# The Relations Between School Climate and Teacher Leadership: Does the School Environment Influence the Type or Amount of Leadership Activity Among Teachers?

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# CHAPTER I

## BACKGROUND ON THE RELATIONSHIPS AMONG TEACHER LEADERSHIP AND SCHOOL CLIMATE

Teacher leadership as a distinct concept has evolved over the past four decades as more and more teachers lead in K–12 (kindergarten through Grade 12) public schools across the United States (Gronn, 2010; Nguyen, Harris, & Ng, 2019; Wenner & Campbell, 2017). Calls for more teacher leadership become louder as research consistently suggests that teachers are legitimate and valuable contributors to organizational leadership (Berry, Daughtry, & Wieder, 2010; Harris, 2009; Spillane, 2012; Wenner & Campbell, 2017). In particular, numerous systematic reviews of teacher leadership research have highlighted the uniquely positive influence teacher leaders can have on student learning through enhancing the conditions within which classroom instruction takes place (Harris & DeFlaminis, 2016; Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004).

These reviews have asserted that the more teachers help make leadership decisions related to classroom instruction, the more those decisions reflect students' and teachers' classroom needs and experiences (Wenner & Campbell, 2017). In addition, teacher leaders may enhance the translation of leadership decisions to action because they can shape action plans to fit their classrooms (Nguyen et al., 2019). When teachers contribute to sensible leadership decisions, they are more likely to understand and buy-in to associated actions, thus increasing their likelihood to carry out those actions (Barth, 2001; Wiess, Cambone, & Wyeth, 1992). In general, suitable interventions with increased buy-in tend to be more effective at improving

schools (Cook, Lyon, Locke, Waltz, & Powell, 2019; Nation et al., 2003). Therefore, calls for increasing teacher leadership make sense.

Despite these calls, the teacher leadership literature remains limited in various ways. For example, extant research has significant gaps regarding teacher leadership measurement and evidence-based insights for enhancing or increasing teacher leadership activity (Shen, Wu, Reeves, Zheng, Ryan, & Anderson, 2020; Wenner & Campbell, 2017). More specifically, gaps remain in measuring and differentiating the relative importance of different ways to conceptualize teacher leadership activities (Nguyen et al., 2019; York-Barr & Duke, 2004). The literature does not provide much clarity regarding factors that explain the observed statistical variability in teachers' leadership activities (Nguyen et al., 2019). Without a clear understanding of what variables are most important and of ways to measure them, teacher leadership measurement generally depends on variables that may not target the most meaningful sources of variation. Practically, these gaps mean that efforts to increase teacher leadership will likely be poorly informed and less effective.

To address these gaps, statewide secondary data was used in the current study to explore factors at both the individual and school levels and describe and explain variations in teacher leadership activities. To describe leadership activities, three conceptualizations of teacher leadership activity were the focus of analyses in this study: (1) *individual leadership activities*; (2) *sets of leadership activities*, and (3) *net amounts of leadership activity*. To assess the relations between these conceptualizations and school environments, conceptualizations of teacher leadership activities are examined in relation to (1) school climate and (2) classroom climate.

## Teacher Leadership and the Need for School Improvement

For decades, there has been growing concern about the state of U.S. public education. Students in the U.S. continue to underperform in math and science in comparison to students from Japan, South Korea, and Finland (Wolff, Baumol, & Saini, 2014). Two-thirds of U.S. students in Grade 8 fail to reach basic math proficiency (according to National Assessment of Educational Progress assessments), with underperformance particularly pronounced in poorer areas (Wolff et al., 2014). This persistent underperformance suggests that the U.S. will struggle to meet its scientific, technical, and economic needs in a globalized world and sustain the standards necessary to be a leader in maintaining a liberal democratic world order.

Attempts to improve instructional effectiveness and school learning environments in the U.S. have been central to educational reform efforts; however, there have been significant challenges. For instance, schools are currently adapting to support the largest influx of immigrant students (Martin & Midgley, 2006). According to projections, this trend will continue and ethnic minorities will account for 150 million of approximately 300 million Americans by 2042 (Roberts, 2008). In 2011, 61 million Americans spoke either a language other than English or English and at least one other language, and that number will continue to rise (Ryan, 2013). All of this suggests that contemporary school reform efforts must embrace student diversity and engage community members who speak languages other than English only. Further, school reform must include different strategies and tools to meet the needs and strengths of people who are culturally different, and different teaching strategies will be essential to reaching diverse learner populations in the same classrooms.

Schools across the U.S. struggle to meet these challenges, which shows in the enduring achievement gaps and disciplinary inequities for students from racial/ethnic minority groups

and/or students who are English-language learners. For example, Black and Hispanic students are at significant academic and disciplinary disadvantages (Pearman, Curran, Fisher, & Gardella, 2019). These same students have lower levels of science and math achievement, according to rankings by the Organisation for Economic Co-operation and Development (OECD), while White and Asian students score well above average (Provasnik et al., 2019). Further, Black and Hispanic students are far more likely to be suspended or expelled than their White peers (Aud, Kewal-Ramani, & Frohlich, 2011; Pearman et al., 2019; Yeager, Purdie-Vaughns, Hooper, & Cohen, 2017). Many argue that schools play a pivotal role in the "school-to-prison-pipeline" in part because of this biased treatment as students from under-represented backgrounds are funneled into the juvenile and criminal justice systems. Cramer, Gonzalez, and Pellegrini-Lafont (2014) asserted that people who dropped out of high school, have learning disabilities, and are racially minoritized are disproportionately represented in U.S. prison populations. Serious structural implications can be drawn from national incarceration rates—the U.S. incarcerates 25% of the world's prison population, but only 5% of the total human population. All of this makes school improvement critical.

