentially susceptible and amenable to creative efforts to navigate indeterminate situations, such as those involving fundamental change. Whereas perpetuating habits requires active maintenance, reorienting habits necessarily requires people to discover new perspectives on indeterminate situations and “entirely new ways of doing things” (Tsoukas & Chia, 2002: 575) to address them. By devoting more attention to the process of discovery, we can enhance our understanding of how people’s actions can reorient their own and others’ prevailing habits during organizational change.

This paper explores how managers and clinicians at “DeltaCare” (a pseudonym), a medium-sized health system, created a new model of inpatient care delivery that originated in a surprisingly difficult mapping exercise, and that came to require affected clinicians to reorient their relational and clinical habits. Through my encounters with these and other participants, and my subsequent analyses of their efforts, I became aware of the centrality of surprise and discovery during key gatherings. The participants I interviewed did not explicitly use the term “discovery” in their narrative accounts of the change process; however, they did use vivid figurative language in their descriptions of experiences of discovery, such as “We were taken aback,” “It was a big ‘aha,’” and “It hits you in the gut so that you can’t let go.” Moreover, participants in this initiative seemed genuinely to care, sometimes deeply, about the new care model they had developed. It was more than just a new way of delivering care; for many, it became a better way of healing patients. These accounts, casual interviews, and iterative analyses prompted me to refine my original focus—“How did DeltaCare members collectively create the new model of care delivery?”—to incorporate discovery. My question thus became “How did discovery unfold within the organizational change process?”

<sup>1</sup> Citations to publications by Peirce follow customary conventions in Peirce scholarship, with identifying letters indicating the following works: “CP” for *Collected Papers of Charles Sanders Peirce* (Peirce, Hartshorne, Weiss, & Burks, 1931–1958), “EP” for *The Essential Peirce* (Peirce, Houser, & Kloesel, 1992), and “NEM” for *New Elements of Mathematics* (Peirce & Eisele, 1976). Thus, this citation “CP 5.510” refers to *Collected Papers of Charles Sanders Peirce*, volume 5, paragraph 510.

A colleague’s suggestion and subsequent analytic work prompted me to borrow the concept of abduction from pragmatism and organizational studies in order to theorize the relationship between change and discovery—and, specifically, to examine how habits are reoriented in the course of change. Drawn from the work of Charles Peirce (Peirce et al., 1931–1958; Peirce et al., 1992), “abduction” is a conjectural mode of inquiry through which people generate new ideas in an effort to make sense of surprising observations or facts (Locke, 2011; Locke, Golden-Biddle, & Feldman, 2008; Van Maanen, Sorensen, & Mitchell, 2007). Whereas deduction “proves that something *must be*” and induction “shows that something *actually is* operative,” the logic and narrative of abduction “suggests merely that something *may be*” (Peirce et al., 1934: CP 5.171, emphasis in original).

A review of the organizational literature revealed that, despite increasing scholarly attention toward the use of abduction in research projects (see Klag & Langley, 2013; Locke, Feldman, & Golden-Biddle, 2015), few studies had examined abduction outside the realm of research. One notable exception is Dunne and Dougherty’s (2016) examination of scientists’ use of abductive reasoning in complex product innovation. Another is Lorino’s (2018) volume on pragmatism in organizational studies, which devotes an entire chapter to abduction. In practice-based work, I found abduction mentioned in publications on two prescriptive methodologies of deliberate change, design thinking, and lean management (see Bicen & Johnson, 2015; Martin, 2009) that incorporate elements of discovery in their process, though not always by name (Brown, 2008; Brown & Katz, 2011; Liedtka, 2018; Mann, 2005). However, none of this work articulates how discovery and abduction relate or how discovery unfolds during change processes.

Returning to data analysis, I found that conceiving of discovery as an abductive mechanism for reorienting habits helped explain how discovery processes unfold within organizational change. Closer analyses of participants’ accounts disclosed what I call “abduction sequences”: creative social activity (Lorino, 2018) that fosters curiosity-driven exploration of indeterminate situations, and fuels participants’ discovery of novel ways of doing things and reorienting habits. Three key motors and their attendant feelings drive abduction sequences: surprise, generative doubt, and expansive inquiry. It is striking that abduction sequences and constructively oriented responses to surprise and discovery occur continually

throughout organizational change, not only in early efforts.

These insights contribute to theorizing organizational change by developing a richer understanding of efforts to reorient habits of belief and action through change, and by explicating discovery's central role as an abductive mechanism for accomplishing this creative process of reorienting. They also suggest that discovery potentially occurs in any change process and is probably much more prevalent in change than prior research has recognized.

### THEORETICAL BACKGROUND

A process-based view (Langley, 1999, 2007) is uniquely suited to examining the relationship between discovery and organizational change: it redirects analytic attention away from overcoming obstacles and toward questions of "how and why things emerge, develop, grow, or terminate over time" (Langley, Smallman, Tsoukas, & Van de Ven, 2013: 1). By assuming open-endedness and indeterminacy to be inevitable and distinguishable features of change, process studies possess the potential to analyze discovery. To date, however, such studies have not explicitly integrated discovery or abduction into their analyses. Glimpses of a discovery process are evident, however, in their portraits of efforts to generate fundamental change.

#### Discovery in Process Studies of Change

Some process studies examine dynamics of emergence, unintentionality, and randomness that catalyze discovery. One early study showed how an unintended amplification of a small change led to the emergence of continuous radical change (Plowman, Baker, Beck, Kulkarni, Solansky, & Travis, 2007). Another portrayed how change emerged in an unexpected area, and surprisingly became the success story for an organization's overall change initiative (Wiedner, Barrett, & Osborn, 2017). In presenting a view of change processes as "unowned," a third study (McKay & Chia, 2013) showed how senior leaders' well-intentioned choices for change produced unintended negative consequences. Such dynamics open up the possibility of examining discovery processes that are themselves emergent, often unintentional and nonlinear.

Process studies also identify mechanisms of organizational change that open up fertile new territory for discovery by highlighting participants' struggles with surprise, tensions, or other situational indeterminacies.

Such mechanisms include paradox (Jay, 2013), micro-processes of meaning-making (Spee & Jarzabkowski, 2017), creative space (Bucher & Langley, 2016; Howard-Grenville, Golden-Biddle, Irwin, & Mao, 2011; Wiedner et al., 2017), and the heterogeneity of interpretive communities (Balogun, Bartunek, & Do, 2015; Howard-Grenville, Nelson, Earle, Haack, & Young, 2017).

To look more closely at how process studies of change might incorporate discovery, I examined a set of relevant empirical investigations published in and since this journal's special issue on process research (Langley et al., 2013). I reviewed them in terms of possible discovery-related elements: an indeterminate situation, a process-based change mechanism, open responses to unexpected events, and shifts to new ways of doing things. I reasoned that, although not explicitly identified as such in these studies, latent elements of discovery are likely to be present. My review disclosed three areas, discussed below, in which attention to discovery can contribute to the literature on organizational change.

***Unexpected interruptions of ongoing activity followed by reflection allow for discovery.*** All of the studies I examined reported unexpected events facing leaders and organizations, such as declining margins (Balogun et al., 2015) or a "deep performance crisis" (Huy et al., 2014). When such studies also described participants pausing and reflecting on their ongoing activity, possibilities for discovery became evident. For example, at Telco, a communications provider (Jarzabkowski et al., 2019), breakdowns in the planned implementation of mandated change prompted managers and employees to stop their activities and reflect on misalignments, which led them to modify the plan. Although other studies note unexpected events, most do not mention reflection on interrupted activity. For example, in McKay and Chia's (2013) research, NorthCo senior leaders were observed to continue to implement failing initiatives and eventually the company went bankrupt.

***Open responses to indeterminacies within change sustain discovery.*** How participants respond to unexpected situations and ambiguity within change shapes whether and how discovery processes unfold. Jay (2013) identified sensemaking amid paradox, which generates the possibility of discovery as a change mechanism. There are explicit cues of discovery at work in Jay's descriptions of managers' responses to indeterminacies generated by paradoxical logics: "continued to wrestle," "explicitly reflected on the question," "more directly confront tension between the institutional logics at play" (Jay, 2013: 152). However, the study does not address how such responses

sustained discovery or generated managers' novel synthesis of initially paradoxical logics.

**Discovery shapes reorientation of habits.** A few studies have provided glimpses of how the discovery process enables the reorientation of habits in the course of generating new ways of doing things. For example, Spee and Jarzabkowski (2017) presented two cases of strategic-planning processes at the same university, both undertaken to address unexpected funding challenges. They identified three micro-processes of meaning-making (Spee & Jarzabkowski, 2017) that participants used: "expanding," by incorporating proposed meanings along with prevailing ones; "combining" potentially conflicting prevailing and proposed meanings; and "reframing" prevailing and proposed meanings.

In one case, faculty and administration met to set new directions for research. When it became clear that the new term "translational research" would not accommodate prevailing meanings, administrators suggested the terms "relevant," to capture some proposed meanings, and "rigor," to signify prevailing meanings about scientific quality. The faculty's eventual acceptance of the reframing led to a new "joint account" of strategic change. In the second case, by contrast, participants were unable to combine proposed and prevailing meanings and thus not able to accomplish a joint account.

My close review of selected process studies identified brief accounts of discovery at work within change. Significantly, however, the discovery process remains obscured within change mechanisms; it has not been explicitly identified as a mechanism for understanding how reorientation of habits is accomplished. To make explicit how discovery unfolds within change, I integrate the concept of abduction from the work of Charles Sanders Peirce (Peirce et al., 1931–1958).

### Discovery and Abduction

The organizational literature has established the involvement of abduction for discovery, and has further developed significant theoretical support for employing abduction in scholarly inquiry (Alvesson & Kärreman, 2007; Behfar & Okhuysen, 2018; Czarniawska, 1999; Hansen, 2008; Ketokivi & Mantere, 2010; Klag & Langley, 2013; Locke, 2011; Locke et al., 2008; Van Maanen et al., 2007; Weick, 2006). Indeed, many scholars agree that the concept of abduction is, in the words of Van Maanen and colleagues (2007: 1149), "perhaps the best answer we currently have to the problems of discovery." Deduction derives

specific observations from generalizations, and induction derives generalizations from specific observations; in Peirce's words, abduction is the only form of reasoning that "introduces any new idea" (Peirce et al., 1934: CP 5.171). As a mode of reasoning, Peirce considered abduction to be weak, yielding "no conclusion more definite than a conjecture" (Peirce & Eisele, 1976: NEM 4:319); at the same time, however, abduction is both the source and a critical engine of discovery.

Examining the everyday use and operation of abduction is consistent with Peirce's thinking; he understood abduction to explain creative thought not only in scientific endeavors but also in ordinary human activities. As Santaella (2005: 188), paraphrasing Peirce, observed, "There is chance in discovery but there is also logic ... a live logic which can explain creation in science, art, and everyday life." Yet, to date, only a few studies have systematically used the concept of abduction to elucidate organizational inquiry processes (see Dunne & Dougherty, 2016; Lorino, 2018).

