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Measuring and Understanding Change Recipients' Buy-in during Lean Program Implementation Efforts

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Abstract
Based on the research conducted by organizational scientists dating to the 1940s, the literature review identifies key important precursors that determine the degree of buy-in by organizational change recipients. The purpose of this study is to investigate the change and sensitivity in recipients' buy-in regarding implementation of lean methodology for operational improvement at three rural hospitals. As a result, we propose insights and guidelines for: a) an assessment of beliefs that can impact the success of an organizational change, and b) recommendations for planning and executing actions to enhance buy-in among organizational change recipients.

Keywords
Organizational change, behavior, lean, healthcare

1. Introduction
Evidence from a variety of sources demonstrate that organizations require continuous innovation and transformation to be successful in a competitive marketplace [1,2]. Prior research suggests that change recipients' buy-in can influence individuals willingness to engage in innovation [3-6]. Importantly, researchers established a relationship between individual readiness to change and organizational performance [7-9].

Currently, a lot of healthcare organizations have decided to utilize the lean methodology to drive continuous improvement. In general, lean can be seen as a philosophy, a perspective that abhors waste in any form. Lean continually attacks defects and waste in a never-ending pursuit of perfection [10]. According to the Institute for Healthcare Improvement (IHI) those at the very top of the organization must lead lean change [11]. Implementing lean thinking and learning requires major change management throughout an entire organization, which can be traumatic and difficult. As such, individual readiness to change can be an important predictor of successful lean implementation.

The intent of this research is to examine individual deficiencies in specific beliefs that can adversely impact the success of an organizational change during the implementation process of lean methodology at three rural hospitals.

2. Background Information

The literature is replete with examples of the importance of individual readiness to change, yet the literature regarding organizational change studies in healthcare industry is scattered throughout diverse research fields. That has led to a fractured view of readiness to change in hospitals, with definitions ranging from organizational to individual characteristics [12]. The majority of the studies in health services journals provides no definition of readiness to change. There are theoretical perspectives that can be applied to the individual healthcare worker's readiness to change. Specifically, Armenakis and his colleagues [13] consider individual readiness for change within the context of the organization and change process in place, with content referring to the targeted change, and process referring to the implementation plan to make the change happen.

In our study, we break down individual readiness to change into five factors: discrepancy, appropriateness, efficacy, principal support, and valence. First, *Discrepancy* refers to an individual's belief that there is a need for change. Kotter [5] refers to this as building a sense of urgency, a catalyst for putting individuals into motion. If individuals do not sense urgency, they may not participate in change efforts at all or only give it a token attempt. Second, individuals must believe that the change is right and proper for the organization. This is referred to as *Appropriateness*. The specifics of the change and its appropriateness need to be communicated effectively to all affected individuals. If some individuals hear about the change and some do not, the change will be slowed. If individuals hear inconsistent messages the change may even fall apart. Third, *Efficacy* refers to the individuals' beliefs that they can contribute to the change. They need to believe they have the knowledge and behaviors necessary to make a difference. Kotter [5] points out that it is crucial to provide employees with appropriate training so they do feel capable. Fourth, individuals do watch to see if the organization provides support for the change (*Principal Support*). Lastly, individuals must see what is in it for them. *Valence* refers to the appeal of the outcome from the change. The benefit could be extrinsic such as a monetary reward. The benefit could also be intrinsic such as more decision making authority.

3. Methodology

The three hospitals in this study are Cannon Memorial Hospital in Linville, NC with 25 acute care beds, Ashe Memorial Hospital in Jefferson, NC with 76 acute care beds, and Caldwell Memorial Hospital in Lenoir, NC with 110 acute care beds. The unit of analysis in this study is the healthcare professional, which includes nurses, technicians, administrative workers, and managers. At each hospital, both intervention and control groups were studied. The intervention group included employees that participated in at least one rapid improvement event (RIE). A RIE is a one to four day event where key personnel come together to solve problems using lean methodology. The control group included employees who were only exposed to lean awareness or had a basic training session. The research method used in this study was approved by the North Carolina State University Institutional Review Board (IRB) to ensure appropriateness for both academia and the hospitals. Simpler Consulting, who developed the implementation plan, acted as the coach on lean implementation.

