How Complexity Leadership Enables Both Resilience and Effectiveness: Validation Study to Distinguish Leadership Interaction Modes during Organizing

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Organization researchers have long identified organizational climate and culture as key constructs for predicting organizational outcomes. Likewise, leadership is often cited as an antecedent of both climate and culture (cf. Schneider, Ehrhart and Macey, 2013). However, at present, the field lacks clearly defined constructs and validated metrics that describe what one means by leadership in this context. Also lacking are descriptions of the specific leadership interactions and mechanisms that are hypothesized to engender climate or culture and thus drive desired organizational outcomes.

This article addresses this gap by introducing and validating a 10-item measurement instrument of Complexity Leadership Organizing Modes (CLOM) and its two 5-item subscales. The first subscale, Resilience Leadership Mode (RLM), is posited to address risk (variance) in the ecosystem that might imply that new or different opportunities must be targeted. It does this by creating diversity of perspectives and capabilities within the organization. This internal optionality allows the organization to be flexible when responding to surprise events. The second, Effectiveness Leadership Mode (ELM), is posited to maximize return (expected value) that derives from existing opportunities and capabilities. It does this by promoting focus and efficiency while exploiting known opportunities. We show that these CLOM scales have content validity and exhibit stable psychometric characteristics allowing them to be used for future research. Eventually, we hope that this work can be useful in practice as a way to diagnose deficiencies in the leadership modes in organizations.

In keeping with the epistemology of organization-level constructs, this instrument is motivated by systems-informed theories of organizational leadership rather than psychologically

grounded leadership theories that focus on what it means to be called a leader (cf. Schyns, Meindl & Croon, 2007), what a "leader" is like (cf. Bobbio & Rattazzi, 2006), how a leader behaves (cf. House, 1971), or how one should communicate to others so that they will follow (cf. Bass, 1990).

Contribution of this Study

This paper contributes to the field by defining and providing an instrument to measure Complexity Leadership Organizing Modes (CLOM). The survey instrument is based upon well-defined and clearly observable leadership interactions that do not depend on the characteristics, traits or behaviors of individual leaders. This new construct reflects the level and mix of leadership interactions within a given unit of organizing. It does this by measuring how often various leadership interactions are observed to promote or diminish various local rules of interaction over a given time period within a complex adaptive system of agents. Taken together, these leadership interactions are posited to ensure that the system continually maintains and renews the key enablers of both its effectiveness at maintaining short term access to requisite resources and its capacity for resilience by developing and maintaining optionality in the face of uncertainty over the intermediate and longer term.

This study provides evidence which supports the construct validity of the CLOM instrument including: content validity of the original items, psychometric properties of a full and abbreviated scale including robustness of the scales across subpopulations, and a demonstration of convergent/divergent discrimination of the metric when considered against other constructs in its nomological network (proximate, distal, and unrelated constructs). The paper concludes with a discussion of possible future research and offers recommendations about research that might identify the antecedents and consequences of the CLOM construct.

SYSTEMS THEORY, COMPLEXITY AND LEADERSHIP

In a 2001 article in *The Leadership Quarterly,* Russ Marion and Mary Uhl-Bien called for leadership researchers to look to complexity and complex systems ideas for new approaches to their field. The earliest incarnations of this call for systems-informed leadership research can be found in the application of general systems theory (von Bertalanffy, 1950) to the problems of management in organizations. In particular, Katz & Kahn (1966) expressed a systems definition of organizational leadership as the "influential increment" (p.528) beyond the routine interactions that occur within organizations. Their point is that in uncertain environments, a human interaction system can never be designed to take into account all contingencies. Therefore, leadership interactions must always be present to read the signs that are relevant to organizing within the ecosystem and to catalyze the necessary correctives along the way. Hence, successful organizations must have a leadership meta-capability (Hazy, 2005) that maintains and evolves their functioning in order to sustain or improve the organizing system's relative fitness in the short, intermediate and the long term within a changing ecosystem.

Katz & Kahn (1966) described specific interaction types that constitute this "influential increment". These include: making adjustments for "changing external conditions", correcting inevitable internal "incompleteness of organizational design" and managing problems that arise with respect to organizational membership and boundaries. These imperatives have been framed in a complexity context (Hazy, 2011) and form the basis of the Complexity leadership framework proposed by Hazy and Uhl-Bien (2015) and used herein to develop our scales. We argue that the leadership interactions that constitute this "influential increment" are actually the leadership antecedents that catalyze other commonly measured aspects of organizational climate and culture (Schneider, Ehrhart, and Macey 2013). As such, taken together, the local occurrences of leadership interactions of various types across the organization constitute what we

are calling the Complexity Leadership Organizing Modes (CLOM) in the organization. Table 1 provides the list of various leadership interactions that Hazy and Uhl-Bien (2015) posited to be necessary to enact each of these system-level leadership functions during organizing.

Agreement across CLT approaches

In answer to Marion and Uhl-Bien's call, several approaches have been put forth that apply complexity thinking to leadership practice on a theoretical level. Hazy (2004, 2005, 2006) described leadership within a complex system as an organizational capability – he called this a meta-capability – that arises to address the system complexities that Katz & Kahn (1966) enumerated. His studies used system dynamics to model Intel in the 1980s and NCR in the 1990s to show that varying the levels of two distinct types of what he called "leadership activities" – he called them "transformational/generative" and "transactional/convergent leadership" respectively – impacts the relative adaptability and performance of firms.

In parallel, Marion and Uhl-Bien (2006) and with Bill McKelvey (2008) suggested a conceptual description of leadership as it is experienced in traditional bureaucratic organizational forms as they face today's complex ecosystems. They argued that organizations should become more like complex adaptive systems and that as a result leadership should be more distributed. Their Complexity Leadership Theory (CLT) approach also identifies the imperatives of adaptability and performance calling their corresponding types "adaptive" and "administrative" leadership. Recently,

These approaches use of the complex adaptive systems (CAS) epistemology to draw attention away from the individual "leader" as some uniquely skilled or charismatic individual who "brings" leadership into the system from outside. They replace this traditional heroic conceptualization of "leadership" (Schyns, Meindl & Croon, 2007) by situating leadership as

emerging from within the system as a series of leadership interactions or "events" (Lichtenstein et al., 2006) that must be performed if the organizing system is to survive.

