A Longitudinal and Multilevel Examination of Organizational Change

By

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A Longitudinal and Multilevel Examination of Organizational Change

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Abstract

This research examines how a hospital's transformation to lean management produced change-supportive behaviours and attitudes. Comparisons to a wait-list control group showed improvements in leadership trust, communication, and engagement among employees who had bought into the change initiative, while affective commitment dropped in employees who had not bought into the vision. An exploration of the nature of these changes over time revealed a curvilinear pattern, suggesting that it may have taken six months before participants truly understood the implications of the change. Through longitudinal growth curve analysis, a follow-up study employing a within-subject, multilevel design found support for three predictive models of change readiness, as well as cross-level evidence suggesting that the processes that contribute to change readiness actually differ within individuals and within groups. Implications for predicting change in change-related attitudes, group-level influence on individuals, the timing of interventions during change, and the referent perspective of measurement are discussed, along with the limitations of this field study.

July 6, 2016

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A Longitudinal and Multilevel Examination of Organizational Change

Everything changes, and nothing stands still.

Alluding to the constant flow of a river, the Greek philosopher Heraclitus is reputed to have claimed that the only constant in life is change. This aphorism has been widely applied in organizations, which are continually evolving and change to meet dynamic demands and requirements from the environment. In the organizational context, however, the constant seems to be the failure of change. Hammer and Champy (1993) claim that over 70% of change efforts fail, and Smith (2002) found that 75% of major change efforts had no discernable effect on organizational performance. Given this track record, there is a large body of literature devoted to understanding how to manage organizational change (Pettigrew, Woodman & Cameron, 2001) and seeking to identify the cause of failed organizational change (Beer & Nohria, 2000; Kee & Newcomer, 2008; Wall, 2005).

There is no one panacea for addressing the high rate of change failures. With an eye towards increasing productivity and improving employee attitudes in the context of wide-scale, continuous change, reviews of the literature recommend simultaneously implementing a combination of interventions focused on human resources while taking into account the dynamic properties of organizational culture (Guzzo, Jette & Katzell, 1985; Halfhill, Huff, Johnson, Ballentine & Beyerlein, 2002; Macy & Izumi, 1993). As for the evaluation of such change initiatives, reviewers have woefully suggested that, until now, examinations of the implementation and outcomes of change initiatives have had difficulty teasing out effects at the individual and departmental levels (Martins,

2011). Fortunately, recent advances in statistical software and analytical techniques such as hierarchical linear modeling and longitudinal growth curve modeling portend that the time is here now for rigorous examinations of change interventions at multiple levels (Martins, 2011).

Purpose

The research question at hand asks: what are the processes by which new business practices introduced as part of a planned organizational change affect employee attitudes and behaviours over time? Although this represents a complicated question, the current study proposes to shed light onto the mechanisms of change initiatives through an intervention design, utilizing multilevel modeling to examine the longitudinal nature of change. First, the author evaluates whether the change initiative in question actually makes a difference in employee attitudes and behaviours. This is achieved in Study 1, in which employees undergoing the change are surveyed every six months on their thoughts and feelings about the initiative. Next, the nature of that change is examined over time. Finally, multilevel longitudinal modeling is applied to the prediction of change over time. Study 2 allows for this exploration of change over time by surveying a smaller group of core participants to the change on a more frequent basis.

Importantly, the data for the current study were collected in situ – in a real organization that was implementing a real organizational change. The cooperation of the organization in this research allowed the author to collect in-depth measures over a substantial period of time. Although laboratory studies can be considered the gold standard for separating cause and effect, the importance of conducting field research in

psychology cannot be understated as it has the potential to reveal how participants behave in their natural environments (Lewin, 1944). The many challenges associated with this type of research can make it difficult for researchers to exercise control over the intervention and collect valid data, while the impact of external factors must also be considered and mitigated as best as possible. One of the contributions of this research will be in describing these challenges in the form of verbatim comments from real participants in this study (included as Appendix A: Interviews with Unit Management and Appendix C: Verbatim Comments from Study 2 Participants). On the quantitative side, the resulting data provides a basis for designing practical, evidence-based interventions serving to enhance employee attitudes and change-supportive behaviours as planned change unfolds in an organization.

Overview of Context

The organization within which this research takes place is a 270-bed hospital of approximately 2000 employees in Ontario, Canada. In 2012, the hospital began plans to implement a complete change in management philosophy based on the principles of lean management. The hospital's new business performance system was designed to promote problem-solving among staff at all levels and create a culture in which employees felt empowered to participate in regular process improvements. It was expected that this change initiative, once initiated, would continue to evolve over the next five or more years. This is typical of large-scale, radical organizational change (Burke, 1995). Utilizing an iterative approach, the long-term strategic plan for spreading the new management system throughout the hospital involved implementing the proposed change

initiative in three clinical units (or "departments") at a time, on a yearly basis. The presented research reflects the first year of the implementation, wherein the three clinical units of focus were the very first to undergo the transformation.

Lean Management

In the automotive and manufacturing industries, lean manufacturing is a management philosophy that was conceived primarily as a new means of cost reduction (Ohno, 1988). Its primary features consider the expenditure of resources for anything other than the "creation of value for the customer" as waste, and thus a target for elimination from the business process (Krafcik, 1988). Lean manufacturing organizes work through a demand-pull flow that is initiated by the customer, as such producing items only when they are required. In this manner, work processes are transformed at all levels of production, and total efficiency can be achieved.

The goals of lean are to improve quality, achieve better responsiveness to client needs, and improve overall efficiency (Applebaum & Batt, 1994; Cusumano, 1988; Holweg, 2007; Osono, Shimizu, & Takeuchi, 2008; Sun, 2011). These goals are achieved by transferring quality-management responsibilities from middle-level managers to frontline workers, typically resulting in a complete reorganization of management and redistribution of power (Womack, Jones, & Roos, 1991). Although lean manufacturing was developed for optimization of the automotive industry, its basic principles can be applied to other sectors. By way of example of its applicability to healthcare, Virginia Mason Medical Center transformed the infrastructure of its organization in order to empower employees to make changes at the front line when they become aware of a

faulty element in the business process (Black & Miller, 2008). In parallel to the product-pull system used by the automotive industry, employees at this medical center use standardized work processes and just-in-time production to "pull" the patient through the hospital, from admission to discharge.

In its most basic form, lean management is about removing waste from the production system. Although at least seven different kinds of waste have been identified in the literature, two obvious examples highly applicable to healthcare are *wasting time* (e.g., by waiting, asking for clarification, or redundancy in motions required to get work done) and *wasting inventory* (e.g., caused by inefficient storing patterns, or performing more work than actually necessary). The application of "lean thinking" involves continually asking whether steps of the production system add value to the final product or service (Black & Miller, 2008). Although there are many elements of lean management, its two main concepts include (a) just-in-time production by consistently delivering only the service that is needed, in just the required amount, where and when it is needed, and (b) the ability to stop a process at first sign of an abnormality, which, in the healthcare world, means a system that keeps patients safe from harm or death. Once lean elements are implemented and employees are trained on their purpose, proper usage, and future goals, total transformation of the organization demands a relentless pursuit of continuous, incremental improvement (Black & Miller, 2008). The diligent application of lean thinking (e.g., root cause analysis), lean principles (e.g., data collection and process evaluation), and lean tools (as detailed in the following section) leads to the elimination of delays and obstacles that exist for the various "value streams" of a hospital: patients,

clinicians, medications, supplies, information, equipment, and processes all "flow" from one area to another (Black & Miller, 2008).

The elements of lean and its approach to productivity are not new. Some rudimentary ideas such as the standardization of parts and operations can be found among texts describing weapons' manufacturing in the late 1500s and late 1700s (Swartz, 1994). Henry Ford's assembly line process for the continuous-flow assembly of automobiles is another example of the presence of early lean-like elements in the workplace (Black & Miller, 2008). The father of lean manufacturing as it is known today is presumed to be Taiichi Ohno, the chief process engineer of Toyota Motor Corporation, who helped implement a production system that signalled when new parts or supplies were needed, stopped any process at the first sign of abnormality (as a measure of quality control), and arranged machinery in the order they were used in the manufacturing process (Ohno, 1988). Eventually, Toyota's production system evolved into the lean management system we know today.

In the 1990s to the early 2000s, the lean revolution had reached the healthcare industry, focusing on cost reduction and service quality improvement (Barnas, 2014). The healthcare industry is one in which complacency and inefficiencies reign due to steady customer demand and lack of competitive pressure (Black & Miller, 2008). Like many businesses, healthcare organizations spend an inordinate amount of time on activities that do not add value to patient outcomes, including reworking processes that were completed with defects or reacting to urgent problems as they arise instead of planning ahead. For hospitals at the forefront of the lean revolution in healthcare, applying a manufacturing

method to healthcare was risky. The approach has since paid off: benefits can be observed in many hospitals and other types of healthcare organizations that have adopted lean measures, from large-scale, top-down lean "transformations" to those who used a less philosophical, "tools-only" approach (Barnas, 2014; Wellman, Jeffries, & Hagan, 2010).

The healthcare organization participating in this research had committed to a complete culture transformation, not merely a tools-based approach. This plan requires a culture shift in normative approaches to problem-solving, as healthcare providers notorious for finding quick workarounds (due to the critical nature of their job) were trained instead to spend time identifying and addressing the root cause of a problem. The hospital's strategic five-year plan for deployment included a one-year planning phase, in which leaders were able to identify corporate performance priorities and accomplish several action items: for example, the entire senior management team was trained in lean management principles, a "lean transformation" promotion office was created to manage the improvement activities in the new system, a healthcare process improvement expert was hired to coordinate the spread of the new business system and provide coaching to middle-level management, and the services of external consultants were procured as required to build lean-related skills of middle-level managers.

This study begins at the launch of a set of new business practices, the point at which the lean philosophy was introduced to frontline staff for the first time. As previously stated, the hospital decided to take an iterative approach to spreading lean throughout the hospital: each iteration of the transformation would introduce lean

business practices to the units undergoing the change that year. Together, the new set of practices forms a system that drives each employee's daily work.

The hospital recognized that communication of the new business practices as a system (as opposed to individual practices) and consistent messaging was important for adoption of the new management philosophy (Whelan-Berry & Somerville 2010). The change initiative was thus baptized as the *Continuous Performance Improvement (CPI) System* and provided with its own logo, which was branded onto the various problem-solving and visual management tools provided by the internal transformation office. As a result, all staff—even those in units that are not yet affected by the change initiative—would be able to recognize elements of the transformation and refer to the hospital's new business system by its name.

The implementation of lean production systems varies quite widely across organizations and industries (Kochan, Lansbury, & MacDuffie, 1995). Indeed, due to the research implications of this fact, Landsbergis, Cahill, and Schnall (1999) urge lean researchers to carefully describe the work reform in their studies. As such, the following section will outline these details. Although the hospital recognizes that its ultimate goal is to foster the lean *philosophy* and promote a culture of continuous improvement, it has introduced specific lean management *tools* to support the change. The descriptions of the newly introduced business practices are organized in a manner consistent with their expected area of impact. In describing these practices, this author will begin with those used by managers to help in their daily planning of operations, followed by practices meant to enable daily improvement among frontline staff. Next, more strategic processes

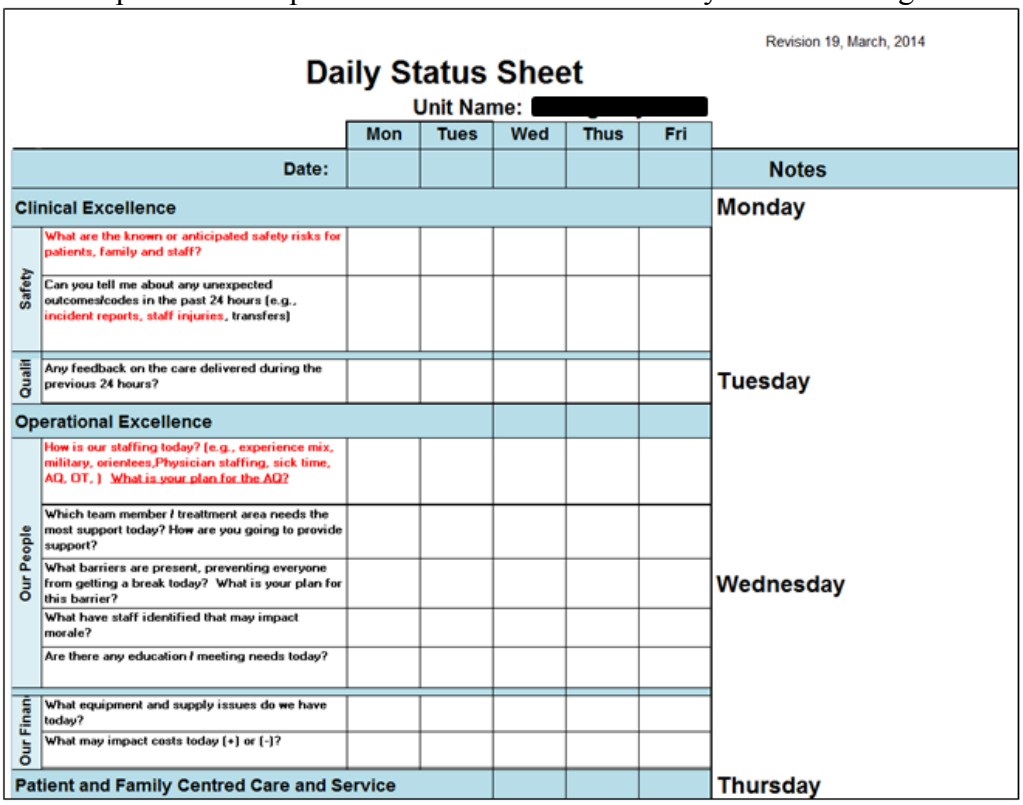
that address larger issues in the unit will be outlined, and subsequently linked with organizational strategic priorities. Finally, with an eye on the sustainability of the change initiative, the plan for standardizing work related to the new business practices and fostering the new management philosophy will be described.

Planning. The planning component of the hospital's lean system is meant to help the organization plan for the day's upcoming or expected events. *Daily status exchanges* were implemented as a standardized technique for sharing critical information to this end. Every morning, the unit's manager and supervisor(s) meet for 15 minutes to recap the events of the previous shift, identify areas or employees in need of additional support, and follow-up on issues that have arisen and require attention. The documentation of status exchanges allows for longitudinal identification of waste and/or trends. Further, the questions posed by managers to supervisors during this exchange are aligned within the greater strategic priorities of the hospital: this helps supervisors make the link between the work they do every day, and the hospital's vision and strategic goals. The better they understand how their work at the frontline contributes to the organization's overall performance in key areas, the more likely it is that supervisors will translate these insights to their own subordinates, who do not participate in the status exchange.

Making the link between one's daily work and its impact on the greater organization has a beneficial effect on individuals' commitment to their employer (Meyer & Allen, 1997; Meyer, Paunonen, Gellatly, Goffin, & Jackson, 1989). With the goal of using this approach to indirectly foster loyalty and engagement, the hospital supports the use of tools that help employees see where they belong within its strategic vision. From

the manager's perspective, these status exchanges help them mobilize resources and plan for the rest of the day by encouraging them to think proactively. See Figure 1 for a sample of the questions asked during the daily status exchange.

Figure 1. Sample of the hospital's Status Sheet used for daily status exchanges.



Revision 19, March, 2014

Daily Status Sheet

Unit Name: [redacted]

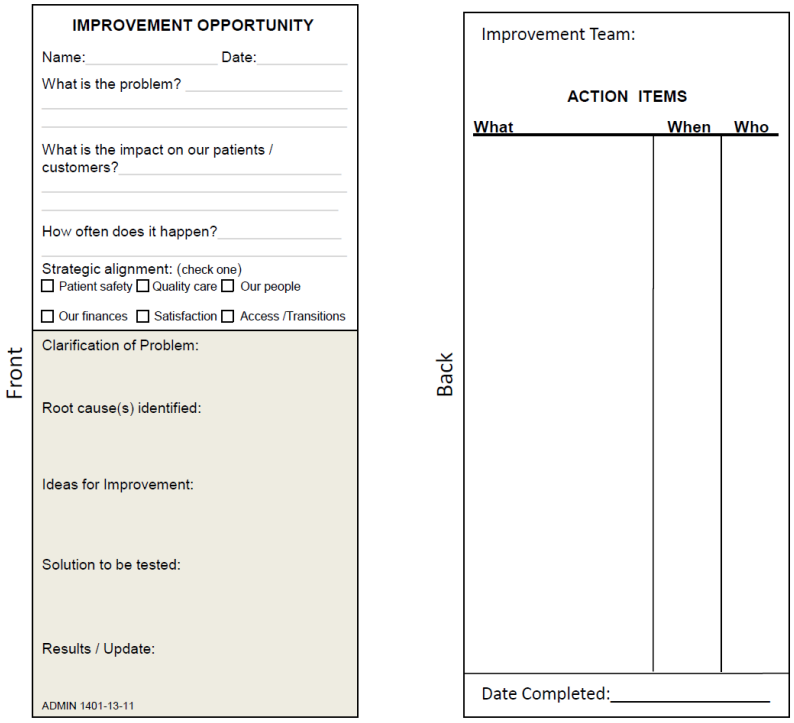
		Mon	Tues	Wed	Thus	Fri	
	Date:						**Notes**
Clinical Excellence							**Monday**
Safety	What are the known or anticipated safety risks for patients, family and staff?						
	Can you tell me about any unexpected outcomes/codes in the past 24 hours (e.g., incident reports, staff injuries, transfers)						
Qualit	Any feedback on the care delivered during the previous 24 hours?						**Tuesday**
Operational Excellence							
Our People	How is our staffing today? (e.g., experience mix, military, orientees,Physician staffing, sick time, AO, OT,) What is your plan for the AO?						
	Which team member / treatment area needs the most support today? How are you going to provide support?						
	What barriers are present, preventing everyone from getting a break today? What is your plan for this barrier?						**Wednesday**
	What have staff identified that may impact morale?						
	Are there any education / meeting needs today?						
Our Finan	What equipment and supply issues do we have today?						
	What may impact costs today (+) or (-)?						
Patient and Family Centred Care and Service							**Thursday**

Daily improvement. The hospital's approach to daily improvement was by managing the performance of daily operations. This involved standardizing operations, identifying and eliminating waste in business practices, and using data to ensure that processes and services were always reliable.

One of the key tenets of implementing lean at the hospital was to give staff opportunities to present ideas for quality improvement and enable them to make improvement decisions at the front line by removing barriers that may have prevented

them from taking action. To this end, the hospital introduced *process improvement tickets* as a means for staff to identify an issue, relate it to the hospital's strategic priorities, and begin the problem-solving process by investigating the root cause of the problem. See Figure 2 for an example of a process improvement ticket.

Figure 2. Process improvement ticket used by staff as the first step of the problem-solving process.



Process improvement tickets were beneficial to the unit because they helped identify issues of varying scope, ranging from minor irritations (e.g., a piece of equipment is constantly missing or placed somewhere too far from where it is needed) to major problems that involve more than one group of stakeholders (e.g., the layout of the triage area in the Emergency Department is inadequate for the provision of certain types of care). For staff, posting process improvement tickets became a way to communicate

with the management team and lend their voice in the provision of high-quality patient care. This was one avenue for them to become more involved in the performance of their unit as a whole, again allowing for the association to be made between frontline work and the greater organization's performance.

The *daily huddle* was one of the most directly engaging practices introduced as part of the transformation to lean. Every day, all available frontline staff gathered to discuss any posted improvement tickets during a timed, 15-minute gathering. Huddles followed a standardized series of steps designed to guide participants through a discussion to identify (a) the root cause of an issue presented by a process improvement ticket, (b) alternative potential solutions, called "countermeasures", to be developed and tested through pseudo-scientific methodology, and (c) the "owner" of the ticket, who volunteers to take action and perform related work with support from other volunteer members. In traditional management systems, the manager would be expected to use his or her managerial status to influence corrective action; in a lean-thinking organization, frontline staff are the leaders and participants of process improvement, and managers serve to remove barriers that prevent their subordinates from performing this work. This practice involves employees in the articulation and development of the solution of the problem, enabling them to be the ones who take meaningful action and make decisions that affect their work directly.

Daily huddles are a critical aspect of the newly-introduced business performance system. The huddle environment created the opportunity for leaders to (literally) see challenges at the front line, and engage individuals in a sequential and clearly defined

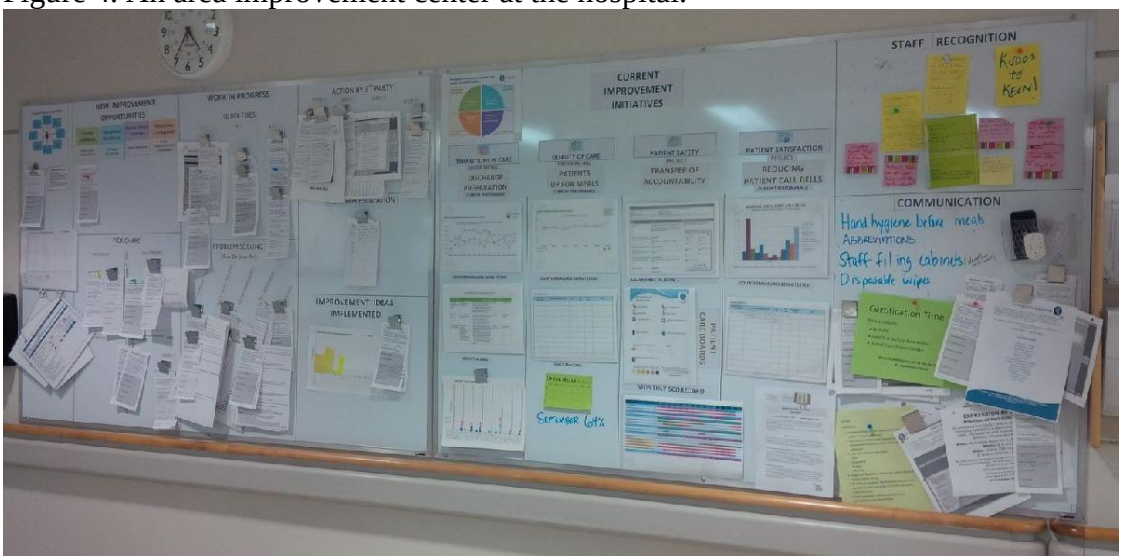
thought process to identify the root of the problem. This practice was designed to enable staff who have the knowledge and skills to diagnose the root cause of problems they encounter on a frequent basis to actually carry out the analysis and find solutions, without intervention by bureaucracy. See Figure 3 for a photo of a daily huddle in action.

Figure 3. A daily huddle taking place on one of the hospital's inpatient units: the unit manager (center) facilitates a discussion on root cause analysis and process improvement.

The unit's monthly performance on key metrics was shared with employees by posting illustrative graphs on the *area improvement centre*, a whiteboard located in a central area of the unit. At every daily huddle, the huddle facilitator spoke to the performance graphs, in this manner providing feedback to employees about their collective performance relative to organizational strategy and highlighting any performance improvement initiatives that had been initiated through the daily huddle. As previously described, making the link between an individual's daily work and the

hospital's greater performance relative to patient safety and quality of care is a priority for the hospital. Refer to Figure 4 for a photo of an area improvement center.

Figure 4. An area improvement center at the hospital.



Larger issues. Issues with scopes that go beyond minor daily irritants and have a large impact on the work practices or performance outcomes of the unit were dealt with using more resource-intensive techniques than status exchanges, process improvement tickets, and daily huddles. These so-called larger issues often require in-depth root cause analysis by multiple stakeholders who may be dependent on, or indirectly affected by, any aspect of the issue. The hospital's strategy for improving larger issues included the adoption of several techniques that encourage participants to identify the root cause of a problem, experiment with possible solutions, analyze the results of these experiments, and implement the best alternative solution. These techniques are outlined below.

A culture of continuous improvement. Promoting a culture of continuous improvement, wherein employees are encouraged and empowered to conduct problem-solving and make improvement decisions at the front line, was the underlying mission of

the hospital's transformation to lean management. One of the strategies implemented by the hospital to reach its transformation goals involves propagating a method known as *lean thinking* (also known as "A3 problem solving", named such for the size of the paper used in problem solving) throughout the organization (Jimmerson, 2007). In essence, by training its entire management team and a few key personnel at the front line, the hospital's plan was to foster a culture in which problem solvers follow a logical, sequential, and clearly defined series of steps that initiate deep thinking about the root cause of a problem instead of jumping to quick solutions that may cause inefficiencies and become harmful to the system in the long run (Jimmerson, 2007). As participants progress through the problem-solving steps, direct observation of work processes allows them to gain a deep understanding of the system instead of operating on assumptions.

Unlike traditional management systems in which problem-solving is reserved for management, this type of analysis is meant to be conducted by those closest to a particular event, and as close to the occurrence of the issue as possible (Jimmerson, 2007). The staff members conducting the problem-solving analysis must be familiar with the particular structure and process, and, more importantly, must be supported by a network of internal coaches (i.e., managers and supervisors, and additional support from the lean transformation office). Although the main concepts of A3 problem-solving are relatively easy to learn, teach, and coach, the method is extremely time-consuming and requires a significant commitment of effort. However, efforts have been shown to pay off in thorough resolution of problems at their root (Jimmerson, 2007).

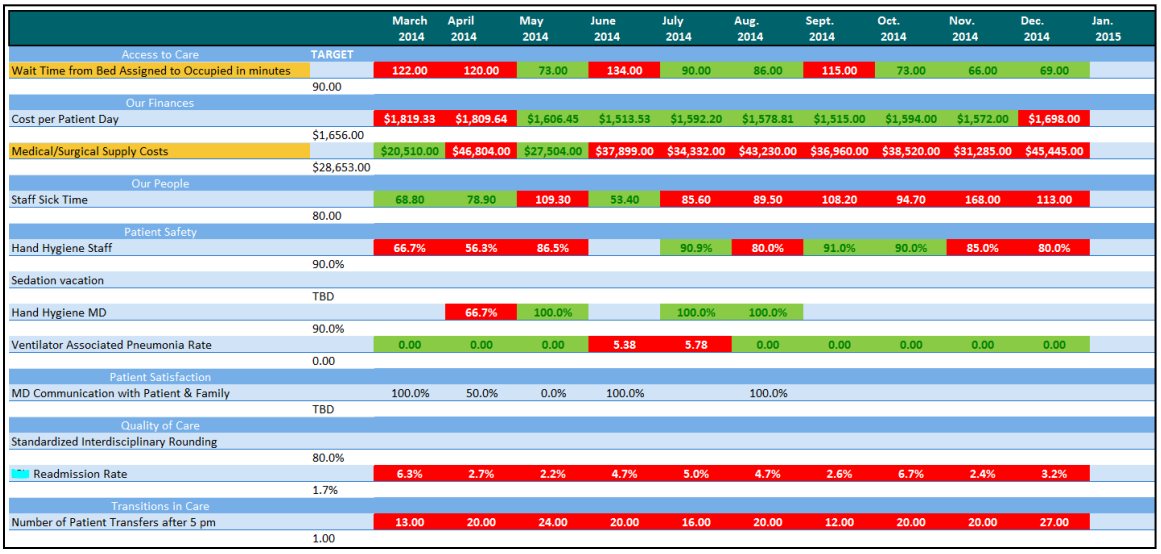
Proponents of A3 problem-solving believe that the one-on-one coaching infrastructure developed in the implementation of the technique has a beneficial effect on trust between managers and their subordinates (Barnas, 2014; Black & Miller, 2008; Jimmerson, 2007; Wellman et al., 2010). The coaching relationship develops leadership skills in managers, while staff being coached feel that they are making meaningful improvements while being encouraged to develop their own strengths (Jimmerson, 2007). As a result, workers feel empowered and understood by their manager.