Many reform efforts currently underway are designed to improve both schools and teaching so that all students have the support they need to be successful (Berube, 1994; Gross & Shapiro, 2015). Some of the most influential efforts have been focused on schools' power structures with a particular focus on empowering teachers to play greater roles in school leadership (Saultz, White, Mceachin, Fusarelli, & Fusarelli, 2017). Teachers' participation in school leadership has emerged as a promising intervention that addresses enduring achievement, discipline, and racial/ethnic inequities among other common school challenges.

Teacher leadership is a process by which teachers—individually and collectively—wield

influence on people and aspects of their` school communities with the purpose of advancing student learning and development and improving the school environment (York-Barr & Duke, 2004). According to Nguyen and colleagues (2019), teachers who actively "lead within and beyond the classroom, identify with and contribute of a community of teacher learners, and accept responsibility for achieving the outcomes of that leadership" (p. 61) are considered *teacher leaders*.

Teachers' engaged in leadership activity may promote outcomes that lead to improved student learning for multiple reasons. First, teachers' leadership activity augments school leadership capacity beyond conventional administrative leadership. When more staff take on leadership roles, particularly in large schools, decisions can be made and implemented more efficiently and on a broader scale (Harris, 2013). Moreover, teachers may be more motivated and committed to carrying out these decisions by virtue of their participation in the decision-making process (Barth, 2001; Weiss et al., 1992), thereby further increasing capacity.

Secondly, when engaged in leadership, teachers can offer unique perspectives that can address some of the more complicated roots of intractable problems (Barth, 2001; Keedy & Finch, 1994; Marks & Printy, 2006). Teachers are important information sources for everyday classroom issues and student experiences, that can be leveraged to reach the core of more challenging problems (Wenner & Campbell, 2017). Moreover, they have detailed information about the school's organization as it functions in and around classrooms, which may result in useful insight into classroom-based solutions (Lierberman & Miller, 1999; Talbert & McLaughlin, 1994; Shen et al., 2020). Also, teachers' relational networks involving students, parents, community members, and school administrators may enable more effective programmatic implementation. Both knowledge of and functional relations across these networks

may aid resource allocation, enhance information exchange and dissemination, and facilitate collaborative problem identification and solving (Harris, 2013; Wenner & Campbell, 2017).

Finally, teacher leadership activity may influence the school climate, creating a more favorable learning environment. Teachers' participatory, democratic, and communitarian forms of managing schools' social environments may contribute to the formation of equitable, amicable, and supportive relationships among teachers (Sales, Moliner, & Francisco, 2017). In turn, students may benefit from higher teacher morale, a trusting school climate, and improved leadership decision making (Barth, 2001).

## Teacher Leadership and Student Learning

While several theories have been developed to organize our understanding and investigation of the ways teacher leadership leads to improved school and student outcomes, research that validates these theories is limited. In fact, systematic reviews and meta-analyses of the teacher leadership literature show that little empirical attention has been devoted to the direct connections between teacher leadership and student learning outcomes (Harris, 2013; Nguyen et al., 2019; Shen et al., 2020; Smylie, 1997; Wenner & Campbell, 2017; York-Barr & Duke, 2004). No significant relationships between teacher leadership and student outcomes (e.g., student achievement, attendance, engagement with learning in the classroom, learning-related behaviors) were found in the few studies in which these direct associations were examined (Leithwood & Jantzi, 1999, 2000; Marks & Louis, 1997; Taylor & Bogotch, 1994). More recent reviews show that few studies have assessed direct associations among teacher leaders or their leadership with student outcomes (Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017). The results from these reviews did not report any significant direct associations among

these constructs. Moreover, the results did not report any additional studies that have investigated direction relations among teacher leadership and student learning outcomes beyond the three aforementioned studies.

Instead, indirect relationships between teacher leadership and student learning outcomes have been reported in several quantitative studies (see recent systematic reviews: Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017). All of the studies suggest that teacher leadership influences dimensions of classroom climate in ways that improve classroom instruction and, in turn, improved classroom instruction influences student learning. In one study, Supovitz and Tognatta (2013) used survey data from 721 teachers across 38 schools to examine the effects of teacher leadership on teachers' instructional practices and student learning. Significant models linked the influence of teacher leadership with student learning mediated through classroom instruction. In two other studies (Sebastian, Allensworth, & Huang, 2016; Yost, Vogel, & Liang, 2009), this mediation relationship was also identified using smaller, but independent, samples. Together, these studies show that teacher leadership influence is positively linked with teachers having favorable levels of time and resources to support student learning, maintain high standards and support for delivering instruction, and create social and behavioral environments conducive to student learning. Additional evidence, independent of teacher leadership influence, has linked each of these outcomes with quality classroom instruction (see Greenwood, Carta, & Atwater, 1991; Wang, Degol, Amemiya, Parr, & Guo, 2020).