Also common in the complexity perspective is the realization that uncertainties, change and complexities in organizing systems imply that the "influential increment" bifurcates into two distinct leadership imperatives: the need to explore and develop optionality or resilience within the organization in order to respond to change and uncertainty in the ecosystem, and the need for effectiveness to exploit known opportunities to acquire requisite resources (March, 1991). Gell-Mann (2002) calls the two imperatives: information gathering and information using. Uhl-Bien, Marion and McKelvey, (2007) call them adaptive and administrative leadership, and Hazy (2006) calls them generative and convergent aspects of the leadership meta-capability. More recently, Hazy and Uhl-Bien (2015) settled on the names generative and administrative leadership activities while Arena and Uhl-Bien (2016) use the terms entrepreneurial system and operational system to make this key distinction.

In this study, leadership interactions of these two types are assumed to create a complexity leadership organizing mode (CLOM) which indicates the presence of a healthy leadership meta-capability. The two aspects of the CLOM are: a *Resilience Leadership Mode* (RLM) which engenders adaptability through generative activities that create optionality for the organization to address uncertainty, variance or risk, and an *Effectiveness Leadership Mode* (ELM) which supports performance by converging toward an expected value for predicted outcomes as these are reflected in some chosen metric or standard.

Disagreement on the "influential increment" to manage membership and boundaries

Where complexity theories disagree relates to the "influential increment" needed for monitoring, control and interventions to manage membership rights and responsibilities and define and maintain boundaries. These are the leadership interactions that hold the system

together as an entity, a unity, in the face of external pressures. Uhl-Bien, Marion and McKelvey (2007) argue for what they call Enabling Leadership which they suggested would set the conditions where self-organization would unfold. Arena and Uhl-Bien (2016) call this third area "adaptive space". Hazy (2012) argues for unifying leadership that integrates action and promotes a shared identity. Hazy & Uhl-Bien (2015) called these internally focused leadership interactions "community-building". They are intended to create a complexity leadership mode that engenders a common identity and facilitates integrated action. As we discuss later in this article, the community-building aspect of CLOM was not isolated in this study.

DEFINING COMPLEXITY LEADERSHIP ORGANIZING MODES

Complexity Leadership Theory (CLT) takes the view that "organizations" can be represented as complex adaptive systems. This implies that they are systems of interacting semiautonomous agents (individuals or groups) that respond to events in the ecosystem by enacting a set of evolving, heterogeneous, locally relevant rules that constrain these interactions in a manner that maintains a level of fitness that is adequate for survival (Uhl-Bien, Marion & McKelvey, 2007). To highlight the systems perspective that informs this perspective, herein we call the organization an "organizing system" of human agents.

At a point in time, any organizing system is assumed to be in a *state* that reflects a complex and distributed collection of local interaction rules that are expressed in the nodes and edges of the social network connections (Hazy, 2008) comprising the organizing system. Potentially, however, due to conditions is in the ecosystem or events that are internal to the organizing system, at a later point in time, an organizing system could be a different state with the same or with different rules in distinct localities. For such a transition in state to occur, however, a mechanism must exist to instantiate it. In the complexity framework, the mechanism must enable changes to, or reinforcement of all relevant local rules of interaction as these are

enacted globally and also locally across the organizing system. Hazy (2005; 2006) has called this the leadership meta-capability. It is instantiated as specific, localized *leadership interaction* events. The CLOM measures the local presence and global distribution of this meta-capability.

To do this, we define a *leadership interaction* as an observable interaction between individuals where at least one individual in the interaction either reinforces an existing consensus practice or norm that operates at the level of the local rules of interaction among agents. An example of a leadership interaction would be when one individual "amplifies a voice that is not being heard" during a discussion or a meeting by promoting the notion that during interactions everyone should value quieter voices equally with other, louder voices which sometimes drown out the voices of others. By reinforcing norms which amplify quieter voices, this leadership interaction brings and retains more information about various possibilities in the working memories of the involved agents, and this in turn retains optionality in the organization and therefore supports the value potential that comes from organizational *resilience*.

Another example would be "establishing specific targets and deliverables" during a conference call. This might involve reinforcing the consensus practice where the group clarifies for all participants what specific tasks must be completed by the next meeting, and who is accountable for delivering them at the next meeting. Clarifying deliverables and targets, increases efficiency and therefore contributes to value potential that can be realized through *effectiveness*.

The reader should note that a one way interaction during a "town meeting" executive presentation also meets the definition of leadership interactions if, that is, locally enacted norms or practices are impacted. See Table 1 for other examples. The premise of complexity leadership is that leadership has its effects by impacting rules of interaction as they are enacted locally. Thus, if all of the individuals simply continue to comply with prior norms or even some or all of

the involved individuals refuse to conform – that is, no effort is made to reinforce, dampen or change anything – then no leadership practice has occurred. Thus, leadership interactions can be observed by third parties as local rules of interaction are reinforced, dampened or changed, and they can be observed to occur more or less frequently as they are needed to sustain or evolve the human interaction dynamics that express organizing within a complex adaptive system.

The Complexity Leadership Organizing Modes (CLOM) instrument measures the frequency that each of these locally enacted events are observed. Thus, the strength, composition and distribution of the CLOM across organization are posited to reflect the potential that an organizing system will undergo a change in state in response to external or internal events. Events might be the drivers of the change in an organizing system's state, but this effect is catalyzed at least in part by leadership. The CLOM as measured locally across the organization reflects the organizing systems capacity to realize the value potential available in the ecosystem. It describes the capacity of the organization's leadership meta-capability to respond to events in the ecosystem whether they are predictable and expected (ELM) or uncertain and therefore provide the organization with the capacity to respond effectively to surprise (RLM).

The Initial 40-Item Scale

The original scale used in this study has forty items and is shown in Table 1. Each item identified is based upon an analysis of the results of a review by Hazy & Uhl-Bien (2015) and is meant to describe an observed *leadership interaction* or practice that addresses the the complexity interpretation (Hazy, 2011) of the "influential increment" described by Katz and Kahn (1966). Recall that leadership interactions are posited to be necessary to human organizing because interactions occur locally in response to the ubiquitous presence of uncertainty of events in the ecosystem and within the black-boxes that are the individual agents who are involved in the system. How often each of these specific leadership interactions occur – daily, weekly,

monthly, etc. – is posited to be indicative of the level or "stock" of leadership interactions that create a complexity leadership capability in the organizing system. The way that their level and mix varies locally to match conditions in the ecosystem is therefore an indicator of the health of the leadership meta-capability in each workgroup, department or organization.