Champion group. A long held belief in the healthcare industry is that when undergoing organizational change, *champions of change* are highly effective at motivating others and contributing to innovative ideas, standardized business processes, and new practices (Aoun, Shahid, Le, & Packer, 2012; Dobson, Fitzgerald, Ferlie, Gabbay, & Locock, 2010; Hendy & Barlow, 2011). For this reason, the hospital opted to include a group of champions to serve as one of the main vehicles of change-related communication. On a monthly basis, the champion group met for two reasons: (a) to receive change-related communication updates from senior management, and (b) to monitor the *unit's key performance indicators* (KPIs). The unit's KPIs were identified using an approach marrying unit-specific outcomes (e.g., number of medication errors on the unit, per month) with greater organizational priorities (e.g., patient safety). Examples of unit KPIs tracked monthly include patient falls, documentation omissions, and nosocomial infection transmissions. When the group found that performance on a specific KPI was below acceptable level and must be improved, the champions collectively

undertook related process improvement work, sharing information on their progress with the rest of their peers on the unit.

Monthly scorecard. Each member of the champion team selected a unit KPI and became accountable for it, in that he or she agreed to be responsible for collecting data on the KPI's current value and updating it on a monthly basis in the unit's *monthly scorecard*. Monthly scorecards are an electronic reporting tool used by staff to input data as well as present historical trends of the 10-15 unit KPIs. See Figure 5 for screenshots of the monthly scorecard.

Figure 5. Screenshot of the monthly scorecard.

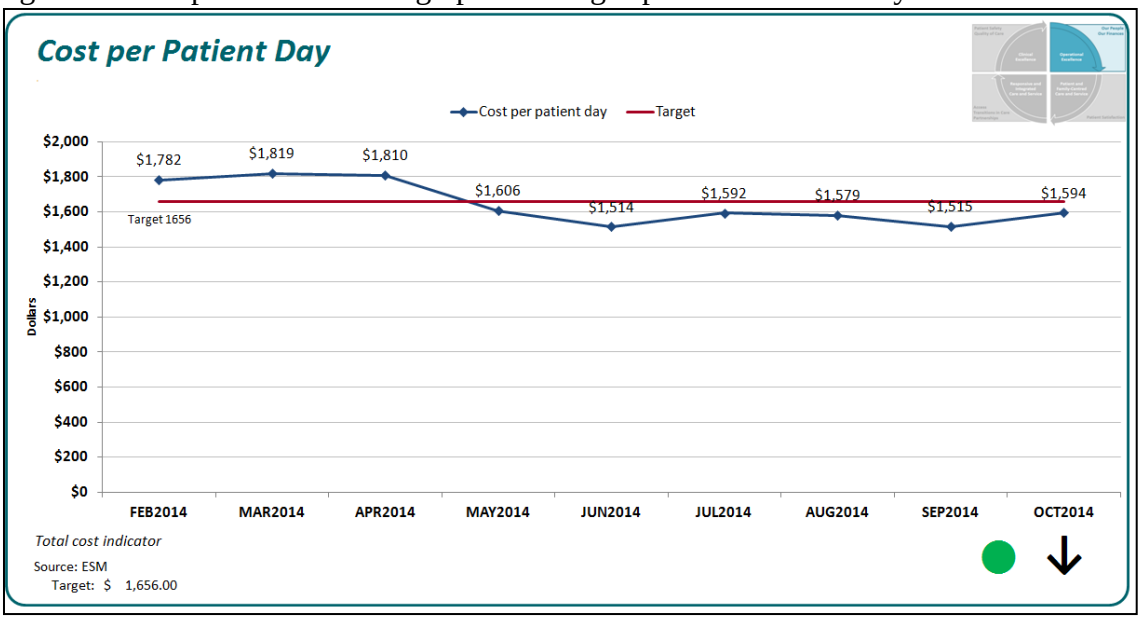


		March 2014	April 2014	May 2014	June 2014	July 2014	Aug. 2014	Sept. 2014	Oct. 2014	Nov. 2014	Dec. 2014	Jan. 2015
Access to Care	TARGET											
Wait Time from Bed Assigned to Occupied in minutes		122.00	120.00	73.00	134.00	90.00	86.00	115.00	73.00	66.00	69.00	
	90.00											
Our Finances												
Cost per Patient Day		$1,819.33	$1,809.64	$1,606.45	$1,513.53	$1,592.20	$1,578.81	$1,515.00	$1,594.00	$1,572.00	$1,698.00	
	$1,656.00											
Medical/Surgical Supply Costs		$20,510.00	$46,804.00	$27,504.00	$37,899.00	$34,332.00	$43,230.00	$36,960.00	$38,520.00	$31,285.00	$45,445.00	
	$28,653.00											
Our People												
Staff Sick Time		68.80	78.90	109.30	53.40	85.60	89.50	108.20	94.70	168.00	113.00	
	80.00											
Patient Safety												
Hand Hygiene Staff		66.7%	56.3%	86.5%		90.9%	80.0%	91.0%	90.0%	85.0%	80.0%	
	90.0%											
Sedation vacation												
	TBD											
Hand Hygiene MD			66.7%	100.0%		100.0%	100.0%					
	90.0%											
Ventilator Associated Pneumonia Rate		0.00	0.00	0.00	5.38	5.78	0.00	0.00	0.00	0.00	0.00	
	0.00											
Patient Satisfaction												
MD Communication with Patient & Family		100.0%	50.0%	0.0%	100.0%		100.0%					
	TBD											
Quality of Care												
Standardized Interdisciplinary Rounding												
	80.0%											
Readmission Rate		6.3%	2.7%	2.2%	4.7%	5.0%	4.7%	2.6%	6.7%	2.4%	3.2%	
	1.7%											
Transitions In Care												
Number of Patient Transfers after 5 pm		13.00	20.00	24.00	20.00	16.00	20.00	12.00	20.00	20.00	27.00	
	1.00											

The scorecard was automatically produced upon input by the champions of the current month's value for each KPI. Further, this tool has graph-building capabilities that displayed information on trends. Unit managers or champions had the ability to access the scorecard to print out and post trending performance data in the area improvement

centers, in this manner providing feedback to the rest of the employees about the unit's performance over time. See Figure 6 for an example of a performance graph.

Figure 6. Example of interactive graph-building capabilities of monthly scorecard.



Monthly scorecards are meant to be tailored to each unit while still reflecting the major goals of the hospital as a whole (Barnas, 2014). As nearly all scorecard metrics can be traced directly to the organization's strategic priorities, this forum for sharing feedback with employees was presumed to help employees gain perspective on the hospital's current performance and strategic vision, and help them see how their day-to-day work affects the monthly performance of the unit. This, in turn, is believed to facilitate accountability of unit performance (Barnas, 2014).

Sustainability. *Standard work* is one of the most important concepts of lean management. The idea is to standardize work processes to a repeatable cycle time that is satisfactory in meeting customer demands: for example, one could develop standard work to describe the steps taken by a healthcare provider to measure a patient's blood pressure.

For all value-creating and incidental work in the organization, standard work ensures that (a) work is being performed safely and efficiently, and expectations are reasonable, and (b) "defects", or abnormal conditions, can be detected as soon as they occur (Black & Miller, 2008).

The proper application of standard work in hospitals leads to sustainability of improvements through non-punitive, systematic observation (Jackson, 2011). Further, standard work is meant to be improved: once supervisors were trained to the standard, they observed frontline staff performing the work at regular intervals over time for two reasons: (a) to ensure that work was being performed correctly, thus sustaining any implemented improvements, and (b) to uncover new process efficiencies discovered by frontline staff performing the work. Any deviation from the standard triggered an investigation by the supervisor into why the worker did not follow standard work—a practice that often results in the creation of a *new* standard, because, in some cases, the standard is not followed because the worker has discovered a more efficient way to perform the work. In this manner, standard work can be documented, audited, revised, and improved by the organization, involving intermittent observation of the work by supervisors, with periodic improvement to the work (Jackson, 2011).

Advocates for standard work warn that initial resistance to the Taylorist concept of standardization (Dankbaar, 1993; Taylor, 1914; Tsutsui, 1998) is normal and expected, as workers often initially believe that standard procedures will destroy innovation and creativity (Jackson, 2011). However, such cautions are contrasted by claims that standardization improves job satisfaction through recognition for making improvements

to the standard, improved self-efficacy due to more effective skills training and less variation in practice, and better communication practices among teams and between shifts due to the predictability of work (Jackson, 2011).

Purpose of Study 1

This research begins by asking whether a planned implementation of lean thinking and related business practices in a hospital would result in significant changes to employee attitudes. The following section presents a literature review of step-based models of change implementation in relation to the framework employed by the hospital featured in this research, with two hypotheses on expected improvements in change-related attitudes, behaviours, and process indicators.

The first set of hypotheses is followed by background and theory on the nature of attitudinal change in organizations over time. Next, a second set of hypotheses, developed to explore the nature of significant changes over time and incorporate time in the study of change, is presented.

Study 1: The Effect of Implementing Lean Management in an Organization, over Time

Lean management became a mainstay of business management discourse in the 1980s and 1990s (Dunlap, 1997; Welch, 2001), at which time academic researchers sought to confirm the concept and offer evidence of its effects on management practice and organizational performance (Handel, 2014). Perhaps the most prominent evidence for the impact of lean, however, consists of Toyota's elevation as the market leader in the automotive industry and displacement of mass production by lean manufacturing

(Holweg, 2007; Krafcik, 1988; Womack et al., 1991). In line with this observation, the study of lean management has occurred in large part through case studies. Despite the popularity of the approach over the past twenty years, systematic and empirical research on lean management is difficult to find in the literature (Handel, 2014). Ostensibly, the limited number of empirical studies on lean management could be due to the many methodological and logistical challenges of conducting field studies on large-scale transformations encountered by researchers when they are not affiliated with an organization in the corporate world.

Lean and Reorganization: Effect on Productivity and Organizational Performance

In lieu of scientific research on lean management, the 1980s and 1990s brought studies investigating the effects of various organizational structure variables, such as size (as number of employees), hierarchical levels, number of subunits, and decision-making authority, on organizational performance. Although these studies may make no mention of lean management, comparisons between organizations on lean-related aspects such as workflow efficiency, waste reduction, decentralization, and productivity can be useful indicators of the impact of lean-like or lean-related change in organizations. For example, having acknowledged that there exists a large body of literature examining relationships between various organizational structure variables and employee attitudes, Carillo and Kopelman (1991) investigated relationships between structural variables and organizational performance. Results of this study show a negative association between the overall productivity of employees and the number of hierarchical levels in the organization, which would suggest that flatter organizations are more productive than

centralized ones. However, the authors also found a curvilinear relationship between administrative intensity and productivity, such that the highest and lowest ratios of managerial personnel to clerical employees (specifically, .28 or higher and .20 or lower) was related to a higher productivity index score than a ratio of .21 to .27 managers per clerical employee. This finding suggests that top-heavy organizations are not necessarily detrimental to efficiency (Carillo & Kopelman, 1991). In another investigation of the impact of lean on organizational outcomes, Moore (2001) found that layoffs in over 300 companies in the U.S. resulted in productivity improvements for only 45% of the sample, but the vast majority (88%) suffered a serious decline in employee morale.

It is important to note that these mixed findings are not surprising given the inherent difficulty of measuring productivity output of white-collar workers (Caves & Kreps, 1993; Lehrer, 1983; Sumanth, Omachonu, & Beruvides, 1990). Yet, they become even more interesting when considering that managerial layoffs are often associated with introducing lean-like change (i.e., related to waste reduction, downsizing, or streamlining; Cappelli, 1992). The lean argument for organizational efficiency through decentralization and managerial layoffs becomes weaker in the context of these findings.

Lean management is commonly believed to provide more autonomy and flexibility to managers with respect to making decisions, as decentralization is often a major component of a transformation to lean (Freidson, 1970; Larson, 1977; Womack et al., 1991). An interesting analysis of organizational control over the managerial process in the 1990s by Prechel (1994) challenges the assumption that decentralization extends managerial freedom and autonomy by suggesting that such arguments do not

acknowledge that successful decentralization demands the introduction of more precise controls at the point of production in order to ensure standardized product quality, such that decentralization can indeed result in the tightening of organizational controls at the managerial level.

A recent review of post-bureaucratic and neo-liberal theories of organizations, which argue for decentralized structures and low management-to-staff ratios, found only weak support for the hypothesis that debureaucratized organizations are more efficient. Examining organizational structure over the last few decades, Handel (2014) found evidence of a trend toward flatter organizations over time. Organizations with taller hierarchies were found to be less proactive with somewhat greater performance issues, but are arguably more "employee-friendly" because of the greater amount of fringe benefits offered compared to other organizations (Handel, 2014). Organizational size is one of the most robust predictors of levels of hierarchy and management structure (Lazonick, 2010; Marsden et al., 1994), and Handel's (2014) review suggests that management structure is more likely to reflect technical task requirements that do not change compared to changing environmental conditions. In short, the relationship between lean organizations and performance may continue to be unclear because theories of lean management, which are largely founded on case studies, may have drawn overly simplistic inferences and applied them to industries that were conspicuously over-bureaucratic (Handel, 2014). While the introduction of lean management in an organization can have a decentralizing or "thinning" effect on the management structure,

the evidence is mixed with respect to whether flatter organization of work improves efficiency.

Lean as a Culture Change with a Focus on Continuous Improvement

In this research, the change initiative of focus involved less organizational restructuring and more of a cultural shift towards lean thinking and continuous improvement. In fact, the lean manufacturing system made known by Toyota is widely regarded for its institutionalization of continuous improvement (Shamshurin, 2011). There is a dearth of empirical research on this topic exists, as many of the supposed evidence of lean management (especially in healthcare) exists in the form of case studies (e.g., Fucini & Fucini, 1990; Parker & Slaughter, 1988), large scale surveys (e.g., Lewchuk & Robertson, 1996), and popular management books by lean gurus emanating from the Toyota Production System (e.g., Barnas, 2014; Black & Miller, 2008; Toussaint & Gerard, 2010; Wellman et al., 2010). In addition to the methodological inadequacies residing in reviews of such studies (e.g., Landsbergis et al., 1999), wide variation exists in what constitutes implementation of lean production. The literature is often dominated by a focus on its tools and methods, some of which were previously described; this focus can distract from the theory behind lean management and continuous improvement (Hines, Found, Griffiths, & Harrison, 2011). It is possible that the case-study methodology is so popular because of the low incidence of successful transformations to lean production found in the literature: correct institution of the lean philosophy has been observed in proportions as low as 10% of transformations (Baker, 2002; O'Corrbui & Corboy, 1999; Sohal & Eggleston, 1994). Of those organizations that are successful, the

impact of implementing lean as a philosophy (as opposed to a set of tools) is most often studied as outcomes in economic performance and productivity.

Impact of lean thinking on economic performance. Many studies provide evidence associating lean management with business competitiveness (Billesbach, 1994; Liker, 1996, 2004; Standard & Davis, 2000). A comparison with mass production by Lathin and Mitchell (2001) found a 90% reduction in lead-time, inventory, and cost of quality. Similar results were observed by Nystuen (2002), who found reductions in lead-time (11%), product travel time (90%), and inventory (82%). Salem, Solomon, Genaidy and Luegring (2005) found significant reductions in waste in their evaluation of some lean tools applied to the construction industry, a finding that has been replicated in several studies (e.g., Agbulos, Mohame, Al-Hussein, AbouRizk, & Roesch, 2006; Mao & Zhang, 2008; Song & Liang, 2011). That said, executing lean thinking in organizations is extremely resource-intensive. For example, the CEO of a leader in sealing application technology asserts that $7 million a year is spent on lean practices (Olexa 2002a, 2002b), although results of these initiatives are claimed to produce $20 million in cost savings.

Impact of lean thinking on employee outcomes. In his original text explaining lean management, Ohno (1988) urges readers to remember that whilst the objective of the production system was to improve efficiency by eliminating waste, it is equally important to maintain a respect for humanity. Since this account, some researchers insist that the effect of morale and motivation has been overlooked in the literature detailing Ohno's (1988) Toyota Production System (Vasilash, 2001). Components of human resource management are rarely evaluated despite being frequently discussed: Allen and Brady

(1997) and Utley, Westbrook and Turner (1997) discuss the importance of reciprocal communication with employees and the roles of coaching and listening, while Dimancescu, Hines, and Rich (1997), and Standard and Davis (2000) propose that the manner in which changes are implemented and communicated is critical in determining whether the changes will occur. Further, the role of leadership during a transformation to lean is often discussed theoretically, but rarely evaluated (Vasilash, 2001).

Using survey data, Osterman (1994) found that manufacturing establishments that had successfully transformed their work practices (e.g., to reflect teams, job rotation, quality circles, or Total Quality Management) were more likely to employ worker-oriented strategies such as extensive training, innovative pay schemes, and other efforts to induce greater commitment from the labour force. Lathin and Mitchell (2001) found a 50% increase in worker productivity when comparing traditional mass production to lean production. It is important to note that some critics of lean argue that observed productivity increases in lean organizations actually result from greater monitoring of staff by management (e.g., Gordon, 1995). In a somewhat related vein, others claim that cost savings in lean enterprises are achieved by imposing excessive workloads on employees and driving up strain and burnout, rather than through true efficiencies (Parker & Slaughter, 1988; Harrison, 1997). Indeed, a heartfelt account by Barnas (2014) details the sense of futility expressed by a manager who was overwhelmed with the “added work” that had been created for her by the implementation of lean management. A literature search on this topic has not produced research attempting to quantify workload changes and disentangle them from changes in productivity levels.

Knight and Haslam (2010) found that the philosophy of standardization and control lying at the core of lean offices had led to decreased feelings of psychological comfort, job satisfaction, and physical comfort (Keyte & Locher, 2004; Louis, 2007). Their results were in line with theory proposing that workers' perceptions of procedural justice via participative decision-making are attenuated by lean because employees lack control over their environment, resulting in lower levels of organizational identification and job satisfaction (Ellemers, De Gilder, & Haslam, 2004; Haslam, 2004; Tyler & Blader, 2003). Similarly, Berggren (1993) and Parker and Slaughter (1988) suggest that employee participation in decision-making is actually limited in lean production, contrary to statements by advocates of lean (e.g., Barnas, 2014; Womack et al., 1990). Turnbull (1988) calls the system "work intensification" and "deskilling", and warns of deleterious consequences to the mental health of workers in lean organizations.

In a quasi-experimental field study in the automotive industry, Parker (2003) describes the impact of three lean production practices (lean teams, assembly lines, and work standardization) on employee outcomes. Pre- and post-test results over three years showed a negative effect of all three lean production practices on organizational commitment, self-efficacy, and strain, while the control group showed no negative changes in outcomes. Further analysis showed that declines in perceived work characteristics, including job autonomy, skill use, and participation in decision-making, partially contributed to the observed declines in employee outcomes (Parker, 2003).

On the other hand, positive consequences of lean production have been identified by several studies. Womack et al. (1990), Schonberger (1986), and Monden (1994) argue

that lean production creates conditions for job enrichment and job enlargement through teamwork, skill use, and job rotation. Adler and a team of researchers conducted a series of semi-structured interviews with managers, employees, and union representatives of an automotive plant (Adler, 1993). This set of research found health and motivation benefits in workers making use of standardized work and feeling as though they had been heard:

> "*Little things can make a big difference, like how high or low the stock is placed or how the tools are organized or where the hoses are. The person actually doing the job is the only one who can see all those factors. (...) Today we drive the process, and if we need their help, the engineer is there the next day to work on it with us."* (p.39).

A greater sense of trust and respect between managers and workers was also uncovered by Adler (1993). Management attitudes were believed to have improved in that they were more likely to listen to workers' ideas and follow-up on conversations. This newfound respect elicited a reciprocal reaction from employees, who began noticeably committing to producing higher-quality work.

A matched opinion survey study by Mullarkey, Jackson, and Parker (1995) found increases in perceived level of control and job satisfaction in employees over time, while levels of stress related to problem-solving demands and production responsibility did not change. At the group level, observable increases in coworker support and group cohesiveness among employees were also apparent.

The Change Process: Step-Based Models of Implementation and Process Indicators

Research suggests that between one-third to 80% of planned changed initiatives fail (Beer & Nohria, 2000; Fisher, 1994; Higgs & Rowland, 2000; Hirschhorn, 2002; Knodel, 2004; Kotter, 2008; Sirkin, Keenan, & Jackson, 2005), reflecting the level of

challenge faced by organizations engaged in change processes and the complexity of change management. Since the release of Kurt Lewin's (1947) three-step model of change, which describes the overarching process of unfreezing, changing, and refreezing organizational culture as a basic framework for generating new behaviours, scholars and practitioners have introduced ideas related to alternative versions of step-based models of change. Interestingly, practitioners agree that there continues to be difficulty planning and successfully implementing organizational change (Burke, 2008). Saving the history of change management and ontological questions about the nature of change for later in this presented research, the following steps of the organizational change process outlined by Whelan-Berry and Somerville (2010) were based on a review of step-based models of change. Their review presents the change process steps most frequently found in the literature, along with their associated drivers of change and recommendations for successful implementation.

In anticipation of the launch of their transformation to lean, the hospital completed one full year of planning and preparation, following a step-based framework very similar to the one described below.

Step 1: establishing a clear compelling vision. Whelan-Berry and Somerville (2010) indicate that most change models begin by stressing the importance of establishing a sense of urgency in change targets in order to give weight to the idea that change is necessary (Cummings & Worley, 2004; Galpin, 1996; Kotter, 1996). The key is to communicate a vision of the desired future state, including specific details on the characteristics and outcomes of that future situation. The importance of communicating

an easy-to-grasp message that appeals to all stakeholders is heavily underlined, as employee acceptance of the vision is a crucial driver of widespread change (Brenner, 2008; Gradwell, 2004; Palmer & Dunford, 2008; Riis, Hilderbrandt, Andreasen, & Johansen, 2001). Whelan-Berry and Somerville (2010) indicate that early communication of a compelling message is the first step in moving employees to a point of considering the need to change, which may ultimately enable them to modify behaviours.

Communication as an indicator of the change process. In response to the positive influence of communication in times of change, the hospital's plan to implement lean management includes practices specifically aiming to increase communication about progress and performance in work teams (see *daily huddles, improvement tickets*, and *area improvement centres* starting on page 11). Leaders expect these tools to facilitate communication amongst unit staff and members of work teams.

Step 2: moving organizational change to the group level. Managing change as it transitions throughout the organization is necessary for linking the meaning of the overall change vision to specific job groups or individual roles (Cummings & Worley, 2004; Kotter, 1996, 1999). At this point in the initiative, change-supportive actions and communication by leaders signal the importance of moving forward with adoption of the initiative, encouraging employees to engage in change-supportive behaviours that relate to their own groups (Whelan-Berry & Somerville, 2010). Individual employees learning how the change will affect their department or team becomes a mechanism for diffusing the change throughout the organization (Whelan-Berry & Somerville, 2010).

The role of trust in senior management. Trust in leadership has long been shown to be a crucial element of successful organizational change, with many studies having examined its effect on employee outcomes during change (Neves & Caetano, 2009; Saunders & Thornhill, 2003). The experience of trust, however, has been relatively ignored in the literature (Young & Daniel, 2003). Although definitions of trust have not often come to consensus in the social psychology (Simpson, 2007), sociology (Barbalet, 2009) or organizational literature (Rousseau, Sitkin, Burt, & Camerer, 1998; Schoorman et al, 2007), research has shown the influence of trust on cognitions, emotions, and behaviours (Lewicki, Tomlinson, & Gillespie, 2006; McAllister, 1995). The affective element of trust has been understudied, in the change literature as well as in research on interpersonal relationships (Lewicki et al., 2006; Young & Daniel, 2003). By contrast, on the cognitive level, trust helps individuals rationalize and make sense of relationships and decision-making (Lewis & Weigert, 1985). The relevance to organizational change is highlighted in that sensemaking, the process of seeking to understand the world, occurs in the wake of interruptions to routine such as organizational change and triggers an emotional reaction to the interruptive event (Weick, 1995). Where the goal is to reduce emotional reactions to change, scholars have identified employee perceptions about the role of their leader in the change process as being a pivotal element in determining that response (Szabla, 2007).

Step 3: individual adoption of change. Change theorists purport that at the heart of widespread organizational change is change at the individual level, wherein individual behaviours and values are changed as a result of the greater process unfolding across the

organization (Cameron & Quinn, 1999; Coghlan, 2000; Katz & Kahn, 1978; March, 1981; Marshak, 1993; Sullivan, Sullivan, & Buffton, 2002). In other words, the messaging of the vision is translated through and ultimately enacted by the individual employee when he or she actually changes her values, attitudes, and behaviours. In fostering behavioural change, Whelan-Berry and Somerville (2010) identify change-related participation of employees as one of the main drivers of adoption of change.

In change theory, the emerging focus on the participative role of change targets was a move away from traditional culture-centric frameworks of change implementation (Martins, 2011). Pasmore and Fagans (1992) noted that developing individuals and enabling them to participate effectively in change-supportive initiatives was the key to successful change management. The theme of participation by employees is so pervasive in change implementation frameworks that several unanimous insights can be derived; Martins (2011) states that to be effective, employee participation should be (a) broad, as in involving the entire system affected by change, (b) substantive as opposed to symbolic, and (c) conferred by employees who have been given the knowledge and ability to participate in a meaningful way. Participation fosters a sense of ownership in those who take part in the change, such that resultant actions and behaviours are more genuine. This can be at least partially explained by participative theories of managers developed in the 1960s, which describe how employee participation leads to improvements in productivity and commitment to organizational goals because it allows employees to be in control of their destiny (Lawler, 1992). Indeed, participation in problem-solving and decision-making has shown associations with a number of beneficial outcomes, including

improvements in organizational effectiveness (e.g., Cotton, 1993; Lawler, 1999; Lawler, 1992; Vandenberg, Richardson, & Eastman, 1999), motivation (e.g., Latham, Winters, & Locke, 1994), and health and safety (Lawler, 1992). In addition, a review of participants in employee involvement programs compared to non-program participants found higher levels of commitment to the organization, job satisfaction, and loyalty, in addition to more positive views of management (Freeman & Rogers, 1999).

Participation in decision-making as a second indicator of the change process. The specific relevance of employee participation in lean management has been widely surmised by proponents of the approach, who believe participative practices to be one of the main differentiators of lean manufacturing from mass production (Adler, 1993). In the context of lean, the involvement of employees in decision-making at the front line and the degree to which employees can influence more distal issues that affect the context of their daily work are said to be the main drivers of productivity improvements (Ashforth, 1989; Womack et al., 1991).

Effective management practices that involve employees in decision-making and participation require a number of key principles (Lawler, 1986). First, employee skills and knowledge regarding the organization's business strategy and work processes must be developed and information-sharing mechanisms put in place. This allows employees to interpret and act on information as it becomes available. Next, a redistribution of power allows them to take action and make decisions depending on their level of expertise (Lawler, 1986). Finally, rewarding performance based on tangible results and individual contributions is important for sustaining participation (Lawler, 1986).

In consideration of the above principles of effective participative practices, and seeing as one of the tenets of lean management is to involve employees at the source of problems in the decision-making related to solutions, it is expected that active participation in problem-solving at daily huddles or monthly champion meetings at the hospital will be affected throughout the course of the transformation.