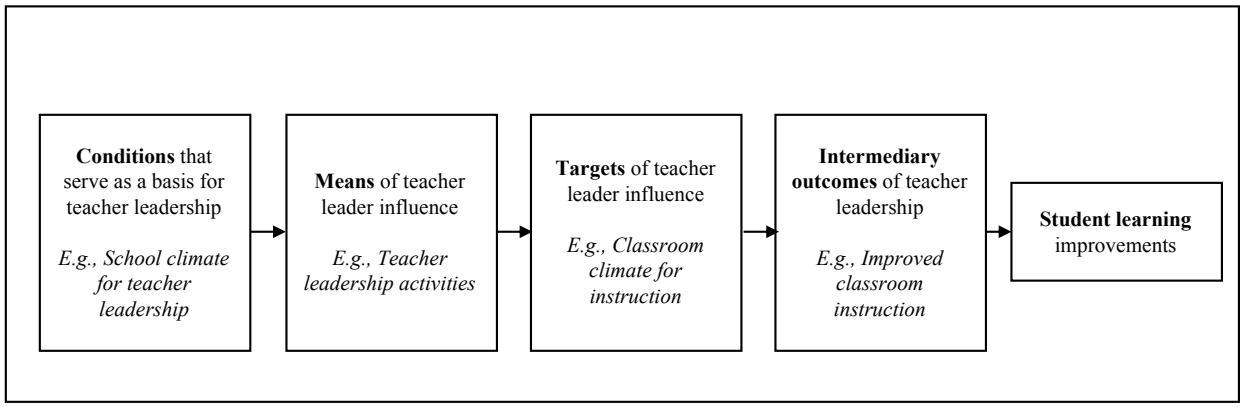
A range of variables representing teacher leadership have been linked with different elements of organizational and classroom climate related to classroom instruction (see Sebastian et al., 2016; Urick, 2012). Although variables across these studies were not directly comparable, significant variability in the magnitude of these results was observed. In other words, given

evidence of possible variability, it is possible that the varying forms of teacher leadership have varying relationships with dimensions of organizational and classroom climate related to classroom instruction. Naturally, a driving inquiry in teacher leadership is, *which forms and conditions of teacher leadership are more closely associated with desired outcomes?* (see Harris, 2003; Wenner & Campbell, 2017 for similar questions).

To date, only one conceptual framework of teacher leadership (see Figure 1) has gained acceptance (York-Barr & Duke, 2004), and it links teacher leadership with student learning outcomes through classroom instruction. In this conceptual framework, results from discrete studies are combined into a series of five teacher leadership components, with each component highlighting sources of variability in addition to variability that might derive from relationships among components. Taken together, the framework suggests the possibility of different forms of teacher leadership, or at least where one might look to find them (e.g., among relations between means of teacher leadership influence and targets of teacher leadership influence).

**Figure 1**

*Summary of York-Barr & Duke (2004) Conceptual Framework for Teacher Leadership*




Within this structure, the presence of multiple conditions can serve as a foundation for

teacher leadership. Conditions include characteristics of teachers who lead (e.g., a teacher's leadership capacity), qualities of leadership work (e.g., teacher leadership is valued), and aspects of school climate for teacher leadership (e.g., sufficient resources are available for professional development). Teacher leadership itself is impacted by these conditions. Teacher leadership itself nominally refers to the means of teacher leader influence and are primarily operationalized as teacher leadership activities. Leadership activities influence targets across the school including individuals (e.g., other teachers), groups (e.g., grade-level teaching teams), or organizational factors (e.g., classroom climate for instruction). Influence on these targets can bring about changes in teaching and learning, including changes in classroom instruction. As a result of these changes in classroom instruction, teachers who lead may indirectly influence student learning.

This remainder of this chapter reviews what is known and things that remain uninvestigated about several of these components and the relationships among them. It pays particular attention to teacher leadership itself (teacher leadership activity) in relation to both school and classroom climate relevant to teacher leadership and instruction. It identifies multiple important conceptualizations of teacher leadership activity that may be meaningful for measuring teacher leadership. The chapter concludes with both a conceptual and technical summary of the current study's contribution to the literature.

## Teacher Leadership and School Change

York-Barr and Duke (2004) offered few specifics about the mechanisms or levers teachers use to influence their schools. However, later reviews (Nguyen et al., 2020; Shen et al., 2020; Wenner & Campbell, 2017) identified teacher leadership activity as an overwhelming primary mechanism by which teachers influence their schools. In such activities, teachers may

share power with many others at the school. But, the activities themselves—and not who they were shared with—were considered the foremost attribute of teachers' means to influence their schools because they predicted desired leadership outcomes more consistently and stronger than any other attributes (Marks & Printy, 2003; Robinson, Lloyd, & Rowe, 2008; Smylie, 1997). Though, future research may weaken this claim. Researchers have only begun to recently examine "who power is shared with to perform activities" as a meaningful attribute (e.g., Spillane, 2012) and a majority of this research focuses on formal school leaders (i.e., school principals). Extant evidence at least suggests that leadership activity functions as meaningful sources of variability in links between teacher leadership and desired outcomes and appears to suggest it is a likely candidate for a predominant source of variability (Nguyen et al., 2020; Shen et al., 2020).

Yet, despite attention on teacher leadership activity, core clarifying questions remain about the specifics. Namely, what conceptualizations of teacher leadership activity most meaningfully capture the contribution of activities to desired outcomes? For example, are specific activities more strongly associated with desired outcomes? Or is the net amount of time spent on activities more strongly associated with desired outcomes? A clearer metric of teacher leadership activities would have implications for development a more concrete understanding of relationships between the means teachers use to influence their school and other components of the teacher leadership process. The literature documents at least three conceptualizations of teacher leadership activity that that may meaningfully account for variability in the teacher leadership process. These conceptualizations include (a) *individual activities*, (b) *sets of activities*, and (c) *net leadership activity*. To date, no study has investigated the relative ability of each leadership activity conceptualization to account for variability in the teacher leadership

process.