**Discovery, abduction, and reorienting habits in organizational change.** Early in his career, Peirce considered abduction to be an evidencing process: an inference from data to a hypothesis. Later, he "widened his concept of inference to include methodological processes" (Burks, 1946: 301) involved in the discovery of hypotheses. Defining abduction more broadly is important because it incorporates both the inquiry context and social processes—such as observation, surprise, and puzzling over what is not known—that support (or not) abduction. It also situates abduction within the act of meaning-making. Logic and narrative are inseparable: abduction can be understood as the "simultaneously narrative and logical creation of new hypotheses, the search for a plausible story that might transform the initial puzzling situation into an intelligible and testable account" (Lorino, 2018: 95). Through narration of a plausible story, abduction brings coherence and a future orientation to an indeterminate situation. Thus, abduction is a creative and social inferential process within ongoing processes of inquiry and acts of meaning-making (Dunne & Dougherty, 2016; Locke et al., 2008; Lorino, 2018).

Peirce's theory that belief and doubt underlie all human action is central to explicating the relation between discovery and reorientation of habits in a context of change. According to one commentator on Peirce's work, through the course of our lives, "all we have for interacting with experience are our beliefs and our doubts" (Chiasson, 2001: 55). "Belief" can be

characterized as a calm and satisfactory state of congruence between one's habits and one's environment. It is that upon which we are willing to act. When we believe something, we expect certain outcomes to occur and interpret our observations according to these expectations. Further, we not only cognize our belief, we feel our belief; this "feeling of believing" (Peirce et al., 1992: EP 1:114) itself indicates an established habit at work. By contrast, "doubt" is a state of incongruence between one's habits and one's environment. In such indeterminate situations, our functioning habits meet with some form of resistance from the world. Indeed, for Peirce, a "true" doubt is one that "interferes with the smooth working of the belief-habit" (Peirce et al., 1934: CP 5.510). We become uneasy, and often troubled or uncomfortable.

Humans constantly encounter unexpected situations that require reconsideration of habits. These breakdowns of habit can become a starting point for their reorientation. Indeed, the ability to "take" and to "lose" habits is, in Peirce's view (Peirce, Hartshorne, & Weiss, 1935: CP 6.613), essential to reorientation:

The highest quality of mind involves a great readiness to take habits and a great readiness to lose them. ... No room being left for the formation of new habits, intellectual life would come to a speedy end.

We still know very little about how discovery operates to foster the taking and losing of habits within organizational change and other inquiry processes. By integrating abduction and a process view of change, the present study contributes new understanding of the undertheorized relation between discovery and the reorientation of habits of belief and action via organizational change.

## METHODOLOGY

### Research Setting and Change Initiative

This field study took place at DeltaCare, a horizontally integrated, medium-sized, nonprofit health system located in the central region of the United States. At the time of the research, the system consisted of four hospitals, approximately 5,000 staff members and clinicians, and 125 primary care providers in 20 locations. About a decade prior to the creation of the new inpatient care model, DeltaCare had created a well-regarded organization development (OD) function whose head worked directly with the senior leadership team. Later, immediately prior to the change initiative, the organization introduced lean methodology into its quality improvement efforts.

Consistent with this methodology, senior leadership began to include patients in sponsored events.

In the course of exploring how the hospital system could assure its continued relevance 10 to 15 years in the future, DeltaCare clinicians, managers, and senior leaders created (with input from patients) a new model of inpatient care delivery. This initiative began in March 2005 and continued through implementation of the first unit in February 2007. The new care delivery model embraced "a vision of hospital care with nursing at its center provided in an environment designed specifically ... to ensure safety and to promote healing" (Internal document, 2007). It also reoriented clinician relationships by bringing together physician, nurse, and pharmacist at a patient's bedside shortly after admission to discuss a care plan.

A comparison of comparable patients in the new unit and traditional inpatient units at the end of 2008 found that the average length of stay had decreased by at least 10%. Moreover, defect-free medication reconciliation had improved from 1.05 in 2006 for all units to zero defects per chart in the new care unit (Internal document, 2009). Finally, the percentage of patients satisfied with their care had increased from 68% in traditional units to 90% in the new unit. Leadership spread the new care model to other medical-surgical and specialty units, introducing a second unit in 2009 and a third in 2010. These units continued to show improvements in quality, patient satisfaction, and nursing satisfaction. Costs and lengths of stay also declined. By 2013, all inpatient units were onstream (Internal document, 2013).

From the outset, the gatherings and conversations that eventually culminated in the new care model intentionally involved multiple stakeholders: not only nurses, physicians, and senior leaders, but also pharmacists and unit managers. Patients, volunteers, and some board members also participated in large events. Furthermore, leaders understood that physicians' engagement was critical if the initiative was to succeed, and, from the beginning, two to three hospitalist physicians participated as "physician champions" in every cross-disciplinary event. As the nursing transformation leader recalled:

We've done a lot of work behind the scenes. I meet routinely with the main physician champion and director of operations, and we talk a lot about what is the role of physician champions ... to be the catalyst for change in the hospital.

Over time, the change initiative grew in scope to incorporate three major areas: care flow processes (the

subject of this study), introduction of a new electronic medical record system that could be tailored to fit the new care model, and renovation of physical space. After the board of trustees voted in late 2007 to extend the new model to other inpatient units and to raise funds for a new building, the initiative to renovate existing units expanded to include new construction for the new units. To support the extension of the new model, the hospital system president secured the secondment of a nonclinician manager to assume the role of full-time project manager. DeltaCare support staff, including an organizational development specialist and a lean improvement facilitator, became involved as needed.

### Data Collection

I collected data over a 30-month period in 2007–2009, followed by periodic telephone updates with senior leaders through 2011, and a sustained collection of documents through 2013. At DeltaCare, as a known researcher whose primary role was to conduct research (Lofland & Lofland, 1995), I sought to understand people's lived experience of creating organizational change in the form of a new care delivery model. My involvement began shortly after the first new-model unit went live, with multiple phone conversations with senior leadership and collected documents pertaining to the initiative. I visited in January 2008, shortly after the board had approved system-wide extension of the model and planning for the second unit had begun. I visited again in 2009, just after the second unit had gone live; a third unit was in the planning stage. The timing of the visits enabled collection of data that captured both retrospective and prospective vantage points on the change initiative. Participants reflected on their own and others' efforts to create the new model, including future social practices, their experience in implementing the first unit, and on anticipated adjustments to the model for subsequent units.

The data consisted of formal and casual face-to-face interviews, supplemented by occasional follow-up emails or phone calls; internal and external archival materials; and field notes of observations. During site visits, I conducted interviews, observed meetings about the change initiative and unit operation, and collected internal archival materials. I twice observed traditional and new units in operation (without entering patient rooms) and attended a portion of a strategic retreat devoted to spread word of the new model. On the units, I engaged in casual conversation with clinicians about the new model. DeltaCare leaders

also organized orientation sessions that provided me opportunities to interact with staff not directly involved in developing the new care model; these sessions provided broader understanding of the change initiative.

**Interview data.** These data consisted of formal and informal interviews. I conducted 25 in-depth, semi-structured formal interviews with clinicians, managers, staff members, and senior leaders involved in creating the new care system, including all the clinicians and managers who had launched the new system in the initial unit and most of those who had done so in the second unit. I conducted an additional five semi-structured follow-up interviews with four members of the leadership team for this initiative (two with the hospital system president and one each with the project leader, nursing transformation leader, and director of operations). All interviews were conducted at the interviewees' workplaces, usually at their offices or in a small conference room. Given interviewees' clinical duties, interviews were scheduled for 45 minutes; ultimately, they averaged an hour in length, and a few lasted 75–90 minutes. Some interviewees later contacted me by email or telephone to tell me something they had forgotten to mention.

All formal interviews were taped and professionally transcribed, yielding approximately 900 pages of double-spaced text. After each interview, I recorded my observations and described what I had heard at a slightly more abstract level, but without generalizing beyond the data and local context (Diesing, 1971). For example, I pinpointed events that had been particularly consequential for participants' efforts and for the trajectory of the change process.

In addition to formal interviews, I engaged in "conversational interviews"—that is, unstructured conversations that arose spontaneously in everyday work situations (Lofland & Lofland, 1995), such as over lunch, during training sessions, following formal interviews after I had turned off the tape recorder, and on the units. They gave me access to participants I had not interviewed and to follow-ups with many I had interviewed. For example, clinicians might point out some aspect of the physical unit, such as the huddle space for clinicians or the absence of a nursing station, as exemplifying a point they had made earlier about the new care model. Or staff and clinicians on the unit, and, on one occasion, the chief nursing officer, might orient me to particular workings of the new model and how it differed from prior practice. I also asked questions prompted by my initial analyses. For example, when I saw

clinicians working together, I asked about the realities and difficulties of the revised clinician roles and their prior expectations. I jotted notes in a small notebook while on the unit and in training sessions; the notes yielded an additional 100 pages of double-spaced typed data.

**Archival data.** The archival materials comprised internal and external communications about the change initiative and launch of the new care delivery system. Internal documents (275 pages) included newsletters distributed to clinicians and other staff to provide updates on the change initiative; compilations of nursing satisfaction surveys and comparative care metrics; reports and planning documents about the change initiative; and slides from senior leaders' presentations to the board and to external stakeholders. External documents collected through 2013 (150 pages) included local and national news coverage and videos on the launch of the new care model. I also acquired copies of two videos about the change initiative produced by DeltaCare to share with donors and board members.

The archival materials fleshed out my understanding of the fuller situation in which the change effort unfolded. Internal newsletters and presentation slides were especially useful for compiling a history of the events, participants, and activities comprising the initiative. Analytically, I used archival materials to interrogate, elaborate, and validate themes disclosed in the interviews. For example, they provided important data about the consistent use of cross-disciplinary groups and the intentional involvement of patients.

## Data Analysis

As is typical of qualitative field research (Diesing, 1971; Emerson, Fretz, & Shaw, 1995; Locke, 2001), analytic work began while I was still collecting data and continued after I left the field. For example, the notes compiled after interviews helped me distill local themes that cut across interviews (Diesing, 1971; Lofland & Lofland, 1995) and archival materials. Among these themes were "collective activity in the change effort" and "reshaping clinician interactions in delivering patient care." While still in the field (and briefly after leaving it), I sought additional data, often by telephone, to assess the extent of empirical support for tentative interpretations (Locke et al., 2008). After leaving the field, I read the full set of data, making marginal notes about participants' day-to-day experiences of creating the new model and connecting data with promising provisional ideas.

Induction is the logic through which researchers derive generalizations from specific observations; when used in isolation, it yields patterns but not novel theorizing (Alvesson & Karreman, 2007; Locke, 2011; Locke et al., 2008; Timmermans & Tavory, 2012). Thus, my analytic approach here paired induction with abduction, to develop new understanding of discovery. For example, I paid particular attention in the field to occurrences that struck me as unusual or as out of keeping with my expectations. During open and subsequent coding (Locke, 2001; Lofland & Lofland, 1995), I did not assume a straightforward, nonproblematic progression from data and ideas to local and general codes. Instead, I envisioned coding as an iterative activity consisting of many kinds of moves, including, for example, consulting the literature repeatedly and, with increasing depth and focus, working out promising ideas with relevant data, such as discovery and abduction sequences.

