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How Kaizen Group Leader Selection Affects Group Participation

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HOW KAIZEN GROUP LEADER SELECTION
AFFECTS GROUP PARTICIPATION

A Thesis
Presented to
The Faculty of the Department of Architectural and Manufacturing Sciences
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science

By
M. Joleen Byerline

August 2013

HOW KAIZEN GROUP LEADER SELECTION
AFFECTS GROUP PARTICIPATION

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I dedicate this thesis to my husband.

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August 2013

41 Pages

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Organizational communication research indicates group member participation increases as the legitimate power differences among group members decreases. Lean principles and practices indicate Kaizen Event members will contribute regardless of legitimate power levels, due to member training, education, and the Lean team-oriented culture. Further study is needed to determine if Lean culture and training maximize group member contribution, or if legitimate power levels in Lean environments manipulate participation.

The focus of this case study is a central Kentucky Lean manufacturing organization that practiced Lean principles for at least three years and completed a Kaizen Event within twelve months previous to the beginning of the study. The participating organization indicated the legitimate power levels of Kaizen Event members. Kaizen Event members received a voluntary survey consisting of Likert scale-scored questions regarding his or her perceptions of level of participation, encouragement and opportunity to participate, comfort in participating, and the degree the group listened to the member. The results of the survey indicated participation in the Kaizen Event groups did not significantly differ among different legitimate power levels.

Chapter 1

Introduction

Statement of Purpose. The purpose of this case study was to determine if members of American Lean Kaizen Events shared common cultural values concerning perceived legitimate power distance with members of American non-Lean group members. The distribution of legitimate power, or position in the organizational hierarchy, of the Kaizen group members was identified. Group members then completed survey questions measuring their perceived level of participation. Data was analyzed to determine if differences in legitimate power affected the participants' perception of their participation in the Kaizen Event.

Significance of Research. Estimates suggest up to 60% of U.S. companies are implementing some form of Lean practices (Hurdle, 2009). Given the potential for maximizing the efficacy of Kaizen Event groups and the importance Lean organizations place on incremental improvement, researching methods for increasing Kaizen Event member participation is an important contribution to American industry. This case study explores the effects of power distance on Kaizen Events in a central Kentucky organization and provides methods for future studies.

Problem Statement. Research on group dynamics in traditional Western organizations indicates participation increases when group members are allowed to share power (Guzzo & Dickson, 1996; Hartog & Koopman, 2001). Groups may share power by allowing group members with less legitimate power than other members to lead the group. Lean organizations manage participation by creating a participative culture through training and careful employee screening. Members participate as part of a social

norm. Lean principles; however, do not condone sharing power in order to increase member participation. Western group literature suggests sharing power, going as far as to suggest allowing subordinates in the hierarchal structure to lead superiors during group work (Harvey & Drolet, 1994; Wellins, Byham, & Wilson, 1991). Lean organizations choose Kaizen Event leaders based on legitimate power, or the organizational hierarchy (Davis, 2011; Feld, 2001; Liker, 2004). American Lean organizations may further optimize Kaizen Events by adopting Western hierarchy-flattening strategies.

Hypothesis. The study materials ask if the leader of the group or subgroup possessed more legitimate power than the other members of the group. The Lean literature reviewed for this study suggests choosing group leaders that possess greater or equal power to the other members in the group. If organizations are allowing lower-legitimate power holders to lead, the organization is deviating from popular Lean theory.

H₁: Lean organizations choose individuals to lead the group with greater or equal legitimate power in relation to the rest of the group.

Null₁: Lean organizations do not choose individuals to lead the group with greater or equal legitimate power in relation to the rest of the group.

By determining if the group leader has greater or equal legitimate power in relation to the rest of the group, the study also determines the legitimate power distance among the groups and subgroups studied. The organization identified groups and subgroups led by the Lean project leader or the Lean team leader, further identifying groups with a large legitimate power difference.

H₂: Groups and subgroups with less difference in legitimate power between the leader and group members will produce higher participation scores.

Null₂: Groups and subgroups with less difference in legitimate power between the leader and group members will not produce higher participation scores.

Limitations. This case study was limited to one central Kentucky manufacturing organization practicing Lean principles for at least three consecutive years prior to the study. The groups studied were participants in real-world High Impact and/or Sustaining Kaizen Events. Survey participants included all currently employed members of all Kaizen Events occurring up to twelve months prior to the study. Participation in the Likert-style survey was anonymous and voluntary.

Assumptions. This case study was completed under the assumption that all information given by the company was accurate, such as the hierarchal makeup of the group and the completeness of member attendance. Kaizen Event members who agreed to participate were assumed capable of reading and understanding written English and were willing to participate in good faith.

Definitions of Terms. For the purposes of this study, the following definitions applied:

1. Lean: A production practice that targets and eliminates waste. Any expenditure of resources that does not create value for the customer is considered waste (Black 2008).
2. Kaizen: Continuous improvement. A Lean philosophy that focuses on maintaining a competitive advantage through a well-managed, dynamic change process (Barnes 1996).
3. Legitimate power: Power derived from a position or status (Liker 2004).

4. Expert power: Power derived from the individual's knowledge, skills, and abilities (Liker 2004).
5. Referent power: Power based on the trust, respect, and admiration of the powerholder. Power derived from charisma (Liker 2004).

Chapter 2

Review of Literature

Modern organizations often employ teamwork to achieve goals. Individuals working together receive monikers such as group, team, circle, or pod. Although variance occurs among organizations in the specific definitions of the terms, generally a group is enclosed in a larger system. A group is composed of interdependent individuals whose decisions affect others. The group members perceive themselves as a social entity, and they are perceived as a social entity by others outside the group (Guzzo & Dickson, 1996). In order for a group to perform effectively, group members must participate in group activities.