Step 4: sustaining the momentum. Most models comment on the need to sustain the momentum of the change implementation process; that is, continuing to display the new behaviour until it becomes truly institutionalized within the culture (Armenakis & Bedeian, 1999; Cummings & Worley, 2004; Galpin, 1996; Kotter, 1995). For this particular step, continued communication by leaders and adequate provision of resources (e.g., time allocated to change-supportive behaviours, sufficient personnel or budget allowances, etc.) signals to employees that the initiative continues to be an organizational priority, and is necessary for success. Two-way communication at this stage is also important to ensure that obstacles to supporting the change are removed (Whelan-Berry & Somerville, 2010).

Step 5: institutionalizing the change. Finally, once the new behaviours are accepted as the new norm of the organization, most models describe a Lewinian "refreezing" of the culture, operations, and business processes (Armenakis & Bedeian, 1999; Cummings & Worley, 2004; Kotter, 1995). At this stage, alignment in the organization's structure and control processes help ensure that employees do not revert to pre-change processes or states (Whelan-Berry, Somerville, 2010). Systems and processes that continuously evaluate the change initiative and allow for corrective action to occur

when regression is observed have been identified by researchers as a critical component of this particular stage (Vollman, 1996; Hennessey, 1998; Cameron & Green, 2004).

Employee engagement and affective commitment as outcomes in change management.

Advocates of lean management are quick to tout its benefits for staff morale, citing improvements in retention rates and employee satisfaction (Barnas, 2014; Womack et al., 1991). Some point out that lean produces engaged employees, who "are less likely to quit and are more likely to be good ambassadors for the firm and its brand" (Odegard, 2013, p.1). Statements such as these draw eerily similar parallels to what academics call organizational commitment—perhaps more specifically, affective commitment (Meyer & Allen, 1997) or pride (Mowday, Porter, & Steers, 1982). In an effort to capture the casual observations of lean practitioners, disentangling affective commitment from work engagement may provide scholarly insight on the employee-related outcomes of implementing lean.

Engagement is often described in terms of being a positive, fulfilling, affective-motivational state of work-related well-being, where employees have high levels of energy and identify strongly with their work (Bakker, Schaufeli, Leiter, & Taris, 2008; Bakker & Bal 2010). The model arguably most used by academics in occupational health psychology is best predicted by job resources (e.g., autonomy, supervisory coaching, and performance feedback) and personal resources (e.g., optimism, self-efficacy, self-esteem) (Bakker et al., 2008). In this model, engagement is characterized as a negative correlate to burnout, defined and operationalized using three components: vigour, dedication, and

absorption (Schaufeli, Salanova, González-Romá, & Bakker, 2002). That said, the past few decades have seen the construct of engagement cast in a variety of frameworks with no sign of unification. To name but a few examples, work engagement has already taken the form of job satisfaction (e.g., Harter, Schmidt, & Hayes, 2002), job involvement (e.g., Kanungo, 1982), affective commitment (e.g., Wellins & Concelman 2005), loving one's job (Kelloway, Inness, Barling, Francis, & Turner, 2010), vigour (Shirom, 2003), or a composite of vigour + dedication + absorption (Schaufeli et al., 2002).

By contrast, organizational commitment is more clearly defined. The most prominent academic conceptualization of organizational commitment is a three component model put forward by Meyer and Allen (1997). The three components reflect the reasons for which employees choose to remain with their employing organization, and include affective commitment ("because they want to"), normative commitment ("because they should"), and continuance commitment ("because of a lack of available alternatives"). Focusing explicitly on affective commitment, associations between this construct and positive work-related attitudes have been demonstrated (Meyer & Allen, 1997). Where organizational commitment involves attachment (O'Reilly & Chatman, 1986) or another force binding an individual to his or her employing organization (Meyer, Becker, & Vandenberghe, 2004), engagement theorists have noted the clear fit of most operationalizations of employee engagement with the aspects of commitment reminiscent of meaningfulness, belonging, and positive attachment (Macey & Schneider, 2008). However, it is in the business world that organizational consulting firms and public polling companies are most apt to employing conceptualizations of engagement

founded in meaningfulness and belonging. Such definitions frame engagement as emerging from employees when they perceive meaningful alignment between their work and their employing organization (White, 2011).

A leader in employee engagement surveys known as The Gallup Organization has developed (and copyrighted) twelve core items known as the Gallup Q12© or the Gallup Workplace Audit (GWA; The Gallup Organization, 1992-1999). These items are a heterogeneous mix of employee perceptions in several areas such as employee recognition, intrapersonal justice, job involvement, staff-management relationships, co-worker relationships, and employee growth and development, all constructs that have appeared informally in the extended engagement literature (for some examples see Sagie, & Koslowsky, 2000; Kelloway et al., 2010; Shirom, 2003; Harter et al., 2002; Barling, Kelloway, & Iverson, 2003). This instrument is the product of quantitative and qualitative corporate research and management research (Gallup, Inc., 2008), and currently represents one of the most popular business interpretations of work engagement having demonstrated links with business outcomes (Harter et al., 2002).

A note on managing simultaneous change. The nature and shape of organizational change initiatives, even seemingly-prescribed ones such as lean management (Womack et al., 1991), varies greatly across context. Organizational context differences themselves further affect the nature of change in employee attitudes. One example of this effect lies in observations by Herold et al. (2007), who found that the simultaneous implementation of numerous change initiatives had important implications for individuals' commitment to the change. Specifically, they found that multiple,

overlapping implementations of change interventions had a detrimental effect on employees with lower change self-efficacy in that they demonstrated lower commitment to the change. The relevance of this finding becomes important when considering that throughout the transformation to lean management, other unrelated initiatives were being implemented across the hospital, some of which heavily involving some participants in this study (employees in outpatient unit C, which will be described later in this paper).

Hypotheses 1 and 2: The Impact of Lean Management on Employee Attitudes

The research question for the first part of study 1 is: was the change initiative successful in improving employee change-related attitudes? Specific hypotheses appear below.

Hypothesis 1: improvements in change-related attitudes (i.e., trust in leaders, engagement, and affective commitment), behaviours (i.e., attendance at huddle), and process indicators (e.g., communication and participation) will be observed within units in the experimental group, over time.

Hypothesis 2: the experimental group will show positive differences in change-related attitudes and process indicators over time compared to a wait-list control group.

The Nature of Attitudinal Change in Organizations over Time

The sheer volume and propagation of the change literature has long been a challenge for reviewers, who characterize it as being riddled with theoretical propositions unsupported by data and empirical observations quoted without proof or disproof (Kahn, 1990; Macy & Izumi, 1993; Pettigrew, 1985). Although some recognize that research has become theoretically richer of late, others have attempted to organize the topic through

the application of frameworks (e.g., Mintzberg & Westley, 1992) and typologies (e.g., Van de Ven & Poole, 1995). Large-scale models of change are plentiful (e.g., Carr, Hard, & Trahant, 1996; Porras, 1987; Porras & Robertson, 1992; Rogers, Hayden, Ferketish, & Matzen, 1997), as are studies focusing on specific aspects of the change process (e.g., communication in Armenakis, Harris, & Feild, 1999; leadership in Bartunek, 1984; participation in Dunphy & Stace, 1993). When it comes to thinking about how change occurs, recent reviews of the change literature point out that researchers continue to ask ontological questions about the *nature* of change, with trends suggesting that today's researchers are debating whether change is episodic or continuous, and whether it is forcibly made or just happens (Porras & Silvers, 1991; Weick & Quinn, 1999). Interestingly, the answers to these questions seem to depend on researchers' personal assumptions concerning adopted theoretical approaches and research methodologies (Martins, 2011), although it should be noted that such questions have remained central to the literature since the advent of modern change management. Thinking of the relative immaturity of organizational change as a field, it is understandable that scientists and practitioners still disagree about the dynamic effects of time, process, discontinuity, and context (Pettigrew et al., 2001). However, given the object of study—change—these questions and the continuous centrality of ideas about change are not surprising. Change, defined as "a set of behavioral science-based theories, values, strategies, and techniques aimed at the planned change of the organizational work setting for the purpose of enhancing individual development and improving organizational performance, through the alteration of organizational members' on-the-job behaviors" (Porras & Robertson

1992:723), is in other words a *difference* between two states, making it difficult to find patterns to study (Weick & Quinn, 1999).

The roots of the organizational change literature are grounded in century-old commentaries on leading or managing change and planning for strategic change. Surviving texts from 2300 BCE to 350 BCE, summarized by Rindova and Starbuck (1997), present evidence on contingency strategies used by ancient Chinese superiors to minimize violence and disorder in times of turbulence brought about by war and urbanization. As previously alluded to, more contemporary theories of organizational change stem from the seminal work of Lewin (1947, 1951), whose Planned Approach to change was considered to be the best way to manage incremental change from the 1950s to the 1970s (Burnes, 2004). As the first psychologist to discuss the role of group dynamics in shaping member behaviour, Lewin developed the Planned Approach to change included four concepts (Lewin, 1947). One of these concepts is known as the 3-step model, consisting of three basic steps that liken the organization to an ice cube: according to Lewin (1947), a successful change project would involve unfreezing (i.e., destabilizing), moving (i.e., motivating), and refreezing (i.e., stabilizing) organizational culture in order to affect human behaviour.

To this day, many modern models of change can still be mapped on to Lewin's (1947) framework (Martins, 2011), despite it going under fire in the 1980s for being overly mechanistic in an era when the focus of change researchers was on rapid, transformational change (Burnes, 2004). At the time, critics argued that Lewin's (1947) Planned Approach to change was not suitable to real-world application in organizations

because of its apparent simplicity and inertia (e.g., Dawson, 1994; Kanter, Stein, & Jick, 1992; Pettigrew, Hendry, & Sparrow, 1989; Stacey, 1993; Wilson, 1992). However, others would argue that Lewin actually viewed organizational change as constant and continuous, but sometimes changing at different rates (Lewin, 1947; Burnes, 2004). Indeed, the theoretical foundations of Lewin's work lie in gestaltist principles of achieving change at intermittent moments in time, only when individuals are allowed the opportunity to reflect and gain insight.

The nature of change over time thus remains one of the major unresolved theoretical issues of our time. A debate rages on about whether change is episodic or continuous, with researchers disputing whether organizations in their "normal" state are inert or continuously changing (Martins, 2011). The tempo of change, as defined as "characteristic rate, rhythm, or pattern of work or activity" (Random House 1987:1954), is proposed by Weick and Quinn (1999) to be a meaningful partition of the change literature worthy of study. In their evocative review of the literature, Weick and Quinn (1999) contrast episodic change with continuous change by comparing the two forms on five properties found in comprehensive theories of change (Dunphy, 1996). Table 1shows a summary of the comparison.

Table 1: Comparison of episodic and continuous change.

	Episodic change	Continuous change
Metaphor of organization	Organizations are inertial and change is infrequent, discontinuous, intentional.	Organizations are emergent and self-organizing, and change is constant, evolving, cumulative.
Analytic framework	Change is an occasional interruption or divergence from equilibrium. It tends to be dramatic and it is driven externally. It is seen as a failure of the organization to adapt its deep structure to a changing environment. Perspective: macro, distant, global. Emphasis: short-run adaptation. Key concepts: inertia, deep structure of interrelated parts, triggering, replacement and substitution, discontinuity, revolution.	Change is a pattern of endless modifications in work processes and social practice. It is driven by organizational instability and alert reactions to daily contingencies. Numerous small accommodations cumulate and amplify. Perspective: micro, close, local. Emphasis: long-run adaptability. Key concepts: recurrent interactions, shifting task authority, response repertoires, emergent patterns, improvisation, translation, learning.
Ideal organization	The ideal organization is capable of continuous adaptation.	The ideal organization is capable of continuous adaptation.
Intervention theory	The necessary change is created by intention. Change is Lewinian: inertial, linear, progressive, goal seeking, motivated by disequilibrium, and requires outsider intervention. 1. Unfreeze: disconfirmation of expectations, learning anxiety, provision of psychological safety. 2. Transition: cognitive restructuring, semantic redefinition, conceptual enlargement, new standards of judgment. 3. Refreeze: create supportive social norms, make change congruent with personality.	The change is a redirection of what is already under way. Change is Confucian: cyclical, processional, without an end state, equilibrium seeking, eternal. 1. Freeze: make sequences visible and show patterns through maps, schemas, and stories. 2. Rebalance: reinterpret, relabel, resequence the patterns to reduce blocks. Use logic of attractions. 3. Unfreeze: resume improvisation, translation, and learning in ways that are more mindful.

	Episodic change	Continuous change
Role of change agent	Role: prime mover who creates change.	Role: Sense maker who redirects change.
	Process: focuses on inertia and seeks points of central leverage.	Process: recognizes, makes salient, and reframes current patterns. Shows how intentional change can be made at the margins. Alters meaning by new language, enriched dialogue, and new identity. Unblocks improvisation, translation, and learning.
	Changes meaning systems: speaks differently, communicates alternative schema, reinterprets revolutionary triggers, influences punctuation, builds coordination and commitment.	

Table from Weick and Quinn, 1999 (reprinted with permission).

The difference between episodic and continuous change is observable from a macro-level viewpoint. Episodic change is more strategic, more deliberate and formal, less frequent, slower in pace, and seldom fully implemented (Mintzberg & Westley, 1992). Implementation of episodic change is initiated at senior levels of the organization when the organization struggles to adapt to problems arising in its environment, such that it produces revolutions that shift systems and processes after the change has been triggered (Weick & Quinn, 1999). By contrast, continuous change reflects changes that are ongoing, cumulative, and ever-evolving (Weick & Quinn, 1999). Continuing updates of work processes are the result of the notion that small, simultaneous adjustments across groups cumulate and can create substantial change. Orlikowski (1996) describes the implementation of continuous change as being unanticipated in the sense that it is not deliberate nor dramatic, just recurrent, drawing a sharp contrast to episodic change in which triggers are more important.

In the context of the current study, it could be argued that the hospital's transformation to lean management represents an episodic change with the goal of creating a culture of continuous change. That is, when the senior management team

reacted to internal and external pressures by initiating a formal change in management philosophy and introducing new business practices, the organization underwent a paradigm shift towards the newly-created equilibrium supported by the planning and intent characteristics of episodic change. Once the hospital's transformation to lean management is complete, the goal is that its new reality will reflect a culture in which nonconforming actions that improve adaptation and adaptability are encouraged and expected, thus embedding the knowledge of the organization into its norms in a manner characteristic of continuous change (Heskett & Kotter, 1992; O'Reilly & Chatman, 1996). The question remains of *when* the (episodic) change is typically considered complete; or, to borrow Lewin's (1947) terminology, when the culture's transition is complete and the organization is ready for refreezing. The answer to this question lies within employees: although organizational change certainly takes place across multiple levels, inherent in the wider process is the generation of change within individuals. In other words, employees experience a change in their behaviours or values as the initiative takes its course through the organization (Coghlan, 2000; Katz & Kahn, 1978; March, 1981; Marshak, 1993; Sullivan et al., 2002). A closer examination of the change process, at micro levels where the introduced change is likely to have an impact on attitudes, emotions, and cognitions, may shed light on the timing of procedural issues involved in change management.

Organizational and Individual Processes Involved During Planned Change

One way to organize the expansive body of change research is by approaching it from (a) a macro (or conceptual) perspective, which includes ontological questions as

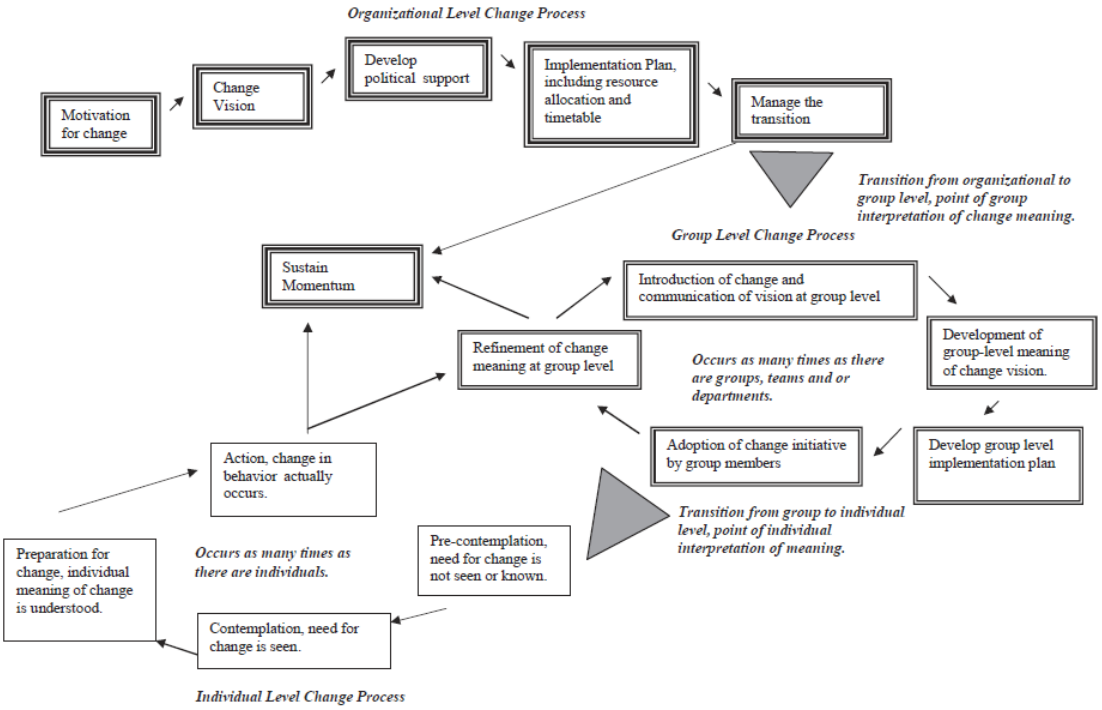
touched upon in the preceding section, and (b) a micro (or operational) lens, which focuses on the content of change, the change implementation process, and contextual factors affecting change implementation. In our quest to explore the patterns with which change affects employee attitudes and cognitions over time, we will now delve into this latter area of the research.

The change implementation process, focusing on the steps involved in the successful execution of change implementation, is one of the most prolific areas of the body of literature on change management (Martins, 2011; Porras & Robertson, 1992). With most models remaining applicable to Lewin's (1947, 1951) foundational model for planned change, Porras and Robertson (1992) analyzed 16 implementation theories for trends in the steps proposed within each model. Along with others (i.e., Halfhill et al., 2002; Sashkin & Burke, 1987; Whelan-Berry & Somerville, 2010), their review found that the steps proposed by large-scale models of change are mostly similar, while the focus of the model can differ. For example, many of the reviewed models focus on the role of the change agent (e.g., Galpin, 1996; Kotter, 1995), the role of the external consultant (e.g., Argyris, 1970; Cooperrider & Srivastva, 1987), elements that communicate the scale and scope of change (e.g., Amis, Slack, & Hinings, 2004; Hinings & Greenwood, 1988;), elements that engage change targets through participative dialogue (i.e., Armenakis & Harris, 2002; Armenakis et al., 1999), or the role of change targets themselves and the importance of their participation (e.g., Judson, 1991; Weisbord, 1987, 1988). While most models stress the importance of creating a sense of 'urgency' in employees by communicating a reason for the change and a vision for the future state,

procedural issues related to implementation and dissemination are, for the most part, only tentatively discussed or vague. In other words, step-based models of planned change often fail to describe specific actions and behaviours to perform at each general step (Whelan-Berry, Gordon, & Hinings, 2003).

In an effort to empirically test how multiple levels of the organization interact at each step of the change process, Whelan-Berry et al. (2003) conducted a real-time, longitudinal study at a large firm undergoing a planned change using on-site observation, reviews of written communications and meeting minutes, interviews, and surveys. The results of their investigation were compiled in a comprehensive model of change describing processes at the organizational, group, and individual levels (see Figure 7).

Figure 7. Model of organizational change processes (Whelan-Berry et al., 2003)



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Whelan-Berry et al.'s (2003) model provides an excellent description of the high-level processes and cognitions experienced by individuals within groups when change is introduced to them. By thinking of each step of this model as an elapsed moment in time, one can imagine a Lewinian linear progression of the change implementation over time while observing the operational, cognitive, and affective processes occurring at each step. However, does this imply that employee attitudes during the change implementation are also likely to follow a linear pattern over time, such that each step's actions result in an accumulation of positive feelings towards the change? Research investigating how individuals experience organizational change suggests that employee reactions are far from being that straightforward. For example, it has been established that success of the implementation of change hinges on whether the change vision is accepted by all stakeholders of the initiative (Brenner, 2008; Gradwell, 2004; Palmer & Dunford, 2008; Riis et al., 2001), as this key driver enables individual adoption of the change and motivates employees to consider the need for change and eventually present change-supportive behaviours (Whelan-Berry & Somerville, 2010). In this case, messaging of the change vision is an example of one action that can greatly influence the direction of employee reactions towards the change, with respect to their attitudes, cognitions and emotions.

The addiction and smoking cessation literature brought us a strongly-supported model of individual change developed by Prochaska, DiClemente, and Norcross (1992). This model outlines five stages through which individuals move in order to change their behaviours and personal values: precontemplation, contemplation, preparation, action,

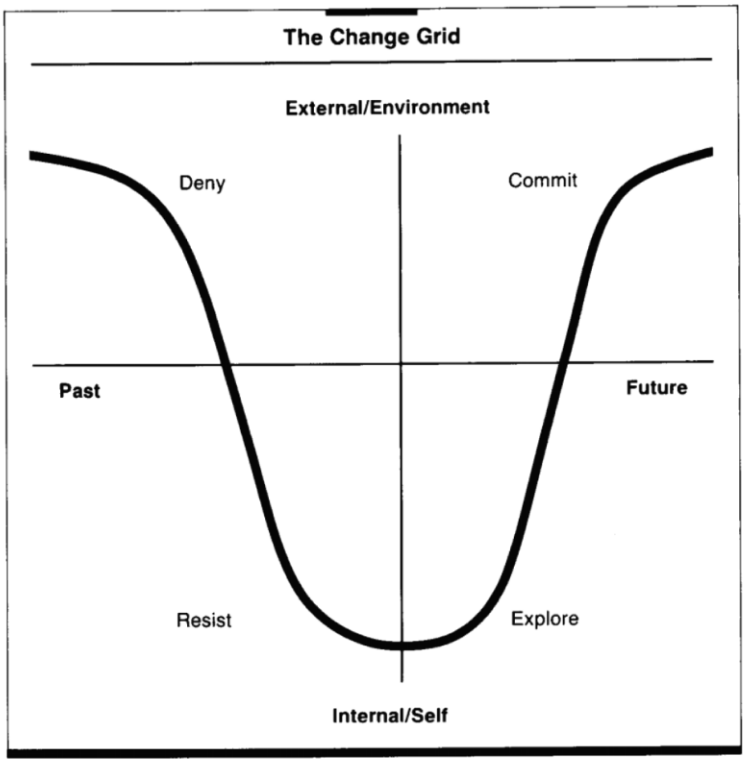
and maintenance. The management literature has applied Prochaska et al.'s (1992) model of change to leadership theory (i.e., Walker & Grover, 2003), organizational transformation (i.e., Harvey & Brown, 1996), and human resource development (i.e., Madsen, 2003). In the context of organizational change, personal change following Prochaska et al.'s (1992) model has been identified as crucial to the successful implementation of change across an organization (Coghlan, 2000; Katz & Kahn, 1978; March, 1981; Marshak, 1993; Sullivan et al., 2002).

The psychological literature contains a body of research on affective reactions in times of change (e.g., Brundin, 2002; Huy, 1999, 2002; Mossholder, Settoon, Armenakis, & Harris, 2000; Paterson & Härtel, 2002; Vince & Broussine, 1996). In fact, several lines of research have uncovered four sequential and distinct stages of employee emotions. Jaffe, Scott, & Tobe (1994) present a framework mapping four phases of individual responses to organizational change; in chronological order, these phases are denial, resistance, exploration, and commitment. A similar model developed by Isabella (1990) uncovered comparable phases of employee reactions to change, which were named anticipation, confirmation, culmination and aftermath.

Interestingly, these frameworks appear to be contrasted by the positive or negative lens used by each author to define the stages of their respective models. For example, whereas Jaffe et al. (1994) describe the messaging phase of the change process (when employees hear formal communication about the change for the first time) as *denial*, which has a negative connotation in that individuals question the necessity of the change, Isabella's (1990) model describes a *confirmation* stage where change targets reflect

understanding about the anticipated event. Although these two frameworks do not overlap perfectly, they both support the idea that employees experience a more cyclical than linear pattern of reactions, changing their viewpoints, reactions, and interpretations over and over throughout the implementation of change. In fact, Jaffe et al. (1994; and Scott & Jaffe, 1988) use a curvilinear figure to tentatively illustrate the changing responses of individuals undergoing change, over time (see Figure 8). Isabella (1990) goes as far as identifying triggers for employee shifts in interpretive stages, echoing research on trigger events that signal that a cognitive redefinition of a situation is required (Billings, Milburn, & Schaalman, 1980).

Figure 8. Model of individual responses to change over time. *(From Jaffe, Scott, & Tobe, 1994)*



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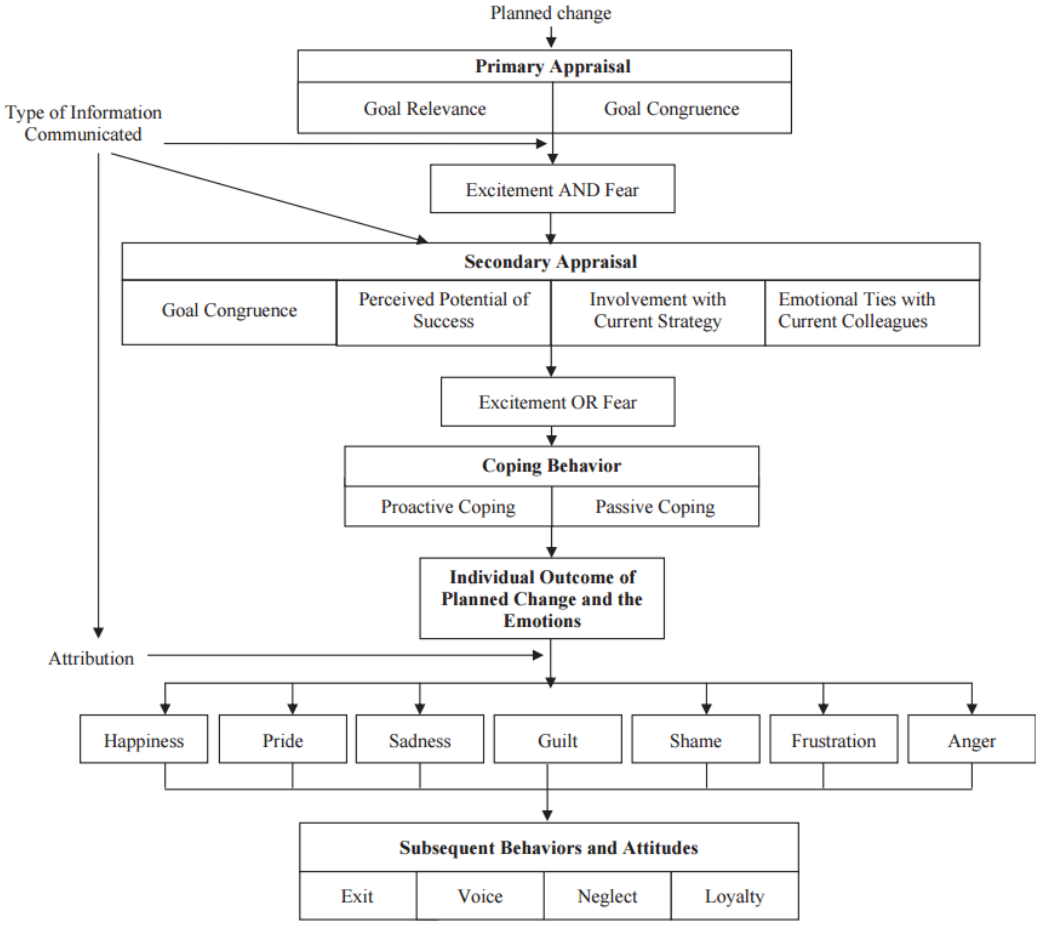
Presenting a theory of *why* and *how* employee emotions evolve throughout implementation of change, Liu and Perrewé (2005) use Lazarus' transactional model of stress and coping (Lazarus, 1966, 1991; Lazarus & Folkman, 1984) to develop a cognitive-emotional model of individual reactions to planned change with four distinct stages. In their model, primary appraisal of the initial communication on change triggers high arousal and mixed hedonic tones, producing anticipatory emotions. Next, the emotions become positive or negative as a result of employees' appraisal of the perceived potential of success of the change, involvement in the current strategy, emotional ties with colleagues, and goal congruence. This emotional experience has an effect on coping behaviours displayed in the third stage. Finally, the fourth stage brings discrete, evaluative emotions that shape subsequent behaviours and attitudes.