Two observations in particular richly informed this study. Early on, during formal and conversational interviews, I noted that participants' accounts of the change initiative went beyond mere cognitive descriptions of what had happened when and who was involved. Without prompting, clinicians and managers alike expressed chagrin that patients had struggled in the prior care system. Those involved in the change effort seemed genuinely to care about the new care model. Many clinicians, especially physicians and pharmacists, shared their discomfort about working as a care team in patients' presence. I came to regard these confidences as expressions of emotional investment in the changes they faced individually and as a group. Over time, I noticed connections between these expressions and the unfolding discovery process.

Second, many participants pinpointed specific events in the course of creating the new model that seemed to qualify as "magnified moments" (Hochschild, 2003): episodes of heightened importance, such as interludes of intense glee generated by unusual insight, or moments of deep concern when things went meaningfully wrong. These were events that lent new urgency and meaning to the change initiative: variously, members witnessed patients' difficulties with the current care system, struggled themselves to delegate important clinical tasks, or were delighted to realize that the new model might actually work. Because these events seemed central to their narrations, I compiled an inventory of them. To protect against retrospective bias, I added such events to the inventory only when participants from different disciplines mentioned them or when archival materials provided details about them. Curious about these events, I developed a

data-rich vignette about each of them. In my later exploration of how discovery operates within change, these vignettes became important resources for articulating abduction sequences, along with work in pragmatism.

**Analytic shifts.** As in much qualitative research, my focus evolved. In addressing my question—how discovery unfolded within organizational change—I had framed discovery as a set of subprocesses of the change process, each associated with a primary logic (abduction, deduction, induction) though other logics are also present. Two challenges to this framing prompted its reconsideration: the finding that discovery occurred continuously in the course of change, not merely at the beginning; and comments received during the review process that the subprocesses looked like another model of change.

In trying to untangle the processes of change and discovery, I eliminated the subprocesses and revisited the data. Concurrently, I returned to the literature on abduction (especially Lorino, 2018, and Peirce et al., 1992). In doing so, I noticed that the vignettes developed earlier related to abduction and to Peirce's theory of belief and doubt.<sup>2</sup> Conjoining my data with that literature led to elaboration of an abductive cycle in the form of a new analytic unit that I call "abduction sequences." I use this term to signify loosely connected and overlapping episodes of situated creative social activity (Lorino, 2018) that unfold within the change process in ways that are neither random nor predictable.

### Abduction Sequence as Analytic Unit of Discovery

Analytically, abduction sequences consist of three key motors and their attendant feelings: surprise, doubt, and inquiry. The enactment of these sequences sustains discovery via participants' constructively oriented responses to the motors and to newly discovered possibilities. Figure 1 illustrates the relation between prevailing belief (the upper half of the figure) and doubt (the lower half). Belief and doubt characterize the coordinated transaction between humans—the locus of habits—and their environment. Beliefs become susceptible to doubt via surprising experiences: doubt triggers inquiry about new possibilities, new beliefs replace old ones, and new beliefs may again become susceptible to doubt.

**Belief.** Belief is "of the nature of a habit" (Peirce et al., 1992: EP 1:115); beliefs "guide our desires and shape

our actions" (Peirce et al., 1992: EP 1:114). They remain settled until they are impinged on by unexpected situations—that is, until something surprising occurs, we continue to believe and to accept our beliefs.

**Surprise.** Central to abduction, surprise is "any event that happens unexpectedly or any expected event that takes an unexpected turn" (Cunha, Clegg, & Kamoche, 2006: 319). In the event of a surprise, we are unable to interpret what we experience in light of prevailing belief and often feel at a loss. Yet surprise also demands understanding, requiring us to guess about the meaning of whatever has surprised us. In this respect, surprise provokes doubt.

**Doubt.** Our beliefs become unsettled and action becomes paralyzed; we know neither how to act nor what to believe: "The irritation of doubt causes a struggle to attain a state of belief" (Peirce et al., 1992: EP 1:115). In other words, doubt demands understanding and provokes inquiry.

**Inquiry.** Triggered by doubt, inquiry is a social process: "a cooperative search for truth for the purpose of coping with real problems encountered in the course of action" (Joas, 1996: 128). Its object is to create a new actionable situation. Inquiry and its attendant feelings, such as anticipation and excitement, can transform, adapt, reinvent, and reject habits—beginning with failing habits—and elicit new ones. Inquiry acts simultaneously on the situation (environment) and on habits (the locus of which is people) to rebuild their relationship.

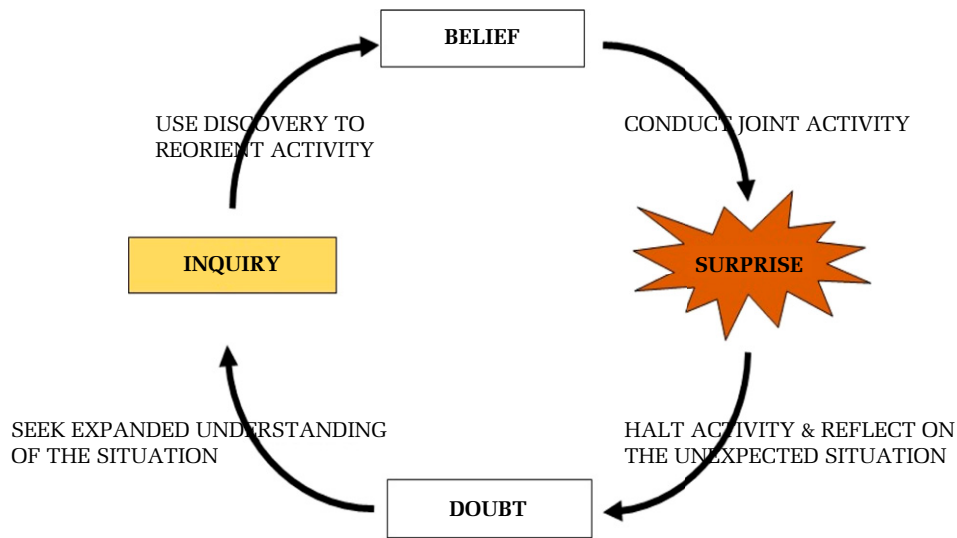
**New belief.** When we replace a belief that was in doubt with a different belief that has withstood the test of experience (Misak, 2004), we once again feel settled in our (new) belief. We have created a new actionable situation. New beliefs in turn become susceptible to doubt if challenged by surprising experience, and the abductive cycle is renewed.

### CREATING COLLABORATIVE CARE IN DELTACARE

Empirical analyses of the creation of a new system of care delivery at DeltaCare, using the abduction sequence as the analytic unit, showed that discovery occurred continuously throughout the change process, and operated via five abduction sequences. During the first two sequences—"engage the indeterminate situation" and "deepen the significance of the indeterminate situation"—participants discovered new understanding of the situation and made new meaning about its significance. In the third sequence—"construct an imagined configuration"—participants imagined new possibilities that in turn

<sup>2</sup> Curiously, Peirce did not spell out the relations among doubt, belief, and abduction (Paavola, 2015). Selected work by contemporary pragmatists (Misak, 2004; Paavola, 2012, 2015) have illuminated that relationship.

**FIGURE 1**  
**The Abduction Sequence**



generated associated new habits of practice and belief. In the final two sequences—“try on new habits” and “negotiate new habits”—participants experimented with conditional new habits associated with the imagined configuration. Together, these five sequences enabled participants to let go of prevailing habits and tentatively take on new ones that supported fundamentally new ways of working.

In the following sections, each of the five sequences is first developed narratively and then in terms of the abduction sequence cycle. Figures 2 to 6, below, depict the five sequences profiled.

### **Abduction Sequence #1: Engage the Indeterminate Situation**

Since her promotion and transfer to this part of DeltaCare a few months earlier, the hospital system president had been talking extensively with clinical leaders and managers about possible ways of creating value in the marketplace that might sustain the relevance of the hospital system for 10 to 15 years. Using the lean methodology recently introduced into the organization, she followed up these conversations by sponsoring a four-day enterprise-wide “value-stream” event conducted by a lean consultant (sensei). She invited a cross-disciplinary group, including frontline clinical staff, managers, and senior leaders. Participants also included board members, volunteers, and patients; the patient participants had been identified via physician referral, self-nomination, and invitations to patients who had submitted formal complaints about their care.

**Mapping high-level care flows.** Designed to “figure out the hospital,” the event addressed the highest levels of inpatient, outpatient, and emergency care delivery. The participants analyzed care processes and patient flows within and across each of the three areas. The consultant grouped participants by area, assigning each group to a small room. Using paper posted on the walls, each group mapped the flows that characterized its assigned care area and identified points of connection with the other areas. As one clinician explained, “We tried to map the flow of the patient through our services to the best of our ability, looking for connections as well as where there were poor handoffs.” Some participants reported visiting other rooms to gain perspective on their group’s connections with flows in other areas.

Not all went smoothly. Reconvening, all three groups expressed surprise at their inability to map the respective care processes clearly, especially at the highest levels. The project manager later recounted the difficulties they experienced:

This mapping exercise is at a very high level, at the 60,000-foot view. And you could still see the fragmentation ... the poor handoffs. You could see all the breaking points, where there was no integration between the patient coming from an ambulatory ward into the acute care setting, back to the ambulatory ward.

Participants interviewed recalled discussing whether the difficulty of the mapping exercise pointed to real

issues in patient handoffs. Worried, the full group chose to take a closer look at the mapping problems by walking the care flows.

**Walking actual care flows.** The sensei consultant reassigned participants to the same three groups. When possible, they would follow real patients; otherwise, they would replicate a typical patient's path accompanied by frontline staff who would describe the flow as they walked it. The inpatient group began at admission and proceeded through discharge. The outpatient group started at a specialist's office on the hospital campus and proceeded to other buildings where testing was performed. Since mapping showed patients having no further contact with the hospital after leaving the emergency department, this group merged into the other groups.

Reconvening after walking the care flows, a number of clinicians and managers described their experiences as "eye opening" and "discomforting." Poor handoffs and other disconnects had been evident. For example, those who had walked inpatient flows observed how "chaotic" it could be for a hospitalized patient to get services; waiting and delays were commonplace. For instance, only when a physical therapy transport aide arrived at the room of a patient scheduled for physical therapy did it become apparent that the patient was in the radiology department waiting for an MRI. Participants also observed nurses trying to work around inefficient systems to get needed but delayed services for patients. A frontline nurse who participated in this group shared what she described as a "common situation." Lab work was needed to determine which antibiotic was most appropriate for a patient; when the lab work was not completed on time, a nurse had to make repeated calls to the lab. A clinical leader summarized the inpatient group's insights: "After having problems mapping the flow ... and watching the difficulties of nurses in progressing patient care, we realized just how often patient care involved heroics."