Western, non-Lean groups.

In order for power sharing to have a positive effect, the group must meet certain criteria. Group size limits participation by limiting the quantity and quality of communication that can occur among individual members (Napier & Gershenfeld, 1989). When groups consist of large numbers, interpersonal interaction with each member becomes impractical. Groups that strive for high levels of participation should maintain relatively small numbers (Carletta, Garrod, & Fraser-Krauss, 1998). For example, quality circles are groups that form to improve quality or solve quality problems. They consist of three to twenty members, but ideally seven to ten members (Crocker, Chiu, & Charney, 1984). The necessity for participation also depends on the task and goal of the group (Anderson & Brown, 2010). Groups facing complex tasks and problems that require creativity benefit from flatter hierarchal structures where members have increased freedom to participate. Conversely, in situations with simple, less ambiguous tasks,

fewer participative hierarchies prevail. This study focuses on ambiguous, changing situations requiring flexibility and creativity. In these situations, participation usually leads to small, short-run improvements, sometimes leads to significant, long-lasting improvements, and results in statistically negligible negative effects (Guzzo & Dickson, 1996).

Group member participation increases the overall efficacy of the group. Decision quality improves by integrating input from all members rather than deferring judgment to a dominant individual (Tjosvold, 1986). Statistically, aggregate assessments from many members consistently outperform individual assessment, simply due to mathematical averages (Anderson & Brown, 2010). Team member participation increases the efficacy of the team. Participation benefits team members by filling the needs of self-expression, control, power, and belonging. When team members participate, their dedication to implementing the resultant solutions increases. Participative team members contribute to and understand the rationale behind the final solution and encourage each other to complete tasks (Tjosvold, 1986). Superior group discussions occur when members actively offer their expertise, rather than waiting for other members to contribute (Carletta, Garrod, & Fraser-Krauss, 1998).

Increased acceptance of the benefits of participation and utilization of groups leads to changes in traditional leadership. The lack of boundaries and shifting needs of modern organizations necessitate temporary groups that can be disassembled and reassembled as needed. The formal power structure of traditional hierarchies cannot support this fluidity of group involvement (Hartog & Koopman, 2001). Leaders cannot rely on the power awarded them from hierarchal positions (Hartog, 2004). Contemporary

groups typically have members with high levels of knowledge or skills to contribute. Members increasingly desire to participate in the leadership functions of their groups. This new member dynamic and the increasingly flattened hierarchal structures in industry emphasize the need for rethinking traditional leadership hierarchies (Carson, Tesluk, & Marrone, 2007). Group leaders enable the group to solve problems more effectively rather than managing the group, requiring a different skill set than traditional managers (Leadership, n.d.). Any group member with proper skills and experience can fill the leadership role (Hartog, 2004; Hartog & Troopman, 2001). Even traditional quality circle literature concedes that any qualified member can lead the circle (Crocker, Chiu, & Charney, 1984). Allowing alternatives to the traditional, legitimate power-based leadership structure potentially provides benefits to the organization.

Negative Effects of Power Differences

Legitimate power stems from position or status within a hierarchal structure (WebFinance, 2012). Skills and characteristics do not affect legitimate power; it is strictly a formal authority (Stewart, Manz, & Sims, 1999). A group leader with substantial legitimate power acutely affects member participation. When a high status individual is present in a group, all members direct communication to that person (Napier & Gershenfeld, 1989). The legitimate power of the leader establishes communication dominance, regardless of qualifications or skills (Silver, Cohen, & Crutchfield, 1994). Low status individuals tend to not communicate with each other and take fewer risks (Napier & Gershenfeld, 1989).

In the traditional groups, the leaders contribute more to the conversations than if each member contributed equally (Carletta, Garrod, & Fraser-Krauss, 1998). Top

ranking group members tend to speak fifteen times more than lowest ranking members, and speak five times more the member next highest in rank. Higher-ranking members have been found to dominate group conversation 75% of the time, though they constituted only 30% of the group members (Anderson & Brown, 2010). Centralized communication networks develop because powerful group leaders make, and are asked to make, more task-oriented utterances (Carletta, Garrod, & Fraser-Krauss, 1998). Leaders can control the conversation even when others speak by asking leading questions. The resulting communications still radiate from the leader's initial question.

Low ranking members tend to adopt the ideas of the higher-ranking members, negating the benefits of an aggregated decision (Anderson & Brown, 2010). Silver, Cohen, & Crutchfield (1994) found high status group members initiated significantly more ideas than lower ranking members, even when each member was allotted an equal amount of speaking time. Lower ranking members tend to substitute data and facts for riskier information, such as new ideas. Subordinates perceive the legitimate power holder has the right to make decisions (Napier & Gershenfeld, 1989). Individuals tend to overestimate the skills of the top hierarchy and overvalue their judgments (Anderson & Brown, 2010).

Groups may also lose effectiveness by spending the majority of their effort verifying or denying the dominant member's ideas, rather than submitting ideas of their own (Haleblian & Finkelstien, 1993). Subordinates display less thinking on their own, make fewer decisions based on their own opinions, and become more dependent on their supervisor's views. Individual member participation is minimized while the legitimate

power-holder participation is maximized. The groups produce correlated errors instead of integrated decisions (Anderson & Brown, 2010).