Figure 9. Theoretical cognitive-emotional model proposed by Liu & Perrewé (2005) of individual reactions to organizational change.



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Based on the implications of their theoretical model, Liu and Perrewé (2005) recommend that change agents adjust the timing and content of their change-related communication in response to the phase in which employees are found at the time. However, the question of *how much time* employees typically spend in each phase of the response cycle remains unanswered.

Incorporating Time in the Study of Change

Researchers have repeatedly recognized a need to factor time into theories of change (Beer & Walton, 1987; Gersick, 1994; Van de Ven & Huber, 1990; Weick & Quinn, 1999). Despite the recent availability of "correct" models for successful change, which have been derived from the plethora of scientific studies and popular books on business consulting, and summarized in such reviews as Porras and Robertson (1992) or Whelan-Berry and Somerville (2010), there continues to be little empirical investigation on the timeliness and appropriateness of change implementation steps (Pettigrew et al., 2001). Incorporating time in the study of change has been a struggle for researchers, who are challenged with studying a phenomenon that is inherently dynamic, using research methods that are relatively static (Pettigrew et al., 2001; Martins, 2011).

In the short term, research on the experience of change suggests that most practitioners expect a sharp reaction—be it positive or negative—upon the initial introduction of the intervention (Kotter, 1995; Nadler & Tushman, 1994; Recardo, 1995). It is plausible that if it exists, the temporary "dip" in change-related attitudes described by Scott and Jaffe (1988) would happen early in the change implementation process, after the change effort has been announced and discussed in the context of internal and external pressures and opportunities, presumably lasting until communication of the vision for the future state of the organization is effectively accomplished (Kotter, 1996, 1999). Poor communication at the beginning of a change implementation, in terms of poor content and/or media, is a known contributor to cynicism and lack of acceptance by employees (Hinings, Brown, & Greenwood, 1991; Richardson & Denton, 1996; Whelan-

Berry et al., 2003). All in all, research on individual reactions to change suggests that attitudinal changes occurring in the short term depend on whether the change vision is accepted by employees. That said, research has not yet determined when and for how long such reactions may be experienced.

Similarly, there remains a dearth of research addressing long-term effects of implementing a change. Sustaining the momentum of implemented change requires the organization to grant the initiative adequate and continual resources to continue to produce desired behaviours (Armenakis et al., 1999; Cummings & Worley, 2004; Galpin, 1996), something that often does not occur in change efforts. Indeed, it has been noted that sustaining organizational change is a difficult endeavour, with many researchers having observed that short-term adoption of change can suffer regression back to original, pre-change conditions (Armenakis & Bedeian, 1999; Beer & Eisenstat, 1996; Buchanan et al., 2005; Kotter, 1995; Senge et al., 1999). Statistically speaking, one would expect such cases to show little or no change over time in change-related improvement data. A meta-analysis by Guzzo et al. (1985) uncovered a significant negative relationship describing the introduction of a change initiative and measurement of its productivity effects ($r = -.10$, $p < .05$), concluding that the beneficial effects of introduced change actually become weaker over time. However, the authors of this study calculated their meta-analytic effect size using linear correlation coefficients—given the suggestion that attitudinal change over time may follow a curvilinear pattern, it is possible that the observed overall negative linear relationship may conceal a curvilinear (i.e., quadratic) pattern of change over time.

Further, an important consideration when researching large-scale change over time is the impact of incremental increases of the scope and content of the change. For example, in this particular investigation at the hospital, a phased approach to implementing continuous improvement was utilized by introducing new business practices one at a time over a period of 12 months. Although this approach mitigates the negative effects that would have occurred in a drastic large-scale transformation, research has shown that as the scale of change increases, employee responses to the change become increasingly negative (Rafferty & Griffin, 2006).

Hypothesis 3: The Nature of Change over Time

Hypothesis 3 was developed regarding the nature of the change over time, seeking to better understand patterns through which attitudinal and cognitive processes evolve as organizational change proceeds. Researchers such as Liu and Perrewé (2005) have successfully argued for the presence of distinct stages that precede and predict change-related behaviours depending on the appraisal of a stressful change situation. Change can create in individuals a simultaneous experience of excitement and fear, two strong emotions very different in their affective tone, whose dynamic interplay is believed to influence the outcome of secondary appraisals and behavioural reactions in the coping stage. For this reason, hypothesis 3 predicts a curvilinear pattern of change-related attitudes over time, reflecting the strong emotions experienced by individuals trying to decide whether the change is relevant and meaningful to them. In line with Scott and Jaffe's (1988) curvilinear depiction of individual response to change over time, an initial

period of anxiety and discomfort about the change is anticipated, such that a temporary "dip" is expected to precede an eventual improvement in change-supportive attitudes.

Hypothesis 3: *Change-related attitudes will show a curvilinear, U-shaped pattern over time.*

Methodology: Study 1

Sample

As previously described, the organizational context is a 270-bed hospital of 2000 employees in Ontario, Canada. The data analyzed in the context of Study 1 were obtained from frontline staff in each of the three units that made up the experimental group, as well as a wait-list control group.

Experimental group. The experimental group in this study is composed of two inpatient units that provide the same service, to the same population of patients ("Unit A" and "Unit B"), and one outpatient unit ("Unit C") that provides acute care and treatment for a range of ailments and injuries. Inpatient Units A and B each employ between 59 and 84 part-time, contract, and full-time workers. These units offer inpatient, acute care for adult patients with a variety of complex medical conditions that are not normally treated with surgical intervention. Common diagnoses include respiratory disorders, congestive heart failure, and liver disease. Physicians working in these units are interchangeable and work where needed, while nurses usually work in only one unit. Unit C employs approximately 121 part-time and full-time workers specializing in the delivery of acute care to patients who arrive without prior appointment. The initial point of entry of the vast majority of patients at this hospital is via Unit C.

Together, the experimental group is composed of approximately 60-70% nursing staff, including registered nurses (RN) and registered practical nurses (RPN), 10% clinical staff or techs, 15% physicians, and 10-15% housekeeping, support, and food services staff. All three units in the experimental group are each managed by one manager and a team of supervisors.

Response rates for the baseline survey were approximately 85% in inpatient Unit A (n = 50), 60% in inpatient Unit B (n = 50), and 68% in outpatient Unit C (n = 82). The breakdown of participants by broad job group is as follows: 6-15% non-clinical or support, 56-68% RN/RPN, 0-16% clinical staff or techs, 14-16% physicians, and 12% other (i.e., management team, etc.).

Wave 2 of the survey saw a slight decrease in the number of responses, with response rates declining to 58% in inpatient Unit A (n = 34), 46% in inpatient Unit B (n = 39), and 59% in outpatient Unit C (n = 71). Breakdown by participant job group includes 5-12% non-clinical or support, 65-72% RN/RPN, 1-10% clinical staff or techs, 3-27% physicians, and 1-17% other.

By the final wave of the survey, attrition had brought the response rate to 39% in inpatient Unit A (n = 23), 39% in inpatient Unit B (n = 33), and 49% in outpatient Unit C (n = 59). Participant job groups can be broken down into 2-3% non-clinical or support, 48-86% RN/RPN, 3-9% clinical staff or techs, and 4-39% other.

Control group. An inpatient unit providing related services to a similar population of patients as Units A and B was selected as a wait-list control group. Of the approximately 59 part-time, full-time, and contract workers employed in the control

group unit, 40 volunteered to participate in this study, representing an overall response rate of 68%. The breakdown by job group was as follows: 0-10% non-clinical or support, 66-92% RN/RPN, 4-10% clinical staff or techs, and 5-22% other.

A note on within-subjects effects. After careful consideration, the decision to use non-identified (anonymous) surveys to gather this data was made in order to quell employee concerns about privacy, while encouraging participation. Studies from a number of fields have shown that survey responses become more socially desirable and of lower quality when participants perceive less anonymity (Bowling, 2005; Durant, Carey, & Schroder, 2002; Sashkin & Prien, 1996), while others suggest that lower response rates can occur as a consequence of identifying surveys (Thompson, Surface, Martin, & Sanders, 2003). Given the senior level commitment to the success of this initiative and the trepidation among staff about participating in the surveys, it was important to collect as many surveys as possible, and for the responses to be as accurate as possible. Therefore, the only demographic questions included in the questionnaire asked the employee to identify his or her primary work unit, employment status, and job group. Although this decision was the best alternative from an ethical standpoint (Saari & Scherbaum, 2011), it poses limitations on the statistical exploration of within-subjects effects on greater outcomes.

To work around this limitation, the within-subject effects in this study were determined by creating subgroups of participants who fell within clusters of cross-tabulated demographic variables. In other words, the "participants" used in within-subject, longitudinal analyses were, in practice, very small clusters of like participants.

Using this method of clustering, the three surveys of individual participants who took part in the study from beginning to end would always be linked to each other, except in the few cases where participants changed jobs but remained in the experimental group throughout the course of the study. Of the estimated 264 employees who were invited to take part in this research, the author knows of only one such case—this is because most experimental group employees who changed jobs over the course of the study actually left the organization, or transferred to a unit that was not part of the experimental group.

The assumption is that even if the participants are not exactly the same wave-over-wave (although they very well may be), they are likely to at least be exposed to similar situations at work. For example, if the part-time night-shift housekeeping staff in inpatient Unit A who participated in wave 1 is not the same part-time night-shift housekeeping staff in inpatient Unit A who participated in wave 2, it is assumed that they are at least similar to each other.

This method allowed for the identification of more than 100 subgroups of participants across the three units. The vast majority of subgroups represented 1-3 people per survey wave, but a few reached a membership of up to 14 individuals who met the demographic criteria of that particular subgroup. In cases where subgroups contained the scores of more than one participant, the average of all related scores was used for analysis. As this method led to a decrease in usable sample size, the total number of responses used in statistical analyses dropped from n = 506 (actual participants, including control group and excluding surveys omitting required demographic information) to n = 358 (subgroup clusters).

Procedure

In line with models describing successful change initiatives (Armenakis et al., 1999; Halfhill et al., 2002; Kotter, 1996), this study examines the effects of simultaneously-implemented interventions related to the change initiative on attitudinal outcomes of staff throughout the first year of the roll-out plan. Although difficult to capture in a field study, the use of longitudinal, nested data allows for investigation of the impact of this change initiative on employee attitudes and behaviours over time. The nature of this field study presented challenges that resulted in necessary compromises related to data collection procedures and data analysis. As such, this section describes the challenges encountered, their final outcomes, and reasons for any decisions made.

All frontline staff in the experimental group were given the opportunity to voluntarily participate in a brief survey every 6 months. This survey tracks employee attitudes throughout the year, from baseline (just before having been introduced to the change initiative), to six months and one year later. The importance of completing this survey was personally communicated to staff by senior leaders and by unit managers. Since anonymity of responses was of utmost importance to participants, paper surveys were collected using a drop box (or mailed in) during each two week collection period and contained three demographic questions about the participant's primary work unit, job status, and job group.

In healthcare research, where response rates are typically low, it is important to ask the minimum possible number of questions from busy healthcare providers. This practice ensures respect for the time of the participants, who are voluntarily using their

limited break time to take part in the study, and is a factor in maximizing participation rates. The paper survey was thus limited to one double-sided page. It included three- to four-item measures on trust in senior leadership, communication (amongst coworkers), participation in decision-making and affective commitment. A one-item measure of engagement was also included in this survey.

Prior to distributing the survey, some steps were taken to improve reliability and ensure maximum validity. For example, feedback was gathered and items were pilot-tested among various subject-matter experts to optimize wording such that it is meaningful to frontline care providers and reflects the operation of a healthcare organization. Efforts were also made to standardize data collection when possible.

In addition to the attitudinal surveys collected every six months from the experimental group, process variables were collected as a measure of behavioural support of the change initiative. Attendance at daily huddles by staff and senior leaders was tracked on a daily basis throughout the year, and the number of improvement idea tickets posted on the performance board was also recorded at the end of every month.

Control group data collection and manipulation check. Attitudinal data gathered from the wait-list control group was collected under similar circumstances, although at slightly different time points in order to accommodate staffing and workloads. The first collection occurred three months after the experimental group's baseline survey, at a time when staff in the control group would have presumably heard very little about the changes taking place in the experimental group units. The last collection was taken at the same time as the experimental group's third iteration of the

survey, i.e. 12 months after experimental baseline. At this time, the control group may have become slightly more aware of the new set of practices being implemented in select units across the hospital, despite not being officially involved in the change initiative themselves. To confirm these assumptions, a manipulation check was conducted by comparing control group responses to a survey item that asked participants about the daily improvement huddle, which is a specific business practice introduced by the CPI System that would not have been in place in the control group. Details on the item used in the manipulation check are included in the Measures section, and results of the analysis can be found in the Results section.

Measures

Subjective (attitudinal) survey measures. The items administered in this survey are corporately available from KPMG, National Research Corporation, and The Graham Lowe Group—market research and consulting firms hired by the hospital to assist with the strategic deployment of the change initiative. Although items belonging to each consulting firm are not published in this document, a literature review of the constructs measured by the items put forward by said firms has uncovered very similar items developed within the realm of academic research—these are described in this section whenever possible.

Unless otherwise specified, all items described in this section are measured using a five-point agreement scale ranging from “strongly disagree” to “strongly agree”. The option of “don’t know/not applicable” is given to participants, and none of the items are mandatory.

Trust in senior leadership. Four items make up the leadership trust subscale, which reflects the degree to which employees trust that senior management takes staff feedback to heart and are aware of problems affecting the front line. These items are loosely similar to the management trust subscale found in Cook and Wall (1980), who reported an alpha coefficient of $\alpha = .78$ and a test-retest coefficient of $r = .60$ ($p < .001$). In this study, Cronbach's alpha ranged between $.86 \leq \alpha \leq .91$ over the three time points of this measure.

Communication (within unit). Without specifically mentioning the change initiative or the introduced business system by name, four items measuring the level of communication on one's unit were included in the survey administered to frontline staff. The items ask participants the extent to which specific communication practices promoted by the change initiative are in effect on their unit, whether performance of the unit is discussed regularly, and whether they perceive peer-to-peer communication to be authentic and sincere. Cronbach's alpha for this scale ranges between $.80 \leq \alpha \leq .82$ over the three time points of this measure.

Employee engagement. The measurement of employee engagement was limited to one item in order to address previously-noted concerns about low response rates. The item draws parallels with the conceptualization of engagement as dedication in Schaufeli et al. (2002), a state in which employees are inspired and experience a sense of enthusiasm. It is very similar to the item "[my] company inspires me to do my best work" used in BlessingWhite's (2011) published business measure of employee engagement, and is available corporately from National Research Corporation.

The test-retest correlations for the engagement item used in this study are $r = .51$ for waves 1-2 ($p = .000$), and $r = .33$ for waves 2-3 ($p = .048$), where each wave is 6 months apart. Sample attrition is believed to account for the smaller product-moment coefficient and higher p-value observed between waves 2-3.

Affective commitment. The 4 items measuring affective commitment reflect the extent to which participants agree that their work unit provides services and patient care of the utmost quality, and that staff in their team make an effort to achieve these high standards. The items in this study are very similar to items 1 and 6 of Mowday, Steers, and Porter's (1979) Organizational Commitment Questionnaire (OCQ), whose psychometric properties include (a) an alpha coefficient of $.82 < \alpha < .93$, (b) adequate evidence of convergent validity with measures of intent to stay with the employing organization, intrinsic motivation, and organizational attachment, and (c) evidence of discriminant validity with attitudinal measures of job involvement, career satisfaction, and job satisfaction. The items administered as part of the current study are very similar to the following OCQ items: "Q1: I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful" and "Q6: I am proud to tell others that I am part of this organization".

Cronbach's alpha for this scale ranged between $.61 \leq \alpha \leq .72$ over the three waves in this study. Compared to the psychometric properties of the OCQ, the relatively lower alpha values obtained in this study are attributed to heterogeneity within the experimental group with respect to organizational commitment. Analysis showed that removing any of the items from the scale did not improve the alpha value.

Participation in decision-making. Items assessing participation in decision making were directly related to the change initiative. This construct was measured at the individual level through the frontline staff surveys. The items assessing participation in decision making are corporately available from National Research Corporation and The Graham Lowe Group, and reflect the extent to which participants feel they are involved and consulted about changes and able to make suggestions about the work on their unit. Cronbach's alpha for this scale of three items ranged between $.60 \leq \alpha \leq .81$ across the three time points collected over the year.

Objective (process) measures. Throughout the study, behavioural indicators of employee participation in the change initiative were collected and tabulated on a daily or monthly basis.

Participation in huddle. The number of non-physician staff members who attended daily huddles was captured on a daily basis using a simple count at the end of the meeting. Mean monthly attendance was computed by averaging the number of attendees by the number of huddles held that month, such that the average count represents the number of bodies present as opposed to the percentage of workers on the unit who are present at huddle. Senior leaders were not counted in the total number of staff because they are considered to be agents of the change as opposed to active participants. As physicians in Canada are not actually employed by the hospital in which they work, they are not considered frontline staff in this study and were not included in the daily number of staff members present.

Number of posted tickets. The total number of posted improvement tickets, representing issues put forward by staff that require problem-solving, was tabulated on a monthly basis for each unit in the experimental group.

Manipulation check. One item asking participants about the effect of a specific component of the change initiative (the daily huddle) was included in the survey to determine whether participants had been influenced by the implementation of the CPI System in the experimental units. The item in question read "*Daily huddles result in task assignments to improve processes and follow-up."* Presumably, no change in this item over time in a unit that had not implemented daily huddles would suggest that control group participants were not being influenced by the experimental group to any significant degree.

Results: Study 1

Descriptive Statistics

The descriptive statistics of each attitudinal variable are outlined in
Table 2, which includes each unit in the experimental group at each wave of the study.

Table 2

Descriptive statistics of standardized attitudinal variables by experimental unit and time.

	Unit A			Unit B			Unit C		Waitlist Control		
	n	*M*	*SD*	*n*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Trust in leaders												
Baseline	38	3.37	.763	38	2.71	1.03	46	2.77	1.07	25	2.22	.749
Wave 2	26	3.96	.670	28	3.57	1.07	45	2.93	.988	31	2.39	.832
Wave 3	23	3.59	.456	33	3.36	.730	33	2.39	.704	35	1.79	.704
Communication												
Baseline	38	3.73	.747	38	3.12	.928	46	3.36	.920	25	2.22	.692
Wave 2	26	4.21	.500	28	3.86	.717	45	3.60	.747	31	3.00	.922
Wave 3	23	3.74	.541	33	3.50	.612	33	3.03	.760	36	2.32	.841
Employee engagement												
Baseline	38	3.55	.978	36	2.83	1.36	45	3.22	1.02	25	3.05	.899
Wave 2	26	4.38	.637	28	3.61	1.10	45	3.33	1.02	31	3.24	1.01
Wave 3	18	3.89	1.02	30	3.63	1.07	30	3.07	.740	35	2.10	.926
Affective commitment												
Baseline	37	2.87	.872	38	3.96	1.26	45	3.55	.653	23	2.31	.581
Wave 2	26	2.96	.644	28	4.29	.669	41	3.56	.623	30	1.94	.802
Wave 3	22	2.63	.635	33	3.90	.855	33	2.94	.828	34	2.16	.701
Participation in decision-making												
Baseline	38	3.81	.777	38	3.48	.779	46	3.02	.716	25	4.43	1.05
Wave 2	26	4.27	.476	28	3.79	.715	45	3.30	1.05	31	3.99	.567
Wave 3	23	3.68	.498	33	3.48	.680	33	2.43	.605	34	3.05	.906

Note: The two inpatient units (A and B) were combined in longitudinal analyses.

Manipulation Check

A one-way ANOVA of the manipulation check item within the waitlist control group yielded a non-significant difference over time, F (2, 108) = 1.78, p = .174. By contrast, the experimental group showed a significant change in this item over time, F (2, 433) = 13.59, p = .000). This suggests that the implementation of the CPI System in the experimental group did not have any significant influence on the waitlist control group, and the manipulation was successful.

Differences over Time (Hypothesis 1)

Hypothesis 1 proposed that improvements in change-related attitudes, behaviours, and process indicators will be observed within each unit in the experimental group, over time.

Attitudinal measures. For each unit in the experimental group, a linear mixed model was conducted using each attitudinal measure as a dependent variable to test whether differences can be detected over time. This analysis was conducted using SPSS Statistics 17.0 (www.spss.com), using techniques outlined in Shek and Ma (2011). Table 3 outlines the estimates and test statistics for this analysis.

Table 3

Linear Mixed Model Showing Longitudinal Growth by Unit

	Unit A				Unit B				Unit C			
Trust in leaders	*b*	*SE b*	*t*	*p*	*b*	*SE b*	*t*	*p*	*b*	*SE b*	*t*	*p*
Intercept	.44	.11	4.21	.000**	-.18	.14	-1.3	.196	-.22	.12	-1.71	.090
Slope	.30	.17	1.72	.090	.70	.21	3.2	.002*	-.13	.18	-.76	.448
Communication												
Intercept	.41	.12	3.34	.001**	-.28	.14	-2.00	.048*	-.15	.13	-1.17	.244
Slope	.15	.20	.752	.454	.51	.21	2.45	.016*	-.05	.18	-.29	.766
Employee engagement												
Intercept	.24	.13	1.81	.073	-.42	.16	-2.53	.013*	-.20	.11	-1.72	.087
Slope	.51	.23	2.20	.031*	.77	.25	3.03	.003*	.05	.17	.32	.750
Affective commitment												
Intercept	.42	.14	3.06	.003*	-.12	.18	-.70	.481	.29	.11	2.47	.015*
Slope	-.22	.23	-.95	.345	-.01	.27	-.04	.966	-.57	.18	-3.10	.002*
Participation in decision-making												
Intercept	.39	.13	3.08	.003*	-.10	.13	-.77	.440	.11	.14	.77	.438
Slope	.00	.21	.00	.999	.03	.20	.17	.858	-.25	.21	-1.14	.256
Attendance at huddle												
Intercept	11.24	1.19	9.45	.000**	6.59	1.08	6.10	.000**	12.62	1.52	8.26	.000**
Slope	.39	.13	3.15	.009*	1.15	.11	10.23	.000**	-.16	.14	-1.12	.294
Tickets posted												
Intercept	18.48	5.50	3.36	.006*	13.34	3.10	4.30	.002*	11.29	4.31	2.61	.024*
Slope	-.70	.58	-1.22	.250	-.63	.31	-2.03	.069	-.07	.45	-.16	.875

Notes: The asterisk denotes a significant probability value of p < .05, and two asterisks** point to a probability value of p <.001.*

Results show that some significant increases in positive attitudes can be detected within inpatient Units A and B over time. Specifically, significant increases are observed with respect to trust in senior leadership (Unit B: t (94) = 3.26, p = .002), communication (Unit B: t (94) = 2.45, p = .016), and employee engagement (Unit A: t (82) = 2.20, p = .031; Unit B: t (88) = 3.04, p = .003). By contrast, attitudinal growth is not significant for any of the measures in the outpatient Unit C, except for affective commitment, which shows an overall decline over time (Unit C: t (110) = -3.11, p = .002). No significant linear growth in participation in decision-making was detected in any of the three experimental units.

Behavioural measures. Another linear mixed model analysis was conducted for each unit in the experimental group with monthly average attendance at huddle as the dependent variable. Test statistics and estimates can be found in Table 3. Findings indicate that huddle attendance of staff increased significantly over time for inpatient Unit A (t(11) = 3.15, p = .009) and inpatient Unit B (t(11) = 10.23, p = .000), but not for outpatient Unit C. Linear growth in the number of tickets posted by staff per month was not significant for any of the three units in the experimental group.

In partial support of hypothesis 1, attitudinal and behavioural growth is observed among staff in the inpatient Units A and B. The lack of change in attitudinal and behavioural measures in outpatient Unit C suggests that the transformation to lean management was not effective in that unit.

Comparison of Linear Rates of Change between Experimental and Control Groups (Hypothesis 2)

Hypothesis 2 stated that the experimental group will show positive differences in change-related attitudes and process indicators over time, compared to the wait-list control group.

To determine whether frontline staff in the experimental group showed a difference in change-related attitudes over time compared to those in the wait-list control group (hypothesis 2), a longitudinal mixed model was conducted on a sample consisting of the experimental and control groups using time nested within participants, and participants nested within unit. In this analysis, a significant interaction term of experimental group*time is indicative of a between-group difference in the dependent variable's rate of change over time.

Results of this analysis are shown in Table 4. Among the measures included in the survey, affective commitment is the only variable demonstrating a significant difference in change over time (t (263) = -2.05, p = .004), with the control group showing higher affective commitment that the experimental group.

Table 4

Mixed Model Comparing Fixed Effects of Experimental Group with Control Group

Dependent Variable	*b*	*SE b*	*t*	*p*
Trust in leaders				
Intercept	-.68	.29	-2.35	.063 ns
Group	.71	.33	2.16	.082 ns
Group*Time	.18	.18	.98	.388 ns
Communication				
Intercept	-.46	.25	-1.80	.128 ns
Group	.48	.29	1.66	.155 ns
Group*Time	.06	.12	.48	.654 ns
Employee engagement				
Intercept	-.23	.26	-.88	.412 ns
Group	.15	.29	.51	.626 ns
Group*Time	.28	.15	1.83	.142 ns
Affective commitment				
Intercept	-.38	.18	-2.05	.075 ns
Group	.61	.21	2.84	.023*
Group*Time	-.33	.11	-2.93	.004*
Participation in decision-making				
Intercept	-.50	.19	-2.57	.037*
Group	.67	.22	2.95	.022*
Group*Time	-.18	.10	-1.80	.072 ns

Notes: control group coded as 0, experimental group coded as 1. The asterisk denotes a significant probability value of $p < .05$.*

At first glance, it would appear that the analysis failed to detect much difference between the experimental group and the control group, which would suggest that the change failed and the initiative was not effective in the experimental group. However, in addition to the quantitative evidence presented in the previous section, qualitative data presented in Appendix A suggests that the initiative was never fully adopted by employees of outpatient Unit C in comparison to inpatient Units A and B. This observation led to the hypothesis that any positive effects created by the change initiative in inpatient Units (A and B) compared to the control group may be masked by attenuated growth in the outpatient Unit C. Therefore, a follow-up analysis was conducted by

repeating the longitudinal mixed model after removing Unit C from the dataset. Table 5 outlines the results of a mixed model comparing the fixed effects of the inpatient units (A and B) with the control group.