A clinician member of the group who had walked outpatient flows described care delivery as "really not a very patient-friendly experience at all." Patients sent from a specialist's office for diagnostic tests had to walk through two buildings. Then, because they were typically not prescheduled at the lab, they frequently experienced delays. On occasion, these delays lasted hours, uprooting plans and causing long waits for patients. Then, patients had to retrace their steps to the physician's office. Even an outpatient who had a scheduled lab test typically returned later for other tests. Some clinicians initially attributed this scenario to system scheduling issues, or to physicians issuing orders for tests sequentially.

A nurse relayed that participating patients offered a different perspective: that the "system made it too difficult to navigate more than one test, so people *preferred* to come back on another day." Equally troubling was seeing elderly and pulmonary patients struggle to navigate multiple buildings and corridors for prescribed tests. "When you walked this flow as a patient," a clinician recalled, "You understood that elderly people ... were walking way too much for their abilities to get their testing done."

By all accounts, participants in the event felt deeply chagrined at having observed so many patient struggles and other hindrances to care, including undue hardships for the most vulnerable patients. Both disconnects and heroic efforts by clinical staff to head them off were real and undeniable. As a clinical nurse leader recalled, "As we discussed our mapping and walking all of those flows, what was clear to all of us, to *all of us*, in that room is that the flows didn't connect at all." Others concurred:

Well, I think it helped us, to say, "Wait a minute, this really is chaotic." (Senior leader)

It was a big "aha" that helped make visible to us that we were not doing ... patient care as well as we would like. (Physician)

Further discussion of the now visibly problematic nature of care delivery led participants to embrace a focus on the patient and on eliminating hardships in the delivery system. They resolved to begin immediately, with inpatient care, and subsequently to proceed to other care areas. The project manager commented: "We quickly realized that we couldn't work on all disconnects in care at once." The clinical nurse leader concurred: "When we looked at inpatient care ... it was so broken that we agreed: that's the first thing we need to fix."

Participants in this initial enterprise-wide event continued to discuss its impact on them, and its role in catalyzing their efforts to change care delivery:

It's an intense week ... You're all together, you're working hard, you're released from your other duties ... It's that mixing it up, and walking it, and seeing it, that helped spawn some of the consequential creativity. (Nurse manager)

It has been very rewarding being involved from the very beginning ... when we decided collectively to try to shoot for a big breakthrough improvement. (Hospital administrator)

The breakthrough for the eventual Collaborative Care model clearly came in mapping and walking the flows and talking about them with each other. (Physician)

**Findings explicated as abduction sequence.**

Figure 2 depicts the abduction sequence that participants experienced when mapping and then walking care flows.

As shown, a challenge to prevailing Belief, and move to Surprise, occurred when participants experienced unexpected difficulties in a mapping exercise that they had expected to be straightforward. In suspending activity to reflect on what their difficulties might mean, rather than presuming that they already knew, the group advanced toward Doubt. Asking themselves whether the difficulties pointed to real issues in patient care prompted a further progression, from Doubt to Inquiry. In search of better understanding of the situation, participants chose to walk the care flows—when possible, with real patients. By neither dismissing nor presuming to understand the surprising mapping difficulties, the group kept alive the possibility of discovering what they did not yet know. What they discovered was that care fragmentation and patient hardship were real and undeniable. Participants progressed from Inquiry to new Belief as they shed the prior Belief that mapping care flows should be unproblematic,

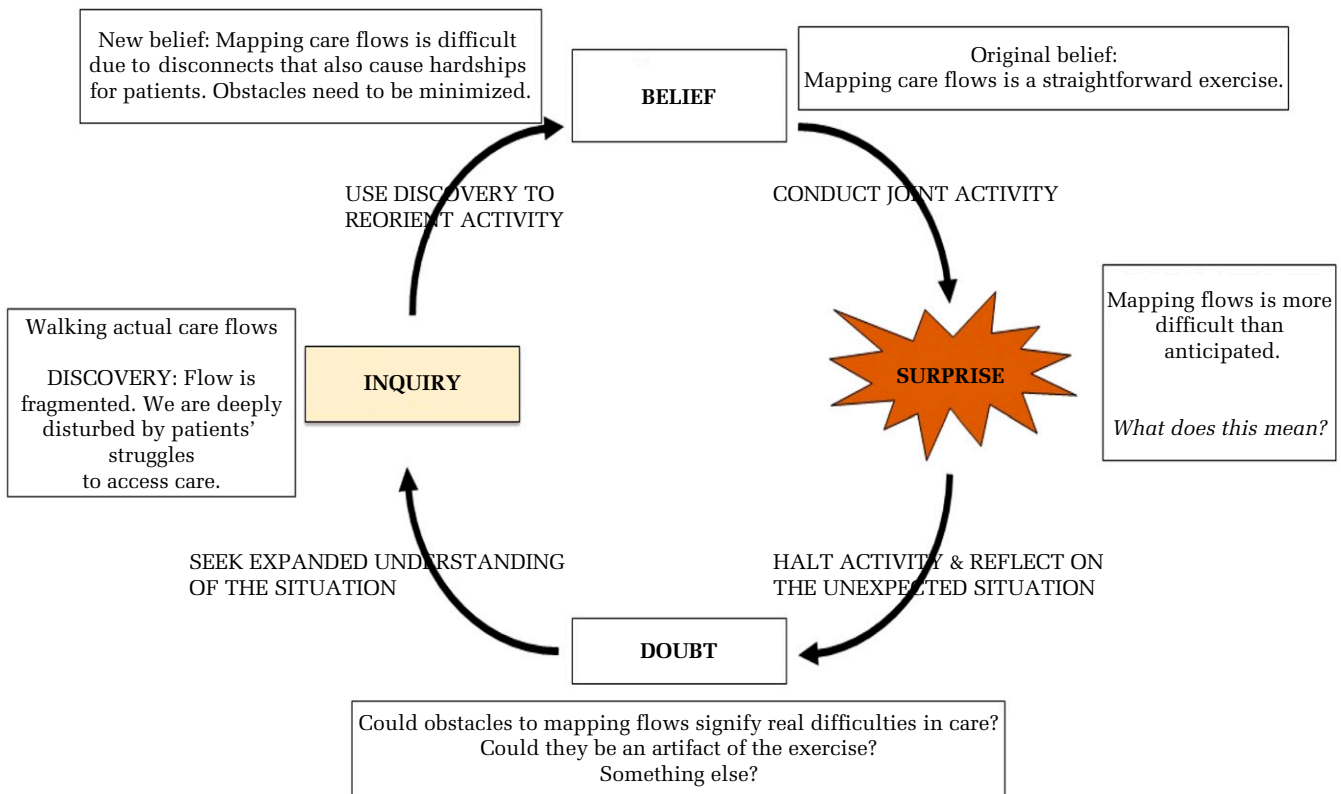
and embraced a new Belief that disconnects in flows are systemic obstacles to patient-focused care that must be eliminated. This shift in perspective helped them navigate the indeterminate situation.

**Abduction Sequence #2: Deepen the Significance of the Indeterminate Situation**

After the enterprise-wide value stream event, the chief nursing officer scheduled a series of events to map specific flows of inpatient care. At the recommendation of the project manager, she adopted a lean tool: vertical value stream (VVS), which structures efforts to capture a flow in detail. A staff facilitator explained that “an enterprise value stream is a mile-wide and inch-deep” analysis of a hospital system; by contrast, “a [VVS] is a mile-deep and inch-wide” analysis of a single flow, such as inpatient care.

The chief nursing officer invited the hospital system president, the project manager, clinicians, and patients to participate in the event. She later described loading a fresh VVS slide onto a laptop and projecting it for all to see. For those who had not been present at the earlier enterprise-wide value stream

**FIGURE 2**  
**Engage the Indeterminate Situation**



event, she recounted the discoveries of care fragmentation and patient struggles that had culminated in the present effort to identify obstacles to optimal inpatient care delivery. Then, the group began to fill in the services associated with inpatient flow, proceeding from the top to the bottom of the slide. The project manager described what happened next:

We were doing a [VVS]. You knew things were broken. Then something happened that hits you in the gut so that you can't let go. It moves and compels you to do something different. It occurred when the hospital system president commented that, while she knew how patients got into the hospital, she didn't know how they got out.

This remark provoked many questions, notably: What makes it so difficult to know how patients move through the system to discharge?

The chief nursing officer shared that, after much discussion, the group eventually turned back to the slide, this time focused not on obstacles but on how patients moved through the inpatient care system to discharge. They worked backward to admission and forward toward discharge. Even so, they reported ongoing struggles. In spite of persistent effort, they could not visually map how patients moved through the system.

One participant described "turning our heads from side to side trying to see how patients might progress in care to discharge." The chief nursing officer recalled that, frustrated by her own inability to visualize the flow and aware of people cocking their heads to view the slide from a different angle, she turned her laptop on its side and thus repositioned the VVS slide horizontally. She described what followed:

We were taken aback. We realized, and then acutely realized at a different and deeper level, that the old care process was oriented to justifying patient stay in the hospital. We needed a different process that focused on optimal recovery.<sup>3</sup>

<sup>3</sup> The phrases "We don't know how they [patients] get out" and "The old care process was oriented to justifying patient stay" may seem shocking. I heard them explained through the invocation of a tree as a metaphor, as follows. The admission process—getting into the hospital—resembles a tree's trunk. Various physicians' orders then radiate out to subunits of the system, which resemble branches and twigs. These subunits, such as radiology and physical therapy and labs, perform their work on separate paths. No single role coordinates them to create alignment around patient needs.

They had seen for the first time that the care flow itself was not set up to move patients seamlessly through the system. This discovery prompted the realization that they could not fix the current system solely by removing obstacles: they had to redesign the entire process of inpatient care delivery. A nurse manager participant explained the insight:

Care is not driven by what the therapy can deliver, or when the physician can come ... It's driven by what the patient needs. That's a whole different paradigm shift.