Several research efforts verify the problematic nature of group leaders who hold significant legitimate power. Steep hierarchies lead to inferior group performance, lower member motivation, lower member satisfaction, and breakdowns in communication among the group (Anderson & Brown, 2010). Hierarchies also reduce trust, reduce cooperation, and increase competition among group members (Anderson & Brown, 2010). When employees do not have a say in managerial decisions, they are less committed to their organizations (Hartog, 2004). Organizations with dominant Chief Executive Officers tend to perform poorly when facing turbulent environments (Haleblian & Finkelstien, 1993). Members of hierarchal groups are more frustrated and have lower self-esteem, experience more anxiety and stress, and exhibit lower satisfaction levels, particularly with their autonomy and authority levels (Anderson & Brown, 2010). Communication problems arise in a group when a member of the group feels his or her ideas are suppressed. The inability to gain recognition and voice leads to frustration, tension, and communication deterioration (Napier & Gershenfeld, 1989).

Fear of negative repercussions can generate a non-participative group. According to the Approach Inhibition Theory (Anderson & Brown, 2010), lower ranking individuals are more subject to social and material threats and they are acutely aware of their situation. When participating in formulating new strategies, all members assume risk and uncertainty. Members may experience anxiety and reluctance due to fears of providing incorrect input, hindering team progress, or causing contention in the team (Edmonson &

Mogelof, 2006). Also, Dominant members may invalidate the contributions of lower ranking members (Haleblian & Finkelstien, 1993).

In groups with varying legitimate power, a greater number of presented ideas went unrecorded than in groups with equal legitimate power (Silver, Cohen, & Crutchfield, 1994). The status differentiation led to a bias and disregard for ideas. Thus, lower ranking members may fear disputing the dominant member's opinions (Anderson & Brown, 2010; Haleblian & Finkelstien, 1993). The fear of being evaluated, or evaluation apprehension, further hampers participation. Providing ideas and negative evaluations most often elicit negative feedback, validating the fears of providing this kind of information to the group. The greater the gap in power among members, the greater the potential cost of negative repercussion for the lower ranking members (Silver, Cohen, & Crutchfield, 1994). Members experience paranoid social cognition, or a suspicion and mistrust of members leading to idea suppression and reduced voice (Anderson & Brown, 2010).

Negative previous experience in involvement with groups and the resulting disillusionment are the chief group communication inhibitors. Group experiences in family, school, peer, and work environments guide expectations for current and future group interactions, expectations that are often ingrained and involuntary (Napier & Gershenfeld, 1989). Leaders possessing strong legitimate power also experience possible negative repercussions from encouraging participation.

Individuals who take action without deliberating possible courses of action appear more influential. Considering input from others makes the leader appear less powerful. Collectively, these factors lead to the member's behavioral inhibition system (Anderson

& Brown, 2010), or internal alarm system, to register danger and suppress any new or contradicting ideas and opinions. The high status individuals hesitate to reveal any limitations or vulnerabilities with members of lower status. Lower status individuals hesitate to contribute due to the likelihood of critical evaluation and the fear of intimidation (Napier & Gershenfeld, 1989).

Reducing the Negative Effects of Power Differences

In order to negate such fears and participate productively, team members must feel a sense of psychological safety (Edmonson & Mogelof, 2006; Hartog & Koopman, 2001). When members feel safe, they begin to offer ideas and knowledge to the group (Hartog, 2004). A psychologically safe environment encourages interpersonal risk-taking, consequently encouraging creativity and innovation (Edmonson & Mogelof, 2006). Positive interaction among team members increases the psychological safety of the team (Edmonson & Mogelof, 2006).

Effective groups cultivate a safe environment to promote idea and opinion sharing. In a safe environment, members adopt and value the group vision more readily (Carletta, Garrod, & Fraser-Krauss, 1998). Several studies confirm that a flatter hierarchal structure produces positive effects for the group, likely increasing the members' psychological safety. Flattening the leadership structure increases group members' sense of empowerment. Empowered individuals possess a sense of self-worth and power. Empowerment transpires when members are given important tasks and the power to choose the best method for completing the task. Sharing leadership and creating a participative environment provides an avenue for empowerment (Harvey & Drolet, 1994).

One category of empowered groups is self-directed teams. Members define and assess their own goals and processes. Self-directed teams also share leadership functions with the group leader; many rotate the position of group leader among the group members (Wellins, 1991). Empowered groups experience greater responsibility, autonomy, information sharing, encouragement, and trust in member's abilities (Hartog 2004). Flatter hierarchies also produce better attitudes (Guzzo & Dickson, 1996), higher worker morale (Napier & Gershenfeld, 1989), less frustration (Guzzo & Dickson, 1996), higher self-esteem (Guzzo & Dickson, 1996), and higher motivation than steep hierarchies (Anderson & Brown, 2010). Improved attitude, morale, and motivation increased productivity and lower absenteeism, directly affecting the organization's bottom line (Guzzo & Dickson, 1996).

Carletta, Garrod, & Fraser-Krauss (1998) compared traditional, hierarchal groups to flattened groups. The members from groups with flat leadership structure had greater participation than in the traditional structure; both in percentage of words spoken and diversity of interactions among members. Even situations where hierarchies are flattened artificially and unintentionally, such as teleconferences and other computer-mediated communication, participation is more equalized (Guzzo & Dickson, 1996). Powerful members do not dominate the conversation as easily as in face-to-face interactions, thereby creating the equalization effect. However, high status members still send more words and instigate more ideas than lower ranking members in computer-mediated communication (Silver, Cohen, & Crutchfield, 1994)

Groups must actively avoid conforming to a hierarchal design that defers decision-making responsibilities to the leader. Otherwise, the traditional norms of

assigning greater responsibility and discretion to the member with legitimate power allow members to justify their inaction (Donnellon, 1996). In *How to Make Collaboration Work*, David Straus (2002) suggested asking a subordinate to facilitate an important meeting. Duke Corporate Education (2005) proposed creating a rotating “project manager” role, allowing team members to take turns leading different team objectives. The norms that encourage members to defer decisions to an individual holding the greatest legitimate power during day-to-day activity will naturally tend to carry over to group activities. Group members who defer responsibilities to the legitimate power holder essentially excuse themselves from participating in group activities (Donnellon, 1996).