Each leadership interaction (each item on Table 1) is posited to be enacted in the organizing system to further some *a priori* functional demand of the "influential increment" (Katz & Kahn, 1966; Hazy, 2011) as described in Hazy & Uhl-Bien (2015). For example, the leadership interaction "forgiving failure" is assumed to be of the *generative* type intended to engender an environment that promotes new ideas and tests different approaches to store information for future use and thus enhance the optionality within the organizing system. Leadership interactions that "forgive failure" would presumably increase future instances of experimentation and prototype testing, which in turn would keep options open and make the organizing system more resilient in response to changes in the ecosystem. As can be seen in Table 2, in the *post hoc* classification, the generative type are herein presumed to engender a *Resilience Leadership Mode (RLM)* which enhances an organization's capacity to respond to shocks and changing circumstances.

Alternatively, leadership interactions that promote local the interaction rule to "establish specific targets and deliverables" are assumed to be of the *administrative* type. These interactions are intended to promote norms that influence individuals to clarify specific targets and to frame discrete deliverables that help organize activities and improve collective effectiveness. Interactions like these are posited to create expected value by exploiting known resources and opportunities. As can be seen in Table 2, in the *post hoc* classification, the administrative-type of leadership interactions engender what we are calling an *Effectiveness Leadership Mode (ELM)*

which enhances an organization's capacity to maintain short term access to requisite resources. Although they interact, both RLM and ELM can occur simultaneously or independently.

To scale the user responses according to levels of a capability, respondents were asked how often in the last three months they observed an occurrence of each leadership interaction in their immediate workgroup. Further, they were asked to report occurrences regardless of who initiated the interaction or even how well it was being enacted. Thus, the Complexity Leadership Organizing Modes (CLOM) scale measures how many times each leadership interaction was observed to occur in each particular work group over a three month period.

More specifically, to gather this data, respondents were asked how often they observed each item, for example, "forgiving failure", over the last three months. Responses are coded as: 1 for never (0 times), 2 for 1 to 10 times, 3 for 11 to 20 times, 4 for 21 to 30 times, 5 for 31 to 40 times, 6 for 41 to 50 times, and 7 for greater than 50 times which, assuming 60 work days in a three month period, is roughly once a day. Thus, a higher overall score for an item translates into more distinct observations of that interaction. As expected, the mean number of times that each leadership interaction was observed varies from item to item and across respondents. However, to provide perspective, from Table 2, the overall mean across all leadership interactions studied was about 3.2. This implies that within the average respondent's workgroup, on average, each of the forty specific leadership interactions that were surveyed was observed a little over once a week.

METHOD

The preceding describes the review and analysis of theoretic and qualitative research studies that led to the 40 generic leadership interaction items that were tested. Based upon a pilot study described in the next paragraph, we believe this list to be relatively exhaustive of the generic types of guiding or influencing interactions used by individuals when they are engaging

in leadership interactions in support of the complexity interpretation (Hazy, 2011) of the influential increment (Katz & Kahn, 1966). Further, the survey is agnostic with respect to any contextual framing or particularity that one might expect to find in a live organizational setting. This study thus explicitly argues that complexity leadership organizing modes (CLOM) can be measured independent of context. The context, however, could interact with the CLOM to determine outcomes.

The initial list of items list was compiled from a published review (Hazy & Uhl-Bien, 2015) of over twenty complexity-informed studies which included a table (pp. 82-83) of proposed complexity leadership practices. Each of these is posited to address a requisite leadership function within complex organizing systems. This list was piloted with one hundred individuals in leader roles using Survey Monkey. For the pilot study, the respondents were asked to indicate: first, if they used a particular practice item (to determine if it should it be included on the list), and second, if they used it, they were asked what they were trying to accomplish by using that leadership practice (the *a priori* designation on Table 1 of the present study). The respondents were also asked to identify any additional leadership interactions that were not included in the original survey.

The results of this unpublished pilot study, along with further review of the Hazy and Uhl-Bien (2015) article, were compiled into the 40-item list that was tested in the present study. As mentioned previously, this analysis also guided the *a priori* categorization of each item as indicated in column two of Table 1. We believe that the process we used for selecting these items offers strong support for their content validity and that they represent generic leadership interactions that are indicative of an active leadership meta-capability in organizations. We therefore argue that observed occurrences of these interactions within a workgroup would be reflective of the CLOM as experienced by individuals interacting within the organizing system.

Sample

To obtain the sample for the present study, we contacted approximately 2000 professional managers using a convenience sample that was based upon the LinkedIn connections of one of the authors. These network connections were developed over 25 years of active business experience including senior management positions at two Fortune 500-level global firms. Respondents were contacted through LinkedIn messaging and were asked to respond to a "twenty minute" online anonymous survey hosted by Survey Monkey. Responses were gathered from January through early April 2016. Prior to launch, this study was reviewed by the appropriate IRB and found to be exempt.

Although 393 of the 2000 managers who were contacted logged onto the survey, 290 or approximately 14.5% of those contacted completed the sections on the leadership interactions that were used for the factor analysis. Table 2 and the Results and Analysis section of this article provide additional demographic data about the respondents. The survey itself was anonymous and IP addressed were not collected. However, for interested users, an email address was provided so that, if they chose to, they could request a report on the results. Forty-eight respondents, about 17% of those who provided usable responses, requested the report by communicating with the authors through a communication channel that was outside the survey collection platform.

The survey itself consisted of multiple sections. Each section was included to validate aspects of the instrument using the various techniques described herein. The complete survey (which is available as supplemental information and from the authors upon request) consisted of:

- 40 items posited to measure leadership interactions, the main subject of the study
- 10 items as an existing measure of absorptive capacity (Daspit & D'Souza, 2013).
- 8 items as a measure of norm strength (De Jong, Bijlsma-Frankema & Cardinal, 2014)

- 3 items to measure healthy eating habits (Hearty, McCarthy, Kearney & Gilbney, 2007)
- Demographic information.

Overview of Data Analysis Method

Once the data was collected, as described in the Results and Analysis section, data analysis was performed in multiple steps. We first conducted exploratory factor analysis (EFA) among the 40 items to assess their dimensionality. We analyzed the results to identify items that would be incorporated into a more useable abbreviated multidimensional measure with sufficient internal reliabilities (as assessed by the Cronbach alpha) to be usable for empirical research on the full measures as well as each of its dimensions.

We then conducted a series of correlational and regression analyses to test whether the resulting ten-item measure as well as the two five-item subscales from which it is composed discriminated against other related (proximally and distally) and unrelated constructs in its nomologically network. Thus, if the level of CLOM or its RLM or ELM subscales could be shown to predict the levels of known constructs, then one could infer that the construct identified by using the CLOM scale is meaningful in some way.