3.1 Data Collection

We assessed individual readiness of change at the end of years one and two based on lean implementation using the Organizational Change Recipients' Belief Scale (OCRB) survey developed by Armenakis, Bernerth, Pitts, and Walker [14]. To obtain contextual knowledge surrounding the answers to the OCRB, we interviewed front line employees as well as the members of the leadership team at each hospital. We slightly modified the survey to better fit the contextual richness of the readiness change of healthcare professionals involved in the lean effort. The quantitative data was collected using a survey instrument presented in Figure 1, with construct titles and ordering of the questions included. A five point scale was used for all questions with 1 = Strongly Disagree, 2 = Slightly Disagree, 3 = Neutral, 4 = Slightly Agree, and 5 = Strongly Agree. We collected a total of 69 (year 1) and 47 (year 2) completed surveys from the intervention group and 30 (year 1) and 74 (year 2) completed surveys from the control group.

Individual Readiness – Valence (VA) = What's in it for me?	
IR1.	The implementation of lean will benefit me.
IR10.	With the implementation of lean in our hospital, I will experience more self-fulfillment.
IR15.	I will earn higher pay after the hospital implements lean.
IR20.	The change in my job assignments because of lean improvements will increase my feelings of accomplishment.

Individual Readiness – Efficacy (EFF) = I can do it.	
IR2.	I am capable of implementing lean.
IR9.	I can implement lean in my job.
IR14.	With the implementation of lean, I will be able to successfully perform my job duties.
IR19.	I believe our hospital can successfully implement this change.
IR23.	Our hospital has the capability to successfully implement lean.
Individual Readiness – Discrepancy (DIS) = Improvement is needed.	
IR3.	We need to change the way we do some things in our hospital.
IR8.	We need to improve the way we operate in this hospital.
IR13.	We need to improve the effectiveness of our hospital by changing our operations.
IR18.	A change is needed to improve our hospital's operations.
IR22.	We need to improve the hospital's performance by implementing lean.
Individual Readiness – Appropriateness (APP) = The new process is an improvement.	
IR4.	I believe lean will have a favorable effect on the hospital.
IR7.	Lean is correct for our hospital's situation.
IR12.	When I think about lean, I realize it is appropriate for our hospital.
IR17.	Lean will prove to be the best for our hospital's situation.
Individual Readiness – Principal Support (PRNS) = We have management support.	
IR5.	Most of my respected peers embrace the proposed implementation of lean.
IR6.	All of the top leaders in our hospital are "walking the talk".
IR11.	All of the top leaders in our hospital support the change to lean.
IR16.	The majority of my respected peers are dedicated to making lean work.
IR21.	My immediate manager is in favor of this change to lean.
IR24.	My immediate manager encourages me to support the change to lean.

Figure 1: Survey Instrument

3.2 Data Analysis

The American Psychological Association [15] requires survey instruments to meet standards of validity. In general, validity refers to having a body of evidence that confirms an instrument is measuring what it is intended to measure. Armenakis and colleagues [14] provide substantial validity evidence for the OCRB. Armenakis, et. al. [14] established the validity through (1) consulting the research literature, (2) surveying executives, (3) conducting an item analysis, (4) running an exploratory factor analysis, and (5) performing a confirmatory factor analysis. The validity evidence supports the construct structure of the instrument. The sample sizes in our study were too small to conduct an exploratory factor analysis on all of items together. However, using five separate exploratory factor analyses, each construct delineated in Figure 1 was confirmed to consist of only one and not multiple constructs.

Instruments must also demonstrate adequate reliability. Table 1 shows the Cronbach's Alphas for each of the subscales. Since this survey instrument was used to describe groups of people as opposed to individuals, the reliability coefficient for each of the constructs is within an acceptable range [15].

Construct	Cronbach's Alpha
Valence	0.73
Efficacy	0.83
Discrepancy	0.83
Appropriateness	0.92
Principal Support	0.80

Table 1: Cronbach's Alpha

4. Results

Table 3 and 4 present the statistical summary of responses to each construct by intervention and control group. Using standard t-tests, significant differences between intervention and control groups were detected for both years

in four out of five constructs: *Efficacy*, *Discrepancy*, *Appropriateness*, and *Principal Support*, all with p-values < 0.05. The employees that participated in at least one RIE event indicate higher level of buy-in. However, our analysis shows no significant differences between intervention and control group on *Valence*. Interestingly, *Valence* is the lowest scoring construct in both years and in both studied groups.