The power holder receives greater support from the group when other members maintain some form of personal power (Napier & Gershenfeld, 1989). Respect and trust develop when members are open to influence from each other. When given leadership opportunities, members become invested in the group and more readily share information and resources. Groups with multiple members performing leadership roles perform better than those with limited leadership (Carson, Tesluk, & Marrone, 2007). Members attribute charisma and sincerity to a leader who displays self-sacrificial attributes, and are likely to reciprocate the behaviors. Self-sacrificial behaviors include denying personal privileges, giving up resources, refraining from using legitimate power, and sharing hardships and rewards (Hartog 2004). These behaviors apply to leaders willing to flatten the hierarchal structure.

Lean Kaizen Events

Lean principles facilitate participation by empowering group members through education and collective decision-making, rather than power sharing (Black, 2008, Liker, 2004). Lean represents more than a business model. Lean is an organizational culture, an all-encompassing and consistent environment of cooperation and Kaizen (Barnes, 1996; Liker, 2004). Lean organizations mandate each member to align their actions, thoughts, feelings, and goals to the Lean principles. Teamwork and culture transcend structure and processes. The apex of Lean philosophy is the Japanese concept of harmony (Barnes, 1996). Harmony requires each member to respect and value every other member, trust each member's capability to contribute, and believe the other members will reciprocate. Members use mistakes as learning opportunities rather than reasons for punishment (Davis, 2011). Individuals also must respect and support the organization and place organizational needs above personal and departmental needs (Barnes 1996).

Lean organizations constantly and consistently reinforce the culture. Candidate selection processes instigate cultural assimilation. Candidates are carefully screened to ensure likely integration of the Lean culture. The selection process can persist over a year (Liker, 2004). Lean organization members undergo extensive comprehensive training on theory and practice, with consistent follow-up training (Barnes, 1996; Black 2008; Davis, 2011). Everyone adopts an attitude of self-reflection and a burning desire for continuous improvement (Schmidt & Lyle, 2010). The culture empowers members, thereby increasing participation (Liker, 2004). Workers perceive they perform valuable jobs and they possess a voice in the decision making process (Monden, 1983). They

receive the training and resources required perform successfully. Workers are allowed access to information, such as data sources and budgets (Barnes, 1996). Organizational performance measures reward participation for both workers and supervisors (Barnes, 1996; Davis, 2011; Liker, 2004). Supervisors are viewed as powerful because they consent to delegate decision-making responsibilities (Barnes, 1996).

Kaizen is a Lean principle representing continuous incremental improvement towards organizational excellence. Every member of the Lean organization participates in Kaizen (Dennis, 2010). A Kaizen Event is a tool for accomplishing Kaizen. In Kaizen Events, structured cross-functional teams receive extensive training and complete hands-on improvements to company processes (Barnes, 1996; Davis, 2011; Feld, 2001; Liker, 2004).

There are four main categories of Kaizen Events (Davis, 2011). High Impact Kaizen Events result in dramatic, rapid improvements to company procedures. Prior to the event, Kaizen leaders map out company processes to determine areas with the greatest opportunity for waste reduction. A section of manageable, repetitive processes within that area becomes the focus for a particular Kaizen Event. High Impact Kaizen Events extend one to two weeks. Lean organizations should commit to at least one event annually. Training and Implementation Kaizen Events consist of ten to fifteen members and extend approximately three days. Lean organizations may arrange up to two events per month, depending on the size of the organization. Group members receive several hours of training for each Lean initiative. The group may also implement small improvements to processes during these events.

Problem Resolution Kaizen Events produce permanent solutions to recurring production problems. These events occur as needed when problems arise and provide the resources to get to the root of a problem and fix it for good, rather than repeating the same temporary repairs. In Sustaining Kaizen Events, ongoing changes are made to the initial improvements implemented during High Impact Kaizen Events. The timing of these events is frequent and short. The members primarily consist of the individuals involved in the process targeted for improvement.

Leaders are carefully selected and groomed from the company ranks in order to preserve the culture. Leaders receive vigorous training, as Lean philosophy requires leaders to display a high level of knowledge and expertise. For example, Toyota's first American plant leader received fifteen years of training before allowed to take the position (Liker, 2004).

Kaizen Events have a well-defined hierarchy of legitimate power (Davis, 2011; Feld, 2001; Kaizen Facilitator Handbook, n.d.; Kaizen Leader, n.d.; Liker, 2004; McBride, 2005). The top ranking member is the Kaizen coordinator (Davis, 2011). Coordinators rarely lead events, but attend the opening and closing days. Some organizations have a dedicated project leader in the subsequent chain of command (Feld, 2001). When the project leader serves as a group member, he or she will function as the group leader. In the absence of the project leader, a team leader will lead the team. When the event breaks down to sub-groups, then other organizational members may lead the groups (Davis, 2011).

Kaizen management allows alternative members to lead events in order to groom individuals for future management positions (Liker, 2004). An individual with

considerable expert power, or knowledge skills and abilities, may also lead groups. This person's expertise on the topic of the group discussion qualifies him or her as a candidate (Black, 2008).

Referent power holders, or socially powerful members, are allowed to lead under the assumption that their charisma and popularity will encourage others to become invested in the Lean culture (Liker, 2004). Management leverages the influence of these individuals as a form of social control.