Related and Unrelated Constructs

In this study, we tested whether the CLOM levels could predict *Absorptive Capacity*, which is assumed to be relatively close to what the CLOM scale might imply (called "proximal"). Separately, we tested whether the CLOM levels could predict *Team Norm Strength*, which is assumed to be only tangentially related the CLOM (called "distal"). Finally, to demonstrate that the correlations among ratings are not simply an artifact of the data collection process, the CLOM scale was tested to be sure it was unrelated to *Healthy Eating Habits* as was expected.

Absorptive Capacity was chosen as a proximate construct because leadership capabilities in general and resilience leadership capabilities in particular would seem to, among other things, enhance the learning capability of the organization. Thus, one would expect that levels on the CLOM would correlate to a moderate to strong degree with Absorptive Capacity metrics. This is because Absorptive Capacity as a construct was framed by Cohen and Levinthal (1990) from an organizational learning argument. Although many researchers have subsequently explored the characteristics of Absorptive Capacity, here we use a recent study by Daspit and D'Souza (2014) which identified four sub-factors that come from organizational learning theory: Acquisition of new information, Assimilation of information into useable knowledge, Transformation of structures that embed knowledge into the organization, and Exploitation of these transformed structures into new capabilities. Our thinking is that if CLOM predicts Absorptive Capacity which in turn predicts new product innovation or other outcomes, then one can reasonably hypothesize that certain leadership interactions likewise predict new product innovation, and so on.

Similarly, *Team Norm Strength* was chosen as a distal construct because leadership capabilities would seem to, among other things, enhance efficacious norm coherence within workgroups, and this would seem to be related weakly or moderately to Team Norm Strength. Thus, one would expect levels on the CLOM to be related weakly or moderately to the levels of Team Norm Strength metrics. This is one of four factors described by De Jong, Bijlsma-Frankema and Cardinal (2014) for peer control in teams. We therefore expect that Team Norm Strength would be weakly or moderately related to the strength of CLOM leadership interactions.

Finally, responses to three questions regarding the respondents' attitudes toward healthy eating were collected as an unrelated construct to control for systematic collection biases in the data. Although both Absorptive Capacity and Team Norm Strength were chosen because CLT

suggests that each of these constructs measures an intermediate effect that can be observed as a consequence of the occurrence of leadership interactions (Katz & Kahn, 1966; Hazy 2011), attitudes to healthy eating should be unrelated.

Robustness Tests

As a further test, we divided the sample into subpopulations to test whether the results remained robust across these subpopulations. More specifically, as is described in the next section, we tested whether the results were consistent across large and small organizations and across sectors which were distinguished according to those with focused for-profit motives versus those which included a significant social value component to their business model. The next section describes the results of these various construct validation methods that we used to test the psychometric characteristics of CLOM survey instrument.

RESULTS AND ANALYSIS

In this section we present the results of the survey study and describe the analysis that was performed to test the validity of the results. First, we describe the sample. Second we describe the analysis that was performed on the responses to the leadership interaction items and the subscales that were developed. Third, we describe the relationships that were tested between the leadership capabilities scale and its subscales and a measure of Absorptive Capacity (Daspit & D'Souza, 2013), a proximal construct, a measure of Team Norm Strength (De Jong, et al., 2014), a distal construct, and attitudes toward Healthy Eating Habits (Hearty *et al.*, 2007), an unrelated construct. In the fourth section, we describe the analysis that we performed on well-defined subpopulations of the data to demonstrate the robust nature of the CLOM scale and its two subscales across a wide range of organizations.

Study Sample

We had useable information for the complexity leadership organizing mode scale from 290 participants. Approximately 240 participants also completed the optional demographic information sections. The majority of these (67%) were male, over 46 years old (73%), managers (66%), worked for organizations with more than 500 employees (53%), had more than 25 years of professional experience (60%), but had been with their current employer for fewer than five years (41%) or between five and fifteen years (40%). The largest concentrations by industry sector were education and health services (29%), professional and business services (19%), information (including publishing, broadcasting and data processing (11%), financial activities (10%), non-profits (9%) and government (8%).

For subsequent analysis we recoded participants as either working for large organizations with more than 500 or more employees (53%) or small organizations with fewer than 500 employees (49%). We also recoded participants as working for organizations that were either non-profit or had a distinct non-profit motivation (government, non-profits, education and health services) (47%) and all others (53%). Although geography was not captured in the survey, based upon those who were invited to participate, most respondents, probably about 80% to 90% were from the US.

Factor Analysis

Our first step in the data analysis was to conduct a principal component exploratory factor analysis (EFA) using with direct oblimin rotation on the 40 preliminary leadership interaction items shown on Table 1. Using the standard Kaiser (1960) cutoff rule of Eigenvalue greater than 1, five factors emerged, accounting for 66.2% of variance. However, the first factor accounted for 52.1% of the variance, and an examination of the scree plot showed a sharp drop off after the second or third factor. While the Kaiser (1960) criterion is commonly used, it has

been shown to produce spurious results, frequently overstating the number of factors (Hayton et al. 2004; Horn, 1965). Rather than relying on this visual and subjective technique, parallel analysis (PA) was conducted using the procedure developed by Hayton et al. (2004). The PA results indicated a two factor solution. Accordingly, we conducted a second EFA with the number of factors constrained to two. The two factors accounted for 56.5% of variance and a correlation of between the two factors of .63. Those factor loadings for each of the forty items are shown in Table 1.

| Insert Table 1 about here|

The *a priori* assignment of leadership interaction items to leadership capability types can be seen in column two of Table 1. These were based on the leadership functions identified by (Hazy & Uhl-Bien, 2015) and validated in a pilot study (see the Method section). These forty items loaded onto two factors as shown in columns 4 and 5 of Table 1, and not onto a minimum of three factors as had been hypothesized. We will return to this difference in the Discussion section.

Shortened 10-Item Scale and Two 5-Item Subscales

The loadings from Table 1 were used to identify a 10-item scale consisting of two 5-item subscales. The subscales were created by selecting items from S1 and S2 on Table 1, which best represented the theoretical complexity framing of the content expected with a *Resilience Leadership Mode* and an *Effectiveness Leadership Mode* as described in the CLOM Defined section. The two subscales that represent these factors are theoretically embodied as complexity approaches that serve two bifurcated system functions:

1) Resilience (information gathering/generative/adaptive functions) to respond to emerging changes and risks by exploring in the ecosystem and creating optionality, and

2) Effectiveness (information using/convergence/administrative functions) to exploit present opportunities to acquire needed resources in the ecosystem and to maximize returns.