*Individual activities* might include collaborative planning or supervising other teachers; meaningful *sets of leadership activities* might be focused directly on improving instruction (e.g., supervising other teachers, designing professional development activities); and *net leadership activity* refers to the overall time teacher leaders spend on activities to influence other teachers. Each of these conceptualizations suggest different dimensions or ways to operationalize and measure the activities that teachers may use to influence their schools. *Individual activities* might also necessitate more detailed measurement of individual components (e.g., how the activities are performed, how much they are performed). *Sets of activities* might necessitate measuring a wide range of individual activities and using latent structures or other modeling methods that account for the ways activities jointly occur. *Net leadership activity* might necessitate using a different measurement approach altogether, for instance, one in which the amount of time teachers spend on leadership activities over the course of the week is examined. Extant evidence does not clarify specifics necessary for operationalizing teacher leadership activity, but it does suggest useful information for designing an analysis that compares the relative ability for each conceptualization to account for variability in the teacher leadership process.

Information about each of these three conceptualizations have emerged from a large (and well established) body of literature focused on the activities of administrative leaders (i.e., principals) who share leadership activities with teachers. Additionally, they are partially corroborated by a smaller body of teacher leadership literature involving small-scale observations of teachers who influence their schools (see Nguyen et al., 2019). The shared activities described in the literature on formal administrators are relevant to teacher leaders due to the shared collaboration between administrators and teachers. Thus, teachers may engage in

these activities as well.

The aforementioned reviews of teacher leadership research literature (Nguyen et al., 2020; Shen et al., 2020; Wenner & Campbell, 2017) consistently reported empirical attention on two conceptualizations of teacher leadership activity. The first conceptualization of teacher leadership activity was types of teacher leadership activity. A few examples of influential activity types are collaborative planning, participation in faculty and staff meetings where decisions are typically made, and the design and delivery professional development programs. A specific teacher's leadership activities may account for a meaningful share of the variance in the leadership process, linking a teacher's means to influence their schools with desired outcomes. Multiple case studies (Du, 2007; Fairman & Mackenzie, 2015; Riveros, Newton, & da Costa, 2013) have documented individual leadership activities that appear to be essential to the effectiveness of teacher leadership influence. For example, teachers who more often reported collaborating and communicating with parents reported more trust and mutual respect among school leadership and the community (Fairman & Mackenzie, 2015). In turn, trust is particularly well documented as an important condition for improving the instructional quality across classrooms at a school (Bryk & Schneider, 2003). In addition to communication with parents, other individual activities are as associated with desired outcomes. Planning, participating in decision-making meetings, supervising and supporting other teachers, contributing to the schoolwide management of student behavior, and completing administrative paperwork are all examples of individual activities associated with desired instructional outcomes (see Nguyen et al., 2019).

However, as documented in several systematic reviews, teachers may perform a wide array of leadership activities (Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr &

Duke, 2004). These reviews have classified a plethora of possible activities into five overlapping categories based on the activity's alignment with five common teacher leadership objectives: (1) communicating and setting a school mission and vision, (2) understanding people and promoting professional growth, (3) designing and implementing organizational change, (4) coordinating instructional and learning programs, and (5) sustaining participatory school decision making. While there is no taxonomy of teacher leadership activities, relevant activities presumably align with these objectives.

A second conceptualization of teacher leadership may suggest an alternate way of operationalizing and measuring leadership activity. Instead of salient individual activities, teachers may use a set or sets of activities, often performed together, may meaningfully account for variability in the teacher leadership process. Substantial literature in general school leadership suggests that this may be a conceptualization of teacher leadership activity with more explanatory power. Decades of leadership activity theories on shared leadership in schools (many primarily focused on formal school administrators who share leadership with teachers and other staff) emphasize different subsets of activities that school leaders ideally should perform together to positively influence their schools (see Robinson et al., 2008). Each of these theories (e.g., instructional leadership theory, managerial leadership theory, transformational leadership theory, shared instructional theory) has drawn from a varying philosophy of effective leadership, and each emphasizes particular activity types as ways to achieve objectives. Given that these approaches have emerged over several decades and that training and professional development programs have drawn from these philosophies, these subsets of activities may be present in practice (Gumus et al., 2018).

According to instructional leadership theory (Leithwood, Jantzi, & Steinbach, 1999), the

most influential leadership actions are focused on enhancing classroom instruction. This philosophy espouses a belief that when school leaders strongly focus on activities tied to classroom instructional quality, conditions that support instruction are more likely to be present in the school. Exemplar activities include supervising other teachers' instruction and helping other teachers prepare for standardized assessments. Primary critiques of this theory include the importance of other leadership goals and activities, for example, improving organizational functioning through efficient distribution of resources (Hallinger & Heck, 2002; Marks & Printy, 2003).

In contrast, managerial leadership theory emphasizes performing organizational tasks and functions that facilitate and enhance school functioning (e.g., completing administrative paperwork, participating in staff meetings) to maximize organizational functioning and efficiency (Hoyle & Wallace, 2005). From this perspective, effective leaders enable the organization to function more effectively and thus achieve desired goals (Firestone & Wilson, 1985). Less functional organizations, per this perspective, are less able to carry out organizational goals despite any focus on specific activities. Similar critiques have noted that managerial approaches do not account for the meaningful ways that school leaders should lead (Simkins, 2005).

Transformational leadership theory is focused on increasing staff motivation, commitment, and capacity while emphasizing professional development as the primary means to do so (Leithwood, 1994). Per this perspective, motivation, commitment, and capacity are essential to a school's staff completing the activities needed to improve their schools. Moral and authentic leadership theory also has a focus on increasing staff motivation, commitment, and capacity, with added attention on leaders who motivate with integrity and prosocial values

(Begley, 2010; Starratt, 2005; Stefkovich & Begley, 2007). In other words, effective leadership styles should serve as buffers against problematic cults of personality or leaders who cultivate cultures misaligned with school environments where everyone thrives. These theories are critiqued similarly to those previously mentioned, given their limited focus.