### ***Findings explicated as abduction sequence.***

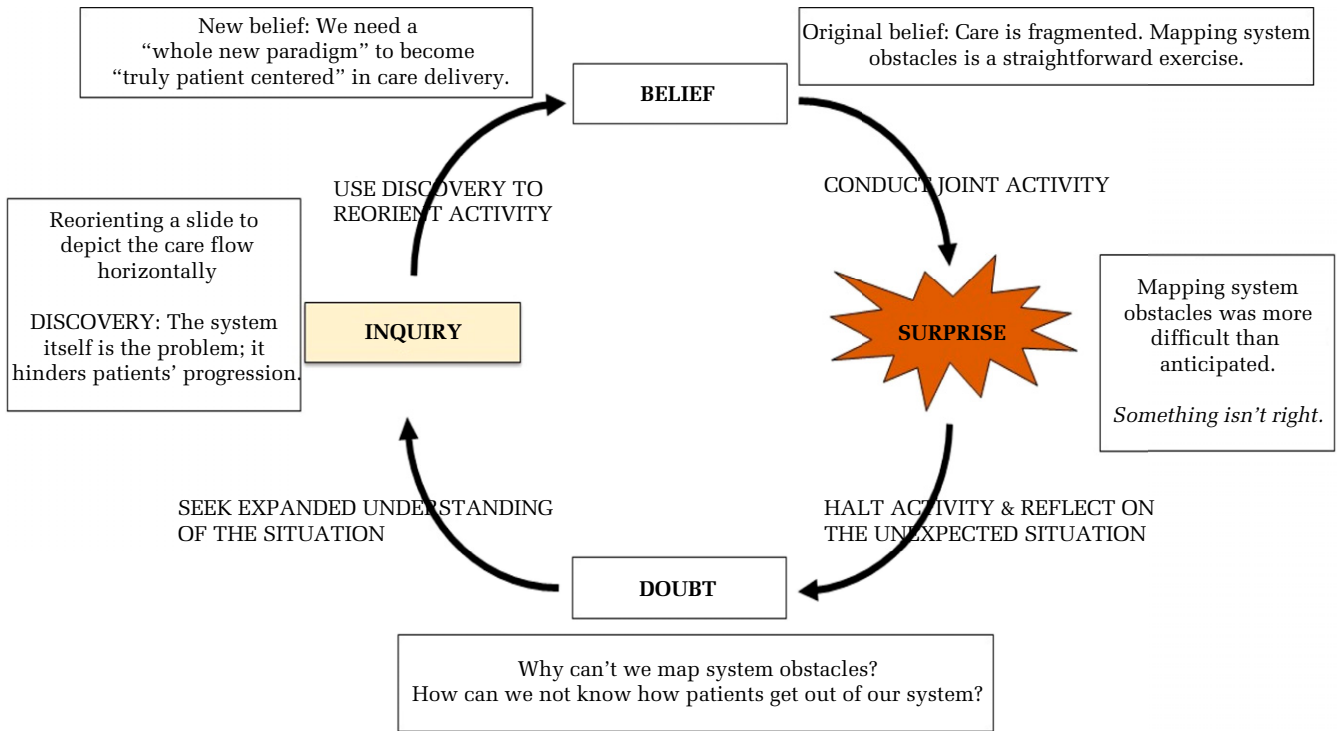
Figure 3 depicts the abduction sequence as participants experienced it when mapping inpatient care flows.

Although participants in the VVS event expected care to be fragmented, they thought they would be able to identify systemic obstacles in the way of inpatient care. The challenge to prevailing Belief occurred when they struggled to map these obstacles. The remark "We know how patients get in ... but not how they get out" had provoked surprise. In halting their activity to reflect, the group advanced to Doubt. How could they not know how patients got out of their system? Seeking to understand this, the participants ignited Inquiry. They looked again at the flow, this time with a focus on how patients actually moved through the system toward discharge. As they cocked their heads to view the flow from different angles, and the chief nursing officer turned the VVS slide sideways, the group discovered that merely removing obstacles would not suffice: they needed to redesign the care delivery process around patient needs. In abandoning the prevailing Belief that eliminating obstacles would address care fragmentation, the group moved toward a new Belief that a "whole different paradigm" was needed for care to be "truly patient centered." This shift deepened the significance of the situation, reorienting their efforts away from improving care delivery toward designing a fundamentally new way of delivering care.

### **Abduction Sequence #3: Construct an Imagined Configuration**

Nursing leadership devoted several subsequent VVS events to key aspects of care delivery, one of which was the admissions process. Clinicians from various disciplines, the project manager, and current and former patients participated. When queried about the involvement of patients in these events, one nurse responded:

**FIGURE 3**  
**Deepen the Significance of the Indeterminate Situation**



We have to have patients on our team ... Every time I've been in events, there were patients ... We always start out with ... rules of our engagement and one of those rules is "When the patient speaks, you will be quiet." ... I can honestly say we didn't bring patients that were always the happiest to our table.<sup>4</sup>

The project manager who attended the admissions event recounted that the name of the new care process "actually came from our patients' comments." As clinicians described it, they were looking at the admission process. A physician recalled a patient describing having experienced "different clinicians ask at least five or six times" why she was there. She became so frustrated recounting this experience that she asked the clinicians present, "Why aren't you

<sup>4</sup> Another nurse commented that the norm of inviting patients to events "was sometimes hard for our doctors." She described a doctor participating in an event who was "less than gracious to our patient when the patient asked a question. 'Well,' the doctor said, 'How do you exactly know? If it walks like a duck, talks like a duck, it's probably a duck.' Quite honestly, it was very inappropriate behavior. ... We had a lot of repair work to do with that patient. So we have to get doctors wanting to listen, not just pretend to listen. ... Self-importance sometimes gets in the way."

talking to each other?" Expressing a similar frustration, another patient described "how aggravating it is to have different people ask you the same question as you lie helplessly in a strange bed" (Internal document: board presentation). A nurse supervisor relayed another patient's comment: "Hold on. ... You all don't look like you know what you're doing. If you don't tell me that you know what you're doing, I won't think you do."

Clinicians listening to patients' accounts of their difficult experiences "realized that we weren't really acting together on such critical care" (Chief nursing officer). While trying to characterize a system in which clinicians would work together for the patient, those at the meeting remember someone suggesting the term "collaborative care," which immediately resonated with many. According to the project manager, the new name "really brought home the collaborative care piece to us very quickly," The hospital system president agreed: "That's when Collaborative Care was born, so to speak."

After this event, the nursing team arrayed patient input by the critical questions raised and circulated the compilation along with information about Collaborative Care in the first system-wide newsletter about the change efforts:

Collaborative Care is a new initiative for DeltaCare hospitals to build a new way to deliver care. ... This will be ... key ... to becoming the preferred destination for inpatient care.

We've included patients in our events and we've heard lots from them about how we can do better. ... They want to know: "Who are you?" "What's wrong with me?" "What are [we] going to do about it, and why?" "Who is going to do it and when?" "When am I getting out of here?" "What do I need to know to continue to care for myself when I leave?"

It is an appropriate expectation. Some of you may feel like you already do these things. ... And some of you may, but it doesn't *happen consistently, by everyone, every day.* (Internal document: *Newsletter*, 1(1), 2005, emphasis in original)

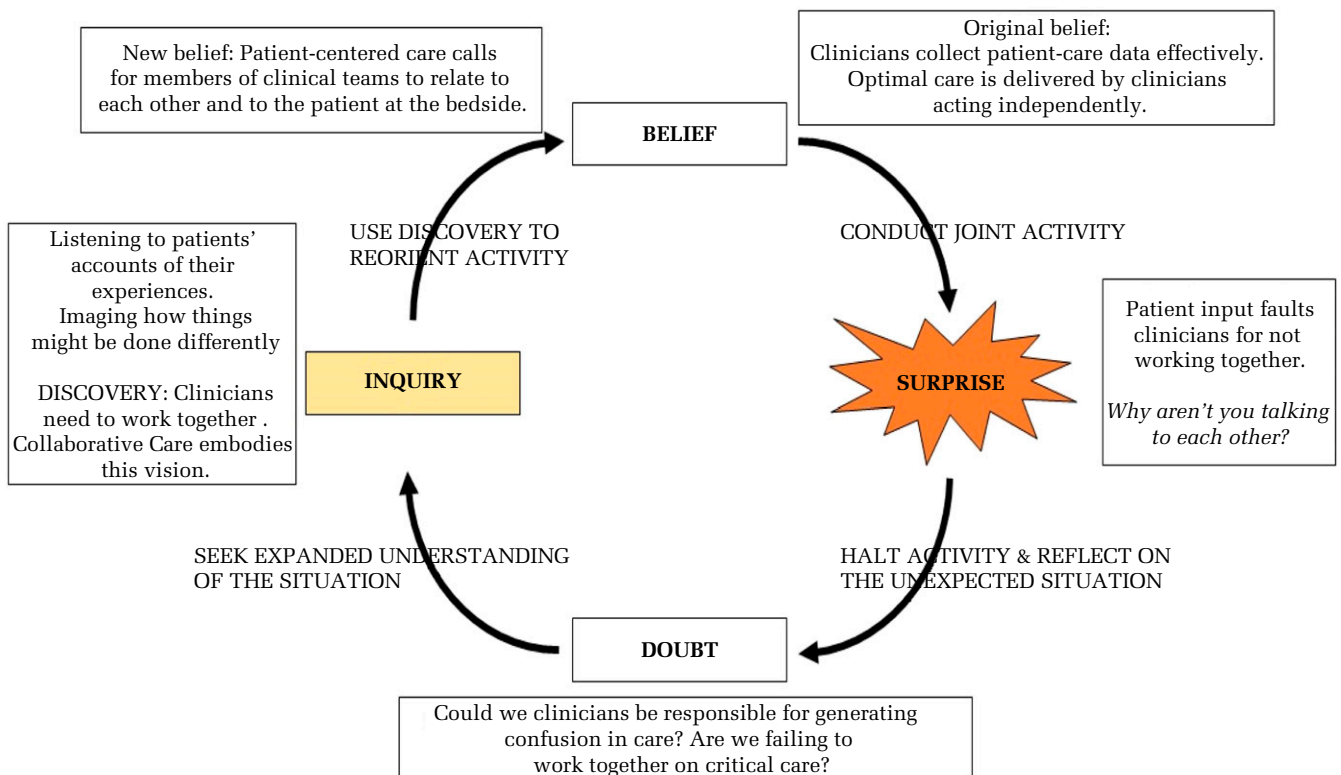
**Findings explicated as abduction sequence.** Figure 4 depicts the abduction sequence experienced by participants, including patients, who reviewed data on patient care needed for the admissions process. Considerable negative patient feedback challenged the Belief that clinicians already collected patient care data effectively during admissions. Surprised by the feedback, the clinicians stopped to take in patients' pointed questions about how clinicians interacted in care delivery:

"Why aren't you talking to each other?" Reflection on the fragmentation of care that the patient's questions had drawn attention to prompted the group's move toward Doubt. Had they, as clinicians, been responsible for sowing confusion? Rather than dismissing the negative feedback, the group moved toward Inquiry, as they imagined how care might be delivered better if clinicians acted in concert. The new name, Collaborative Care, embodied an imagined new configuration (Dunne & Dougherty, 2016). In the course of generating the possibility of a fundamentally new model of care delivery, members moved toward a new Belief.

**Abduction Sequence #4: Try on New Habits**

To guide development of the new model, now known as Collaborative Care, nurses drew on patient feedback that clinicians weren't "on the same page," and on the provisional new Belief that, to be "truly patient focused," clinicians would have to work as a team to deliver care. Eventually, nurses persuaded physicians and pharmacists to agree in principle to meet "side by side with the patient and their family at the bedside in real time" (Interviews and an internal newsletter about the change initiative). This hypothetical team became known as

**FIGURE 4**  
**Construct an Imagined Configuration**



“Trio,” signifying its composition of three clinical professions: the physician, as medical expert and team leader; the nurse, as care manager; and the pharmacist, as clinical expert (Internal documents: presentations to the board, 2006, 2009; presentation to the foundation, 2009).