The Lean emphasis on expert power and subsequent paring of expert power with legitimate power drives the tendency not to share legitimate power with others. Lean philosophy asserts the leader with the highest status must also hold the highest level of expertise. Leadership is also viewed as a method to maintain stability and continuity; incongruity in group leadership may undermine this goal (Liker, 2004).

Japanese cultural influence also drives the hierarchal power structure in Kaizen Events. Japan, the country scoring highest in Hofstede's cultural dimension of power distance, generated Lean philosophy (The Hofstede Center, n.d.). In Japanese culture, allowing a subordinate to lead a superior is simply not acceptable. Exchanging roles would shame the leader, and embarrass and upset the subordinates. The superior/subordinate relationship encompasses dynamics completely unfamiliar to Western, low power distance cultures.

Lean utilizes valid tactics to increase participation, such as education and shared decision-making responsibilities (Black, 2008; Liker, 2004). Lean methods of empowerment also lessen the negative effects of a hierarchal structure on psychological safety (Anderson & Brown, 2010). However, by not sharing legitimate power among

Kaizen Event members, Lean organizations operating in Western cultures may experience process losses. The process loss (Silver, Cohen, & Crutchfield, 1994), or difference between actual and potential productivity in a group, may prove sufficient to warrant changing Lean best practices in America. This study examines if American Kaizen Event groups follow similar patterns with traditional Western groups in terms of the relationship between leadership legitimate power and group participation.

Chapter 3

Methodology

Procedure. The researcher approached a central Kentucky manufacturing organization to determine the organization's willingness to become the subject of a case study measuring participation levels in Kaizen Events. The organization was advised of the limitations of the study and agreed that it had practiced Lean principles for over three years and had held High Impact Kaizen Events within the past twelve months. The organization provided group identifiers in order to differentiate among groups within the same organization and a brief description of the event to ensure participants understood which event they were assessing. Further information identifies the legitimate power dynamic between the group leader and the group. The organization provided the status of the Kaizen Event members, or legitimate power, both within the organization and within the group.

This study focused on legitimate power for two reasons. First, Lean principles stress the importance of legitimate power through implementation of a rigid hierarchal structure. Second, legitimate power corresponds to the individual's position on the hierarchy. Therefore, organization members can objectively differentiate between levels of legitimate power. On a predetermined date, the researcher visited the subject organization. The organization instructed group members to meet together in a meeting room with the researcher. Each member received an identical manila folder with an identical survey and pen inside. The researcher advised participants that the survey pertained to a specific Kaizen Event and read the provided informed consent statement. The researcher instructed the participant to place the completed survey in the manila

folder on the desk when completed. Participants completed the survey or sat in silence until all were completed. The researcher collected the pens and manila folders and stacked them within a secondary manila folder, labeled with the group identifier. The completed surveys remained in the possession of the researcher until stored in a secure location in the Architectural and Manufacturing Sciences Department at Western Kentucky University.

Instrumentation. In the initial communication with the organization, the researcher interviewed the individual responsible for organizing Kaizen Events to determine if the Kaizen Event group leader possessed as much or more legitimate power than all other active members of the group. The organization provided the organizational title of each member and the corresponding position on the hierarchy. This information indicated if the Lean organization in the study deviated from standard Lean ideologies and allowed individuals to lead groups consisting of a member or members with more legitimate power than the leader.

Determining if the leader possessed more legitimate power than or equal legitimate power to other group members further identified the difference in legitimate power between the leader and the rest of the group. After the initial interview, the organization scheduled meetings for group members to complete a 10-point Likert-style survey designed to measure participant attitudes toward participation in the specific Kaizen Event group (See Appendix A).

The twelve survey questions gauge participation characteristics by two categories, ideas and opinions. Ideas represent primarily self-initiated and novel participation, whereas opinions represent secondary or tertiary participation based on the participation

of others. Respondents scoring positively on questions related to opinions and negatively on questions related to ideas may indicate that a percentage of the group monopolized the expression of ideas. This monopoly may promote others to participate solely through opinions on the given ideas. Negative opinion responses and positive idea responses may indicate that a percentage of the group did not accept the others' opinions.

The following survey questions measured the quantity of participation, as perceived by the respondents on the 10-point scale:

- I shared my ideas with the group.
- I shared my opinions with the group.

Other questions identified possible instigators for the quantity of participation. The four questions regarding personal and group encouragement isolated one condition affecting participation, and distinguished if the condition applied to all members or an in-group. Opportunity of all members, comfort level of the respondent, and the level the group listened to the respondent are additional conditions addressed in the survey. Consistent patterns may suggest relationships among conditions and participation levels; however, not all possible conditions that may affect participation levels were addressed by the survey, limiting the certainty of causality. The data regarding the legitimate power of group members and the survey responses were not correlated, maintaining respondent anonymity.

Participants. The subjects of this study were participants of Kaizen Events in a central Kentucky Lean organization. In order to participate, the organization was required to define the organization as practicing Lean principles for at least three years. According to Davis (2011), changing a batch factory to Lean takes one to three years;

therefore, organizations practicing Lean principles for at least three years will have sufficient Kaizen experience and skill for the study. The study was limited to High Impact Kaizen Event or Sustaining Kaizen Event members, as these events particularly benefit from and foster participation (Davis, 2011). A qualifying Kaizen Event concluded within six months prior to the survey, allowing adequate time to include prior events while ensuring participants would recall sufficient details to complete the study. Event groups or subgroups were further limited to having between three and 20 members, to maintain small group dynamics (Crocker, Chiu, & Charney, 1984).