In shared instructional theory, this critique is somewhat addressed by the theoretical assumption that effective leaders both motivate others and pay close attention to instruction (Marks & Printy, 2003). However, in the aptly named contingent leadership theory, it is suggested that effective school leaders draw from more approaches to influence schools (Bush & Glover, 2014). Per this theory, effective teacher leaders are those teachers who employ activities aligned with instructional, managerial, transformational, moral, and shared instructional styles of leadership. They may also perform activities that belong to other less established leadership approaches. As Urick (2012) found, the most effective school principals used a combination of managerial and shared instructional styles. However, no studies have directly explored whether teachers regularly engage in a subset or subsets of activities.

A third conceptualization of teacher leadership activity could suggest an additional alternate way of operationalizing and measuring leadership activity. Instead of activities or subsets of activities being used, teachers' net leadership activity (e.g., total time generally spent on leadership over the course of a typical week or volume of leadership activity) could account for the most variability associated with teacher leadership activity. However, the only evidence supporting this comes from recent latent class analyses of school principal-faculty pairs (Urick, 2012). Subpopulations of principal-faculty pairs varied most based on the amount of time principals spent leading combined with principals' perceptions of net faculty influence on the school (Urick, 2012), not by particular leadership activities or subsets of leadership behaviors. In

turn, one subpopulation of principal-faculty pairs, which represented the highest net volume of leadership across all actors, appeared to more likely be in schools with a greater presence of conditions known to be positively associated with greater instructional quality. Yet, in principal-faculty pairs where faculty were perceived to wield high influence, but principals did not report high leadership activity, there were fewer reports of conditions known to be positively associated with greater instructional quality. Thus, while net volume of teacher leadership appeared important, there were conditions where high net volumes of teacher leadership were associated with undesirable outcomes. Evidence on this conceptualization of leadership activity remains unclear, and this proposition has not been assessed in the literature via the use of a teacher-specific sample.

## School Climate for Teacher Leadership

Multiple organizational conditions may enable or constrain teacher leadership activity. According to the evidence, these conditions can be categorized as related to (1) school climate, (2) principal leadership, (3) teachers' relationships with their peers, and (4) personal factors of individual teachers. Of these four conditions, more research has been dedicated to the connections between teacher leadership and school climate (Wenner & Campbell, 2017; York-Barr & Duke, 2004), and school climate is widely viewed as heavily influential on teachers who lead along with their leadership activities (Fullan, 2001; Harris, 2014). However, no studies show relative relationships between school climate and teacher leadership activity or conceptualizations of teacher leadership activity.

Correlational exploratory studies have primarily been used to find evidence of associations between school climate and teacher leadership. However, these studies neither offer

assessments of more than a few dimensions of school climate at once nor show that they were meaningfully drawn from teacher leadership theory to justify variable inclusion (Wenner & Campbell, 2017). Some of the dimensions explored in the literature include a shared school-wide perception of teacher leadership as an established norm (Talbert & McLaughlin, 1994), teachers' sustained focus on professional learning (Katzenmeyer & Moller, 2002), a shared school-wide vision to improve instruction and learning (Ghamrawi, 2010), and a collective desire to empower teachers as leaders (Ghamrawi, 2010). Each of these dimensions was found to co-occur with a greater presence of teacher leadership. Conversely, other school climate dimensions were found to co-occur with a weaker presence a teacher leadership. If teacher leadership was perceived to violate teacher equality and independence, even in collegial school cultures, then teacher leadership did not flourish (Smylie & Denny, 1990). Similarly, cultures of blaming and coercion were also found to constrain teacher leadership (Cooper et al., 2016; Poekert et al., 2016; Woodhouse & Pedder, 2017).

Additional climate dimensions associated with the school structure also appear to be associated with higher levels of teacher leadership activity, but the literature lacks strong evidence of these associations. In a qualitative 10-school case study in the United Kingdom, Muijs and Harris (2006) found that rigid, dogmatic, top-down, and strictly hierarchical organization hindered teacher leadership. Teachers in these dogmatic structures also had fewer leadership opportunities, fewer perceived incentives to lead, and roles that did not include leadership responsibilities. Teacher leadership also is less likely to occur when teachers have heavy instructional workloads, leaving less time for leadership activities (Gamage, Adams, & McCormack, 2009). The teachers reporting that they spent lots of time addressing issues related to the classroom, students, and parents were less likely to report out-of-class leadership activities.

In contrast, supportive, flexible, transparent, and responsive structures foster teacher leadership (Foster, 2005; Woodhouse & Pedder, 2017). Additionally, teachers are more likely to lead in schools where they feel their time is protected (Hands, 2012). Within these more supportive organizational climates, teachers appear to have the time, resources, and incentives to address matters related to both instruction and leadership.

A school environment in which there are effective principals and other administrators in nonteaching roles may be associated with the presence of teacher leadership, but explanatory mechanisms are largely unclear (Bryk, Sebring, Allensworth, Easton, & Luppescu, 2010; Urick, 2012). Some researchers suggest that when principals and other leaders protect teachers' time and create opportunities for teacher leadership, teachers are more likely to lead (Cheng & Szeto, 2016; Smith et al., 2010). This logic is extended to principals' influence over other conditions that promote teacher leadership, conditions such as supportive school cultures (Leithwood & Jantzi, 1999; Mees, 2008), school-based collegial relationships (Ryu, Walls, & Seashore Louis, 2020), and supportive school structures (Demir, 2015; Hart, 1990). However, there is little evidence that directly connects administrators' influence with teachers' enactment of multiple means of influence. Instead, reasoning might lead to a reverse explanatory mechanism where effective teacher leadership results in policies, practices, norms, and organizational structures that allow more shared, influential principal leadership. Despite direction, a principal's influence may be important in measures of teacher leadership and related to conditions that enable or constrain teacher leadership.