As Trio, clinicians were expected to conduct the admitting assessment of the patient jointly, and to create and update a single care plan. On subsequent visits to the patient, in place of the typical rounding practice, the clinicians—at a minimum, the nurse and the physician, with the pharmacist present as needed—entered the patient’s room together (Interviews; newsletters on the change initiative, 2005–2006; presentation to the board, 2009). A nurse explained the difference between Trio and the prevailing rounding practice as follows:

The structure [of the team] is not unusual to the rest of the world. But what *is* unusual is what they do together. The nurse isn’t just standing by the door listening to the doctor, taking notes and orders. She’s participating in the physical exam and actively in dialogue about the orders and care plan.

One manager described the nursing team’s dedication to making Trio a reality:

We could have easily said, “Oh, we’ll never get the physicians there.” ... But we said, “No, we’re going to be in the room together. We’re all going to hear the patient’s story together. ... We’re all going to put [in place] the plan of care together.” ... No matter how hard, we were going to make it happen, because we thought this Trio was the anchor to the whole system.

Early documents (Presentation to the foundation, 2009) and interviews with clinicians distinguished between current and proposed clinician roles and expectations as delineated in Table 1:

During the admitting assessment, all clinicians were to be at the patient’s bedside; the nurse and pharmacist were to be more active, and the physician was to listen to the other clinicians. In describing the implications of Trio for clinicians, the OD staff specialist emphasized interdependence:

Our providers were used to going in ... see the patient, come out, write orders, and the nurse tries to catch up; the pharmacist tries to catch up. But, with Collaborative Care, they’re all together ... It requires each of them to commit to being there when they say they’re going to be there ... for the team to assemble in order to have the bedside care conference. And that causes them to practice differently. So ... I don’t want to say *sacrifice*, but it’s changing how they practice and how they thought of themselves within that profession.

Leadership recognized the significance of the pending changes for clinicians. For example, the pharmacy director described the change as a “complete role reversal” that would call for a pharmacist to become an “active clinician at the bedside” and would “examine the value of what pharmacists bring to the team” that other clinicians could not. The hospital system president observed that the new model would ask clinicians “to change their sense of what their profession is and their sense of who they are.”

**Hesitancy and discomfort.** The nursing unit leader later described “definitely, hesitancy early on” with Trio among physicians and pharmacists, and pervasive hesitancy among all clinicians. Trio meant letting go of tasks that other clinicians would now perform. Nurses admitted that letting go of bedside tasks, such as administering medications, was “probably one of the biggest struggles.” One pharmacist expressed his discomfort this way: “You want to make sure you’re doing the right thing for the patient, and the ball is not getting dropped somewhere.” Physicians too lamented a loss of control: “Where we struggle is the loss of control, some loss of autonomy, to a degree.”

All clinicians acknowledged that involving patients in a “real-time” bedside conference was “definitely a role changer.” How would they ask each other questions in front of the patient? How would they address patients’ questions as a team? In interviews, physicians in particular described feeling vulnerable in front of the patient and uncertain about what to expect from the other clinicians:

The other big change for us is having input from other clinicians. ... I want to say *challenged*.

When you’re a team member, it’s an adjustment to work as a team. ... I think that’s probably my biggest adjustment. ... Typically, we’re pretty autonomous, and we don’t like to be told what to do. And now, all of a sudden, well, it’s “You can’t do it that way; we really need you to do it this way.”

Before, physicians were sort of independent. Now, we have the nurse, the pharmacist, with us. ... I mean, we’re all trained as physicians that we’re going to work alone. And other people are there to kind of support you, but never as a co-teammate kind of thing. And this is definitely more of being that “co-” sort of thing.

In anticipation of clinicians’ discomfort with implementing Trio, nursing leaders, the project manager, and the OD specialist had designed opportunities to try out the new behaviors with volunteer patients

**TABLE 1**  
**Current and Proposed Clinician Roles and Expectations**

	Move away from. . .	Move toward. . .	New role expectations (habits of belief and action)
Nurse	Doing bedside tasks	"Expanded and empowered role in decision-making and patient-care progression, responsible for bedside management of quality measures"	Work to full scope of practice and trust other nurses to do so as well
	"Too much time spent running for supplies and equipment"		Listen to patient as Trio in developing care plan
Pharmacist	"Back-end role"	"Bedside presence"	Step out of backstage role; interact directly with clinicians and patients
		"Teacher to patient and clinical team"	Listen to patient as Trio in developing care plan
Physician	Hierarchical orientation	"Partner in the care team who exposes her/his thinking to the professional team"	Listen to and consider the input of other clinicians, even in patients' presence Listen to patient as Trio in developing care plan

before the model went live. As the OD specialist explained:

It's not about just learning clinical processes ... It's thinking differently about who they are as professionals within the context of that team delivering ... care. That doesn't happen just at the turn of a screw... Everything in the current world will pull them back to the way they were functioning before ... to do something differently really takes sustaining.

A mock-up unit that duplicated the proposed new space configuration was constructed in vacant space for six weeks of training and practice sessions for nursing staff, including the equivalent of two weeks of cross-clinical training with physicians and pharmacists. The clinical nurse leader explained that the multi-week timeframe was critical in order that nurses could "constantly experiment" and "unlearn old behaviors and learn new expectations." Nurses selected to staff the initial unit were released from their usual clinical responsibilities for much of the training period to familiarize themselves with the new clinical processes, physical layout, and technology, and to make final adjustments. During joint sessions, full clinical teams practiced delivering care, as Trio, to volunteer patients.

In spite of hesitancy and discomfort, clinicians and especially physicians valued the practice sessions for clarifying how the new model and Trio would operate. One physician commented: "Each [of us] needs to see it, feel it, touch it, give input on it, come to consensus." Another physician, an early advocate of the proposed model, explained the value of the practice sessions: "So we came up with a theoretical process of how it was going to work. ...

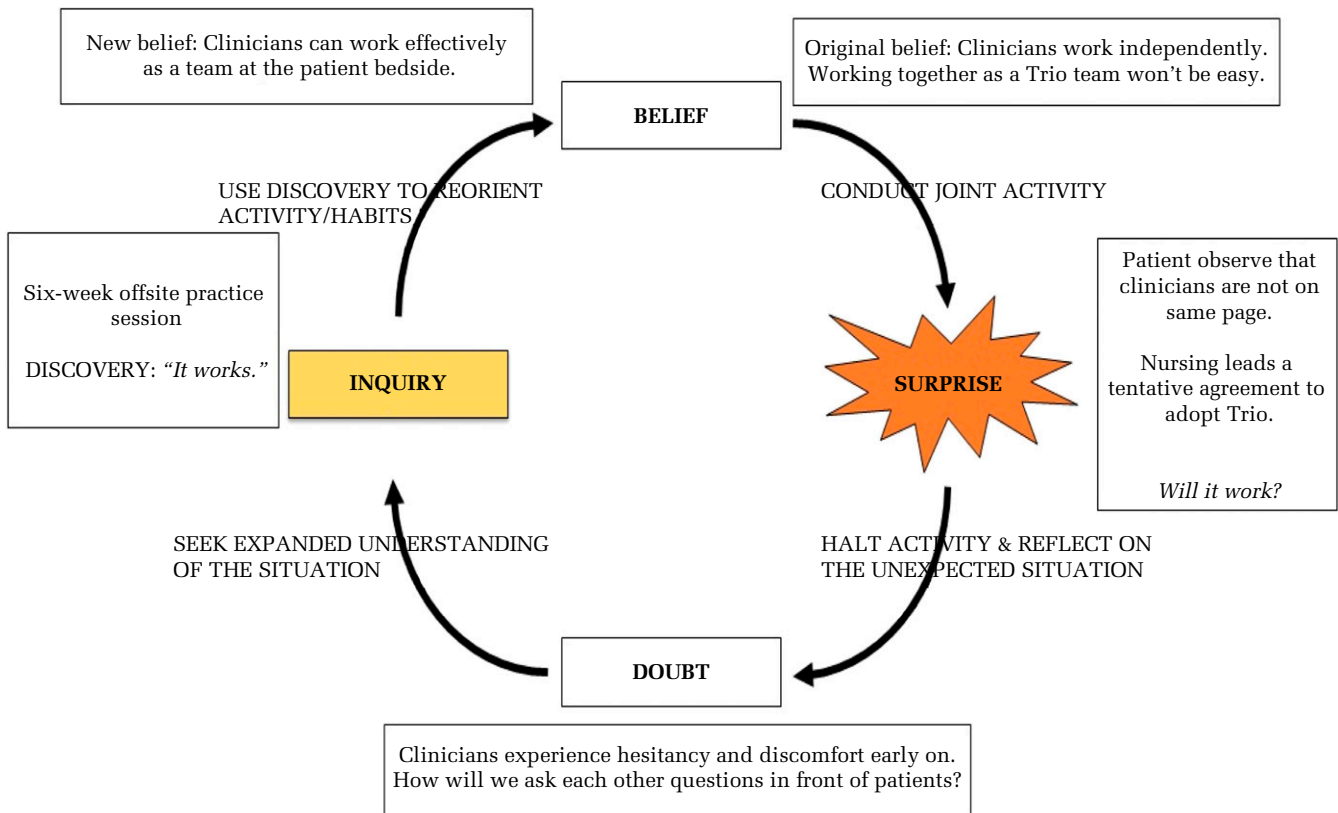
Trialing was incredibly important to say, 'OK, how does the flow actually work?'"

The mildly favorable physician response surprised the manager of physician engagement, who admitted that she had expected some physicians "to go tilt." Instead, they were "pretty positive," offering comments like, "Hey, this isn't so bad" and "I didn't see how this would work, but I can see how this can work now." She described observing physicians practicing Trio with other clinicians and volunteer patients and noting that the physicians, by listening and asking questions, were acting like "the pharmacist and nurse had something to add and contribute." She remembered thinking that "they might well become a team."

**Findings explicated as abduction sequence.** Figure 5 depicts the abduction sequence experienced by the clinical team, support staff, and volunteer patients while practicing new habits associated with Trio.

DeltaCare managers and clinicians embraced the imagined new model, which had originated in the new Belief that optimal patient care requires clinicians to work together at the patient's bedside. At the same time, however, this model challenged the prevailing Belief that clinicians work independently. Figure 5 represents this as a juxtaposition of the new Belief associated with Collaborative Care and the prevailing Belief. By challenging the prevailing Belief, negative patient feedback about ingrained practices and the nursing team's persistent push for agreement in principle on Trio brought about the move from Belief to Surprise. The subsequent progression to Doubt was embodied in clinicians' responses throughout implementation of Trio: from

**FIGURE 5**  
**Try on New Habits**



“hesitancy early on” to felt discomfort and myriad questions, especially from physicians, such as “What if I let go of this work and someone else drops the ball?” and “How will we ask each other questions in front of patients?” The six-week offsite training session in turn activated the move from Doubt to Inquiry: clinicians experienced how the care process and Trio would actually operate. Not only were physicians more positive than observers had anticipated, they discovered that the new model “can work.” As clinicians enacted Trio effectively as a team with care driven by patients’ needs, they generated new Belief.