Table 3: Survey Results for 2009

Construct	Group	N	Mean	Standard Deviation
Valence	Control	30	3.39	0.69
	Intervention	68	3.62	0.66
t=1.56, df=96, p-value=0.06 one-sided test				
Efficacy	Control	30	4.13	0.59
	Intervention	69	4.36	0.53
***t=1.96, df=97, p-value=0.03 one-sided test**				
Discrepancy	Control	29	4.23	0.52
	Intervention	69	4.54	0.54
***t=2.65, df=96, p-value=0.005, one-sided test**				
Appropriateness	Control	30	4.04	0.68
	Intervention	69	4.42	0.65
***t=2.62, df=97, p-value=0.005**				
Principal Support	Control	28	3.94	0.70
	Intervention	67	4.23	0.51
***t=1.99, df=39, p-value=0.03 one-sided test**				

Table 4: Survey Results for 2010

Construct	Group	N	Mean	Standard Deviation
Valence	Control	64	3.36	0.87
	Intervention	47	3.62	0.74
t=1.62, df=109, p-value=0.05 one-sided test				
Efficacy	Control	67	4.09	0.85
	Intervention	46	4.37	0.59
***t=2.13, df=111, p-value=0.02 one-sided test**				
Discrepancy	Control	65	4.26	0.67
	Intervention	45	4.54	0.51
***t=2.44, df=108, p-value=0.008, one-sided test**				
Appropriateness	Control	67	4.08	0.91
	Intervention	47	4.36	0.70
***t=1.74, df=112, p-value=0.04**				
Principal Support	Control	66	3.88	0.75
	Intervention	47	4.21	0.67
***t=2.40, df=111, p-value=0.009 one-sided test**				

5. Discussion and Implication for Practice

Crafting change recipients' buy-in to lean change requires a structured implementation process and engaged hospital leaders trained for making improvements in the quality of care who must create a support structure to foster the development of lean thinkers. So, why and how did the three hospitals in this research investigation achieve such remarkable readiness for change across the organization with regard to *Efficacy*, *Discrepancy*, *Appropriateness*, and *Principal Support*, yet failed to establish *Valence*? In short, based on survey results and our interview sessions, the next subsections attempt to contemplate the key elements influencing change recipients' buy-in during lean implementation efforts.

5.1 Leadership Style and Behavior

Initially, consultants conducted a series of formal and informal training sessions for leaders of each organization to explain their role in leading a lean transformation. In general, the objectives for the training were to:

- Understand the role of executive leadership in an enterprise lean initiative.
- Get a clear sense of urgency for quality and financial benefits.
- Establish outcome expectations for years 1-3.
- Prepare for the change management issues during the various stages of lean.
- Learn how (as an executive) to maximize your organization's return on investment.
- Acknowledge the key steps and leadership decisions that must be made to ensure success.

Particularly, the training focused on relationship and interactions of the leader and employees. Leadership teams were trained to become task oriented, where the emphasis is on what needs to be done and how to do it. At the same time, leadership teams were trained to engage employees through establishing strong levels of trust, admiration, loyalty, and respect. Leadership teams were also trained to be charismatic and highly inspirational by focusing on why improvements need to be done. Our on-site visits, four days in length at each hospital, confirmed that highly trained leadership teams established strong *Principal Support* in all organizations.

5.2 Strategy Formation

During strategy formation, a first draft of the Transformation Plan of Care (TPOC), a proven application of A3 strategic thinking [16] to strategy formulation, execution, learning, and problem solving, was created. In general, the TPOC became the communication object to review the strategic direction set forth by the leadership of each organization. The purpose of TPOC was the following:

- Monitor improvement metrics status and take countermeasures as necessary.
- Perform gap analysis of current to target state.
- Reflect on leadership support at various levels.
- Review absorption rate of organization as it relates to readiness to change.
- Coach senior management about lean strategic thinking.

The strategy formulation and continuous use of TPOC, confirmed to leadership teams the initial need for change (*Discrepancy*) and applicability of lean to healthcare (*Appropriateness*). As such, with a high sense of urgency to conduct improvement projects, a strategy to conduct awareness sessions and training for key internal facilitators was spearheaded.