As seen in Table 2, the 10-Item scale is significantly correlated (r = .95) with the 40-item scale; Subscale 1 (resilience) and Subscale 2 (effectiveness) are significantly correlated (r = .90 and .84 respectively) with the 40 item scale and (r = .89 and .89, respectively) with the 10-item scale. Each of the subscales as well as the choice of items is described in more detail in the Discussion Section.

As the psychometric properties of the 10-Item scale and its subscales appeared acceptable, our next step was to explore their relationships with other variables. We anticipated that organizational size and sector would be related to the level of CLOM. Indeed we found that employees of for-profit organizations had higher CLOM scores on both the 40-item and 10-item measures *(*r = .17 and .21, respectively). This reflects the expectation that for-profits would have a higher rate of observed leadership interactions and thus CLOM since performance feedback about changes in the ecosystem would tend to occur much faster when profit motives are a higher priority. Employees of large organizations reported lower scores on both the 40-item and 10-item measures although these differences were not statistically significant (r = -.12, p = .07) and (r = -.09, p = .15). We expected lower scores in larger firms since bureaucratic process would tend to dampen leadership interactions as firms increase in size.

Correlational Analysis

We further examined the pattern of correlations between our measures and established constructs that we considered to be proximate (absorptive capacity), distal (team norm strength), and unrelated. As shown in Table 2, the pattern of correlations provided evidence of construct validity as our measures (40-item CLOM, 10-item CLOM, resilience LM subscale effectiveness LM subscale) were moderately and significantly correlated with absorptive capacity (.52, .49,

.49, .39), somewhat correlated with group norms (.33, .32, .30, .27), and uncorrelated with healthy eating (.11, .07, .09, .04). Using the Lee and Preacher's (2013) online utility, based on Steiger (1980), we found that for each measure of CLOM, the differences between their correlations with the proximal and distal constructs were statistically significant as were the differences between their correlations with the distal and unrelated constructs.

We were also interested in determining whether there was evidence that the distinction between subscale 1 and subscale 2 were conceptual and practical in addition to being statistically significant. To explore this, we tested whether they differ with respect to antecedents or consequences. The correlations between the two subscales and each of the other variables are shown in Table 2. We used Lee and Preacher's (2013) online utility, based on Steiger (1980), to test whether the differences in each pair of non-independent correlations were statistically significantly different, and we found that in most cases they were. That is, subcale #1 or RLM was more strongly related to absorptive capacity, work group norms, healthy eating, age, years of professional experience, and organizational size, whereas subscale #2 or ELM was more strongly related to sector, gender, and whether the respondent was in a management role.

| Insert Table 2 about here|

In addition to examining correlations, we also conducted a series of hierarchical regressions with the demographic variables as controls and then calculated the incremental variance (ΔR^2) by each of our measures with each of the proximate, distal, and unrelated variables. Those results are shown in Table 3 and are consistent with the correlations. Finally, in order to provide further evidence of the generalizability of these relationships, we created subsamples of participants from large organizations, small organizations, for-profit, and not-for-profit organizations and examined the patterns of correlations with the proximate, distal, and

unrelated variables. As shown in Table 4, the pattern of relationships was robust across all subsamples.

| Insert Table 3 about here|

| Insert Table 4 about here |

DISCUSSION

The CLOM and its subscales, RLM and ELM have strong psychometric characteristics, and they are correlated with known constructs as implied by theory. These scales might, therefore, be usefully applied in future research. In this section, we first describe three possibilities for future research: antecedents, consequences and improvements in the scale itself. This is followed by a more detailed description of the scales. We close this section with some thoughts about the limitations of this study.

With respect to antecedents, the theoretic pedigree of the CLOM suggests that the leadership interactions that are measured by the CLOM are likely to be triggered when individuals inside the organizing system recognize events in the external ecosystem or events that are occurring inside the organizing system. The former might involve a disruptive innovation by a competitor while the latter might be a management decision to establish performance targets according to certain metrics. More generally, distinct external and internal conditions for the organizing system might trigger differentiated types of leadership interactions which would likewise engender distinct CLOMs in different workgroups within the organizing system. This distinction could be measured in the context of relative values for the RLM and the ELM within various divisions, departments or workgroups as well as the strength of the CLOM overall. Researchers could identify specific triggers and then seek to determine those that are antecedents of a primarily RLM versus a primarily ELM within a given work group, department or organization.

For example, a disruption in commodity markets such as the precipitous drop in oil prices as occurred in 2014/2015 might trigger an increase in the CLOM leadership interactions that drive the ELM subscale in some sectors and at the same time decrease those in the RLM subscale in the same or even in other sectors. Presumably this would be particularly noticeable in firms that are operating in industry sectors where oil prices have a strong primary or secondary impact either as a source of revenue or as a significant cost. It would be interesting to study how specific categories of external ecosystem events (or internal events) impact a firm's CLOM differently in local workgroups depending upon that firm's industry sector and that work group's sensitivity to the event. Both correlation and variance among firms within a given industry would be of interest, particularly when the consequences of the events to the firms in a given industry are also known. This would be interesting to study since certain antecedents might engender a particular "flavor" (mix of RLM and ELM in various departments) of CLOM within an organizing system, but the resulting CLOM might turn out to be inappropriate with respect to achieving desired outcomes. That is, the firm's leadership meta-capability might err in the norms and practices (Raelin, 2016) that it promotes by adopting leadership interactions that engender a non-adaptive performance-focused CLOM when adaptation is required. To understand these differentiated effects, further research on the predicted consequences of various flavors of CLOM is needed.

With respect to consequences, research could develop in two ways. First, the CLOM could likely predict many intermediate constructs derived in organization theory. The relationships between the CLOM and Absorptive Capacity and Team Norm Strength described herein are only two examples of this. Other possible connections would include the relationship between the CLOM and Employee Engagement (Kahn, 1990), perceived Psychological Safety (Edmonson, 1999), and other climate and culture measurements. The logic is that events in the

ecosystem can impact organizational constructs that measure attitudes about how individuals experience life inside an organizing system. But these same events might also trigger leadership interactions which serve a catalytic purpose as individuals work to sustain or evolve the organizing system according to the needs and the demands of the ecosystem.