Table 5

Mixed Model Comparing Fixed Effects of Inpatient Units (A and B) with Control Group

Dependent Variable	*b*	*SE b*	*t*	*p*
Trust in leaders				
Intercept	-.696	.199	-3.495	.022*
Group	.847	.244	3.474	.022*
Group*Time	.393	.114	3.452	.001**
Communication				
Intercept	-.446	.222	-2.008	.110 ns
Group	.537	.272	1.975	.115 ns
Group*Time	.207	.123	1.678	.095 ns
Employee engagement				
Intercept	-.231	.254	-.911	.409 ns
Group	.183	.309	.591	.583 ns
Group*Time	.483	.146	3.314	.001**
Affective commitment				
Intercept	-.387	.217	-1.785	.132 ns
Group	.574	.266	2.145	.083 ns
Group*Time	-.180	.148	-1.213	.227 ns
Participation in decision-making				
Intercept	-.506	.209	-2.422	.066 ns
Group	.664	.256	2.595	.055 ns
Group*Time	-.072	.121	-.593	.554 ns

Notes: control group coded as 0, experimental group coded as 1. The asterisk denotes a significant probability value of $p < .05$, and two asterisks** point to a probability value of $p \leq .001$.*

Results of the follow-up analysis reveal that, compared to the control group, the inpatient units (A and B) experienced significant, positive changes in employee trust in senior leadership (t (177) = 3.45, p =.001) and employee engagement (t (166) = 3.59, p = .000) over time.

Interestingly, the interaction term for affective commitment was not significant after removing Unit C from the sample, despite having been significant (with a negative estimate) prior to Unit C's removal. This suggests that affective commitment may have declined in Unit C over time compared to both inpatient units (A and B) as well as the control group, since the rate of change of affective commitment over time was not significantly different between these latter two groups. To test whether this observation is founded, the analysis was repeated using affective commitment as the dependent variable, this time excluding the inpatient units (A and B) from the experimental group sample instead of Unit C. Results of this follow-up analysis are outlined in Table 6.

Table 6

Mixed Model Comparing Fixed Effects of Outpatient Unit (C) with Control Group for Affective Commitment

	b	*SE b*	*t*	*p*
Affective commitment				
Intercept	-.391	.127	-3.086	.003*
Group	.689	.170	4.050	.000**
Group*Time	-.521	.168	-3.092	.003**

Notes: control group coded as 0, experimental group coded as 1. The asterisk denotes a significant probability value of p < .05, and two asterisks** point to a probability value of p <.001.*

As hypothesized, an observed significant, negative interaction term between the group and time variables points to a decline in affective commitment over time in the outpatient Unit C compared to the control group ($t(82) = -2.59$, $p = .003$).

Test of Curvilinear Growth (Hypothesis 3)

Hypothesis 3 proposed that change-related attitudes will show a curvilinear, U-shaped pattern over time.

The previous results provide evidence for linear growth in the attitudinal variables of staff of inpatient Units A and B over time. To test for the existence and shape of the hypothesized curvilinear pattern of growth (hypothesis 3), a linear mixed model was conducted with time nested within participants, and participants nested within time. A quadratic time variable was created and added to the set of predictors, as per the methodology outlined by Shek and Ma (2011). The output of this analysis was split by service such that inpatient Units A and B were grouped together and compared to outpatient Unit C. This latter manipulation was performed to allow for the investigation of any differences in patterns of attitudinal change when change management was successful (i.e., in inpatients Units A and B) and in the case in which employees refused to openly accept the change (i.e., outpatient Unit C).

Table 7 outlines all growth estimates for each variable, by service. Results show that curvilinear growth is observed in inpatient Units A and B, but is not detected in outpatient Unit C except in the case where no significant difference was found between the control group and experimental group in Study 1. Specifically, the inpatient units (A and B) saw quadratic growth over time in trust in leadership (t (100) = -3.736, p = .000), communication (t (87) = -4.402, p = .000), and employee engagement (t (99) = 2.979, p = .004), but such quadratic increases were not significant in outpatient Unit C. Although quadratic growth of affective commitment in inpatient Units A and B was significant (t (175) = -1.981, p = .049), the previously-noted decline in affective commitment in outpatient Unit C that occurred between waves 2 to 3 was so steep that the curvilinear relationship was also found to be significant (t (80) = -2.853, p = .006). Lastly, recall that

Study 1 showed the growth rate of participation in decision-making to be non-significantly different from that of the control group, suggesting that an organization-wide effect on participation in decision-making had occurred throughout the time this research was conducted. In line with these findings, quadratic growth was significant within inpatient Units A and B (t (122) = -3.610, p = .000) as well as outpatient Unit C (t = -2.904, p = .006).

In the results outlined above and in Table 7, the estimate of the quadratic time term (b of "time_sq") represents the rate of change in quadratic growth compared to the linear rate of change (represented by b of "time"). A negative quadratic estimate indicates an inverse U-shaped curve over time.

Table 7

Curvilinear Growth in Attitudinal Variables, by Service (Inpatient vs. Outpatient)

	Inpatient Units A and B				Outpatient Unit C			
	b	*SE b*	*t*	*p*	*b*	*SE b*	*t*	*p*
Trust in leaders								
Intercept	.035	.15	.23	.824 ns	-.23	.12	-1.89	.061 ns
Time	2.10	.46	4.53	.000**	.49	.45	1.09	.283 ns
Time_sq	-1.49	.40	-3.73	.000*	-.61	.42	-1.44	.153 ns
Communication								
Intercept	-.05	.13	-.33	.753 ns	-.16	.12	-1.31	.190 ns
Time	2.27	.44	4.83	.000**	.76	.44	1.70	.101 ns
Time_sq	-1.80	.42	-4.40	.000**	-.81	.42	-1.91	.061 ns
Employee engagement								
Intercept	-.18	.17	-1.01	.362 ns	-.19	.11	-1.62	.107 ns
Time	2.10	.54	3.86	.000**	.25	.44	.57	.568 ns
Time_sq	-1.42	.47	-2.97	.004*	-.22	.41	-.54	.586 ns
Affective commitment								
Intercept	.07	.14	.49	.632 ns	.19	.11	1.71	.090 ns
Time	1.02	.59	1.69	.091 ns	.80	.47	1.67	.100 ns
Time_sq	-1.00	.50	-1.98	.049*	-1.19	.47	-2.85	.006*
Participation in decision-making								
Intercept	.042	.14	.31	.765 ns	.034	.14	.24	.809 ns
Time	1.64	.48	3.45	.001**	1.72	.59	2.90	.006*
Time_sq	-1.47	.41	-3.61	.000**	-1.93	.51	-3.73	.000**

Notes: The asterisk denotes a significant probability value of p < .05, and two asterisks** point to a probability value of p <.001.*

The fit indices of each linear and curvilinear model, for all units together (overall) and by service, can be found in Table 8. These fit statistics are displayed in smaller-is-better form, such that smaller values are an indication of better fit of the data to the model. When evaluating the fit between two models, significant differences are typically not computed on the indices themselves. Although models with smaller values suggest better fit than models with larger values, it is also important to consider the theoretical basis of each model and whether that is strong enough to compensate for any differences in fit indices.

On the whole, the statistics from each model are not much different from each other, although the curvilinear model shows slightly better fit in most cases. Together with the significant curvilinear estimates observed in the inpatient units (A and B), these findings provide some evidence lending partial support to hypothesis 3.

Table 8

Model Fit Indices Comparing Linear and Curvilinear Models

	Linear model				Curvilinear model			
	AIC	*AICC*	*CAIC*	*BIC*	*AIC*	*AICC*	*CAIC*	*BIC*
Overall								
Trust in leadership	940.05	940.22	964.45	959.45	944.15	944.39	973.43	967.43
Communication	979.60	979.78	1004.01	999.01	966.84	967.08	996.13	990.13
Employee engagement	936.24	936.42	960.36	955.36	938.86	939.12	967.80	961.80
Affective commitment	980.10	980.27	1004.36	999.36	973.01	973.25	1002.12	996.12
Participation	995.10	995.25	1019.48	1014.48	976.05	976.29	1005.33	999.33
Inpatient Units (A & B)								
Trust in leadership	479.28	479.62	500.41	495.41	472.45	472.92	497.80	491.80
Communication	494.13	494.46	515.25	510.25	480.60	481.07	505.95	499.95
Employee engagement	511.93	512.28	532.78	527.78	507.96	508.45	532.98	526.98
Affective commitment	555.50	555.84	576.58	571.58	553.69	554.17	579.98	572.98
Participation	487.72	488.06	508.85	503.85	477.73	478.20	503.09	497.09
Outpatient Unit (C)								
Trust in leadership	334.18	334.69	353.28	348.28	340.08	340.79	363.00	357.00
Communication	343.93	344.44	363.03	358.03	346.15	346.87	369.07	363.07
Employee engagement	305.94	306.46	324.88	319.88	313.01	313.75	335.73	329.73
Affective commitment	305.63	306.17	324.53	319.53	297.07	297.82	319.75	313.75
Participation	371.28	371.79	390.38	385.38	361.02	361.74	393.95	377.95

Notes: The information criteria are displayed in smaller-is-better forms.

Conclusion: Study 1

Significant improvements in employee attitudes and change-related behaviours can be observed over the course of the first year in some units of the experimental group. Indeed, it appears that the transformation to lean management generated increasingly positive attitudes with respect to trust in senior leaders and overall engagement among staff of the inpatient units (A and B) compared to those in the wait-list control group. In addition, a significant linear increase in staff attendance at daily huddles within these units is a behavioural indication of staff participation in the implementation of the change initiative. These findings imply that the transformation to lean management had a positive effect on the inpatient units (A and B), wherein staff have "bought in" to the vision of change and are actively living the new philosophy.

By contrast, employees of outpatient Unit C do not seem to have enjoyed the same benefits and successes of the transformation to lean; in fact, evidence suggests the opposite. While the lack of linear growth in attitudinal and behavioural measures over the course of the study hints at staff resistance to become invested in the change, the observed drop in affective commitment is a clear indication of discontent among workers. Not only did attitudes fail to improve over time, but the significant decline in affective commitment compared to the control group suggests the possibility that negative repercussions ensued when change was poorly managed. Exploration of this question remains a possibility for future research.

Growth in attitudinal and behavioural measures in inpatient Units A and B, in which the change initiative was arguably successfully implemented and adopted by staff,

was non-linear. Specifically, trust in senior leadership, communication, affective commitment and engagement were found to have a quadratic relationship with time, such that an initial increase is observed in the first six months of the implementation followed by a decline over the following six months. In conjunction with the results of the analysis of differences over time, this suggests that Unit A's benefits of the change initiative related to trust in leadership, communication, employee engagement and affective commitment were not sustained over time, having suffered a decline six months post-implementation. Unit B saw a similar decline but managed to sustain detectable differences twelve months post-implementation compared to its baseline results.

In the outpatient unit (C), wherein staff did not appear to buy in to the vision, the observed overall decline in affective commitment can actually be pinpointed to occur as a sharp drop between waves 2 and 3 (six months and twelve months following implementation of the change initiative). This contributes further evidence to the supposition that negative repercussions may arise in employees who do not accept or buy into the vision of the proposed change, as suggested by the results of the analysis comparing Units A and B with Unit C.

Participation in decision-making with respect to change-related processes showed a significant quadratic relationship in all three experimental group units. Recall that no significant difference in participation in decision-making between the experimental group and the control group was found: together, these findings allude to the presence of external circumstances in the greater hospital that affected participation in decision-making at the organizational level.

It is interesting to note that the specific inverse-U shaped pattern observed runs counter to the direction anticipated by hypothesis 3, along with many theories of change that focus on the emotional reactions of employees. These theories table an initial period of discomfort as staff contemplate the necessity of the change and potential impact on their job or work group. Two reasons are proposed to explain this result. The first is that it is possible that in this sample, any initial period of discomfort or contemplation leading to acceptance or rejection of the vision may have occurred within the first six months of the study, such that the data collection procedure employed failed to capture the hypothesized relationship. However, given that the scope of the change initiative introduced to participants is so large that it was gradually introduced to employees over a period of one year, it is possible that employees were initially accepting of the initiative as a vision until they understood it in practice. In other words, it may be that it took more than six months for employees to truly understand the implications of the change initiative and reach Liu and Perrewé's (2005) proposed primary appraisal stage, at which point they were able to decide whether they would accept it or not. This particular explanation is echoed by results of a lean management case study at Virginia Mason Medical Center, whose clinical leadership for their planned change to lean explained that change is difficult for staff: "There's a period when things get worse before they get better. The first six months after the changeover, morale dipped, but after a while you smooth out the rough edges." (Black & Miller, 2008:172).

These findings demonstrate that in this particular organizational context, the transformation to lean management led to demonstrable improvements in attitudinal

measures over time for units in which staff had collectively accepted and supported the implementation of change. With growth evident, the pattern of growth was assessed in order to describe *how* attitudinal improvements had occurred over time. However, without further investigation it is impossible to determine exactly what led to the peaks and valleys uncovered by this research. The next study gets at the heart of change processes, in an effort to investigate *why* certain effects were observed over time, and provide possible explanations for the decline observed after six months.

Study 2: Predicting Attitudinal Changes over Time

The last two decades have seen more interactionist and contextualized models of change management (Martins, 2011), with research incorporating more and more information on contextual factors inside and outside organizations. Studies of external influences on change often focus on organizational pressures, including industry changes, technological changes, or government regulation changes that spark the need for change, but have also included larger forces such as national culture (e.g., Boisot & Child, 1999; Fagenson-Eland, Ensher, & Burke, 2004; Lau, McMahan, & Woodman, 1996; Lewin, Long, & Carroll, 1999). External influencers are most often considered in change research at the organizational level. By way of comparison, internal influencers of change appear to have been studied to a relatively larger extent. Although internal factors can also be studied from an organizational perspective (e.g., by examining participation, communication, or leadership processes, etc.), group- and individual-level investigation is also possible by focusing on employee attitudes as the driver of change.

With respect to contextualized models, one prominent internal influencer is the organization's prior history of change: organizations who subject their employees to constant change tend to cause significant levels of stress (McHugh, 1997), such that negative attitudinal responses to change can occur as a result. Multiple, overlapping change initiatives being introduced contemporaneously, a concept known as "change turbulence", has important implications for the commitment of individual employees to any one particular initiative (Herold et al., 2007; Herold & Fedor, 2008). Cynicism, for example, can arise from frontline staff and middle-level managers alike when organizational change is too stressful to employees, oftentimes due to poor strategy or communication (Dean, Brandes, & Dharwadkar, 1998; Martins & Kambil, 1999; Reichers, Wanous, & Austin, 1997). Indeed, in a recent theoretical review of the change management literature, Rafferty, Jimmieson and Armenakis (2012) affirm that while many factors may contribute to the failure or success of implementing planned change, the most critical issues lie in employees' attitudes toward change. As the following sections will describe, an employee's commitment to change depends on the complex interactions of individual cognitions, organizational context, and group- or team-level characteristics.

Change Readiness

When change research shifted its focus from manager-driven change to empowering individual employees, the concept of employee readiness for change began to form (Martins, 2011). A focus on participant expectations of the implemented change contrasted research on the development and communication of an end-state vision, and

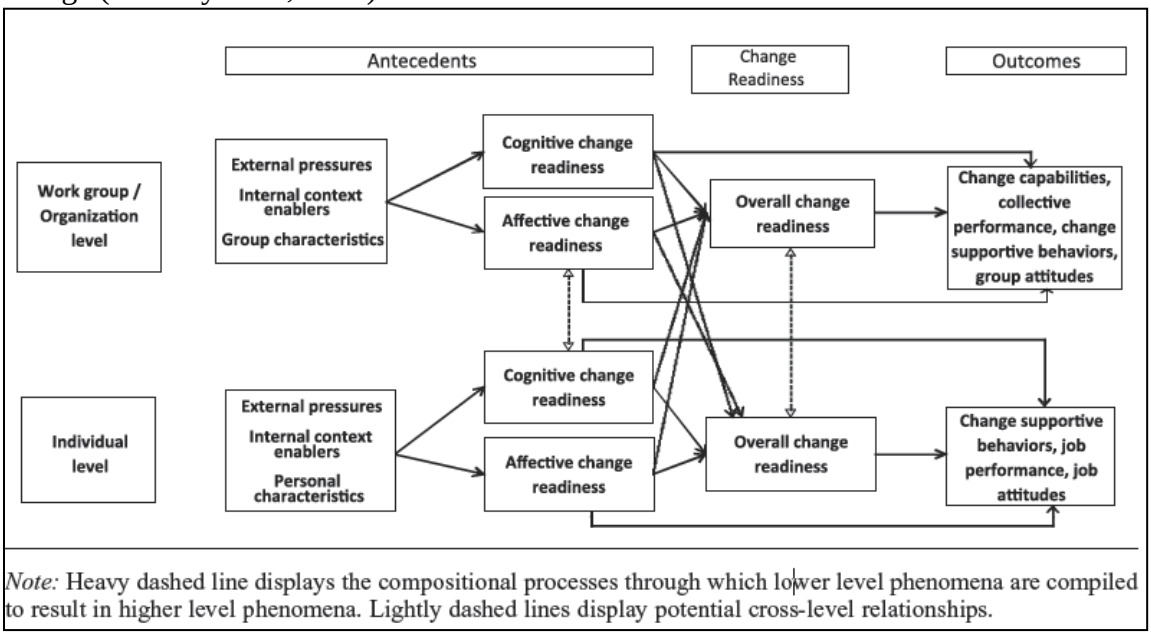
measures of employee openness to and support for change were produced for academic study (Korsgaard, Sapienza, & Schweiger, 2002; Rousseau, 1995; Rousseau & Tijoriwala, 1999; Wanberg & Banas, 2000). The construct of change readiness was introduced by Jacobsen (1957), and has since become embedded in the theory of change as a necessary antecedent to adoption of change. The construct is defined as the "beliefs, attitudes, and intentions regarding the extent to which changes are needed and the organization's capacity to successfully undertake those changes" (Armenakis, Harris, & Mossholder, 1993:681), and has become one of the most prevalent employee attitudes in the organizational change literature (Bouckenooghe, 2010; Rafferty et al., 2012), along with similar constructs such as support for change, openness toward change, and commitment to change. Even when controlling for some of the many procedural aspects related to the implementation of planned change, positive employee attitudes towards change have been found to be of crucial importance to the adoption and success of initiatives (Miller, Johnson, & Grau, 1994).

Change readiness is complex, occurring when environmental factors and personal attitudes are such that employees are open and receptive to an impending change (Holt, Armenakis, Field, & Harris, 2007). Researchers have found that a multifaceted view of change readiness better captures its complexity, conceiving the construct as triadic with cognitive and affective elements, in addition to intent to act (Armenakis et al., 1993; Bouckenooghe, Devos, & Van den Broeck, 2009; Piderit, 2000).

Despite the level of attention provided to the topic of employee attitudes during change, there continues to be limited understanding of change readiness due to a paucity

of studies that focus on its antecedents (Rafferty et al., 2012), especially when considering that an individual's readiness may be influenced by factors other than his or her personal characteristics (Caldwell, Roby-Williams, Rush, & Ricke-Kiely, 2009). Theorists have increasingly found that change readiness and its determinants exist at the individual, group, and organizational levels (Caldwell, Herold, & Fedor, 2004; Caldwell, Yi, Fedor, & Herold, 2009; Pettigrew et al., 2001; Whelan-Barry et al., 2003). However, a review by Rafferty et al. (2012) underlines that the literature on change readiness is limited in that researchers may appear to have recognized that these processes exist on multiple levels, but very few have adopted a multilevel lens to examine the attitudinal processes involved in change management. In response to this limitation, the authors developed a framework outlining the antecedents and consequences of change readiness from a multilevel perspective (see Figure 10; Rafferty et al., 2012).

Figure 10. Multilevel framework of the antecedents and consequences of readiness for change (Rafferty et al., 2012)



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Rafferty et al.'s (2012) model details how internal context enablers, external pressures, and group or personal characteristics (depending on the level of observation), act as antecedents of the cognitive and affective components of change readiness. Change readiness then predicts outcomes relevant to the success of the implemented change, including change capabilities, change-supportive behaviours, and positive attitudes. In simpler words, this model suggests that employees who *think* and *feel* that they are ready for a change are more likely to adopt and commit to it, while those who are forced to adapt to change are more likely to show resistance.

Supported by theoretical underpinnings and some empirical evidence that explains its proposed developmental course, the model suggests that distinct antecedents lead to change readiness for individuals and for groups. For example, empirical evidence suggests that leaders can influence individual employees' personal attitudes towards change when the leader is perceived as effectively communicating commitment to the change (Herold, Fedor, Caldwell, & Liu, 2008). By contrast, change readiness at the work group level can be influenced by the level of psychological trust among members of a team (Edmondson, 1999). Indeed, the implications of Rafferty et al.'s (2012) work highlight not only the importance of examining change-related relationships at two or more levels, but testing the assumption that the relationships exist similarly and in parallel across different analytical levels (as argued by Chen, Bliese, & Mathieu, 2005).

In Study 2, the interplay of change readiness and its antecedents will be explored at multiple levels. This study will build on previous multilevel models of change readiness by incorporating time in the research design.

Antecedents of Change-Related Attitudes

Most research on change readiness and similar change-related attitudes has focused on two categories of antecedents: (a) contextual influences, such as organizational processes and messaging practices that affect individual attitudes, and (b) individual characteristics of employees, leaders, or work groups. The reader will notice that both these categories represent factors internal to the organization: research on the influence of external entities on change readiness does exist (as purported by the model depicted in Figure 10), however, these external pressures are outside the scope of the current research. The scope was contained to studying the effect of the theoretical antecedents of change readiness and change-related outcomes existing in the literature that are implicated in the hospital's transformation to lean – that is, antecedents that were directly manipulated or otherwise affected by the introduction of new lean business practices. Cross-referencing elements of the hospital's introduced business practices (see section entitled "Lean Management" starting on page 11) with research on the determinants of change readiness in the literature resulted in the following list of antecedents included in this study: (a) participation in change-related practices and decision-making, (b) perceived quality of communication related to the change initiative, (c) team cohesion among members of the champion group, and (d) trust in senior leaders.

In line with the previously-described goal of applying a multilevel framework to the antecedents of change readiness, both individual- and group-level variables were included in this study, which each type having unique implications with respect to change readiness. That said, it is noteworthy that even when applying multilevel models, most

research has focused on the effect of individual-level predictors on broader change-related attitudes such as readiness (Rafferty et al., 2012). Group-level investigations of change readiness are very limited in number (e.g., Mohrman & Mohrman, 1997).

Quality of communication related to the change initiative. As detailed in previous sections of this work, a common theme in change management frameworks involves the communicative role of the agent of change. Effective change-related communication must (a) present a clear and appealing vision of the future state that the change is meant to create, (b) be sensitive to the individuality of each unique employee while remaining in line with the organizational context of the change, (c) persist throughout the implementation of the change, (d) reach many employees broadly, and (e) support the opportunity for reciprocity, allowing feedback to reach the primary communicator (Martins, 2011). High-quality change-related communication, then, is purported to help create in employees a sense of ownership or control in the context of organizational change (Bouckenooghe et al., 2009), thus acting as a mechanism for participation in the change and assisting in the exhibition of change-supportive behaviours. Empirical research by Bordia, Hobman, Jones, Gallois, and Callan (2004) supports this assertion by demonstrating that high-quality change communication from management can reduce strategic uncertainty related to the change, as well as the spread of rumours that exaggerate negative aspects of the change. Another field experiment found that dysfunctional outcomes caused by a merger were harsher and longer lasting in a group of employees who received poor-quality information from management, compared to a group that had received a preview of the impending merger (Schweiger &

DeNisi, 1991). Indeed, not only is the *content* and *frequency* of leader communication important to reducing deleterious consequences such as cynicism (Reichers et al., 1997; Wanous, Reichers, & Austin, 2000), but the transformational leadership of the communicator has also been found to mitigate negative attitudes (Bommer, Rich, & Rubin, 2005).

Overall, it is no surprise that implementing change management processes that promote high-quality communication is recommended for positively influencing change-related attitudes in individuals (Rafferty et al., 2012). From a group-level perspective, however, studies investigating the effect of high-quality communication on work groups are few and far between (Rafferty et al., 2012). One example provided in Rafferty et al.'s (2012) review of multilevel research on change readiness is a case study by Whelan-Barry et al. (2003) investigating the maintenance of change momentum through communication. In this study, the authors report that explicit communication addressing what a change would mean to the work group and an implementation plan reflecting the work group's own contingencies is useful in motivating employees and sustaining the momentum for change at that level (Whelan-Barry et al., 2003).

Participation in decision-making. Further to the research on participation and productivity outlined in the introduction to Study 1, the change readiness literature has produced links between participation and positive attitudinal responses to change in individuals, including employee readiness. Empirical studies indicate that processes that encourage participation in change by providing opportunities for a voice allow for the internal development of feelings of empowerment in employees (Armenakis et al., 1993;

Gagné, Koestner, & Zuckerman, 2000). In turn, employees are bolstered with a sense of control that plays an important role in their acceptance of the proposed change (Wanberg & Banas, 2000). Further, the sense of control created by participation in change-related decision-making is necessary for reducing uncertainty and stress in the context of change, as demonstrated by research highlighting the interplay of high-quality communication with participative decision-making (Bordia et al., 2004). Another example of associations between participative decision making and change readiness includes an empirical study by Jones and Issroff (2005), who found participation in decision-making related to the implementation of a new computing system to be related to change readiness. In turn, change readiness predicted system usage at a later date.

Relationships between implementing processes for participative decision-making and group-level attitudinal outcomes have been studied to a lesser extent than in individuals. That said, group-level participation has been related to positive change-related attitudes. In a study of team participation in learning practices, Edmondson, Bohmer, and Pisano (2001) found evidence of team-level mechanisms that can be used to increase employee readiness for change. While implementing new technology in a hospital, managers designed group practice sessions and promoted information-sharing and reflective practice among participants, all the while creating an environment of psychological safety to encourage new behaviours. In this team setting, group-level participation in decision-making was related to readiness for change.

Trust in senior management's commitment to the initiative. In times of change, employees need meaningful interpersonal interactions with their superiors to

respond positively. With respect to its relationship with change readiness, building supportive and trusting relationships has been studied as a mechanism for facilitating employee participation and commitment to change (e.g., Emery & Trist, 1965; McGregor, 1960; Schneider, Brief, & Guzzo, 1996). In particular, trust has been identified as a precondition necessary to an environment conducive of change (Tierney, 1999).

The literature has seen various operationalizations of trust in leadership, with the scope of the definition being the major differentiator between concepts. Some define trust in leadership as the extent to which staff believe their leaders to be honest and fair, keep their promises, and be non-retributive in reaction to open communication about problems (Korsgaard et al., 2002; Lines, Selart, Espedal, & Johansen, 2005; Schoorman, Mayer, & Davis, 2007). During a scale validation exercise, Bouckenooghe et al. (2009) found that participants had a narrower conceptualization of trust than was proposed: the authors refined their measure to capture the trustworthiness of communication by senior management. Finally, with special attention to change management, trust in leadership has been interpreted to refer to the extent to which employees believe that leaders are committed to following through with the proposed change, and will support them throughout the change process (Holt et al., 2007). The latter definition is important to note because of the stress related to change turbulence in employees with prior history in a firm: when change is deemed to be too frequent, of too high impact, or improperly planned from a strategic perspective, employees are susceptible to deleterious health

consequences (Rafferty & Griffin, 2006) and negative change-related attitudes (Dean et al., 1998; Reichers et al., 1997; Martins & Kambil, 1999).