#### **Abduction Sequence #5: Negotiate New Habits**

By all accounts, trying on new habits during the offsite sessions went better than expected. Even so, going live with the first new unit unexpectedly entailed “bumps and bruises.”

During the first couple of weeks, when the unit “was under the microscope of the whole organization, and everyone was trying to do the new process exactly,” implementation progressed smoothly.

However, a number of managers recalled Weeks 3 through 6 as when “things started to get really rough.” Once it became apparent that the new model would require ongoing attentiveness in implementation, the hospital system president approved 90 additional days of support for the new model in use. As a result, the project manager, OD specialist, and care improvement staff continued to address emergent issues. They described their work as “purposeful watching” of actual use of the new care model. They observed, for example, that:

Doctors would start the bedside conference in the patient room without the nurse and pharmacist. ... Early on, you had a lot of that—doctors falling into their old patterns. So we just keep working the care process deeper and deeper and deeper into the new patterns. (Notes, conversation with project manager and care facilitator)

A nurse manager on the new unit explained that, in working with real patients, clinicians “discovered the areas where we should have spent more time, and

then got in the mode of fixing what wasn't going well."

**Tollgates.** "Tollgates"—junctures designated for assessment—proved to be an especially difficult area. They originated at an event dedicated to assembling the care flows of the new model. A nurse manager later described how a group of nurses had arrayed on a board a listing of "everything in care required for a patient" and then assessed "how each piece connected with every other piece of the patient's stay, such as labs processing test results." In the course of doing so, however, they experienced care flow as "*still* kind of disjointed" and "scattered" (Nurse, nurse supervisor). This observation prompted discussion of how to assure that "what should happen for a patient did happen."

In discussing their observation with DeltaCare's consultant on lean methodology, they learned about Tollgate, a lean tool for project planning deployed in manufacturing but not yet in health care. He described the tool as useful in identifying appropriate junctures for "purposeful pauses in a process," to assure that all was progressing as planned; he suggested that they "should think about that concept for patient care." To determine whether the tool would work in their situation, the nurses again listed all the tasks that needed to be done for a patient. This time they were intentional about mapping the sequence: "to be very strategic about what you have to do first versus the kind of thing you do second." When they arrayed these tasks alongside every other aspect of a patient's stay, they realized, "Oh, that [those links] could be our tollgates" (Clinical nurse leader).

Visually, they depicted the new care process as a series of horizontal phases punctuated by periodic tollgates to assess a patient's progress in light of the care plan. As the nursing manager explained:

These [junctures] are our tollgates. ... We say, "This is what needs to happen for this patient, in this amount of time, before we can say that's complete and we can move on. If it's not done, we're pulling the trigger."

Missed tollgates authorized nurses to interrupt care progression and work with appropriate clinicians or ancillary services to solve the problem. As the hospital system president put it, "Nurses are the keepers of the tollgates." As long as care was proceeding according to plan, the nurse advanced the patient forward.

**Difficulties in practice.** When initially proposed as an element of the new model, tollgates provoked disagreement among physicians and between physicians and nurses. Physicians saw tollgates as

constraining their independence and authority (Physician lead, manager of physician engagement), but they remained a feature of Collaborative Care.

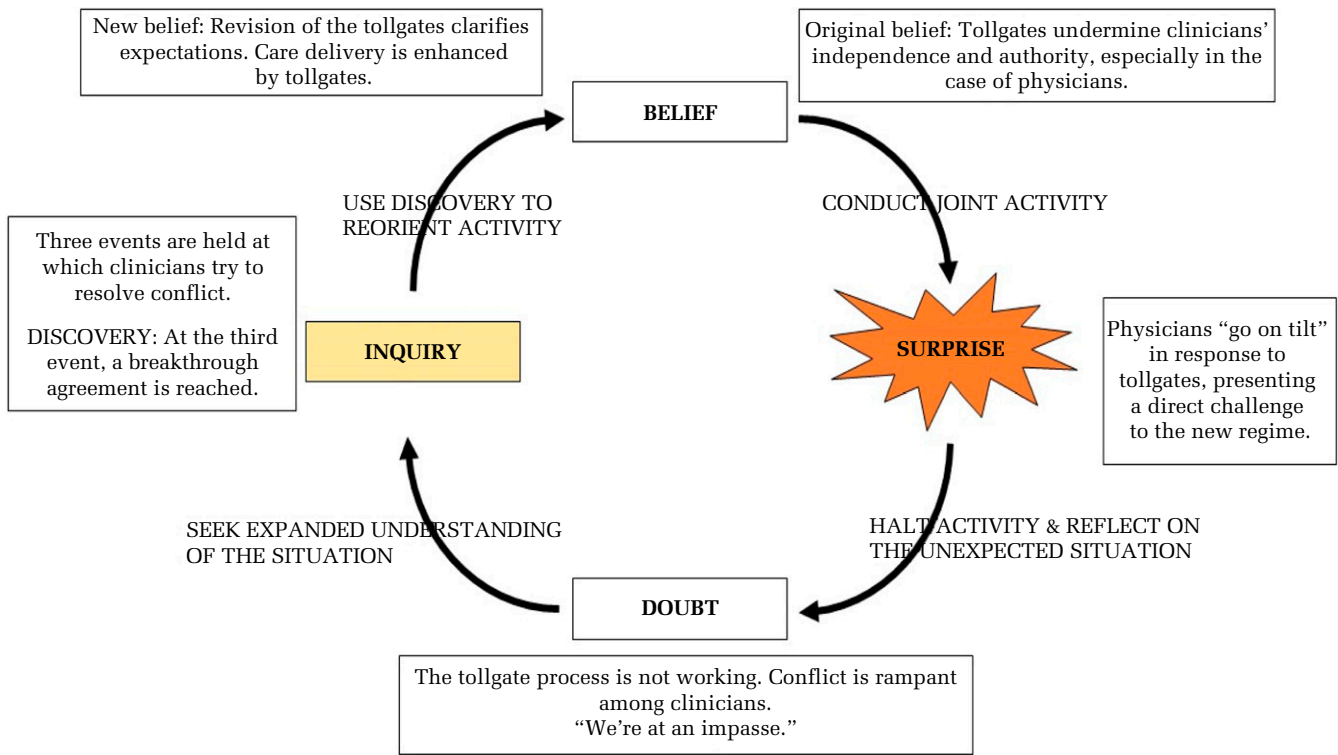
When the new unit opened, nurses described tollgates as entailing a "must-do checklist," which they monitored "to the nth degree, because we were beginning a pilot." Shortly thereafter, physicians began to voice concerns with what seemed to them "rigid" tollgates. The manager of physician engagement said that some physicians "acted more on tilt" about tollgates, including one who bluntly declared, "I really don't like this." Other physicians objected to having to drop what they were doing with patients on other units to return to the Collaborative Care unit. A typical question was, "Why would I come up and do a tollgate when I was just here two hours ago?" As one nursing manager admitted, "Basically, it [tollgate] just was not working."

The project manager convened three events to address the difficulties, all attended by physicians, nurses, and pharmacists. The first two meetings yielded little progress. As the manager of physician engagement explained, the "first two whacks at it ... was just like an impasse." The physicians shared a few ideas, she said, but the "originators of the unit, the real strong nursing champions, became exasperated that the physicians didn't get it. And then the physicians got frustrated that others didn't get *them*." At the third event, according to both nurses' and physicians' accounts, a "breakthrough" occurred. The OD and care facilitators presented data showing that, when physicians participated in tollgates, "even if it was begrudgingly," post-discharge statistics were more favorable.

Having seen that the tollgate process did improve patient outcomes, clinicians agreed to changes that made tollgates "less arbitrary" for physicians while enabling nursing to "own more of the process," calling in physicians only when "absolutely necessary." For this arrangement to work, physicians would need to specify milestones that a patient should have reached at particular points in the care plan. Nursing would monitor those points and assess whether to call in the physician. Physicians were also expected to return to the unit at designated intervals. The project manager commented: "Basically, it was more clear to both physicians and nurses what the expectations were." As the manager of physician engagement remarked, "It was almost a compromise, but it was a realistic compromise that people could do."

**Findings explicated as abduction sequence.** Figure 6 depicts the abduction sequence enacted

**FIGURE 6**  
**Negotiate New Habits**



by the multidisciplinary clinical group disputing the inclusion of tollgates in the new model. Though clinicians affiliated embraced Collaborative Care and the new Belief that optimal patient-centered care delivery required clinicians to work as a team, the adoption of tollgates represented a particularly unwelcome challenge to the residual Belief in clinicians', especially physicians', independence and authority. Surprise took the form of physicians' direct challenge to tollgates. In turn, recognition by managers and clinicians that the process was not working prompted Doubt. The team was at an impasse. The project manager instigated the move to Inquiry when she convened three events to hash out differences about tollgates. Not until the third event, when new data were presented showing better post-discharge statistics when tollgates were in place, did a "breakthrough" moment occur. Although tollgates did work, all clinicians concurred that the process needed refinement. This discovery led to a new agreement that adjusted tollgate practices and clarified expectations consistent with the new Belief of team interdependence.

Two years after the introduction of Collaborative Care, it appeared that the new expectations for

clinician roles were taking hold. Clinicians' reflections on the model attested to its transformative impact:

Collaborative Care not only helps in patient care; it helps in staff care. It works. It really works. (Physician)

It took 17–18 years for me to become the nurse I've always wanted to be. ... Very strongly do I feel Collaborative Care is the right thing for our patients and for me professionally. (Registered nurse)

I really like this opportunity to interact with other medical professionals and have more interaction with the patients ... on the front end. ... It's a much more positive relationship. (Pharmacist)

## DISCUSSION

Despite a growing array of process studies on the dynamics of strategic and organizational change, we still know very little about how discovery within change enables the reorientation of prevailing habits. Glimpses of discovery are evident in these studies, and in prescriptive methodologies of change. For example, when pursued collectively, discovery-related processes such as reflection (Jarzabkowski

et al., 2019; Jay, 2013) enable participants to reflect on a puzzling situation from a different vantage point and to create new understanding. Prescriptive methodologies' recognition of the value of adopting a fresh stance for purposes of reflection is exemplified in practices like *gemba* (Mann, 2005), "gallery walk" (Liedtka, 2018), and designer-led ethnographic observation of end users (Brown, 2008; Brown & Katz, 2011; Martin, 2009). But our understanding of discovery, and how it operates to foster reorientation of habits, remains partial.