Considerable research has demonstrated relationships between intermediate organizational constructs like climate or culture and desirable organization-level outcomes such as profitability, growth, innovation, and so forth. As such, positive support for correlations between the CLOM scale and these organizational constructs would seem to imply that the CLOM may also directly predict organizational outcomes. This would be particularly germane when ecosystem conditions are uncertain or changing. Thus, a second research approach would explore the direct consequences of the CLOM to outcomes at the organization level. This agenda would include studies that look for evidence of direct relationships between the flavors of the CLOM metrics and desired organizational outcomes such as profitability, growth, and the creativity and innovation that are necessary to enable resilience in today's complex organizations.

A third general area for future research is to improve the resolution of the CLOM scale itself. The present study was able to identify two distinct subscales with different characteristics, Resilience Leadership Mode (RLM) and Effectiveness Leadership Mode (ELM). However, complexity theory predicts that there should be, at a minimum, a third factor that reflects the leadership climate that catalyzes support for membership development and integration, like for example, the leadership interactions that engender a climate of psychological safety (Edmonson, 1999).

Further, theory also implies that each of the present subscales might potentially be differentiated into two distinct components, an action component that supports leadership

interactions which proactively change the system's normative influence structure in support of collective action (Contractor & DeChurch, 2016), and an informational component that supports leadership interactions intended to efficaciously gather and process the information that can be interpreted, framed and articulated to influence and direct that action (Michelucci & Dickenson, 2016) as events unfold in the ecosystem. Further research is needed to test for empirical evidence that might support this distinction that is found in theory.

Exploring the CLOM Scale and Subscales

This study was intended to develop a measure that would operationalize complexity leadership theory as an instrument that can be used to develop and test other organizational theories. Toward this end, we developed and validated a 40-item and a 10-item CLOM scale. As would be expected given the derivation, conducting EFA on those ten items resulted in a two-factor solution with the first factor accounting for 54.7% of variance and the second for 12.4% of variance. The Cronbach alpha coefficients of internal reliability were .98 for the 40-item scale, .90 for the 10-item scale, and .86 for each of the two subscales. While Nunnally (1978) suggested that .70 as a minimally acceptable level, we note that our results exceed his more stringent suggestion of .80 for various forms of basic research.

The basic statistics and correlations for the 40 item, 10-item, and subscale measures are shown in Table 2. As is evident, the ten-item scale contains much of the same information provided by the much longer 40-item scale (r^2 = .95) and the pattern of correlations between those two measures and each of the other variables are, accordingly, virtually identical.

The 10-item scale implied by this study adds clarity to the specific interactions that embody the leadership meta-capabilities identified by theory. Together, these items provide conceptual clues about how complexity leadership climate (that is, CLOM) might impact other organizational constructs and outcomes. As we show, the CLOM scale factors into two distinct

subscales that are aligned with the bifurcated imperatives of resilience and effectiveness that have long been identified by theory (March, 1991, Gell-Mann, 2002, Hazy, 2006, Uhl-Bien, Marion & McKelvey, 2007, Hazy & Uhl-Bien, 2015). However, a third internally focused subscale identified in theory was not isolated here. We will say more on this in a few paragraphs. First, however, we describe in more detail the two 5-item subscales comprising the 10-item CLOM scale.

Resilience Leadership Mode (RLM) of Organizing

The RLM subscale captures observed *leadership interactions* that indicate that individual agents or groups have begun to explore divergence within an organizing system. Through these leadership interactions, the agents bring new information into the system and are encouraged to experiment and learn from conflicting perspectives (Arena & Uhl-Bien, 2016) to better understand their implications. These interactions generate more experiments and more information, and so on, in a positive feedback loop.

The leadership interactions that engender a RLM promote the sharing, management of conflict, diffusion and interpretation of this information throughout the organizing system. This provides the system with optionality which suggests that the organizing system will express a higher level of resilience in the face of unexpected future events. The leadership interactions measured for the RLM are:

RLM Subscale: Leadership interactions to enable resilience in a changing the ecosystem

RLM-1: Item # 8: Supporting differences of opinion
RLM-2: Item#13: Providing resources & time to try new things
RLM-3: Item#21: Encouraging learning visits to other organizations
RLM-4: Item#32: Encouraging new approaches
RLM-5: Item#36: Forgiving failure

Effectiveness Leadership Mode (ELM) of Organizing

The ELM scale captures observed *leadership interactions* that promote convergence within human interaction dynamics (Hazy & Backström, 2013) toward an expected outcome. This enables the organization to exploit known opportunities in the ecosystem by imposing structural constraints that focus action and attention. By doing this, agents efficiently coordinate their actions in the current ecosystem to bring requisite resources, like raw materials, human resources and financial capital into the organizing system where events are more predictable. These activities accumulate resources to ensure short to medium term survival. The leadership interactions measured for the ELM subscale are:

ELM Subscale: Leadership interactions to enable effectiveness at exploiting opportunities

ELM-1: Item # 2: Driving accountability
ELM-2: Item #14: Setting objective metrics of success or failure
ELM-3: Item #15: Quieting voices that distract from purpose
ELM-4: Item #26: Asking people to invest more time and energy
ELM-5: Item #27: Establishing specific targets and deliverables

Further Research to Improve the Resolution of the CLOM Scale

In addition to the items selected for the two subscales, other items did not load strongly or were not strongly linked theoretically to either subscale. They were therefore not selected for the 10-item scale. Many of the items that were not included in the RLM or the ELM subscales had a priori assignments that were expected to load onto a hypothesized third factor, community-building. However, in this study, a third psychometrically distinct factor in the survey responses was not resolved through factor analysis.

It is not that these leadership interactions don't occur, however. The mean value of their frequency is roughly the same as those for RLM and ELM. Further, based on the semantic content of these items, we argue that they tend to be internally focused and are essentially

agnostic as to what the organization perceives to be occurring or is actively doing in response to most events beyond the boundaries of the organizing system itself. That is, these leadership interactions are intended to hold the group together as a distinct entity separate from other entities in the ecosystem. As such, one might argue that these interactions are prerequisites for the organizing system to act as a collective in the first place.

These internally focused leadership interactions would be posited to encourage the clear specification of the benefits and responsibilities of membership as well as the nature of the social boundaries of and within the collective, identifying for the members who is in, and who is out. They would engender a sense of identity for the individual and for the group, and they would serve to clarify for each individual how he or she integrates into a whole. An example of boundary and membership related perturbation events that might trigger an increase in this type of leadership interaction would be the decision to outsource a manufacturing facility off shore. Such an event would presumably put stress on many individuals' sense of belonging which in turn would trigger leadership interactions of this type in response to heightened uncertainty (Hazy & Uhl-bien, 2015; Hazy, 2012). We continue to believe that this type of complexity leadership mode, which we are calling *Identity Integration Leadership Mode (IILM)*, is significant. However, the design of this study was unable to provide psychometric evidence in the survey responses that supports the unique presence of this type of leadership interaction as a distinct recognizable type among those we surveyed.