Teacher-peer relationships are also important in teacher leadership as some aspects of these relationships may influence the occurrence of teacher leadership and the degree to which it is associated with desired outcomes. The teachers who encourage their peers to lead and feel

supported by these peers are more likely to report leading (Margolis, 2008). Further, when teachers who feel supported lead, their peers are more likely to accept their decisions, which could lead to leadership decisions having a greater impact on school improvement (Fairman & Mackenzie, 2015). Conversely, when teachers perceive teacher leadership to disrupt egalitarian norms, the reported quality of peer relationships diminishes and teacher leadership has weaker and less direct association with school improvement (Margolis, 2008; Podjasek, 2009).

A range of personal characteristics have been found to be associated with greater likelihood of teacher leadership. Teachers with high levels content and procedural knowledge (Firestone & Martinez, 2007), higher levels of motivation (Margolis & Deuel, 2009), more teaching experience (Angelle & Dehart, 2011), and more comfort with responsibilities (Brosky, 2011; Chamberland, 2009) all reportedly engage in more leadership activities. However, other studies (Fullan, 1994; Katzenmeyer & Moller, 2001) seem to show a wider array of characteristics as novice teachers, experienced teachers, and courageous and humble teachers all report leadership activity.

In addition, the breadth of leadership roles available to teachers suggests that different types of teachers may take on leadership responsibilities. Teachers can serve in formal and informal roles as they may become a union representative, curriculum specialists, or grade-level team leaders; encourage school-wide parent participation; or engage in peer coaching via challenging situations and workplace dynamics. Given both the wide range of characteristics, roles, and situations that may call for teacher leadership, some researchers (e.g., Lieberman & Miller, 2011) have suggested that virtually all teachers lead. According to Urick (2012), preliminary counts suggested that nearly two-thirds of teachers lead on a weekly basis. The literature offers no clear evidence of a higher or lower percentage of teachers actually engaged in

leadership.

## The Current Dissertation Study

Teacher leadership can serve as an important intervention for improving student learning; however, it is not directly associated with student learning outcomes. Rather, it indirectly influences student learning outcomes by improving the conditions that support classroom instruction. Extant research shows numerous connections between teacher leadership and classroom instruction, enough to posit a conceptual framework for teacher leadership (York-Barr & Duke, 2004). This framework connects conditions that form a basis for teacher leadership (e.g., school climate) with teacher leadership. It also ties teacher leadership to specific influenceable targets (e.g., classroom climate) that may, in turn, lead to outcomes such as improved instruction. Through this set of constructs, teachers who lead can influence student learning.

However, details about and relationships between these constructs remain largely uninvestigated. Particularly, researchers are yet to identify the most important aspects of teacher leadership to study. This dissertation study includes two analyses that may serve to assess the most important components of teacher leadership at the individual level and the collective faculty level. To evaluate the meaningfulness of those results and interpret those results in the broader context of a teacher leadership process, post hoc analyses were included to assess relationships among teacher leadership activity and both school and classroom climate.

# CHAPTER II

## METHODOLOGICAL BACKGROUND FOR UNDERSTANDING RELATIONSHIPS AMONG TEACHER LEADERSHIP AND SCHOOL CLIMATE

The concept of teacher leadership is still taking shape in the literature and this study uses an exploratory methodological approach to advance the concept. One central focus of research into this developing phenomenon is the identification of the most important aspects of teacher leadership. Technically, this means that researchers are trying to identify primary sources of variation within teacher leadership. Clearer understanding of primary sources of variability could be translated to interventions that target more influential mechanisms.

The framework developed by York-Barr and Duke (2004) has been a useful organizing framework for signifying possible sources of variability within framework components and relations among those components. This framework was used in this study to identify important components of the teacher leadership processes to investigate. In this dissertation, the means of teacher leader influence, or *teacher leadership* (i.e., teacher leadership activities), was viewed as the conceptual anchor of the teacher leadership process and thus the primary analytic focus. Yet, the literature suggests that dimensions of organizational and classroom climate associated with teacher leadership and classroom instruction are particularly salient to teacher leadership and its influence. Those dimensions strongly influence the way teacher leadership happens and also account for the largest influences of teacher leadership on classroom instruction.

The overarching methodological goal of this dissertation was to investigate and identify primary sources of variability within the teacher leadership process as related to teacher

leadership activity. Another aim of the current study was to evaluate the meaningfulness of these sources of variability by assessing relations with school and classroom climate. This chapter provides a methodological background for how this study identified primary sources of variability within a developing conceptual phenomenon. Because this phenomenon is still developing, this study faced unique methodological challenges including investigating and interpreting multicollinear data in a clearly interpretable way with clear implications for research and practice. Multiple traditional methods (e.g., regression) were insufficient tools for identifying sources of variability within multicollinear data because those methods make assumptions (e.g., orthogonality) that constrain possible sources from which variability might be identified.

**Statistical Methodology**

To understand the primary sources of variation within the leadership activities that teachers use to influence their schools, mixture modeling—both latent class analysis (LCA) and latent profile analysis (LPA)—was used in the current study. Mixture modeling was the best fit for the investigation and identification of primary sources of variation for these key components, given the items and associated response options in this dataset. Alternative approaches (e.g., multilevel regression, structural equation modeling, factor analysis) fundamentally relied on assumptions that were neither a fit for the structure of this data nor matched the developmental stage of conceptualizing and measuring teacher leadership.