Several concepts related to trust in leaders' commitment to change have associations with change readiness. For instance, Holt et al. (2007) used qualitative interviews and open-ended questionnaires to determine that believing that leaders were committed to a change was one of the most influential drivers of change readiness. This latter result was used to inform the systematic development and validation of their measure of change readiness. Rafferty et al.'s (2012) multilevel review of readiness identified perceived organizational support (Eby, Adams, Russell, & Gaby, 2000; Self, Armenakis, & Schraeder, 2007) and perceived congruence of values with leaders (Kirkman, Jones, & Shapiro, 2000) as related concepts that promote positive change attitudes among employees (Armenakis & Bedeian, 1999). At the group level, Ness and Cucuzza (1995) argued that work group readiness can be achieved by leaders who display a commitment to (a) making an effort to develop a change vision tailored for the work group, (b) identifying change-related implications specific to the group, and (c) supporting the group by developing its group efficacy and capability of handling change.

Cross-Level Influences

Within the field of organizational change, interest has grown over the past decade in the interactions of group-level and individual-level factors influencing individual reactions to change (e.g., Caldwell et al., 2004; Caldwell et al., 2009). A study by Fedor, Caldwell, and Herold (2006) illustrates this interest, having found that a group-level outcome influenced individual-level attitudes: individuals were considerably more

committed to a change that was judged as being favourable to the group *and* minimally invasive to individuals than when a change was judged to be unfavourable for the group, regardless of the demands it placed on individuals. As demonstrated in Rafferty et al.'s (2012) multilevel framework (see Figure 10), which suggests that the processes that contribute to change readiness in organizations differ at the individual and work group levels, the investigation of cross-level relationships in change management represents fertile grounds for research.

Recalling that one of the new business practices introduced by the hospital in this study was to develop a group of "champions of change", which consisted of front-line employees presumed to have the ability to motivate their peers to participate in the change, research has demonstrated that, in fact, opinions exhibited by influential individuals can help shape attitudes and reactions of other members of his or her work group. A field experiment by Lam and Schaubroeck (2000) found that select individuals can influence others by promoting positive attitudes toward a service quality improvement initiative. Results of this study provide support for the practice of using champions as agents of change, and also raise interesting questions for the field of change readiness. In Rafferty et al.'s (2012) review of change readiness from a multilevel perspective, the authors speculate about whether the change readiness of influential individuals (such as champions of change) might influence readiness of individuals within their work groups. On the other hand, one can imagine the opposite effect also being possible: the individual readiness of champions could be influenced by the

collective attitudes of the larger group of non-champion colleagues, in an effect resembling “peer pressure”.

Although the author of the current study knows of no investigations of group influences on individual change readiness, research on group climate might provide some insight into this proposed relationship. For example, Rafferty et al. (2012) propose that when the climate of a work group is based in interpersonal trust and mutual respect between members of a work group, key members are more likely to be comfortable expressing personal opinions that may influence the attitudes of others (Edmondson, 1999). Similarly, a group of champions presenting shared perceptions regarding the change may be more likely to impart their feelings onto others than a less cohesive group. This hypothesis is supported by work by Rafferty and Jimmieson (2010) with police officers, who found that, when work groups developed shared perceptions about change, the department became more positive about the change. In line with this finding, a test battery on change climate, readiness, and processes by Bouckenooghe et al. (2009) includes a measure of cohesion, assessing togetherness, cooperation, and trust in the competence of team members, as an internal context factor of importance when assessing change.

Hypotheses

Based on a review of internal workplace contributors to change readiness, two sets of hypotheses are proposed.

Hypothesis set 4: same-level antecedents of change readiness. The first set of hypotheses relates to antecedents of readiness on the same level of analysis. As

previously outlined, research suggests that effective communication and the provision of opportunities for participation are processes that will increase empowerment and feelings of control in contexts of change, which will in turn contribute to positive judgements about the change and overall readiness for change (Bommer et al., 2005; Bordia et al., 2004; Bouckenooghe et al., 2009; Rafferty et al., 2012). Further, group climate is believed to affect readiness in that members of a cohesive work team are more likely to openly share their opinions, which has been shown to lead to more positive feelings about a change (Bouckenooghe et al., 2009; Edmondson, 1999; Lam & Schaubroeck, 2000).

4a: The quality of communication about change will be positively associated with readiness.

4b: Participation in change-related decision-making will be positively associated with readiness.

4c: Trust in senior management's commitment to the change will be positively associated with change readiness.

4d: Among the champions, team cohesion will be associated with change readiness.

Hypothesis set 5: cross-level relationships. Rafferty et al.'s (2012) multilevel framework (see Figure 10) suggests that the processes that contribute to change readiness in organizations differ at the individual and work group levels. Further, cross-level relationships are expected to emerge from group-level influences. As previously indicated, group-level influencers can be (a) the collective perception of workplace factors, as distinguished from a particular individual's perception of the same factors

(Chan, 1998), or (b) a group-level experience (such as leadership) common to all individuals in a group. In this study, a champion group was used for change promotion amongst peers and to increase adoption of the change. It is therefore proposed that the champion group will have a stronger influence on the readiness and trust in leaders of frontline staff than the collective opinion of the unit will have on individual champions.

5a: Individual readiness of champions will influence collective readiness of their colleagues.

5b: Individual champions' trust in leaders will influence collective trust in leaders.

5c: If support for hypothesis 4c (above) is found, a similar cross-level relationship will show that individual champions' trust in leaders will influence collective readiness.

Methodology: Study 2

Due to the nature of work in the healthcare industry, only a relatively small percentage of employees at the hospital have a work-related email account and/or access to the computer as part of their job. For this reason, it is rarely feasible to use electronic surveying as a means of collecting data from study participants. Furthermore, it is difficult to justify burdening busy frontline healthcare providers in acute settings with longitudinal surveys on a more frequent basis than every six months, as previously detailed in Study 1. Study 2 employs a different sample and methodology than Study 1 in order to accommodate these contextual realities at the organization while leveraging the statistical power of a matched-sample repeated-measures design with low attrition. In

Study 2, the author takes a more intimate approach to research by surveying a smaller, more invested group of employees at the front line.

Sample

Recall that as part of the transformation to lean, each unit in the experimental group formed its own team of champions of the change initiative (n = 10 to 15, for a total of n = 42 participants). Champions were hand-picked by their manager to represent a variety of employees from a variety of job groups. These individuals appeared to be well respected by their colleagues, and were believed to have the ability to influence opinions of their peers. Each champion team included at least two (usually three) nurses, two physicians, one porter, one ward aid, one member of housekeeping services, one social worker, one registration clerk, and one member of each of the various allied health groups such as physical therapy and occupational therapy. Unit supervisors were also part of the champion team, while the unit's manager chaired the monthly meetings.

Participation was not anonymous due to the matched sample design of Study 2, but data were kept confidential and individual results were never released. For each completed survey, participants received one chance to win an iPad tablet in a draw of all entries at the end of the study. Participants who completed all five surveys had a 3% chance of winning the prize, a factor believed to have contributed to the low attrition rate and relatively high overall response rate of 83% (response rates ranged from 75-90% over the five waves of data collection). The relatively high response rate suggests that Study 2 participants were much more comfortable with identified surveys as proposed by the author, and were personally invested in contributing to the success of the research

project. Attrition was mostly related to participants leaving their current job through secondment, transfer out, or termination of employment; an estimated 10% of the original participants left the group for such job-related reasons, and were replaced by new champion group members.

Procedure

Four months into the implementation of the change initiative, after experimental group champions were briefed on the purpose and planning for the transformation and had held enough informative meetings to be able to understand the purpose and new business practices of the initiative, participants began receiving an electronic survey distributed by the author of this study on a bimonthly (i.e., once every two months) basis. The relatively high frequency of data collection marks a departure from traditional multi-level analyses in the field of change management (e.g., Cunningham et al., 2002), with most longitudinal studies collecting two or three time points over a period of six to eighteen months. In total, five waves of this survey were collected, beginning at the four-month mark and ending at the twelve-month mark (this is the same timing as the end of frontline staff surveys in Study 1). Results of this survey were not anonymous, and were thus not shared with hospital leadership unless aggregated to the highest-possible group level. This survey was composed of measures reflecting *individual* attitudes and cognitions (i.e., "*I* think __") as well as perceived attitudes and cognitions of the rest of the staff on the unit (i.e., "*My colleagues on the unit* think ___") wherever possible. This approach is consistent with recommendations by Rafferty et al. (2012), who suggest that some change-related attitudes can be measured using a referent-shift consensus model

(Chan, 1998) that captures how an individual believes that others in the unit perceive various aspects of the change process. The survey included measures on champion group team cohesion, quality of communication about the change initiative, participation in decision-making, trust in senior management's commitment to the change, and change readiness.

Measures

Unless otherwise specified, all items described below are measured using a five-point agreement scale ranging from "completely disagree" to "completely agree". The option of "don't know/not applicable" was shown, and none of the items were mandatory. Some items were reworded for context specificity (i.e., replacing "the change" with the actual name of the transformation initiative), and any item deemed irrelevant to the organization or healthcare industry was not included in the survey. Further, as participants were quite adamant about restricting the size of the questionnaire, some scales (identified below) were limited to between three and five of the most psychometrically-sound items in the instrument. The questionnaire for Study 2 can be found in Appendix B.

Quality of communication about the change initiative. Miller, Johnson, and Grau (1994) developed items measuring quality of communication about the change initiative. This scale is described as being a measure of communication effectiveness, with reference to the clarity, frequency, and openness of communication. This scale includes items that were adapted to refer to the specific name of the change initiative at the hospital, for example: "The information provided on the CPI System is clear", "Staff

are sufficiently informed about the progress of the CPI System", and "staff feel that the information provided on the CPI System reaches them mostly as rumours".

Interestingly, the quality of communication about the change initiative changed over time can be inferred from the manner in which participants responded to the items at each time point. A drastic change in Cronbach's alpha values is observed for this scale over the course of the study. For the first three waves, alpha values ranged from .39 to .42, jumping to between .68 and .76 in the fourth and fifth waves. One explanation for this result would be that earlier on in the implementation of the change initiative, when everything was still new to them, participants may not have recognized the name of the new management system nor have understood how to respond to questions about communication quality.

Participation in decision-making. The champion survey includes 5 items used by Bouckenooghe et al. (2009) in the development of their Organizational Change Questionnaire. These items were based on work by Lines (2004) and Miller and Monge (1986), and refer to the extent to which staff are involved in change-related decisions that directly concern them. Items were reworded for context specificity regarding the name of the initiative and newly introduced business practices. Examples include: "All front line staff on the unit feel they can raise topics for discussion at daily huddles" (item reworded for context specificity), "staff members are sufficiently involved in the implementation of the CPI System", and "changes to work are always discussed with all people concerned". Cronbach's alpha for this scale ranges between .70 and .93 across the five time points

involved in this survey. Cronbach's alpha was not improved with the removal of any of the items.

Individual change readiness. Rafferty et al.'s (2012) review of change readiness offers in-depth suggestions on measuring this construct at the individual level by assessing its cognitive and affective aspects. Items measuring cognitive change readiness developed by Holt et al. (2007) include, for example, "I have the skills that are needed to make the CPI System work" and "I think [hospital name] will benefit from this change initiative". From the same scale, items measuring affective change readiness include "I am worried that I will lose some of my status at the hospital when the change is implemented" and "I feel I will be able to handle the implementation of the CPI System with ease". The assessment of behavioural intent to change, a debated component of change readiness (Rafferty et al., 2012), was gathered from Bouckenooghe et al.'s (2009) OCQ with "I am willing to make a significant contribution to the implementation of the CPI System".

In total, 9 items in the champion survey measure individual change readiness – that is, change readiness of the champions themselves. These 9 items were combined as a mean. Cronbach's alpha for this scale was between .76 and .87 across the five waves.

Unit-level (collective) change readiness. As recommended by Rafferty et al. (2012), a referent-shift model for measuring collective (group-level) change readiness was deemed appropriate. The individual-level readiness items described above were altered to change their referent perspective, such that they ask each champion to rate his or her perception of the attitudes of *other members of the unit* on each item (Chan, 1998).

That is, cognitive change readiness at the unit level was measured in the champion survey using items such as "*People in my unit* believe they have the skills that are needed to make the CPI System work" and "*Staff on my primary unit* believe the hospital will benefit from this change initiative". Cronbach's alpha for unit-level change readiness as perceived by the champions was .62 to .88 over the five waves of collection. The alpha coefficient was not improved by the removal of any of the items.

Individual trust in senior leadership's commitment to the change. Having identified trust in leadership's commitment to change (dubbed "senior leader support" in their questionnaire) as one of the themes most significant to readiness, Holt et al. (2007) included this subscale in their systematically developed instrument for gauging how employees feel about proposed changes. Although ten items were developed as part of Holt et al.'s (2007) subscale, only three were included in the survey due to pressures from participants to minimize its size. Examples include "[hospital name]'s most senior leader ([name]) is committed to implementing the CPI System" and "Our corporate management (VPs and CEO) has put all its support behind the CPI System". Cronbach's alpha ranged from .63 to .88 throughout the course of the study, and did not improve by removing any of the items.

Unit-level trust in senior leadership's commitment to the change. Similar to the methodology used to measure collective readiness, the *unit's* group-level perspective of leader commitment to change was assessed by change the focus of individual-referent items to peers and other staff on the unit. For instance, the example items described in the previous section were changed to "*People on my unit* believe that [hospital name]'s most

senior leader ([name]) is committed to implementing the CPI System" and "*Staff on my unit* believe our corporate management (VPs and CEO) has put all its support behind the CPI System". Cronbach's alpha ranged from .78 to .93 throughout the course of the study, and did not improve with removal of any of the items.

Champion team climate: cohesion. Cohesion was chosen as a measure of psychological climate within the champion group on the basis that a (more cohesive) champion group appearing as a united front will be more influential than a less cohesive group. As a dimension of psychological climate, cohesion is defined as "the perception of togetherness or sharing within the organization setting, including the willingness of members to provide material aid" (Koys & DeCotiis, 1991, p.273).

Team cohesion in organizational contexts is infamously difficult to define because measurements have typically involved the adaptation of a cohesion scale for sports teams, resulting in measures that invoke emotions that are too powerful and not appropriate for teams in a work setting (Mudrack, 1989; Mullen & Copper, 1994). In this study, the measure of team cohesion between members of each unit's champion group is composed of items originally based on Stokes' (1983) Three Factor Group Questionnaire, and since used in an organizational context (i.e., Barrick, Stewart, Neubert, & Mount, 1998). Examples of some of the items in this scale include "team members consistently help each other on the job", and "the members of this team get along well with each other". Cronbach's alpha for this scale ranged between .90 and .95 over the five time points.

Results: Study 2

The data for this study were analyzed using MPlus Version 6.12 (Base and Combination Add-On) by Muthén & Muthén (www.statmodel.com). To test each set of hypotheses, latent growth curves were estimated for each predictor and used to predict change in the criterion. Latent growth curve analysis involves estimating a confirmatory factor analysis model with two latent variables (representing the slope of the curve and its intercept) from at least three indicators (Kelloway, 2015). As the slope variable represents the rate of change over time, each analysis involved estimating the slope of the latent growth curve of the criterion from the slope and intercept of the predictor. Details on this technique can be found in chapter 8 of the Mplus User Guide (Muthén & Muthén, 2010), as well as Kelloway (2015).

Model fit was assessed using indices employing with two opposite strategies for estimating fit. The root mean square error of approximation (RMSEA; Steiger, 1990) was used as a measure of absolute fit, and the comparative fit index (CFI; Bentler, 1990) as a measure of comparative fit. In introducing the RMSEA, Steiger (1990) suggests a cut-off value of $RMSEA = .10$ as an indicator of good model fit, while others have suggested $RMSEA = .06$ to be a better cut-off for good fit (Hu & Bentler, 1999). CFI values range from 0 to 1, with $CFI = .95$ generally accepted to represent good fit (Hu & Bentler, 1999).

For each analysis, participants were nested within units, and time was nested within each participant. See Table 9 for descriptive statistics.

Table 9
Descriptive statistics of data collected from champions, by experimental group and time.

	Unit A			Unit B			Unit C		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Communication quality									
Wave 1	10	3.46	0.488	10	3.38	0.319	13	3.35	0.584
Wave 2	11	3.65	0.391	11	3.39	0.312	14	3.63	0.508
Wave 3	10	3.68	0.543	9	3.60	0.412	12	3.63	0.447
Wave 4	10	3.88	0.344	7	4.14	0.412	13	3.18	0.645
Wave 5	10	3.84	0.398	7	4.02	0.535	13	3.12	0.769
Participation									
Wave 1	10	3.66	0.481	10	3.64	0.450	13	3.53	0.645
Wave 2	11	4.00	0.607	11	3.67	1.009	14	3.81	0.658
Wave 3	10	4.11	0.621	9	3.78	0.689	12	3.74	0.631
Wave 4	9	4.04	0.384	7	4.37	0.293	13	3.49	0.739
Wave 5	10	4.02	0.670	7	4.49	0.445	13	3.09	1.015
Team cohesion									
Wave 1	10	3.55	0.380	10	3.52	0.324	13	3.68	0.734
Wave 2	11	3.63	0.435	11	3.55	0.761	14	3.96	0.537
Wave 3	10	4.05	0.620	9	3.90	0.552	12	4.07	0.510
Wave 4	10	3.97	0.519	7	3.84	0.391	13	3.81	0.595
Wave 5	10	4.14	0.599	7	4.01	0.460	13	3.55	0.645
Individual trust in leader commitment									
Wave 1	10	3.45	0.685	10	4.10	0.738	12	3.67	0.835
Wave 2	11	4.00	0.500	10	4.20	0.483	14	3.96	0.664
Wave 3	10	4.15	0.530	9	4.33	0.661	12	4.04	0.782
Wave 4	10	4.25	0.425	7	4.29	0.906	13	3.92	0.760
Wave 5	10	4.20	0.632	7	4.71	0.488	13	3.92	1.017
Group-level trust in leader commitment									
Wave 1	9	3.11	0.601	10	3.70	0.537	10	3.15	0.626
Wave 2	10	3.55	0.599	11	3.68	0.643	13	3.27	0.780
Wave 3	10	4.10	0.516	9	3.94	0.726	12	3.21	0.916
Wave 4	9	4.00	0.250	7	4.14	0.378	13	3.23	0.807
Wave 5	10	4.00	0.471	7	4.36	0.476	13	3.27	0.857
Individual change readiness									
Wave 1	10	3.70	0.369	10	3.90	0.531	12	3.98	0.436
Wave 2	11	3.79	0.431	11	3.69	0.628	14	3.84	0.559
Wave 3	10	3.79	0.493	9	3.94	0.590	12	3.77	0.352
Wave 4	10	3.66	0.331	7	4.11	0.552	13	3.75	0.513
Wave 5	10	3.91	0.408	7	4.18	0.544	13	3.58	0.659
Group-level change readiness									
Wave 1	10	2.81	0.312	10	3.22	0.482	12	2.92	0.529
Wave 2	11	2.92	0.474	11	3.10	0.803	14	2.97	0.710
Wave 3	10	2.90	0.599	9	3.28	0.717	12	2.74	0.539
Wave 4	10	3.04	0.449	7	3.57	0.371	13	2.76	0.798
Wave 5	10	3.08	0.466	7	3.57	0.499	13	2.41	0.655

Same-Level Antecedents of Change Readiness

Hypothesis 4a proposed that the quality of communication about the change would be associated with change readiness. Significant estimates were observed for both the slope (b = 0.71, p = .000) and the intercept (b = 0.125, p = .028) for communication quality predicting *individual* change readiness. Model indices suggest a weak fit with RMSEA = .10 (p-close = .103) and CFI = 0.87. Given that quality of communication was only measured at the individual level and thus had no a priori basis for investigation, the test of quality of communication predicting *collective* readiness was not conducted.

Hypothesis 4b proposed that participation in decision-making would be associated with change readiness. No evidence for support of this hypothesis was found, as neither the slope nor the intercept of participation significantly predicted change readiness at the *individual* level. For the same reason outlined above, the test of participation predicting *collective* readiness was not conducted.

Hypothesis 4c proposed that trust in the commitment of senior leaders would lead to change readiness. At the *individual* level, no significant relationship between trust and individual change readiness was observed. However, a shift in referent perspective revealed some significant findings. At the start of data collection, the initial level of trust in senior leaders at the *collective* level (that is, a champion's perception of his or her colleagues' trust in their senior leaders) was significantly related to collective readiness (intercept b = .31, p = .000). The fit indices for this model have room for improvement, RMSEA = .17 (p-close = .000) and CFI = 0.87.

Hypothesis 4d proposed that team cohesion would be associated with change readiness in the champion group. Results reveal that the intercept of cohesion significantly predicted *individual* change readiness (b = 0.019, p = .000). However, this model was a poor fit for the data, RMSEA = .16 (p-close = .000) and CFI = 0.67.

Cross-Level Analyses

To investigate whether champions were effective in influencing the attitudes of their colleagues, hypothesis 5a proposed that *individual-level* readiness would predict group-level (*collective*) readiness. Results of this analysis were not significant, and the hypothesis was not supported.

In line with the previous investigation, hypothesis 5b proposed that champions' *individual* trust in leaders would influence the *collective* trust of their peers. Results of this particular analysis were not significant; however, in order to investigate whether the opposite was true (i.e., whether "peer pressure" had a stronger influence on champions than vice versa), an analysis of collective trust predicting individual trust was conducted. Results of this follow-up analysis suggest that, in fact, the champions may have succumbed to the influence of their peers because a significant slope estimate was found (b = 0.75, p = .001). Fit indices are passable but also have room for improvement, with RMSEA = .15 (p-close = .002) and CFI = .86.

Lastly, a follow-up analysis for hypothesis 4c was proposed in that if support was found for that relationship (trust predicting readiness), the influence of champions would produce a similar cross-level relationship such that individual trust would predict collective readiness. Given the above results, it is perhaps not surprising that support for

this relationship was not found. However, support for the opposite relationship was observed: a significant intercept of *collective* trust predicted *individual* readiness (b = 0.144, p = .04). Good fit for this model was found, with RMSEA = .10 (p-close = .110) and CFI = 0.94.

Conclusion: Study 2

The purpose of Study 2 was to shed light onto the mechanisms of change using a longitudinal, multi-level perspective. To this end, two sets of hypotheses were developed to assess (a) same-level antecedents of change readiness over time, and (b) differences in relationships at the individual and group levels.

Support for three of the four proposed predictive models was found. At the individual level, a change in the quality of communication received about the initiative led to a change in readiness; beyond providing support for the association of communication quality with change readiness, this finding suggests that efforts to improve communication as the transformation progresses are not lost on employees. In fact, improving quality of communication over time is likely to have a positive effect on individual change-related attitudes. Further, team cohesion among members of the champion group was found to significantly predict change readiness, although the poor fit indices may point to the presence of external variables in this model.

At the group level, employees' initial level of trust in senior leaders (at the beginning of the change) was found to have a significant effect on collective change readiness. These results continue to highlight existing associations between leader trust and change readiness in the literature, while placing emphasis on the planning phase:

findings suggest that building trust during the *planning* phase of a change, *before* it is introduced to the group, is critical to achieving a higher level of readiness. What's more, building trust before introducing a change is likely to have beneficial effects on the perceived messaging (and, perhaps, quality of communication) related to the change, which has been shown above to predict change readiness at the individual level in this sample.

Cross-level relationships were explored by leveraging a shift in referent perspective as well as the champion group's supposed ability to influence the attitudes of their peers. Interestingly, findings opposite to what was hypothesized were revealed, as champions appear to have been influenced to a larger extent than vice versa. The significant slope of *collective* trust predicting *individual* trust suggests that, over time, champions who perceived changes in their colleagues' trust in leaders were likely to follow with similar attitudes. The significant intercept of collective *trust* predicting individual *readiness* has somewhat similar implications, suggesting that individual readiness depends on the initial level of collective trust in leaders prior to the start of the change implementation.

At any level (group or individual), building trust in leaders would be an appropriate action to foster change readiness. Seeing as some studies have shown an inevitable drop in positive feelings about a change over time, especially in circumstances in which new changes (or business practices) are added incrementally until a complete transformation is achieved, it is important to put continuous effort into improving levels of trust in senior leaders. Of note, special attention should be placed on the existing level

of trust prior to introducing the change: results in this sample suggest that means other than trust-building are required to improve change readiness after the initiative has begun. Focusing efforts on improving communication throughout the change appears to be one viable option. On the other hand, it appears that use of a champion team in this particular change initiative has failed to motivate others on the unit to buy into lean management.

General Discussion

The goal of this research was to shed light on multi-level mechanisms of change by studying the case of a transformation to lean management in a medium-sized Canadian hospital. The process variables under study were communication and participation, and the attitudinal variables of interest were trust in leaders, affective commitment, and employee engagement. This research was conducted in a field setting: a design that often generates "messy" data, contributing to low reliabilities and statistical power. However, it must be emphasized that research conducted in the field is very important and necessary to the development of industrial-organizational psychology. As such, the contributions to knowledge made by this research lie within theory, methodology, and practice, and are discussed in this section.

Recap of Findings and Contributions to Knowledge

Study 1 found a significant difference, pre- and post-implementation, in the attitudes and behaviours of employees involved in the change compared to a wait-list control group that had not yet been through the transformation. Further, a significant decrease was observed in the affective commitment of employees of a unit that may have

sustained too much change in too short of a time period (see Appendix A: Interviews with Unit Management and Appendix C: Verbatim Comments from Study 2 Participants for anecdotal substantiation of this assertion), suggesting that negative repercussions can arise from managing change poorly.

Study 1 also uncovered a curvilinear path of change over time, such that the pace of adoption in the first six months was steep and positive, and then the pattern reversed and attitudes went back to pre-change levels in the following six months.

Study 2 was a multilevel investigation of the relationship of our variables of interest with change readiness, a predictor of change-supportive behaviours and successful change management. Findings of this study highlight the importance of creating and maintaining group-level trust in leader commitment in order to get individuals to buy into the vision.

Contributions to theory. Study 1 managed to replicate the little peer-reviewed, empirical evidence that exists on the subject of lean management and its impact on beneficial employee outcomes, in that mixed results were found. Trust in senior leadership, overall staff engagement, and attendance at daily huddles increased throughout the research period—but only for employees who had seemingly "bought in" to the new vision. This was supported by qualitative evidence provided by the managers at the front of What factors might have affected whether this change would be successful or not? Many of the presented models of change appearing in the literature suggest that transformational leadership and effective communication of information about the end vision help individuals rationalize the change (Lewis & Weigert, 1985). In Liu and

Perrewé's (2005) model of individual reactions to organizational change, "type of information communicated" is posited to moderate the relationship between one's primary appraisal of the situation, and excitement or fear as the resultant emotion. Supporting this hypothesis is the observation that, in Study 2, perceived quality of communication about the change was rated lower in the outpatient unit (C) compared to the inpatient units (A and B) at the start of the study: this may have contributed to the observed difference in change readiness. Moreover, an addition to this model is proposed. In both studies, trust in leadership was also lower among employees of the outpatient unit (C) compared to the inpatient units (A and B). Given the magnitude of research on building trusting relationships as a mechanism for motivating employees during times of change (i.e., Emery & Trist, 1965; Holt et al., 2007; McGregor, 1960; Schneider et al., 1996; Tierney, 1999), a logical extension of Liu and Perrewé's (2005) model would be to include feelings of trust in one's leader or change agent as an influencing factor on the relationship between primary appraisals and the emotional reactions that emerge from them.