We believe that this was due to the relatively low resolution of the survey method as an observation instrument. Future research with higher resolution instrumentation might be better able to resolve the presence of this or other factors. This is likewise the case with respect to improving resolution to potentially distinguish leadership interactions that shape information-processing flows from those that facilitate organized action. We are hopeful that future research

will develop more discerning research designs and higher resolution instrumentation – perhaps using social media, artificial intelligence, even audio or video surveillance all combined with data analytics – to more precisely categorize leadership interactions and thus clarify the various distinct aspects of an evolving CLOM.

Limitations of the Study

One of the limitations of the study was that all the data was from the same source. Although Spector (2006) indicated that the dangers of the common source, method might be overstated, it does nonetheless present the possibility that it might lead to strengths of relationships being overstated, understated or accurately reported (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). As our interest was primarily in the relative strengths of the relationships between CLOM and each of the variables in the nomological network, that risk might be viewed as less important. We conducted CFA on the ten items adapted from Daspit and D'Souza (2013) and found that our data also fit their four dimensional model ($X^2(29) = 98.59$, $p < .001$, RMSEA = .10, NFI = .93, CFI = .95; RSMR = .06, GFI = .93, AGFI = .86) somewhat better than it fit a one-dimensional model of absorptive capacity ($X^2(35) = 142.75$, $p < .001$, RMSEA = .11, NFI = .91, CFI = .93 ; RSMR = .07, GFI = .90, AGFI = .84). Overall, the data fit our posited full measurement model (30 observed variables and eight latent variables) well ($X^2(377) = 628.44$, $p < .001$, RMSEA = .06, NFI = .92, CFI = .96; RSMR = .05, GFI = .84, AGFI = .80).

CONCLUSION

This study introduces a 10-item *Complexity Leadership Organizing Mode (CLOM)* scale with its two subscales, *Resilience Leadership Mode (RLM)* and *Effectiveness Leadership Mode (ELM)*. These scales have stable psychometric properties and can therefore be used by researchers to measure the levels of requisite leadership interactions that are theoretically critical

for the organization to respond to external ecosystem opportunities or threats while also maintaining effective access to resources.

The article situates the CLOM within the complexity leadership theoretical framework and describes the theoretical importance of these items in the context of organizing in today's complex ecosystems. Some items are expected to enable organizational resilience. These are meant to encourage creativity and innovation and thus increase optionality and adaptability. By doing so, they increase internal variety within the organizing system and thus, by Ashby's (1962) law of requisite variety, decrease risk for the organizing system in a complex and changing ecosystem. Some items are expected to enable operational effectiveness. They would do this by promoting internal physical and social structures that exert social influence to process resources efficiently. These leadership interactions are therefore expected to imply predictable performance with regards the various short term operational metrics like profitability and growth in known markets.

The instrument described has strong reliability and validity characteristics in the overall *CLOM* and its *RLM* and *ELM* subscales. As expected by theory, the responses to this instrument predict with high levels of significance the users' responses to a measurement of Absorptive Capacity and to a lesser degree to a measurement of Team Norm Strength. These analyses indicate that the CLOM does indeed measure something that is both consistent with theory and is relevant to human organizing. In fact, because it can potentially be codified by objective observation in addition to survey responses, it may measure a phenomenon that is new and different and perhaps more fundamental than existing organizational constructs that rely solely on subjective data.

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Table 1 Scale Items and Results of Direct Oblimin EFA

#	A priori dimension		Pattern Matrix Loadings 1	2	Post facto Dimensions
1.	CB	Describing an inspirational future	.33	.48	
2.	**A/IU**	**Driving accountability**	.08	.76	Effectiveness
3.	G/CB	Setting high aspirations	.33	.55	
4.	IG	Insisting on frank feedback about activities	.45	.35	
5.	A	Clarifying roles and responsibilities	.39	.45	
6.	CB	Promoting shared values	.56	.28	
7.	G	Extending successful initiatives to other areas	.42	.41	
8.	**G/IG**	**Supporting differences of opinion**	.77	-.01	Resilience
9.	IG	Challenging assumptions	.67	.09	
10.	IG	Discussing thoughtfully what is being learned	.69	.07	
11.	CB	Using team or group names or logos	.38	.27	
12.	G/IU	Promoting common language in work groups	.54	.25	
13.	**G**	**Providing resources & time to try new things**	.80	.00	Resilience
14.	**A/IU**	**Setting objective metrics of success or failure**	.21	.64	Effectiveness
15.	**A**	**Quieting voices which distract from the purpose**	.13	.60	Effectiveness
16.	G	Providing discretionary resources to the team	.49	.24	
17.	G	Promoting a "prototype" mindset to get feedback	.65	.11	
18.	IU	Organizing activities to clarify what's happening	.56	.26	
19.	IU	Granting authority to reward success	.58	.27	
20.	CB	Making each member feel important	.97	-.16	
21.	**IG**	**Encouraging learning visits to other organizations**	**.55**	**.11**	Resilience
22.	G	Pushing for new ideas	.78	.03	
23.	IU	Clarifying task interdependencies	.69	.17	
24.	CB/IG	Helping group members relate to one another	.84	-.04	
25.	CB/IU	Assigning the right people to the right roles	.68	.16	
26.	**A**	**Asking people to invest more time and energy**	-.14	.81	Effectiveness
27.	**A**	**Establishing specific targets and deliverables**	.19	.67	Effectiveness
28.	G	Promoting a bias to "try something"	.65	.16	
29.	G	Forming small teams	.47	.33	
30.	G/IU	Making timely decisions	.64	.16	
31.	G/IG	Rotating team membership	.44	.23	
32.	**G**	**Encouraging new approaches**	.88	-.09	Resilience
33.	CB/IU	Having discretion to eliminate wasted effort	.47	.35	
34.	G/IG	Amplifying voices that are not being heard	.74	-.01	
35.	IG	Reporting on activities, e.g. "after action reviews"	.67	.04	
36.	**G**	**Forgiving failure**	.97	-.31	Resilience
37.	CB	Telling someone their contribution is significant	.84	-.05	
38.	CB	Stopping work on failing initiatives	.44	.30	
39.	CB	Treating all individuals fairly	.89	-.18	
40.	A	Insisting team members do their assigned work	.21	.54	
		% Variance	52.1%	4.4%	

Notes: The *a priori* dimension key is as follows: Community-Building (CB), Generative(G), Information Gathering (IG), Administrative (A), Information Using (IU). Items retained in 10 item scale shown in **bold**. Factor 1 (Resilience): Factor 2 (Effectiveness).