For example, in many regression approaches, there is an assumption of orthogonality/independence between the independent/explanatory variables. The teacher leadership data used in this study (described below) strongly violated this assumption (computed variance inflation factors were over 10 across all variables); therefore, regression would perform

suboptimally if applied to the data. These data were highly collinear, in part, because measurement has not been refined to match primary sources of variation. In other words, the variables in this secondary dataset are justified best guesses about meaningfully capturing teacher leadership activity and have not been refined to focus accurately and precisely on primary sources of variability. In theory, variables that capture primary sources of variation should be functionally more independent (i.e., correlate less with one another). Regression approaches are more suitable for such data.

Separately, structural equation modeling permits fewer restrictions of orthogonality by freeing parameters in covariance structures among observed variables and their error terms (Kline, 1998). However, this approach still assumes too much linearity, thus constricting possible relational dimensions among observed variables (i.e., possible latent constructs are limited to number of observed variables). Because of this, it is less ideal for exploring multiple conceptualizations of teacher leadership activity (i.e., sources of possible primary variation) at the same time.

In addition, factor analysis and principal component analysis could have been used to identify sources of variation, but these methods assume that underlying data are continuous (Gorsuch, 1990). Also, orthogonality is assumed in principal component analysis. Technically, these approaches assume too much linearity and constrict possible dimensional relations among observed variables (i.e., possible factors and components are limited to the number of observed variables). These approaches were not a good fit for the ordinal data in the secondary dataset used in this study and were not ideal for exploring nonlinear sources of variation while allowing for linear variation as well.

Moreover, configural frequency analysis (Stemmler, 2014) has been more widely used in

the European-based academic literature to explore multidimensional data, but this approach is less common among researchers in the U.S. It also appears to assume orthogonality more than mixture modeling. Nevertheless, it allows for violating orthogonal assumptions and even measures how often variation is due to violations of orthogonality as opposed to random variation. This approach could have been useful for the present study, but it would have been less useful for an American audience, considering its limited use in the United States.

Further, multiple correspondence analysis has been commonly used to identify underlying data structures (Van der Heijden, Teunissen, & van Orle, 1997). This method involves the use of different math than that of mixture modeling although it allows for exploration of the same sort of variability with similar degrees of flexibility. However, this method requires nominal data; the data in this secondary dataset were ordinal. K-means clustering is a similar method that employs a different approach to rank reduction and clustering to identify primary sources of variation. However, k-means clustering is designed for prediction algorithms to identify the most optimized source of variation. Associated packages do not readily offer descriptions or means for understanding decisions, secondary sources of variation, or other descriptive parameters useful in either evaluating the model, connecting it to conceptual frameworks, or establishing connections with other exogenous variables of interest.

In turn, LCA and LPA offered the best mix of fit to the present data and its interpretability. These methods allow for clustering and nonorthogonality without imposing linearity among changes from one item to another. As a result, more latent structures than observed variables can be identified via these methods, thus enabling the identification of sources of variation beyond linear or linearizable variable-to-variable changes. These features are particularly important for this stage of conceptual and measurement development because they

permit the identification of primary and secondary sources of variation in ways that most other methods would not. Particularly, LCA and LPA results showed that teacher leadership activity might be understood in substantial part as a unidimensional latent variable: overall net leadership activity. However, two other subdimensions that appeared to be important sources of variation were also identified.

Features of the datasets used in this dissertation are described in subsequent sections along with the way LCA and LPA, in particular, permitted the identification of both primary and secondary forms of variation given limitations associated with those features. Illustrations and images will be used to show the ways in which LCA modeled variability across multiple dimensions as well as the way those multidimensional results were understood in the current examination. Such descriptions would likely appear in an appendix of a journal publication to help the reader better understand and interpret multicollinear study results. Though the subsequent discussion focuses on LCA, the insights described below also apply to LPA given the similarity of the approaches. This technical discussion continues in Chapter V of this dissertation, including a description of the way these results would enable the design of simpler questions that more accurately capture primary sources of variance. Theoretically, such variables would be functionally more independent because they capture more primary sources of variability.

**Activity variables in this dissertation were constrained.** Details of variables and associated responses are provided in Chapters 3 and 4. Chapter 3 is focused on an individual-level analysis of teacher leadership activity. Teacher leadership activities were measured by teachers' reports of the time they spent on nine leadership activities: (1) individual planning time, (2) collaborative time, (3) supervisory duties, (4) attending required committee and staff

meetings, (5) completing administrative paperwork, (6) communicating with parents/guardians and the community, (7) professional development, (8) addressing student behavior management, and (9) preparing the school for assessments. Chapter 4 focused on a school-level analysis of teacher leadership activity. Here, teacher leadership activities were measured by aggregated averages of teachers' reports of how much they thought faculty at their school were expected to complete nine leadership activities: (1) making decisions about educational issues, (2) selecting instructional materials and resources, (3) devising teaching techniques, (4) setting grading and student assessment practices, (5) determining content of in-service professional development, (6) establishing student behavior management procedures, (7) providing input on how school budgets would be spent, (8) selecting new teachers to the school, and (9) engaging in school improvement planning.

**Responses were categorical.** For individual-level variables, responses included the following: 0 = none, 1 = less than or equal to 1 hour, 2 = more than 1 but less than 3 hours, 3 = more than 3 but less than 5 hours, 4 = more than 5 but less than 10 hours, 5 = more than 10 hours. For school-level variables, responses included the following: 1 = no role at the school, 2 = small role at the school, 3 = moderate role at the school, and 4 = large role at the school.

Taken together, the variables used in this study from the secondary dataset had the following constraining characteristics: A.) they represented a limited conceptual scope of possible leadership activities, B.) school-level variables were constructed as teachers' views of the school's dependence on faculty to complete leadership activities, C.) individual-level response options were not additive across either individual- or school-levels (i.e., one teacher could report performing less than or equal to 1 hour across all nine activities, but their total time spent on leadership could not be calculated), D.) individual-level response options were not

mutually exclusive (i.e., a teacher could perform two or more leadership activities at the same time), and E.) individual-level responses were not directly comparable (i.e., teachers could not be precisely ranked in terms of time spent on leadership activities). These constraints limited both applicable methods and interpretability of analyses. For example, these data could not be used to calculate a total amount of time spent on leadership activity.