Threats to Validity. In order for the organization to qualify for the study, it must have practiced Lean principles for at least three years. The organization determined if it met this qualification through self-assessment. The study lacked measures to determine if the organization uses Lean principles properly or the organization's level of assimilation to Lean culture. The groups studied were participants in real-world Kaizen Events.

While real-world groups are superior to laboratory-controlled groups in that real-world groups are totally vested in the process, real-world groups experience uncontrollable variables that may affect responses (Carletta, Garrod, & Fraser-Krauss, 1998). Survey respondents measured participation and conditions of the group based on their own personal perception of the event, exposing the results to human error and bias. The survey measured participation and conditions that may affect participation, such as group encouragement, listening, and opportunity. Relationships may exist among the measured elements, but do not necessarily indicate causality. In addition, the study did not measure all conditions that might affect participation. Other conditions, such as the

mental state of the group participants or the working environment of the group may have affected any or all survey questions.

Data Analysis. The survey data were charted in Excel. Means and Standard deviations were calculated using the Excel formulas AVERAGE and STDEVA, respectively, for each group member and for each question. T-tests were performed using Excel t-Test: Two-Sample Assuming Equal Variances to determine if data significantly varied, using an alpha level of 0.05 and a one-tailed test. Data for participation, encouragement, opportunity, comfort, and listening questions were compared. An aggregate of all responses for all questions was also tested.

Chapter 4

Overall Findings

Participants. The central Kentucky Lean manufacturing organization that participated in the case study had held four Kaizen Events in the preceding twelve months. Three of the Kaizen Event groups qualified for the study, one Kaizen Event group did not qualify for the study. This event was a High Impact Kaizen Event consisting of more than 20 members. All three Kaizen groups participated in the case study. Each member of Group A and Group B participated. Seven of eight members of Group C participated.

The central Kentucky Lean manufacturing organization used the same method of leader selection for all three groups. The first and second in command were engineers and production managers, respectively. In the organizational hierarchy, these two positions held equal legitimate power in different branches of the structure. Other group members were operators, the lowest legitimate power holders, or mid-level supervisors. The supervisors held more legitimate power than the operators, but less than the engineers and production managers. One of the supervisors in Group B held more power than the other mid-level managers in the study. Table 1 describes the groups' legitimate power dynamics.

Table 1

Hierarchal Position of Group Members

	Engineer	Production Manager	Upper Supervisor	Supervisor	Operator
Group A	1	1		1	2
Group B	1	1	1		
Group C	1	1		1	3

Descriptive Findings. The results of the survey are listed in Appendix B. As expected, the Lean organization chose the group members with the highest legitimate power to lead the groups.

In aggregated overall scores for all survey questions, the mean scores from Group A and Group C were not significantly different. Group B mean scores did significantly differ from Group C, ($t(118) = -2.84, p < .05$). Group A scores also significantly differed from Group B, ($t(94) = 3.28, p < .05$). However, Group B scores were significantly lower than the other groups, rather than higher.

Scores for each individual question were compared between groups. The groups did not significantly differ. Also, Group B mean scores were equal to or lower than the other groups in the survey categories encouragement, opportunity, comfort, and listening. However, scores were not significantly different between any groups in any of the categories.

Chapter 5

Conclusion

Summary. The central Kentucky Lean manufacturing organization case study produced results that supported H_1 . The organization selected the member with the most organizational legitimate power for leadership positions in the Kaizen groups. The results did not support H_2 , due to insignificant differences in participation among the three groups. Therefore, the $Null_2$ was retained. Group B scored significantly lower in a compilation of all survey questions compared to Group A and Group C, despite a significantly lower power difference. This case study does not suggest a relationship between group participation and member legitimate power difference.

Organizational communication research indicates group member contributions increase when the participant with the greatest legitimate power, or hierarchal status, does not serve as the group leader. Lean principles and practices indicate Kaizen Event members will contribute regardless of group leader selection, due to member training, education, and the Lean team-oriented culture. This case study supported the Lean principles, finding no significant difference in participation among groups with different legitimate power dynamics. Further study is needed to determine conclusively if Lean culture and training maximizes group member contribution, or if participation increases in Lean environments when the chosen leader does not hold the greatest legitimate power.

Data Interpretation. The data supported H_1 : Lean organizations choose individuals with greater or equal legitimate power in relation to the rest of the group. The data did not support H_2 , groups and subgroups with less legitimate power difference

between the leader and group members will produce higher participation scores. Appendix C outlines the comparative statistics among the three groups. Group B experienced the least difference in power distance, with all three members in relatively high managerial positions in the hierarchal structure. The power difference within Group A equaled the power distance within Group C; each group contained at least one operator and one engineer. The scores for the two participation questions (frequency question 1. I shared my ideas with the group and frequency question 2. I shared my opinions with the group) did not differ significantly among the three groups.

In this case study, the group with the lowest legitimate power distance consistently scored lower than the other groups in the survey categories. Response means by question category are outlined in Appendix D. Group B produced lower means in participation, encouragement, opportunity, comfort, and listening. While the separate participation, encouragement, opportunity, comfort, and listening scores did not have a significant difference, the aggregate of all responses for Group B was significantly less than the other groups.

Qualitative Observations. A significant issue arose during the Group B survey session. During the introduction period of the survey, a Group B participant suggested several employees of the central Kentucky Lean manufacturing plant were dissatisfied with the organization, but did not offer causation. It is possible the history and environmental conditions of the organization affected the responses of Group B participants disproportionately to the other groups, since the participant felt it necessary to verbalize his/her frustration. It is also possible the participant felt free to express opinions due to the similar legitimate power level of the group members, all members

being upper management. This case study did not determine the cause of the statement or if the statement or cause of the statement affected the responses of Group B members.