Table 2
Basic Statistics and Correlations

	Variable	M	SD	N	1	2	3	4	5	6	7
1.	Gender	.65	.47	242	-						
2.	Age	3.75	1.11	240	.08	-					
3.	Management	.66	.44	242	-.03	.01	-				
4.	Org. Tenure	1.89	.95	238	.15*	.36***	.06	-			
5.	Prof. Experience	3.27	1.04	241	.14*	.85***	.11	.35***	-		
6.	Sector	.53	.50	244	.13**	-.24***	.07	-.05	-.22**	-	
7.	Size	.53	.50	24	-.06	.03	.15*	.10	.04	.01	-
8.	CLOM 40-item Scale	3.24	1.19	290	.03	-.24***	.12	-.03	-.16*	.17**	-.12
9.	CLOM 10-Item Scale	3.32	1.21	289	.05	-.23***	-.14*	-.06	-.16*	.20**	-.09
10.	Resilience LM	3.09	1.30	287	-.03	-.24***	-.06	-.06	-.18**	.07	-.16*
11.	Effectiveness LM	3.43	1.31	289	.11	-.14*	-.16*	-.02	-.08	.24***	-.03
12.	Absorptive Capacity	3.36	.71	254	.06	-.11	.12	-.01	-.04	.16*	-.09
13.	Work Group Norms	3.94	.74	243	-.01	-.06	.16*	-.04	-.02	.14*	-.04
14.	Healthy Eating	3.20	.79	244	-.12	-.05	.05	-.09	-.04	.06	-.11

Note: CLOM = Complexity Leadership Organizing Modes. LM = Leadership Mode Subscale. Categorical variables: Gender, 1 = male, 0 = female; Age, 1 = ≤ 25, 2 = ≥ 26 to 35, 3 = ≥ 36 to 45, 4 = ≥ 46 to 60, 5 = > 60. Management, 1 = manager; 0 = non-manager; Organizational Tenure, Professional Experience, 1 = ≤ 5 years; 2 = 5 to 15 years; 3 = > 15 to 25 years; 4 = > 25 years. Sector, 1 = for-profit, 0 = not-for-profit including government, health and education. Size, 1 = large (≥ 500 employees), 0 = small (< 500 employees). Cronbach alpha coefficients of internal reliability shown on diagonal.
* $p \leq .05$, two-tailed; ** $p \leq .01$, two-tailed; *** $p \leq .001$, two-tailed.

Table 2 (cont.)
Basic Statistics and Correlations

	Variable	8	9	10	11	12	13	14
1.	Gender							
2.	Age							
3.	Management							
4.	Org. Tenure							
5.	Prof. Experience							
6.	Sector							
7.	Size							
8.	CLOM40-item Scale	(.98)						
9.	CLOM 10-Item Scale	.95***	(.90)					
10.	Resilience LM	.90***	.89***	(.86)				
11.	Effectiveness LM	.84***	.89***	.64***	(.86)			
12.	Absorptive Capacity	.52***	.49***	.49**	.39***	(.84)		
13.	Work Group Norms	.33***	.32***	.30***	.27***	.46***	(.90)	
14.	Healthy Eating	.11	.07	.09	.04	.17	.19**	(.85)

Table 3
Hierarchical Regressions: Different CLC Measures

Step 2 Independent Variables	Dependent Variables		
	Absorptive ΔR^2	Norms ΔR^2	Healthy ΔR^2
CLOM 40-item Scale	.26	.11	.01
CLOM 10-item Scale	.23	.10	.01
Resilience LM	.25	.10	.01
Effectiveness LM	.14	.05	.00

Note; CLOM = Complexity Leadership Organizing Modes. LM = Leadership Mode Subscale. Demographic variables (gender, age, management, organizational tenure, professional experience, sector, size) entered as control variables in first step; with each measure of the leadership modes entered in second step. ΔR^2 for each mode.

Table 4
Correlations of CLOM and Proximal, Distal, and Unrelated Constructs by Subgroups

		1	2	3	4	5	6	7
	Non-Profit							
1.	CLOM 40-item Scale	1.00						
2.	CLOM 10-Item Scale	.96***	1.00					
3.	Resilience LM	.910***	.87***	1.00				
4.	Effectiveness LM	.82***	.88***	.58***	1.00			
5.	Absorptive Capacity	.54***	.47***	.52***	.36***	1.00		
6.	Work Group Norms	.34**	.31**	.36**	.16**	.36***	1.00	
7.	Healthy Eating	.13	.07	.13	.01	.21*	.15	1.00
	For Profit							
1.	CLOM 40-item Scale	1.00						
2.	CLOM 10-Item Scale	.96***	1.00					
3.	Resilience LM	.91***	.87***	1.00				
4.	Effectiveness LM	.82***	.88***	.58***	1.00			
5.	Absorptive Capacity	.54***	.47***	.52***	.36***	1.00		
6.	Work Group Norms	.34***	.31***	.36***	.16	.36***	1.00	
7.	Healthy Eating	.13	.07	.13	.01	.15	.22*	1.00
	Small							
1.	CLOM 40-item Scale	1.00						
2.	CLOM 10-Item Scale	.97***	1.00					
3.	Resilience LM	.91***	.90***	1.00				
4.	Effectiveness LM	.87***	.92***	.68***	1.00			
5.	Absorptive Capacity	.56***	.53***	.54***	.43***	1.00		
6.	Work Group Norms	.35***	.35***	.31**	.29**	.48***	1.00	
7.	Healthy Eating	.15	.12	.17	.04	.19*	.22*	1.00
	Large							
1.	CLOM 40-item Scale	1.00						
2.	CLOM 10-Item Scale	.96***	1.00					
3.	Resilience LM	.89***	.87***	1.00				
4.	Effectiveness LM	.81***	.87***	.54***	1.00			
5.	Absorptive Capacity	.49***	.45***	.44***	.37***	1.00		
6.	Work Group Norms	.30**	.28**	.30**	.15	.43***	1.00	
7.	Healthy Eating	.04	-.00	-.03	.06	.15	.16	1.00

Note: CLOM = Complexity Leadership Organizing Models. LM = Leadership Mode Subscale.