5.3 Awareness Session

Awareness sessions were focused on creating an understanding of what occurs relative to change across the organization, and how each person is involved. Furthermore, leadership initiated a call to action in relation to two key lean tools, 5S and visual management. Each person participating in this session was given education on how to begin to sort out waste from value added steps. This initiative allowed the leadership team to create a feeling of *Efficacy* with respect to lean, even though the initial focus was on simple tools only. Also, education on "what's in it for me" was provided. However, our interviews and participation on RIEs found *Valence* to be inadequately comprehended by managers and front line employees. Predominantly, the employees that did not participate in the RIE event struggled in comprehending how exactly the lean improvements will benefit them; how will they achieve the self-fulfillment; or how would lean improvements affect their pay. For example, one of the common questions was "will I work myself out of the job doing lean?" Despite great efforts by the leadership teams to drive the right message with respect to *Valence,* the existing social norms in each organization suppressed this particular belief factor.

5.4 Facilitator Style and Behavior

The selected lean facilitators at each organization underwent a robust workshop where they learned their roles in the lean transformation. During this session they learned the following:

- How to deliver the basic tools and techniques.
- How to lead a team through the preparation, execution and sustain phases of improvement.
- How to measure improvement and track it at all levels.
- How to create a balance of customer and stakeholder needs across the value streams.
- How to speak publicly.
- How to prepare and lead a high performance team to achieve the best results.

Facilitators were expected to lead at least seven events in order to demonstrate the ability to individually (without sensei's support) support the transformation. The 'lean mission control room' was developed to help facilitators track transformation progress and improvements. Our interviews and observations revealed that facilitators fully embraced the concept and behaviors of continuous and rapid process innovation. The facilitators employed a transformational style to lead change, with objectives to build trust and motivate employees to engage in job actions that promote less variability, higher repeatability, and more standardization. In other words, the facilitators became oriented more toward exploiting efficiencies for gain, while at the same time increasing employees' satisfaction.

This might suggest that effective lean facilitators must be developed throughout the organization during lean diffusion in order to support sustainability of lean transformation.

5.5 Detailed System Analysis

Detailed system analysis, using Value Stream Map (VSM) methodology, enabled the leadership team and managers to see waste in their current processes. The outcome of VSM activities was the implementation plan with clear goals and timeframes that dictated the improvement speed for the lean transformation process. It was imperative for the leadership to be engaged and involved during VSM activities. The outcomes of the VSM analyses were presented to all affected stakeholders in the organizations, further assuring the *Discrepancy* and *Appropriateness* of selected projects and goals.

5.6 Rapid Improvement Events

The identified system improvements were accomplished using intense, focused improvement sessions on selected goals. It was clear to the leadership teams that the results from the RIEs themselves represented the smallest piece of value to the organization. The bigger value was the learning that took place during the event by the team members and management. From our set of interviews with the leadership teams it was clear that such learning was considered as a venue for creating *Efficacy* and culture change consistent with effective lean transformations. The preparation for each RIE began 3 weeks prior to the event. Members of the team were selected using goals agreed upon by the sensei, leadership, facilitator, and the process owner. Preparation work and data was collected prior to the RIE, so the teams could better study current conditions once the event started. In general, RIE events started early Monday morning and ended with a celebration presentation on Friday morning to leadership and management. Bold action was expected, with sustainable results. Simple yet clear measurements were visually displayed in the affected work areas for the process owners to monitor and maintain the positive results. The RIE events were the engine that fueled the change process.

6. Limitations and Future Research

The study had several limitations. First, additional research could further develop and extend the validity and reliability of our survey. The items could be improved so that they are more distinct from the general readiness to change. We also had difficulty deciding on a scale for obtaining the scores for survey items [17]. Therefore, strengthening of the measurement scale would be beneficial. Second, the wording of the questions could be directed to the unit level, rather than the organization as a whole. Finally, our study was conducted on a sample of three hospitals from the state of North Carolina that used a lean transformation model design by particular consultants. Consequently, it is unclear whether our findings apply to other types of medical facilities in other states or countries undergoing lean transformation journey. Future research needs to be conducted on a larger sample so that the data can be examined in a more traditional longitudinal study.

7. Conclusions

This research focused on the measurement and evaluation of individual readiness for change during the lean transformation journey at three hospitals. We learned that developing an organizational capability for continuous improvement is a challenging behavioral undertaking that needs to be carefully nurtured and managed over time. Our results suggest that leadership and lean facilitators' style and behaviors to be key elements for success in achieving change recipients' buy-in to lean transformation. Particularly, we recommend leadership teams to suspiciously analyze "what is there for employees" (*Valence*) in order to engage in lean transformation. In summary, we believe there are no 'shortcuts' during a lean program implementation in hospitals.

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