Contributions to methodology. Study 1 uncovered a curvilinear path of change over time, such that the pace of adoption in the first six months was steep and positive, and then the pattern reversed and attitudes went back to pre-change levels in the following six months. These findings are interesting in light of recent employee-centric models of change developed to focus on the cognitive-emotional processes that occur within individuals at the heart of the change. For example, the curvilinear nature of the change in this research uncovered by Study 1 supports the notion of cyclical rather than

linear experiences of change at the individual level. However, in contrast to Jaffe et al.'s (1994) and Isabella's (1990) frameworks, most measures under study in this organization presented an inverse-U shaped function whereby attitudes improved before the pattern reversed. These findings underline the important questions raised by previous researchers (e.g., Shek & Ma, 2011) on the timing of data collection during longitudinal change. Existing articles merely offer generic warnings that findings may differ based on the frequency and timing of data collection intervals, or describe triggers for moving from one step to the next without any mention of the time spent in each one. Our field is in need of more explicit and tangible milestones related to time, and more research that focuses on the amount of time typically spent by employees at each phase of a change framework.

Study 2 was a multilevel investigation of the relationship of our variables of interest with change readiness, a predictor of change-supportive behaviours and successful change management. Findings of this study highlight the importance of creating and maintaining group-level trust in leader commitment in order to get individuals to buy into the vision. Tying that back to the literature, these findings give support to Rafferty et al.'s (2012) model outlining the determinants and outcomes of change readiness from a multi-level perspective. As argued by Chen et al. (2005), statistical procedures that consider the aggregate level of multilevel constructs are necessary for testing theoretical frameworks of multilevel change theories such as Rafferty et al.'s (2012). This study made use of the suggested referent-shift consensus

model (Chan, 2008) to operationalize change readiness and trust in leadership at the group level in its application to Rafferty et al.'s (2012) framework.

Contributions to practice. While it should be noted that relatively new statistical approaches (such as linear growth modeling) made it possible to examine these complex relationships, the data produced by field studies is typically fraught with statistical challenges resulting from lack of experimenter control and/or influential external variables. In practice, these statistical techniques may be less helpful. However, more practical lessons can be gleaned from this research.

For the executive leaders of the change implementation at the hospital, finding the cause of the dip in attitudes related to the change that occurred after 6 months in order to mitigate it in future iterations is front of mind. Why were the benefits of the intervention not sustained? The results of this research suggest that a decline in senior leadership trust (specifically, trust that leadership would follow through with the change) led to a decline in the buy-in (change readiness) of individual employees. However, Study 1 saw many change-related attitudes other than trust decline simultaneously after 6 months. Possible reasons for the simultaneous decline are thus proposed, although many are outside the scope of this research. The first involves the planned, gradual removal of coaching support and resources for middle-level managers after 6 months of having learned the philosophy of lean management and been introduced to the new business practices with help from a lean mentor at the hospital. The idea is that this gradual reduction of hand-holding allows managers to practice their coaching skills and ability to promote lean thinking and problem solving among their staff (see page 11 in this manuscript), thus

eventually becoming self-sustaining in their application of lean principles to their business. Reflecting on the attitudinal dip observed after 6 months, one might ask whether managers were weaned off their supports too early. Indeed, a culture of continuous improvement requires continual, ongoing coaching between leaders and their staff (including managers and their directors, directors and their VPs, etc.). Coaching activity that ceased too early may have contributed to declining change-supportive attitudes of frontline staff.

In addition, it is possible that the new business practices were solely effective for dealing with minor, day-to-day irritants, and were not effective for long-term resolution of complex problems. In the early stages of the transformation, staff who used process improvement tickets and daily huddles to address minor issues represented a quick win for the lean transformation initiative. However, as tickets became increasingly complex and farther-reaching in their impact on other departments, barriers began appearing in the form of insufficient funds, excessive time requirements, lack of cooperation from other departments, or widespread policy change requirements. When process improvement tickets that required escalation to senior leaders (for approval, funds, or other bureaucratic action) stalled at that level for weeks or months, staff may have lost faith in the leadership's commitment to changing their old ways.

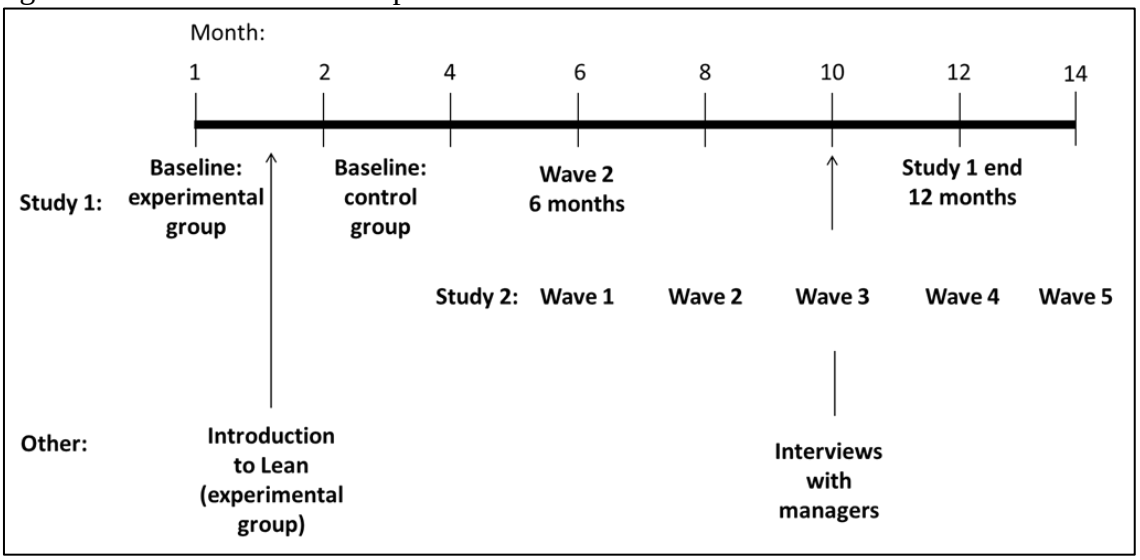
Finally, it is possible that employees became used to their "new normal" after six months, and habituated to the changes that had taken place as part of the transformation to lean.

Other external factors unrelated to the transformation to lean cannot be ignored. Between the second and third wave of data collection for Study 1, electronic documentation was introduced to the frontline staff in inpatient units A and B, meaning that patient paper charts were being replaced with electronic charting. Anecdotally, this change was stressful to employees, with some of them actually exiting the organization in anticipation of the move to e-documentation. This move was perceived by staff to come from the top down, and may have triggered the observed discontent at the front-line 6 months post-implementation. In a related vein, we have seen that change turbulence (Herold et al., 2007; Herold & Fedor, 2008), the concept of increasing and compounding change, can reduce the chances of success of a change implementation due to its deleterious effects on the mental health of employees: the implementation of electronic documentation in close juxtaposition to the transformation to lean may have been too much change for employees to handle.

Whatever the reason for the decline in change-supportive attitudes, the sustainability of teleological change has always been difficult. One year post implementation, many studies have found negligible change or only very small effect sizes (Armenakis & Bedeian, 1999; Beer & Eisenstat, 1996; Buchanan et al., 2005; Guzzo et al., 1985; Kotter, 1995; Senge et al., 1999). The results of this research, however, have implications with respect to the timing of measurement during change management: in longitudinal research of change, it is important to consider possible curvilinear patterns in the data that may conceal linear effects over time.

By way of example, even some of the methods-related numbers involved in this research project demonstrate how the timing of each measure may very well have influenced observed results. The total length of this study was 14 months, and involved 8 waves of survey collection across 7 different participant groups. It is actually quite possible that different conclusions could have been reached should the study have been longer or shorter, or should the administration of surveys have varied. See Figure 11 for an overview of the timeframe within which each data element of Studies 1 and 2 was collected, as well as the temporal relationship between them.

Figure 11. Timeframe and temporal relation of data elements collected.



Potential Limitations

One obvious limitation of this research is that it focuses on only one hospital organization, thereby raising questions about the generalizability of its results. Further, improvement of the measurement scales administered to frontline staff would have bolstered the results with methodological rigour that was unfortunately hampered by the practical realities of field research.

Most of the measures used in this research are perceptual, which may inflate the associations between them due to common method bias. However, whenever possible, academically-developed and validated measures were used: such methods are resistant to the method variance problem (Spector, 1987). Although the longitudinal design of Study 1 had some flaws related to anonymity concerns of participants, the matched data adds a degree of control with respect to confounding effects and other external variables.

Given the results of the study, a measure of employee cynicism may have been useful in the analysis of change readiness. Employee cynicism toward organizational change efforts has been found to damper positive change in organizations in several studies, and could have explained the attenuation of positive attitudes in the outpatient unit (C) (Reichers et al., 1997; Martins & Kambil, 1999).

The data collected from the experimental group was divided into two after analysis of one-on-one interviews with unit managers who explicitly identify the outpatient nature of Unit C as the main differentiator between it and inpatient units A and B (see Appendix A: Interviews with Unit Management), as well as comments from staff surveyed as part of Study 2 (see Appendix C: Verbatim Comments from Study 2 Participants), which suggested that buy-in of staff in outpatient unit C never occurred compared to the other two inpatient units (A and B) in the experimental group. The conclusion of Study 1 was that poorly-implemented change can result in negative repercussions, as suggested by a significant drop in affective commitment observed in outpatient unit C compared to the control group and other two units in the experimental group. That said, it should be stated that it is also possible that statistical power was too

low to be able to detect a difference over time, which would have resulted in non-significant growth for that unit in most of the measured attitudinal variables.

In some cases, the attitudinal measures captured in Study 1 yielded Cronbach's alpha reliability values that were relatively low compared to the comparative scales found within the realm of academia. This is likely to have contributed to poor fit of the data, and makes it difficult to extract clearly interpretable information. Low alphas are a limitation of the study, and could be improved with the addition of psychometrically-sound items to each construct subscale. However, the trade-off for such an endeavour would be to limit the questionnaire by reducing the number of examined constructs. In field research, it is of the utmost importance to respond to contextual realities of the organization and demonstrate respect for the participant's time. This concern is especially relevant in healthcare, when responding to surveys takes participants away from patient care.

Finally, as argued by Cortina (1993), low alpha coefficients are not necessarily indicative of inadequate reliability. Context is important when interpreting alpha, such that the number of items comprising a unidimensional scale has been found to have a profound effect on the coefficient. When the number of items is small, alpha is less likely to reflect internal consistency of items than when scales contain a larger amount of items (Cortina, 1993). Low alphas can even be obtained within scales with adequate inter-item correlations when they contain too few items. Scales with a small number of items demonstrating low levels of alpha can still be quite useful (Schmitt, 1996).

In a related vein, the poor fit statistics of Study 2 can be partially explained by the small n of each group. Although a repeated-measures, longitudinal design over 5 time points helps maximize statistical power of the analysis, group membership of up to 15 members makes it difficult to collect reliable data, despite the high response rate achieved.

Implications

As previously noted, being able to predict a decline in change-supportive attitudes after a certain period of time, or following an external organizational event (such as the introduction of an unrelated but widespread change to business practices), would allow leaders to anticipate and make efforts to mitigate it. This would be the most practical application of this research.

The implications of Study 2, with its multilevel consideration of the antecedents of change readiness, suggest that work groups have a strong influence on the attitudes and opinions of individual employees. This finding implies that assessing individual change readiness using a self-referent perspective may result in an inaccurate appraisal of the situation, and underestimation of the success of a change implementation. Collective change readiness assessed by shifting the referent perspective to the group may alleviate this potential measurement error. Further, the findings of Study 2 highlight the importance of building *collective* trust in leaders and *collective* change readiness through interventions that foster positive beliefs about change for the *group*.

The results of Study 2 also provide insight on the timing of interventions throughout the lean transformation. In response to the conclusion that trust in leader

commitment helps predict buy-in from staff, hospital leaders adjusted their strategic plan for spreading lean throughout the hospital. Where the original plan was to introduce the lean transformation to three new units every twelve months, the new strategic plan involves the option of delaying change if units have not achieved a "critical mass" of leader trust from employees. Analysis of these results has thus become an opportunity for the hospital to identify weaknesses in the execution of its strategic plan, and pre-implementation assessment of change readiness and leader trust now represents important diagnostic information to be compared to the results of the pilot test units featured in this research.

Lessons learned from conducting a field study. Conducting applied research in the healthcare industry proved to be a challenging but very important opportunity to explore the existence of theoretical models in real life. Upwards of 700 surveys were completed, data was painstakingly screened, cleaned, and evaluated at every step of analysis, survey changes were constantly requested by hospital administrators, the scope of the research was constantly re-evaluated, participants were emotionally involved in the entire process, and senior management kept a very close eye on the results of each wave. Ultimately, some hypotheses were supported, but results were not as conclusive as anticipated. Researchers contemplating studying the implementation of large-scale change should be prepared to be flexible when faced with certain complexities whose impact cannot be underestimated at the design phase. For example, maintaining an appropriate level of balance between scientific rigor and realistic expectations given the contextual realities of the hospital was a constant contest of reciprocity, collaboration,

and compromise. The ability to prioritize issues such as participant requests for complete anonymity, with other competing issues that are directly at odds with them (for example, meeting statistical assumptions for data without requirement major transformations), is a necessary requirement for success.

The participants in this research project—that is, the employees of the hospital who underwent the change initiative—should be at the centre of research processes in the design stage. Building and maintaining a professional, yet warm rapport with participants goes a long way towards uncovering special insights that cannot be garnered from questionnaires. Implementation of large-scale change in organizations can be likened to embarking on a great adventure, where the best plans are the most adaptable ones because reality will force unplanned twists and turns. Researchers who have the support and respect of the participants in their study will find such waters much easier to navigate.

Directions for Future Study

With some evidence touting the benefits of lean management on productivity while other research shows mixed or deleterious effects on employee outcomes, the consequences of lean management relative to both employees *and* organizational performance continue to be an important area of study. The addition of multilevel performance data to longitudinal investigation of change-related attitudes could represent an interesting area of new research.

Study 1 uncovered a curvilinear pattern of change-supportive attitudes over time, providing support for change theories that purport specific patterns of emotionality from

employees reacting to implemented change (e.g., Liu & Perrewé, 2005). However, it is possible that the quadratic pattern observed in this study is actually cubic in nature: in Liu and Perrewé's (2005) cognitive-emotional model, for example, individual appraisal-and-response is hypothesized to occur at each of the four phases and shape subsequent attitudes. Mathematically speaking, four "breaks" in the longitudinal pattern of attitudes over time is more likely to be a cubic function than a quadratic one. Future exploration of longitudinal change could investigate change-related attitudes on a more frequent basis than three waves every six months in order to uncover this cubic pattern.

Furthermore, as a follow up to the above, it would be interesting to see whether early adopters and resisters can be identified, and whether patterns of attitudinal reactions differ between the two groups. The author is not aware of any studies with empirical evidence exploring differences in the pattern of change-related attitudes over time between early adopters and resisters.

Study 2 provided some insight on multilevel antecedents of change readiness in finding evidence that the relationship between trust in leader commitment to change and change readiness is different at the individual and group level. This is an important implication in that it highlights a need for research on whether antecedents of change readiness are equally influential across levels, or, as proposed by Rafferty et al. (2012), whether distinct sets of antecedents drive readiness at each level. Further, it might be interesting to explore the other individual- and group-level variables featured in Rafferty et al.'s (2012) model that were not included in this study. For example, personality,

individual values, or organizational climate are presumed to have effects on change readiness in addition to those studied in this research.

Summary

Change, by definition, is a *difference* between two states—making the study of change fleeting and inherently difficult to study. Despite this, the conclusion of this 14-month study brings to light several methodological, theoretical, and practical insights into the mechanisms that drive organizational change.

From a methodological perspective, the use of longitudinal growth curve modeling as conducted in this study is one that should be favoured by change researchers with questions that explore the development of relationships as a function of time in conjunction with other measures. Such methods estimate intra-individual variability over time while identifying between-subject differences, providing credence to longitudinal frameworks of organizational change. In addition, an interesting application of a referent-shift perspective was employed in this study to assess group-level change readiness and leadership trust. This technique allowed for explicit testing of attitudinal processes occurring at multiple levels. Finally, it is imperative that the timing of data collection during studies of longitudinal change be very carefully considered by researchers in the context of the theoretical approach they wish to apply to their study. It would be most beneficial to our field for future research to uncover explicit and tangible milestones related to time in the examination of step-based frameworks of change.

With respect to change theory, this study further supports the notion that individuals experience change in a non-linear fashion. Cognitive-emotional processes

influenced by environmental variables (external to the person) are at play, and special attention should be devoted to cross-level relationships and the reciprocal influence of groups on some of its key members. With reference to Liu and Perrewé's (2005) model, the investigation of trust in one's leader or change agent as an influencing factor on the relationship between an employee's primary appraisal and emotional reaction to a change stimulus is one possible avenue for future research.

Finally, the major practical takeaways from the way in which this hospital's transformation unfurled can be reduced to one action: improving leader trust *before* launching into a large-scale change initiative. Investment in efforts to build up individual trust in senior leaders, such that they will be perceived to be in genuine support of the change initiative once it is communicated to employees, is one important step in achieving a successful transformation.

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Appendix A: Interviews with Unit Management

This report was part of a synopsis of data collected at the hospital during the implementation of its Continuous Performance Improvement (CPI) System. The interview protocol used by the principal researcher was developed by the author with direction from the senior leadership team of the organization, who was interested in specific details about the roll-out of the change initiative.

Purpose

Unit managers are ultimately responsible for engaging their staff and encouraging them to embrace the change being introduced. To this end, they must intellectually embrace the spirit and intent of Lean management, themselves. The main premise of interviewing the three demonstration unit managers was to contextualize quantitative evaluation results and obtain reactionary feedback about how the CPI System was rolled out. The interview served to investigate how managers perceive their own leadership style and whether the CPI System has had a discernible impact on their management practices, and whether conversations with staff had changed as a result of having undergone lean-related training on coaching. Secondary goals of the interview included identifying the barriers and challenges to embodying the Lean philosophy, exploring potential solutions for removal of said barriers, and assessing motivations to change and expectations for the future.

Methodology

Sample

The three nurse managers responsible for the operational performance of each pilot test unit were interviewed.

Procedure

Managers were recruited in person by the principal investigator in order to give them the chance to fully understand the implications of participating in this phase of the research project. Confidentiality was of paramount concern because of information related to job performance and job stress. Participants were promised confidentiality and de-identification of the data they wished to share, and were allowed the opportunity to read and revise reported findings prior to publication (no major changes were sustained). Participants were thanked for their time and for agreeing to participate in this study with gift certificate to a restaurant.

Interview Protocol

With direction from the senior administration team of the hospital, an interview protocol was designed by the principal investigator and approved by the Saint Mary's University Research Ethics Board. The entire interview protocol, including questions posed to participants, can be found in Appendix D: Interview Protocol for Management Interviews.

Results

The following presents findings of the manager one-on-one interviews, which were conducted in mid-October 2013, and lasted approximately 1 hour in duration. Managers were probed for specific details by the interviewer, and quotes outlined in this report serve to highlight specific findings. A thematic analysis was conducted to glean the themes presented in this report.

Learning the Ropes: Introducing Lean and the CPI System

Transparency in communication about Lean is the most important thing for managers about to embark on the Lean journey.

When managers first learned about the CPI System at the Hospital and the role of the three demonstration units, all three report feeling **excited** at the potential benefits of this management system.

> *"It was overwhelming! I didn't know anything about Lean. I had a sense that it was a good thing, but I didn't know what it was."*

Accepting and embracing the concept of Lean was easy for the managers. All agree that the components of Lean fit their personal leadership style, and believe **Lean will enhance their ability to be an effective manager**. Many comments suggested that adopting a Lean philosophy seemed like a natural extension to managers, who held the same values as the Lean philosophy but lacked an efficient system for conducting business in this manner.

> *"The changes we went through last year are more about what I believe in. If there was a problem or an improvement idea, I would go talk to the person to involve them, but then I would take charge and do the digging and running around. Now, they're in charge."*

> *"I've always made a point of asking how they could look into things, but improvements were done when I had time to do them. I didn't have a formalized way of solving issues, but I still engaged my staff, I always tried to be visible, and I looked for opportunities for feedback."*

Some managers commented on how learning the principles of the CPI System would be especially beneficial for less experienced managers. It is believed that new managers are likely to have an appetite for the type of information and knowledge offered through the CPI System, and this will benefit them in the long term.

> *"CPI would be great for a new manager. Even a new manager going to a new area. It will help with getting to know the staff and the priorities of the unit."*

> *"This is my journey. This is something that I am going through now that will affect the rest of my career."*

However, the managers explained that **not knowing how to communicate the System to staff** and **having underestimated the time commitment required** by them created

conflict on their units, at the beginning. Both these comments are about communication about the CPI System, either to managers or by them. Although it is understood and accepted that the concept and idea of the CPI System at the Hospital was not fully developed at the time, and that part of the role of being a demonstration unit was to help the system evolve, the following comments are offered with an eye towards improving the experience of the new units chosen to undergo a Lean transformation in 2014:

> *"I don't like to blindside my staff, but that's what it felt like. It was difficult to explain to staff why I was leaving to go to Thedacare when I had no clue about what the Lean business model was."*

> *"I'm not that confident at 'fake it til you make it'. To talk about something, I have to know what it's about."*

> *"I wish I had known that it takes 2.5 hours every day to do the leader standard work. I wish the communication about time commitments had been made very, very clear."*

For managers new to Lean and the CPI System, **support related to leading huddles** was identified as not only important for them, but also for the team leaders who are sometimes charged with running the huddle. Support for leading huddles involves developing several skills, such as following standard work for huddles and planning quick fixes, as well as providing support to boost the self-esteem or confidence of the speaker.

> *"As a nurse, you're not used to talking in front of a lot of other people. Leading huddles can be difficult."*

> *"I regularly involve team leaders in operations, and I will expect them to lead some huddles."*

Leadership Style and Compatibility with Lean Management

All three managers display varying degrees of transformational leadership skills.

The interview included a conversation about each manager's leadership style and practices. At the surface, it is evident that all three demonstration unit managers possess some characteristics required for successfully promoting change in their department. For example, when asked how they manage to get the best out of an employee, all three spoke of concepts related to **recognizing individual contributions, encouraging creativity and getting employees to ask questions,** and **articulating a vision that is appealing and inspiring.**

The following quotes have been abridged for clarity:

> *"I hone in on their best qualities and I try to leverage them. At the end, I celebrate successes."*
>
> *"It's about baby steps. You give them positive feedback to boost their confidence. Then you put them in situations where they can grow."*
>
> *"I try to make tasks meaningful. I love to ask 'what would your parent appreciate that you did on the unit, if they were your patient?'. It gets them to see tasks in another light."*

Some comments went a step further than simply appealing to the individual employee to complete a task, demonstrating that managers understand the higher goal of **connecting their staff's sense of self to the collective identity** of the unit. Tactics such as these help employees develop a sense of purpose, adding value and meaning to their jobs.

> *"It always helps an employee be accountable when they can see that they are part of the Hospital [and are able to affect performance outcomes, themselves]."*
>
> *"I always tell them, 'your perspective is important'. I try to get them to see that different roles are important, and the unit wouldn't be the same without their input."*

Finally, only a few comments demonstrated attempts by managers to gain **respect and trust** from their employees. When leading a change initiative such as the implementation of the CPI System in demonstration units, trust and respect are integral in creating buy-in and engaging employees.

> *"When I coach, I have to make sure it's not perceived as a disciplinary thing."*
>
> *"I want to be a role model for my staff. I'm trying to be the change that I want to see."*

Effect of CPI System on Leadership Style and Coaching Practices

The Center for Continuous Performance has been effective at providing managers with useful coaching techniques, while the CPI System is believed to have helped with unit performance and accountability.

Interestingly, some comments showed the extent to which the CPI System has already impacted leadership styles. It is clear that the **Lean philosophy complements each manager's values**, and the specific coaching techniques and behaviours taught by the Center for Continuous Performance Improvement and the Lean Coaching Workshop are perceived as effective and useful.

> *"I used to get my staff together, inform them of the target we were trying to reach and where we were at, and then follow up with audits. (Laughs) It was so ineffective! Now it's a lot better because we work through things together. Performance meetings are done in a very supportive way."*

As part of the roll-out of the CPI System, the demonstration unit managers have attended numerous workshops and informal training sessions on how to effectively coach their staff into becoming problem solvers. All three managers expressed appreciation of the coaching they've received from the Center for Continuous Performance Improvement, knowing that this type of training is difficult to do.

> *"[Name of CPI coach] has done a great job. She is never punitive, and offers very good suggestions."*

> *"Training how to coach is difficult because coaching is a skill, not a tool. It's not prescriptive. It's something that needs to be practiced."*

> *"I've gotten the basic coaching from Yellow Belt training, and that was pretty introductory. It's been effective, but now I feel like I need more."*

When asked to talk about one technique they've learned while being coached by the Center for Continuous Performance Improvement, the most popular technique was **asking employees what they think they should do next.** Managers described how this technique had, in some cases, changed the way they perceived what it means to be an effective coach, and described the situations in which they actively try to apply this coaching technique:

> *"It's so effective. It gives a sense of shared ownership, and I don't own all the problems on the unit anymore. It has changed the way I speak with nurses on my unit."*

> *"I look for every single opportunity to coach. It's something I've always known about, but hadn't been able to practice in a systematic way. I how have the protected time [in my daily schedule] to practice coaching, it's great!"*

> *"I try to do this with new change nurses. It's always the first question I ask."*

> *"Now, coaching is about letting go a little, giving them confidence to do something, gently guide them if necessary, but most of all it's about staff learning."*

Looking back, managers report that their roles were more task-, performance- and priority-driven before the CPI System was implemented on their units, rather than about developing their staff. Most of the managers identified unit operations as the main focus of their role, at the time, and effective performance was judged by meeting targets (sick time hours, GAP tool completion, PEPS, etc.) and maintaining staffing capacity.

> *"There seemed to be a different sense of priority. Now, it's almost as if it's a given that the performance [of the unit] will follow. It's almost as if we're striving for something more. Before, it was about completing each task on my list, one at a time. Now it's about developing and growing my staff so that we can share the accountability."*

The three managers understand that although the work and accountability for the unit's performance is shared among the [champion group] and frontline staff, unit priorities must be related back to the metrics tracked through the CPI System. This suggests that **managers have adopted the CPI System as the business model for attaining performance targets in their units**, instead of believing that they are solely responsible for meeting targets. The following quotes demonstrate the shift in thinking that has occurred, as managers agree that unit performance is achieved through the development of staff:

> *"I cross reference the [champion group] stuff with my Accountability Agreement. Going forward, I will need to marry [champion group] priorities with organization priorities."*

> *"Graphs of our performance are displayed all the time. I can speak to them and the staff can see, visually, that we are meeting targets. We can get excited about that."*

> *"The performance board will take off. People are starting to put 2 and 2 together and thinking about how they can affect the measures."*

Operational resources (i.e., time, budget, staffing) were identified as having the largest impact on attaining performance targets.

> *"The unit performance is the [champion group] metrics. What makes [the targets] difficult to reach is operational constraints. The CPI System helps meet targets in units that are in operational maintenance mode, [but not in those that are] over budget or understaffed."*

Effect of CPI System on Manager-Staff Interactions

Managers attribute a change in conversations with staff to the CPI System.

For all three managers, a change was apparent and observable on their units, to varying degrees. Managers were asked to describe this change, how much work had gone into creating it, and how they felt about it.