An organization representative disclosed to the researcher that the organization recently experienced a significant lay-off and restructuring, close to the time of the Kaizen Events. A substantial environmental occurrence, such as a lay-off, may have affected scores. A major lay-off in the midst of major Kaizen Events also may affect the successful utilization of Lean principles, since lay-offs are not an approved Lean practice.

Suggestions for Further Study. Future studies in the effects of Kaizen Event group leader selection on group participation will further determine if American Lean organizations can increase Kaizen Event participation by manipulating the legitimate power of the group leader. Repeating this study in additional organizations over time and compiling results will provide data that are more accurate. Thoroughly mapping the organizational hierarchy and determining the relational positions of each group member would provide a superior illustration of the correlation between legitimate power and participation. Requiring organizations to meet stringent requirements to qualify as a Lean organization before participating in the study would reduce threats to validity. Additional methods of determining participation, such as tallying utterances and conversation mapping, reduce the human bias associated with surveys and may further clarify the correlation. Subsequent research may also employ control groups in Lean organizations, as Lean organizations tend to maintain strict hierarchies within Kaizen groups. Creating Kaizen Event groups where the leader does not hold as much or more legitimate power than all other members and comparing member participation to

traditional Kaizen Event groups will help determine if American Lean organizations would benefit from this practice.

Additional studies could also use the research instrument for an indirectly related study. The survey scores suggest respondents participated and felt they had encouragement and opportunity to participate to a higher degree than they felt comfortable participating and felt the group listened to them. Surveying the same respondents after subsequent Kaizen Events may show a relation in participation in subsequent events and the comfort and listening of previous events.

APPENDIX A

Case Study Survey

Kaizen Event Communication Survey

Thank you for your time. The purpose of this survey is to identify factors that affect participation during Kaizen Events. Participation in this survey is ANONYMOUS and VOLUNTARY. You may leave at any time without repercussion. Please do not write any personal data on this survey, such as age, name, company status, company name, etc. If you consent to participating, please complete your survey at this time. Thank you.

All questions are regarding the specific Kaizen Event described by your survey moderator. Please answer each question on a scale of 1 to 10, with 10 meaning the action in the question always occurred, and 1 meaning the action never occurred. Shade in the circle with your response.

1. I shared my ideas with the group.

Never Rarely Sometimes Always

1 2 3 4 5 6 7 8 9 10

2. I shared my opinions with the group.

Never Rarely Sometimes Always

1 2 3 4 5 6 7 8 9 10

3. Each participant was encouraged to share his or her ideas with the group.

Never Rarely Sometimes Always

1 2 3 4 5 6 7 8 9 10

4. Each participant was encouraged to share his or her opinions with the group.

Never Rarely Sometimes Always

1 2 3 4 5 6 7 8 9 10

Please answer each question on a scale of 1 to 10, with 10 meaning you completely agree with the statement, and 1 meaning you completely disagree with the statement. Shade in the circle with your response.

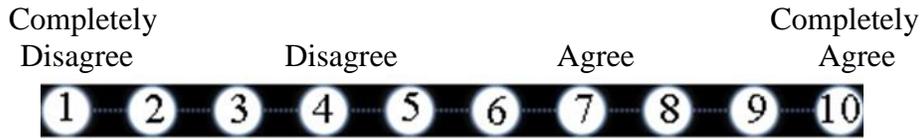
1. I felt comfortable sharing my ideas with the group.

Completely Disagree Disagree Agree Completely Agree

1 2 3 4 5 6 7 8 9 10

(Continue to the next page)

2. The group listened to my ideas.



3. I felt comfortable sharing my opinions with the group.



4. The group listened to my opinions.



5. Each event participant had an equal opportunity to share his or her ideas with the group.



6. Each event participant had an equal opportunity to share his or her opinions with the group.



7. I was encouraged to share my ideas with the group.



8. I was encouraged to share my opinions with the group.



APPENDIX B

Table B1

Survey Responses of Group A with means and standard deviations

Group A	Survey Question	Respondant A	Respondant B	Respondant C	Respondant D	Respondant E	mean	std dev
frequency 1	I shared my ideas with the group	10	8	10	10	10	9.6	0.894427191
frequency 2	I shared my opinions with the group	10	8	10	8	10	9.2	1.095445115
frequency 3	Each participant was encouraged to share his or her ideas with the group	10	10	10	9	7	9.2	1.303840481
frequency 4	Each participant was encouraged to share his or her opinions with the group	10	9	10	9	7	9	1.224744871
agreement 1	I felt comfortable sharing my ideas with the group	9	9	9	9	7	8.6	0.894427191
agreement 2	The group listened to my ideas	10	7	9	9	7	8.4	1.341640786
agreement 3	I felt comfortable sharing my opinions with the group	9	8	9	9	7	8.4	0.894427191
agreement 4	The group listened to my opinions	10	8	10	8	7	8.6	1.341640786
agreement 5	Each event participant had an equal opportunity to share his or her ideas with the group	10	9	10	9	10	9.6	0.547722558
agreement 6	Each event participant had an equal opportunity to share his or her opinions with the group	10	9	10	9	7	9	1.224744871
agreement 7	I was encouraged to share my ideas with the group	10	10	10	9	7	9.2	1.303840481
agreement 8	I was encouraged to share my opinions with the group	10	10	10	9	7	9.2	1.303840481
	mean	9.83	8.75	9.75	8.92	7.75		
	standard deviation	0.389249472	0.965307299	0.452267017	0.514928651	1.356801051		