This study's findings make two important contributions to our understanding of the undertheorized relation between discovery and change. First, it offers a framework that explains how the unfolding of discovery within and through organizational change can reorient prevailing habits of belief and action. The process of discovery, which entails moving away from prevailing habits and moving toward new ones, operates via five abduction sequences. Individuals in turn can sustain the discovery process via constructively oriented responses to surprise and to resulting discoveries. Second, this study offers a methodology for use in future research to investigate the discovery process and in practice, to cultivate discovery processes. Specifically, I propose *abduction sequences* as useful analytic means and vocabulary for purposes of examining discovery within change and other inquiry processes such as innovation and learning.

### How Discovery Reorients Habits within Organizational Change

**Realms of discovery.** That discovery occurs *continuously* throughout change is a central finding of this study. Thus, we expect to observe discovery not merely at the beginning of change efforts but throughout and after implementation.

The first realm, moving away from prevailing habits, involves shared efforts to fully experience and understand indeterminate situations in light of new experience and future possibilities. This realm, which primarily involves Abduction Sequences #1 and #2, entails discovering (when ongoing action is interrupted) the "diffusely problematic quality" (Joas, 1996: 131) of the situation. It takes iterative work for participants to realize what they do not know, or have not yet seen, about an indeterminate situation. They need to revisit (Timmermans & Tavory, 2012) the now-indeterminate situation that helped them let go of prior expectations. The framework posits that discovering an indeterminate situation

and finding new meaning in it depends on participants' *inability to frame* their new experience by calling on prevailing habits of belief and action.

The second realm, moving toward new habits, consists of efforts to generate new meaning and fundamentally new ways of working to address the indeterminate situation, as they have come to know it. In this realm, which primarily involves Abduction Sequences #3 through #5, potential new situations become more real. To bring this about, participants imagine new configurations while trying on and negotiating new ways of working that challenge prevailing habits. The framework posits that discovering new ways of working depends on participants' *ability to reframe* new experience and to reorient habits in novel ways.

**Abduction sequences and their relations.** The study found that discovery comprises at least five interdependent abduction sequences, each of which consists of belief, surprise, doubt, and inquiry, along with their attendant feelings and constructively oriented responses. Such sequences are social: participants enact abduction sequences jointly. Such sequences are also creative: participants discover new understanding of puzzling situations, attribute new meaning to them, imagine new possibilities, and try on and negotiate what those future possibilities might look like in practice.

Abduction Sequence #1—engage the indeterminate situation—involves an initial confrontation with a surprising situation that interrupts ongoing activity, and participants' subsequent efforts to understand that situation. Through social creative activity, such as walking care flows with patients, participants discover what they had not known or anticipated about the situation that, in turn, prompts reconsideration of prior habits. This initial sequence is critical to the discovery process in two respects. First, the surprise is participants' first realization that something may be awry: not yet actionable, given prevailing habits, the situation becomes indeterminate. Second, the discovery process is fragile: participants' efforts can readily, and almost imperceptibly, either enable discovery (e.g., the present study; Dunne & Dougherty, 2016) or derail it (Chai, 2017) at this nascent juncture.

Abduction Sequence #2—deepen the significance of the indeterminate situation—is prompted by recognition of new or expanded difficulties; for example, "How can we not know how our patients get out?" Specifically, this sequence offers an important opportunity for participants to broaden the purpose and scope of change by imbuing the indeterminate

situation with deepened significance. Rather than perpetuating a predetermined or provisional purpose for a change initiative, participants continue to explore what they still do not know about the indeterminate situation. When successful, they make new meaning, transforming the situation from a matter of fact (e.g., removing systemic obstacles to care) to a matter of essential concern (Latour, 2004), such as helping patients get well (Lorino, 2018).

Abduction Sequence #3—construct an imagined configuration—shifts participants' attention toward imagining possible ways to reconstruct the indeterminate situation as they have come to understand it. More specifically, they imagine a "configuration of interactions," such as Collaborative Care, that enables them to "capture enough of the vast but noisy information" (Dunne & Dougherty, 2016: 143) while continuing to pursue the unfolding discovery process. An imagined configuration is tentatively considered, and may not ultimately be used, but it is critical in mediating participants' transition from prevailing habits toward future ones.

In Abduction Sequence #4—try on new habits—participants experiment with potential new habits associated with the imagined configuration; they are likely to experience both discomfort and comfort with proposed new features (e.g., Trio). Depending on the results, they can begin to enact new habits or hold onto prevailing ones. Trying on new habits either provides further assurance (reinforcing new belief) that the imagined configuration will work in practice, or amplifies doubt (reinforcing prevailing belief) about the proposed model and its components.

Abduction Sequence #5—negotiate new habits—involves negotiating the terms and potentially even the continued existence of new habits associated with the new configuration. At this juncture, as compared to Sequence 4, some participants cling to prevailing habits more tightly, expressing serious reservations about proposed new habits. It can take an impasse—a standstill in ongoing activity—to negotiate the terms for integrating new habits. It is central to successful negotiations that participants jointly explore tensions between new and prevailing habits, not for purposes of dismissal or adaptation of one to the other, but to imagine creatively a third option that reorients prevailing habits and enables new ones. In this respect, Abduction Sequence #5 fosters further meaning-making, even after implementation, about what the new model and its constituent elements signify.

**Constructively oriented responses.** The study found that constructive responses to surprising

situations, such as listening to and actively considering negative patient input, can sustain further discoveries within and across abduction sequences.

The literature on organizational surprise conceives surprise either as an exogenously generated threat to be neutralized or minimized (Cunha et al., 2006; McDaniel, Jordan, & Fleeman, 2003) or as an inherent feature of complex systems (Bechky & Okhuysen, 2011; Cunha et al., 2006; Reis Louis, 1980) that "cannot be avoided, eliminated, or controlled" (McDaniel et al., 2003: 266) and thus requires adaptation. Both responses discourage discovery; neither halts ongoing activity to explore what is unknown about the unexpected experience. This kind of response is conservative, in that it "harmonizes the existing; it does not create" (Follett, 1924: 228).

By contrast, the present study illuminated a qualitatively different response to surprise occurring within sequences: a constructively oriented one that suspends ongoing activity to actively engage with surprise. For participants, not knowing what to think or how to proceed causes discomfort or even agitation. But, rather than trying to control or adapt to surprise, participants step outside the indeterminate situation via a discovery process that prompts reconsideration of prevailing habits. Thus, constructively oriented responses entail "fashioning a reply instead of merely taking adaptive actions" (Henri Bergson, cited in McKay & Chia, 2013: 210).

This study showed that, by making narrative connections across individual abduction sequences, participants shape discoveries yielded by prior sequences to make new meaning about the indeterminate situation that can richly inform efforts to reconstruct it, such as broadened purpose of change via connecting Sequences #1 and #2, and enable habit reorientation. This form of responsiveness is especially significant because it enables a *cumulative* and thus more concerted shift away from prevailing habits toward new ones.

A key implication is that *habits themselves do not derail discovery*. What derails discovery is the stubbornness or rigidity with which individuals cling to habits of belief and action (Peirce et al., 1992). It thus matters *how* participants respond to surprise: their response can ignite discovery and potential reorientation of prevailing habits, or not.

### Abduction Sequences as Analytic Means for Examining Discovery

This paper proposes abduction—and, in particular, abduction sequences—as a means of examining how discovery operates in organizational change processes.

By putting discovery under a microscope, abduction sequences make visible the kind of everyday creativity within change that can reorient prevailing habits.

By examining shared enactment of abduction sequences, this study joins a growing number of empirical, process-based studies of organizational and strategic change that incorporate micro-analyses of collective effort. This work draws attention to transaction (Dewey & Bentley, 1949), a relational unit of analysis that conceives humans acting together with the environment. This analytic perspective is signaled by phrases such as “collectively held experience” (Balogun et al., 2015) and “joint accounts” (Spee & Jarzabkowski, 2017).

Abduction sequences are also analytically useful for identifying and explicating how particular change mechanisms discussed in the literature, such as willingness to challenge (Wiedner et al., 2017), meaning-making (Spee & Jarzabkowski, 2017), and sensemaking (Balogun et al., 2015; Jay, 2013), differ from discovery, and how they themselves operate to generate or derail discovery. Bringing an analytic eye for discovery into data collection and analysis will help us better theorize how and why particular change mechanisms, and particular ways of enacting them, foster (or subvert) the reorienting of habits within change.

Finally, attention to discovery and abduction enables richer theorizing about breakdowns (Jarzabkowski et al., 2019), paradoxes (Jay, 2013), and other “triggers” of creative action. As discovery unfolds, breakdowns of prevailing habits become starting points for reorienting habits. By conceiving of such prompts analytically as surprising experience, research could examine such components of discovery as how and which expectations are breached, and how particular types of surprise might catalyze expansive inquiry processes. Thus, breakdowns and other surprises trigger potential abduction sequences that, conditioned on participants’ constructively oriented response, can stymie prevailing habits, halt ongoing activity, engage what is not known, and, by enabling expansive inquiry, bring about discovery.

### Boundary Conditions and Future Research

This study investigated a system-level change initiative in a medium-sized health system. Certain features of the organization and its environment might explain why members were able to create a successful new model of care in an industry known for strong professional boundaries and clinical protocol that constrain change. At the time of the study, the health system did not face immediate survival

issues. Thus, it may have been easier to encourage discovery with a longer-term horizon than it would be in the face of crises requiring immediate action. Yet, participants have successfully generated discovery in time-urgent radical change (Jarzabkowski et al., 2019). Future research might investigate discovery in time-pressured environments. Second, DeltaCare valued its small but highly credible OD department that had worked extensively with the senior leadership team. This suggests that leaders’ involvement per se may not explain an initiative’s success. Future research could examine the involvement of leaders disposed to act habitually in ways that foster (not derail) discovery. Finally, senior leadership had recently introduced lean management, a methodology for promoting transparency and responsiveness in addressing issues. This methodology may have helped mitigate industry norms in this instance because it was used in the service of discovery; some examples indicate that lean management and other prescriptive methods do not always support system change. Future research could examine the effect of intentionally incorporating discovery into these methods.

More generally, this study illuminated discovery as abductive mechanism for reorienting habits within change. Future research could analyze how political and cultural dynamics foster or derail discovery processes within change. Moreover, at its heart, discovery is a shared, creativity activity, infused with feelings of discomfort, enthusiasm, passion, irritation, and joy throughout the process. Future research could enrich our understanding of emotions in discovery processes by elaborating the expression and experience of these and other emotions in surprise, doubt, and inquiry, and by examining in turn how these emotions shape discovery processes and the reorienting of habits.

The literature on change—focused as it is on overcoming obstacles to organizational change, often in the form of employee resistance—has overlooked how participants actually go about the process of reorienting practice and belief within change. By adopting a pragmatist conception of reorientation of habits as a form of creative achievement, this study has shed light on the undertheorized relation between discovery and reorienting habits within change. It directs scholarly attention toward understanding participants’ creative engagement with diffusely problematic situations as critical to generating fundamentally new ways to address them. It also suggests that both research and practice would benefit by assuming a broader view of abduction and discovery as processes

that occur *continuously* within change and other inquiry processes.

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