In terms of the nature of the change, comments centered on conversations with staff. One manager explains that the conversations themselves had not changed so much as the people with whom they are taking place:

> *"The CPI System has provided me with a vehicle with which to interact with my staff. Before, conversations were more social and general. Now, I have a focused way of getting to know my staff and how they think. Now, I talk to people who are putting up tickets because they want to be a part of process improvement. I don't have to rely on the same few who are extraverted and who come see me all the time."*

The other managers believed that it was the content of conversations that had changed, and this had led to noticeable differences in their staff:

> *"I see a difference in my staff. There used to be this one nurse—she always had a million ideas for improvement, but staff felt like she was just nagging. Now she has a vehicle to channel her energy in a positive and productive manner. IT'S GREAT."*

> *"I see a difference in how I relate to my staff now. I'm very happy about what my unit looks like today, [because] people on the unit have changed their attitude."*

When asked which component of the CPI System they preferred, the **status exchanges** with team leaders and directors were the resounding selection. Managers described the status exchanges as giving them a priority for the day, helping them be supportive of the team leader, and giving them an opportunity to share critical information and feel in control. It was noted, however, that status exchanges with team leaders were "getting boring" and in need of evolution.

Barriers and Challenges to Implementing the CPI System

The biggest challenge is the CPI System's inflexibility and dependence on time-based structure, especially in [outpatient unit C]. Other barriers to implementation include the existence of two distinct cultures at the Hospital, resistance from allied health and physicians, and the time it takes to work on projects.

Some comments shed light on the challenges created by introducing change in the work practices of demonstration unit managers. More specifically, standardizing parts of one's workday is one aspect of the CPI System that has caused some challenges in terms of workload management. Managers describe the system as **rigid** and **inflexible,** and report staying at work later than usual in order to complete the work they would have normally done in the time that is currently being attributed to leader standard work. In addition, doing work related to the CPI System in areas of heightened **time sensitivity** has proved to be a challenging issue that has not yet been resolved.

> *"It was easier to prioritize [what to work on at any given moment] back then. I had more flexibility to fill my day with what I needed to do. I had control over my own time."*

> *"Now, I don't have much autonomy. It's fine, that's the way they want to run their business. But it's a rigid system when it comes to scheduling. There's no flexibility, no room for deviation."*

> *"There is no flexibility in this system for doing the work. It's difficult to balance priorities for which process improvement project to work on, and even 15 minutes can result in us missing a time sensitive target."*

With respect to the rigidness of the CPI System, **[outpatient unit C]** was identified as the demonstration unit facing the greatest challenge, because of the time sensitivity of the department. It was proposed that its nature as an **outpatient unit** has more to do with these challenges than its size, budget, or staffing, and a possible solution would be to allow for more flexibility in scheduling of components in such departments.

> *"Huddles are at the mercy of staff availability. There is a huge disconnect between what actually happens in [outpatient unit C] and how the Hospital is trying to implement the CPI System."*

> *"[Outpatient unit C] isn't able to tie anything down to a particular timeframe. You can do that in inpatient units as there is less time sensitivity."*

> *"Flexibility is the key to sustaining the CPI System in an outpatient department such as [outpatient unit C]."*

Another major challenge identified by the managers was what they called **"living in a hybrid world"**, where the CPI System has been introduced in a minority of departments while the Hospital continues its business as usual. Managers described it being difficult to empower their staff to take action on a process improvement when the rest of the organization expects approval from managers at every step. In addition, it is difficult for managers to find extra time in their workday to work on organizational deadlines that are not related to the CPI System.

> *"Right now, not everyone is on board. For example, all we get from [non-clinical support department] is empty promises. We live in two worlds and it's difficult."*

> *"When I coach for problem solving, I always have to take that extra step of giving people in other departments a heads up on what my staff is doing. The old-school mentality of the Hospital with respect to having management sign off on everything is limiting."*

> *"We still have organizational deadlines for managers that we cannot move. After gemba, I do staffing stuff while people pop in to discuss things, then I have meetings. The CPI System is so rigid that there is no time to complete [work for the organizational deadlines]".*

Frustration at the **resistance** displayed by staff who refuse to come to huddle was echoed by managers who perceive a disconnect between some job groups. For example, where some nurses are extremely engaged, physicians or allied health professionals appear to be more reluctant to join huddles because of workload concerns.

> *"When physicians are not part of the huddle, it creates a divide that doesn't need to exist."*

> *"I want to tell them that if their workload is too high, we need to do CPI! But they're just so disconnected."*

The **time** taken by some components of the CPI System was also identified as a barrier to implementation. For example, frontline staff working on improvement projects and managers taking a moment to coach are time-consuming tasks. Although it is generally understood that change initiatives take time to implement, time is a precious resource in many areas of the Hospital.

> *"There are many improvement projects going on at any given time, and that's time away from the patient. There's a way to prioritize them, but even that takes time."*

> *"Even if an issue is up on the board as a ticket, people still come to my door to talk about the problem. The time I spend on that ticket becomes duplicated work because it takes so long to work through both the ticket (at huddle) and face-to-face."*

> *"Coaching is very time consuming if you want to do it properly."*

> *"Sometimes it's hard to find the time to embody Lean and practice coaching. I don't want to be walking around, shoving this down my staff's throats when they've got [jobs] to do."*

Looking Forward

Sustaining the CPI System at the Hospital may require more flexibility when it comes to outpatient units, but managers are hopeful about the future of the CPI System at the Hospital. Key messaging to new units should showcase the successes of the demonstration units.

Managers expressed **cautious optimism** regarding whether the CPI System will be sustained at the Hospital, warning that implementation will fail if the necessary resources and support are not provided by the organization. This latter concern was identified for sustainability across the Hospital and in [outpatient unit C], specifically.

> *"CPI will be successful if we focus all of the Balanced Scorecard priorities through the CPI System. We can't get distracted and do side projects."*

> *"It might be that the CPI System will have to look different in outpatient environments where you can't control the structure of the day."*

A few comments pushed for showcasing the success stories of the demonstration units as a means of messaging the CPI System to future units. The most effective way to sell the CPI System was deemed to be with the message that it gives employees the opportunity to actively work to provide better patient care.

> *"We should take the successes of the demonstration units to give the new units a more tangible vision."*

Appendix B: Study 2 Questionnaire

Instructions for first questionnaire:
Earlier today, you were invited to participate in a series of online surveys on your experience as part of the [champion group name] on your primary unit. By participating, you will be helping two projects:
1) The Centre for Continuous Performance Improvement will group totals (**not** individual responses) and general comments to see how they are doing in terms of rolling out the CPI System.
2) As part of my doctoral dissertation, I am conducting a research project under the supervision of Dr. Kevin Kelloway and with funding from the Social Sciences and Humanities Council. With your permission, I would like to track your responses over the next six months and see whether they change as [hospital] continues its implementation of the CPI System.

[This Informed Consent form appears prior to starting the electronic survey. Participants must select "I accept – Next" to continue in the study.]

All members of the [champion group], including you, will receive a survey every 2 months. As you are part of a small team, your participation is invaluable as results are only reliable if enough surveys are fully completed. We appreciate your efforts to complete each survey.

There are only **four groups of questions** to answer this round. It should take you **less than 10 minutes**.

The potential benefits to participating in this study include getting the opportunity to provide feedback to the Centre for Continuous Performance Improvement on their process for implementing the CPI System. You are also contributing to the scientific study of change management through Laure's dissertation research.

The potential risks for participating are minimal. However, if you experience any adverse emotional responses to this survey, such as feeling anxiety, stress, or frustration, please feel free to skip those questions. You are encouraged to contact Laure with your concerns in this type of situation.

Participation in this survey is completely voluntary. You may withdraw at any time and without penalty by closing the browser now. If you would like to remove the feedback you provided in an earlier wave from Laure's dataset, please feel free to email laure.pitfield@smu.ca. If new information that is relevant to your decision to continue or withdraw from participation becomes available throughout the course of the research project, you will be given this information in a timely manner.

Note: This survey site (Qualtrics.com) uses secure servers located in the United States. Therefore, the information you provide will be stored outside of Canada.

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board. If you have any questions or concerns about ethical matters, you may contact the Chair of the Saint Mary's University Research Ethics Board at ethics@smu.ca or 902-420-5728.

Once again, your continued participation in all surveys is extremely important to [hospital]'s understanding of how the Centre for Continuous Performance Improvement introduces these practices.

Many thanks in advance.

Research title: A Multi-Level Investigation of Organizational Change
SMU REB File number 13-202
Student investigator: Laure Pitfield
Department of Psychology
Saint Mary's University, 923 Robie Street, Halifax NS
Phone at [hospital]: x5692
Email: lpitfield@[hospital].ca or laure.pitfield@smu.ca

['Next' Button:] I understand what this study is about and appreciate the risks and benefits. I have had adequate time to think about this and have had the opportunity to ask questions. I understand that my participation is voluntary and that I can end my participation at any time without penalty.

Instructions for second to fifth questionnaires:

As we continue to introduce practices that will help us to foster a culture of continuous improvement at [hospital name], we would like to survey the [champion group name] in an effort to determine how to most effectively engage staff and spread the new business model across the Hospital to all other programs.

You will receive a survey once every 2 months. As you are part of a small team, your participation is invaluable as results are only reliable if enough surveys are fully completed.

We appreciate your efforts to complete each survey.

There are only four groups of questions to answer this round. It should take you less than 10 minutes.

This survey is being conducted by the Centre for Continuous Performance Improvement at [hospital name], not by the unit in which you work. Please be assured that this survey is completely confidential - in fact, no [hospital] employee will ever see your individual responses.

The data will be collected and tabulated by Laure Pitfield, a graduate student at Saint Mary's University, who will remove all identifying information from comments and report on results by grouping responses. If you have provided informed consent to Laure to participate in her dissertation research, your responses will be included for this purpose.

Once again, your continued participation in all surveys is extremely important to our understanding of how we introduce these practices. Many thanks in advance.

Electronic Questionnaire:

This survey will refer to the Continuous Performance Improvement (CPI) System, which involves the following components: Daily improvement huddles Daily status exchanges between team leaders and managers The work of the [champion group] related to collecting data for the monthly scorecard and actively working to improve driver You will be asked questions that may seem similar to each other, but refer to different perspectives.

Agreement scale used for all applicable items:

Completely disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Completely agree (5)	Don't know/ Not applicable (6)

Q1 [COHESION] Thinking about the [champion group] and the individuals who comprise this group, please use the agreement scale to indicate your response to each statement.

	1	2	3	4	5
This group works well together as a team	❍	❍	❍	❍	❍
Members of this team pull together	❍	❍	❍	❍	❍
Members of this team really care about one another	❍	❍	❍	❍	❍
Individuals on this team trust each other	❍	❍	❍	❍	❍
The amount of work done by this group is very large	❍	❍	❍	❍	❍
The quality of work done by this team is very high	❍	❍	❍	❍	❍
When a priority arises, our team does an outstanding job at doing the necessary work required to address it	❍	❍	❍	❍	❍
Compared to similar work groups, this team's performance is very high	❍	❍	❍	❍	❍
Team members consistently help each other on the job	❍	❍	❍	❍	❍
The members of this team get along well with each other	❍	❍	❍	❍	❍

Q2 [COMQUAL and PARTICIP] Thinking about the implementation of the Continuous Performance Improvement (CPI) System, please use the agreement scale to indicate your response to each statement.

	1	2	3	4	5
The information we are provided on the CPI System is clear **[comqual]**	❍	❍	❍	❍	❍
Staff on my unit feel that the information provided on the CPI System reaches them mostly as rumours **[comqual R]**	❍	❍	❍	❍	❍
Staff in my unit are sufficiently informed about the progress of the implementation of the CPI System **[comqual]**	❍	❍	❍	❍	❍
With regards to the CPI System, two-way communication between corporate management (VPs and CEO) and our unit is very good **[comqual]**	❍	❍	❍	❍	❍
We have been clearly explained the necessity of the CPI System **[comqual]**	❍	❍	❍	❍	❍
Decisions related to the CPI System concerning work are taken in consultation with the staff who are affected **[particip]**	❍	❍	❍	❍	❍
Process improvement ideas are always discussed with all people concerned **[particip]**	❍	❍	❍	❍	❍
In general, our unit manager takes account of the staff's remarks **[particip]**	❍	❍	❍	❍	❍
All front line staff on the unit (including allied health, EVS, dietary, etc.) feel they can raise topics for discussion at daily huddles **[particip]**	❍	❍	❍	❍	❍
Staff members are sufficiently involved in the implementation of the CPI System at [hospital] **[particip]**	❍	❍	❍	❍	❍

Reminder – The Continuous Performance Improvement (CPI) System involves: daily improvement huddles, daily status exchanges between team leaders and managers, and the work of the [champion group] related to collecting data for the monthly scorecard and actively working to improve drivers.

Q3 [INDIVIDUAL READINESS and INDIVIDUAL TRUST IN LEADERS] Now, think about your involvement in the Unit Leadership Team and use the agreement scale to respond to the following statements.

	1	2	3	4	5
I am willing to make a significant contribution to process improvement **[CRi]**	❍	❍	❍	❍	❍
I have the skills that are needed to make the CPI System work **[CRi]**	❍	❍	❍	❍	❍
I am worried that I will lose some of my status at the Hospital when the CPI System is implemented **[CRi R]**	❍	❍	❍	❍	❍
I think [hospital] will benefit from the CPI System **[CRi]**	❍	❍	❍	❍	❍
Implementing the CPI System will make my job easier **[CRi]**	❍	❍	❍	❍	❍

The time we are spending on the CPI System should be spent on something else **[CRi R]**	❍	❍	❍	❍	❍
[hospital]'s most senior leader ([name]) is committed to implementing the CPI System **[SRi]**	❍	❍	❍	❍	❍
Our corporate management (VPs and CEO) has put all its support behind the CPI System **[SRi]**	❍	❍	❍	❍	❍
I feel I will be able to handle the implementation of the CPI System with ease **[CRi]**	❍	❍	❍	❍	❍
I feel as if some components of the CPI System are just extra work on top of a full workload **[CRi R]**	❍	❍	❍	❍	❍

Q4 [COLLECTIVE READINESS and COLLECTIVE TRUST IN LEADERS]
Finally, use the agreement scale to indicate how you believe your primary unit will be affected by the Continuous Performance Improvement System.

	1	2	3	4	5
Overall, people in my unit have the skills that are needed to make the CPI System work **[CRu]**	❍	❍	❍	❍	❍
Staff on my primary unit believe they will benefit from the CPI System **[CRu]**	❍	❍	❍	❍	❍
I have heard people on my primary unit say that the time we are spending on the CPI System should be spent on something else **[CRu]**	❍	❍	❍	❍	❍
My colleagues believe that the CPI System will make their job easier **[CRu]**	❍	❍	❍	❍	❍
People on my unit believe that [hospital]'s most senior leader ([name]) is committed to implementing the CPI System **[SRu]**	❍	❍	❍	❍	❍
Colleagues on my unit feel that they will be able to handle the implementation of the CPI System with ease **[CRu]**	❍	❍	❍	❍	❍
Staff on my unit believe our corporate management (VPs and CEO) has put all its support behind the CPI System **[SRu]**	❍	❍	❍	❍	❍
I have heard staff on my unit refer to components of the CPI System as extra work on top of a full workload **[CRu]**	❍	❍	❍	❍	❍

Q5 [COMMENTS] Do you have any other comments regarding the work you are doing as part of the Unit Leadership Team? Remember that this survey is confidential and your name will not be associated with anything you say. ***Note: see Appendix C for comments.***

Appendix C: Verbatim Comments from Study 2 Participants

Inpatient Unit A:

Wave 1	I do not attend the daily huddles. Our department senior had advised us that we do not have coverage or the time to go to these meetings. By going to these meetings, we could not see 2 patients in our day.
Wave 2	I strongly feel that the front line staff are not enthusiastic about these changes. The main concern I hear is that they do not have time to work on these projects. They feel that they can barely manage the load of patients let alone doing extra projects.
Wave 3	I am so very happy to be able to take part in the [champion group], I believe that the implementation of CPI has made the jobs of all allied health easier and more enjoyable. I also believe that with this process the team has never been stronger and more involved with each other. This process has been thoroughly enjoyable for me, I enjoy coming to work much more knowing that my voice and the voice of every other person is heard no matter how big or small of an issue is brought up. I am pleased to be able to work with all members involved in the [champion group] and look forward to making a difference within the hospital that everyone can benefit from and am excited to work with all who are involved.
Wave 4	I am looking forward to see the next phase, now we are gathering data on different drivers, I wish the whole hospital will be able to follow what we have started.
Wave 5	- Many areas have seen improvement already, this is the only way we can improve communication with all team members and work with positive thinking and positive attitude. - There have been a number of changes regarding staff who are part of the team, so the team is somewhat on hold at this time. The team will need to be revamped and possibly re-do certain things, as there have been a number of changes. Staff rotate, get re-assigned etc... this is challenging in terms of keeping momentum and continuity of the work we are tasked to do as a team.

Inpatient Unit B:

Wave 1	- I think that Senior Management has put resources and time into implementing LEAN because they want to save money. I do not think they are actually ready for the culture shift that is required. I think that staff as skeptical, and will believe it when they see it. - As with any new changes, we all have to go through the transitional phrase, and eventually we hope we will all get there together. - We are working very hard to make this system work. Just hoping to see great results.
Wave 2	- I feel it is lot of work, on top of your regular work load & patients assignment. If management is really interested in improving the quality of service in this hospital, they should give some time off our regular workload to finish the data collection. - I am very much satisfied with how this team is working and I would like to give my best to this team.
Wave 3	- As staff are getting more familiar with CPI, everyone is feeling more comfortable. This is important because we can support each other and discuss things knowing help is there. With senior management attending huddle, people know this is very important to the hospital and are therefore paying attention to it. In the end, it's a win/win. - I feel that some members of the [champion group] don't have their whole heart in the change, and don't feel the importance to attend the meetings. This can be frustrating to those of us who work hard to implement the change, and make the effort to rearrange schedules to be there. - In principle I see this as a good and useful approach. The monthly [champion group] meetings are helpful.
Wave 4	- Sustainability of CPI needs to come from the top, I feel that some components of CPI are definitely slipping!! - Our manager does listen as the time was changed for white board huddle to better accommodate the staff
Wave 5	- It appears staff on the unit are feeling more comfortable with CPI process, and seeing a difference on patient care and the flow of the unit as well. On any given casual conversation with the nurses, they all feel at the beginning, it was a lot of work, but now when they get used to the process, see the benefit , and appreciate the implementation. All in all, not just my observation telling me it is a positive change, even nurses are telling me that they don't mind it after all :) - I find team work is better. It also helps people feel like they are being listened to when the issues are brought forward at the huddle - I find the CIP is a good initiative and am glad to be on the [champion group]. As an allied health person, the daily huddles are the only thing that waste my time.

Outpatient Unit C:

Wave 1	- I find the daily huddles quite repetitive and not a good use of my time. - Sometimes I feel excited and empowered, but more often I feel discouraged and pessimistic... The system seems to be so completely unfixable. - We are asked to commit to the [champion group], however as a shift worker I feel we are not supported in trying to get the appropriate time off. - As a concept, the CPI system is difficult to understand when you've been working in a top down way for so long. Front line staff are change weary and although I think this is a good change, they just see it as another change and more things to do in their already hectic day.
Wave 2	- CPI is making it much easier to make positive changes & get things done. - My normal workload does not allow me to do any [champion group] work during regular shifts. Will need hours designated for this extra work. - I think our staff each need a 2 - 4 hour course on the CPI system to better understand it. Some of the staff really don't understand what this all about. In order for this to have staying power, the investment NEEDS to be made to pay staff to attend this course. - It is certainly important to look at how things can be improved but continual change can be very stressful and demanding on staff.
Wave 3	- I think the [champion group] is a good team and has its benefits, however I feel the meetings are redundant. - [Outpatient unit C] tends to be a place where staff don't stay interested in something for very long. The "huddle" and the whole CPI I fear they are now bored with. A lot of changes are happening in this department all at the same time.
Wave 4	- Our regular monthly [champion group] meeting is very effective and helpful as it updates all the team members of how our measures are working and what our next driver will be. We are able to express our concerns at the meeting and support each other. - It is an ongoing battle. Very difficult to maintain enthusiasm when the staff continue to be very negative about it. - The staff have stated they actually do not like management at the huddle, they feel they are being judged and watched and that the upper management don't really care. - [Outpatient unit C] continues to struggle with the implementation of the CPI system. Empowering the front line and positive staff engagement need to be a focus next year to ensure success of lean management.
Wave 5	I love and support the CPI concept, however I feel somehow we have failed to engage the staff adequately and consequently they are frustrated and the ability to back up the truck so to speak is going to be very difficult. This concept appeared at a very demoralizing time for our department manager. The workload has increased with no hope of more nurses, so every shift they are working to exhaustion, and now the ward aid for nights have been taken away which will only add more work on the nurse. I don't see them being on board easily.

Appendix D: Interview Protocol for Management Interviews

Introduction and statement of purpose and confidentiality	*2 minutes*

Thanks for agreeing to talk to me today. I am conducting this special phase of my dissertation because I think that hearing about your experiences would enrich the quantitative data I have been collecting and help contextualize what is happening at [hospital name] right now. I'm going to be asking you some questions about what the past few months have been like for you and your staff.

This conversation will be kept completely confidential. What I mean by that is that I won't be talking about what you tell me to anyone other than my supervisor at school – there are very severe repercussions for me if I break confidentiality. I will be taking notes because I don't like to use an audio recorder, but rest assured that as soon as I leave the Hospital today, I will put these notes in my private files at home. Eventually I will code them for themes and use them to contextualize results of the quantitative data we're collecting.

Confidentiality of this interview is the most important thing for me to avoid any potential negative impact on your job. That said, there are some things that we talk about that could help with the spread of the CPI System to the rest of the Hospital, so if you're agreeable to sharing some of this information with [coach and manager of the Centre for Continuous Performance Improvement], I can write up a report that combines the answers of all three managers without being able to identify who said what, and you would get to see it before I released it. If you're okay with that, we can talk afterwards about what to share and with how much detail – but I will not divulge anything without your explicit permission and instructions on how to do so.

This conversation will last about one hour. To thank you for your participation, I'd like to offer you a gift certificate to The Keg restaurant. Feel free to disregard any question or end the interview early if you wish. If you have any ethical concerns, please contact the email address on the consent form.

Before we start,

1. Do you have any questions?

NOTE TO INTERVIEWER – Purpose of interview is to:

- Assess leadership style of manager in order to determine whether they intellectually embraced the spirit and intent of lean Management;
- Assess degree of change in leadership style since the beginning of the initiative, determine what specific behaviours have changed and whether conversations with staff have changed, and assess motivations behind changing/resisting change;
- Gain an understanding of how the implementation of lean has affected their (a) job performance, (b) leader self-efficacy (confidence), (c) staff engagement strategies, and (d) view on performance and accountabilities;
- Identify the barriers and challenges to embodying the lean philosophy, and what can be done to remove those barriers;
- Assess motivation to change and expectations for the future.

NOTE TO INTERVIEWER: EXTEND DISCUSSION ONLY AS LONG AS IT TAKES TO GLEAN REQUIRED INFORMATION FROM EACH SECTION – AVOID ASKING QUESTIONS WHEN NOT NECESSARY. AVOID PASSING TIME ALLOTTED FOR EACH SECTION. KEEP ENTIRE DISCUSSION TO 1 HOUR.

Current management philosophy *15 minutes*

2. Can you tell me a little bit about how you view your own leadership style?
    - What sort of thing influences your leadership style? Do you find that you have to change your leadership style depending on circumstances? **PROBE**: in what ways?
    - How do you think your staff views your style of leadership?
    - What are your priorities, as a leader? How would you rank them? How do you balance **[TOP RANK]** with **[COMPETING PRIORITY]** (e.g. "quality patient care" and "timeliness")
3. Tell me how you would approach a situation where you want to get the best out of someone. **PROBE**: How do you influence people to achieve what you need them to achieve?
    - Where do you think you learned how to do this? Has it always been that way?

4. Can you tell me a bit about how you address poor performance? **PROBE**: what does poor performance look like? What would you do in this particular case? Please walk me through the steps.

5. What kind of leadership style do you think is valued in this organization?

Before implementation of CPI System
15 minutes

You began this journey ten months ago.

6. Can you describe what it was like when you first got started? **PROBE**: What did you expect, at the very beginning? Did you do anything to prepare? **IF YES**: What sorts of things did you do to prepare?

7. Can you describe what a typical day was like before the implementation of the CPI System on your unit? **PROBE**: what happened when problems arose? How did staff bring up quality improvement ideas? How would you respond to these ideas?

8. How did you feel about your own performance as a unit manager before the implementation of the CPI System? **PROBE**: what was morale on the floor like? Were you normally able to meet your performance accountabilities for the unit? **[IF YES]** How did you ensure that your accountabilities were met?

    - If you had to categorize your performance before the CPI System as "top", "average", or "below average", what would you say?

9. Would you say you were satisfied or dissatisfied with your job at the Hospital, at the time? **PROBE**: why do you say you were **[INSERT ANSWER]** with your job?

Change since implementation of CPI System *20 minutes*

10. Tell me what it's been like since the implementation of lean and the CPI System. **PROBE**: Was it what you expected to be like? How so?

11. Is there anything that you wish you had known about lean/CPI System before starting to work on its implementation in January? **[IF YES]:** Why? What effect do you think this would have had?

12. Do you think implementing the CPI System was worth it, or not? Why?

*The CPI System included the introduction of a few 'tools' and techniques to use in your daily work on the unit. (**IF ASKED**: Specifically, the daily huddle, the daily manager/team leader exchange, the work being done on the Unit Leadership Teams, and the Monthly Scorecard.)*

13. Tell me about your use of these tools and techniques.

    - What are your favourite components? What are your least favourite components?

    - How has CPI System changed your daily work? **PROBE**: Thinking about the work that you do every day, how does it compare to how you used to do your job before the implementation of the CPI System?

The CPI System also involves learning about 'lean thinking'. You've attended workshops on coaching.

14. Have you received 'coaching on coaching' from other sources?

15. Describe what it means to be an effective coach. **PROBE:** what is the most important principle that stands out to you about being an effective coach?

    - Have you learned anything about coaching via the implementation of the CPI System? **IF YES:** what have you learned? How often would you say that you apply the techniques that you learned?

16. How do you view your own coaching abilities? How do you think your staff views your coaching abilities? How do you think your director views your coaching abilities? How do you think [coach] views your coaching abilities?

    - Do you ever make a concerted effort to apply coaching techniques in specific situations? Tell me about how you approach these situations.

    - How do you practice coaching? What do you tell yourself when you are coaching a staff member?

17. Tell me an example of a situation where one of your staff would approach you with a problem. How do you approach this kind of situation?

18. How would you describe your effectiveness at coaching your staff?

And finally,

19. Can you identify anything that makes it difficult to implement the CPI System in your day-to-day? **PROBE**: anything else?
    - What should happen to make this easier for you?
20. What happens when it feels like it's too difficult to use the CPI System techniques or associated coaching techniques? Why does this happen?

Expectations for the future *8 minutes*

21. As we continue to expand the CPI System, what motivates you to continue?
22. How do you see yourself in this role/job next year?
23. Do you expect that learning about and implementing the CPI System will have a lasting effect on you? How so/why not?
    - Do you expect the CPI System to be sustained on your unit?
    - Do you think the Hospital will be successful at spreading and sustaining lean thinking throughout the organization?

Thank you so much for your participation. Would you like me to include you in a report combining the answers of all three managers but without making it obvious as to who said what? If so, would you like me to share this report with [coach]? You would get to see the report and make any changes before it is released. Of course, you can always change your mind – feel free to let me know. **[INTERVIEWER TO LEAVE CONTACT INFORMATION]**