Table B2

Survey Responses of Group B with means and standard deviations

Group B	Survey Question	Respondant A	Respondant B	Respondant C	mean	std dev
frequency 1	I shared my ideas with the group	10	8	7	8.33	1.527525232
frequency 2	I shared my opinions with the group	10	8	8	8.67	1.154700538
frequency 3	Each participant was encouraged to share his or her ideas with the group	10	9	8	9	1
frequency 4	Each participant was encouraged to share his or her opinions with the group	10	9	8	9	1
agreement 1	I felt comfortable sharing my ideas with the group	10	4	8	7.33	3.055050463
agreement 2	The group listened to my ideas	8	6	6	6.67	1.154700538
agreement 3	I felt comfortable sharing my opinions with the group	10	4	7	7	3
agreement 4	The group listened to my opinions	9	6	8	7.67	1.527525232
agreement 5	Each event participant had an equal opportunity to share his or her ideas with the group	10	7	8	8.33	1.527525232
agreement 6	Each event participant had an equal opportunity to share his or her opinions with the group	10	7	8	8.33	1.527525232
agreement 7	I was encouraged to share my ideas with the group	10	7	8	8.33	1.527525232
agreement 8	I was encouraged to share my opinions with the group	10	7	8	8.33	1.527525232
	mean	9.75	6.83	7.67		
	standard deviation	0.621581561	1.642245322	0.65138947		

Table B3

Survey Responses of Group C with means and standard deviations

Group C	Question #	Survey Question	Respondant A	Respondant B	Respondant C	Respondant D	Respondant E	Respondant F	Respondant G	mean	std dev
	frequency 1	I shared my ideas with the group	10	8	7	10	10	10	7	8.86	1.463850109
	frequency 2	I shared my opinions with the group	10	7	7	10	10	10	7	8.71	1.603567451
	frequency 3	Each participant was encouraged to share his or her ideas with the group	4	9	10	10	10	10	10	9	2.236067977
	frequency 4	Each participant was encouraged to share his or her opinions with the group	10	7	10	10	10	10	10	9.57	1.133893419
	agreement 1	I felt comfortable sharing my ideas with the group	10	6	8	10	10	7	8	8.43	1.618347187
	agreement 2	The group listened to my ideas	10	6	8	9	10	7	5	7.86	1.951800146
	agreement 3	I felt comfortable sharing my opinions with the group	10	6	8	10	10	7	7	8.29	1.704336206
	agreement 4	The group listened to my opinions	10	7	8	9	10	6	6	8	1.732050808
	agreement 5	Each event participant had an equal opportunity to share his or her ideas with the group	10	9	10	10	10	7	10	9.43	1.133893419
	agreement 6	Each event participant had an equal opportunity to share his or her opinions with the group	9	9	10	10	10	10	10	9.71	0.487950036
	agreement 7	I was encouraged to share my ideas with the group	10	10	10	10	10	10	10	10	0
	agreement 8	I was encouraged to share my opinions with the group	10	8	10	10	10	10	10	9.71	0.755928946
		mean	9.416666667	7.666666667	8.833333333	9.833333333	10	8.666666667	8.333333333	8.964166667	
		standard deviation	1.729862492	1.370688834	1.267304465	0.389249472	0	1.66969422	1.874873733		

APPENDIX C

Table C1

Aggregated Statistical Comparison of Group A and Group B

t-Test: Two-Sample Assuming Equal Variances

	<i>group A</i>	<i>group B</i>
Mean	9	8.083333333
Variance	1.220338983	2.65
Observations	60	36
Pooled Variance	1.752659574	
Hypothesized Mean Difference	0	
df	94	
t Stat	3.284383891	
P(T<=t) one-tail	0.000718319	
t Critical one-tail	1.661225855	
P(T<=t) two-tail	0.001436638	
t Critical two-tail	1.985523442	

Table C2

Aggregated Statistical Comparison of Group A and Group C

t-Test: Two-Sample Assuming Equal Variances

	<i>group A</i>	<i>group C</i>
Mean	9	8.964285714
Variance	1.220338983	2.324010327
Observations	60	84
Pooled Variance	1.865442656	
Hypothesized Mean Difference	0	
df	142	
t Stat	0.154698121	
P(T<=t) one-tail	0.438639488	
t Critical one-tail	1.655655173	
P(T<=t) two-tail	0.877278975	
t Critical two-tail	1.976810994	

Table C3

Aggregated Statistical Comparison of Group B and Group C

t-Test: Two-Sample Assuming Equal Variances

	<i>group B</i>	<i>group C</i>
Mean	8.083333333	8.964285714
Variance	2.65	2.324010327
Observations	36	84
Pooled Variance	2.420702179	
Hypothesized Mean Difference	0	
df	118	
t Stat	-2.842379246	
P(T<=t) one-tail	0.002638916	
t Critical one-tail	1.657869522	
P(T<=t) two-tail	0.005277831	
t Critical two-tail	1.980272249	

APPENDIX D

Table D

Means of Survey Question Responses by Category

	Group A	Group B	Group C
question # frequency 1	9.6	8.33	8.86
question # frequency 2	9.2	8.67	8.71
participation mean	9.4	8.5	8.79
question # frequency 3	9.2	9	9
question # frequency 4	9	9	9.57
question # agreement 7	9.2	8.33	10
question # agreement 8	9.2	8.33	9.71
encouragement mean	9.15	8.67	9.57
question # agreement 5	9.6	8.33	9.43
question # agreement 6	9	8.33	9.71
opportunity mean	9.3	8.33	9.57
question # agreement 1	8.6	7.33	8.43
question # agreement 3	8.4	7	8.29
comfort mean	8.5	7.165	8.36
question # agreement 2	8.4	6.67	7.86
question # agreement 4	8.6	7.67	8
listening mean	8.5	7.17	7.93

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