***Variables were functionally dependent.*** The dependence of these data were a primary "constraint" in context of most methods. Teacher leadership is a rapidly developing conceptual phenomena given the increase in its use at schools; it is also complex. Teachers can engage in many types of activities in complicated contexts with varying situations, goals, relationships, and people. The dataset used in this dissertation captures both teacher leadership and organizational climate features to measure some of this complexity; many third variables that could account for parts of these relationships are not included among the variables in the dataset. For example, variables did not capture the impact of specific professional development programming approaches on teacher leadership that could account for a significant amount of variability on the tasks teachers perform within the school. In other words, if a particular professional development program becomes popular across a state, and many teachers across some schools and districts are being trained to lead in a specific way, there might be dependencies within a school that this dataset cannot readily account for.

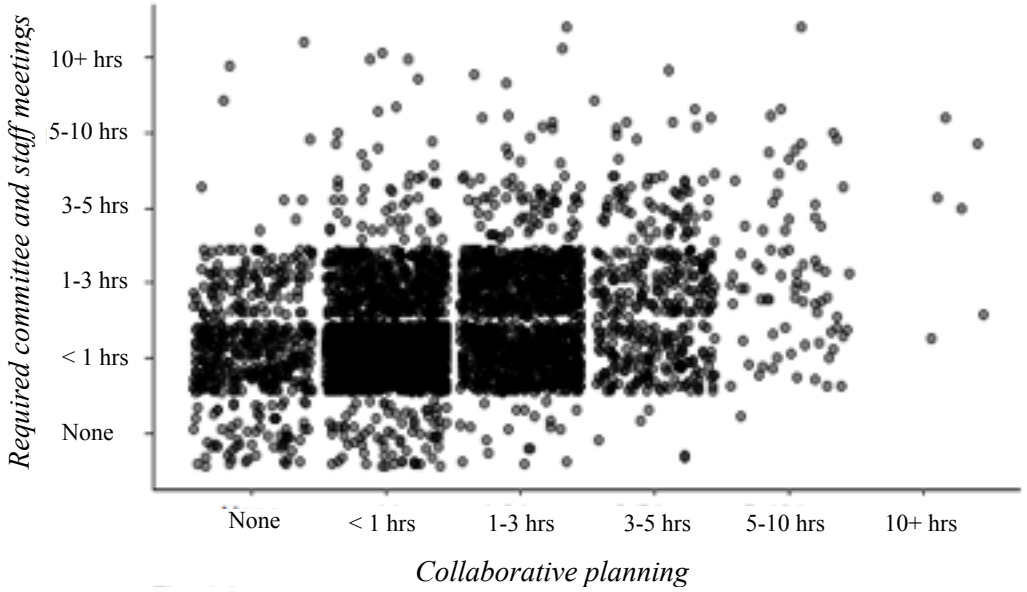
Nevertheless, clear dependencies were observed among the activity variables in this dataset, and these dependencies were sensible. Teachers could have preferences for engaging in leadership activities, in general, and thus engage in a wide array of leadership variables. Moreover, teachers could engage in multiple leadership activities simultaneously (e.g., collaboratively planning during participation at a staff meeting). Since orthogonal assumptions

were not a fit for this data, typical statistical modeling techniques would have likely performed suboptimally with these major violations. These data were functionally dependent (see correlations in Tables 2 and 7).

**Visual demonstration of statistical methods used to identify primary sources of variation.** Clustering and dimensional reduction were used to identify primary sources of variation through LCA and LPA. Chapters 3 and 4 include detailed descriptions of LCA and LPA models and reasoning, respectively. However, a visual demonstration is provided to illustrate the way primary sources of variability within teacher leadership activity were identified in this study. Figure 2 presents a scatter plot between two example teacher leadership activities (i.e., *participating in required committee and staff meetings* and *engaging in collaborative planning*). The categorical response options available ranged from *no time* to *10 or more hours* per week. A strong linear and positive relationship among these components was shown as most teachers reportedly spent similar amounts on time on both activities—possibly at the same time. Few teachers reported spending many hours on one activity but few hours on the other.

**Figure 2**

*Jittered Scatter Plot of Required Committee and Staff Meeting Attendance and Collaborative Planning*




The data reported ranges of time spent. For this visual, the scatterplot points are jittered slightly to show the density of points within each time range while also highlighting the correlation between the two variables. That is, most people who spend a lot of time on *collaborative planning* also spend a lot of time in *required committee and staff meetings*. Additionally, plotting all 60,000 individuals excessively cluttered the image. A random subset of 4,000 individuals is shown.

The nine activity variables were all highly correlated with one another (i.e., demonstrated dependence), and across all combinations of these nine activities, patterns were similar to those shown in Figure 2. A consistently observed positive linear trend across all combinations of these nine variables (again, as shown in Figure 2) represented one dimension and property of interest: *net time spent on leadership activities*, meaning that the data appeared to "move" across all combinations of variables in a way mainly described by *net amounts of time spent on leadership activities*. Because this effect was the most pronounced (see Figures 7 and 11 for alternative

visuals demonstrating this effect), it was concluded in this study that *net leadership activity* meaningfully accounted for the most variance among possible conceptualizations, making it a primary source of variability in teacher leadership activity. If future researchers focus their measurement on *net leadership activity*, then theoretically, they are more likely to capture more functionally independent data.

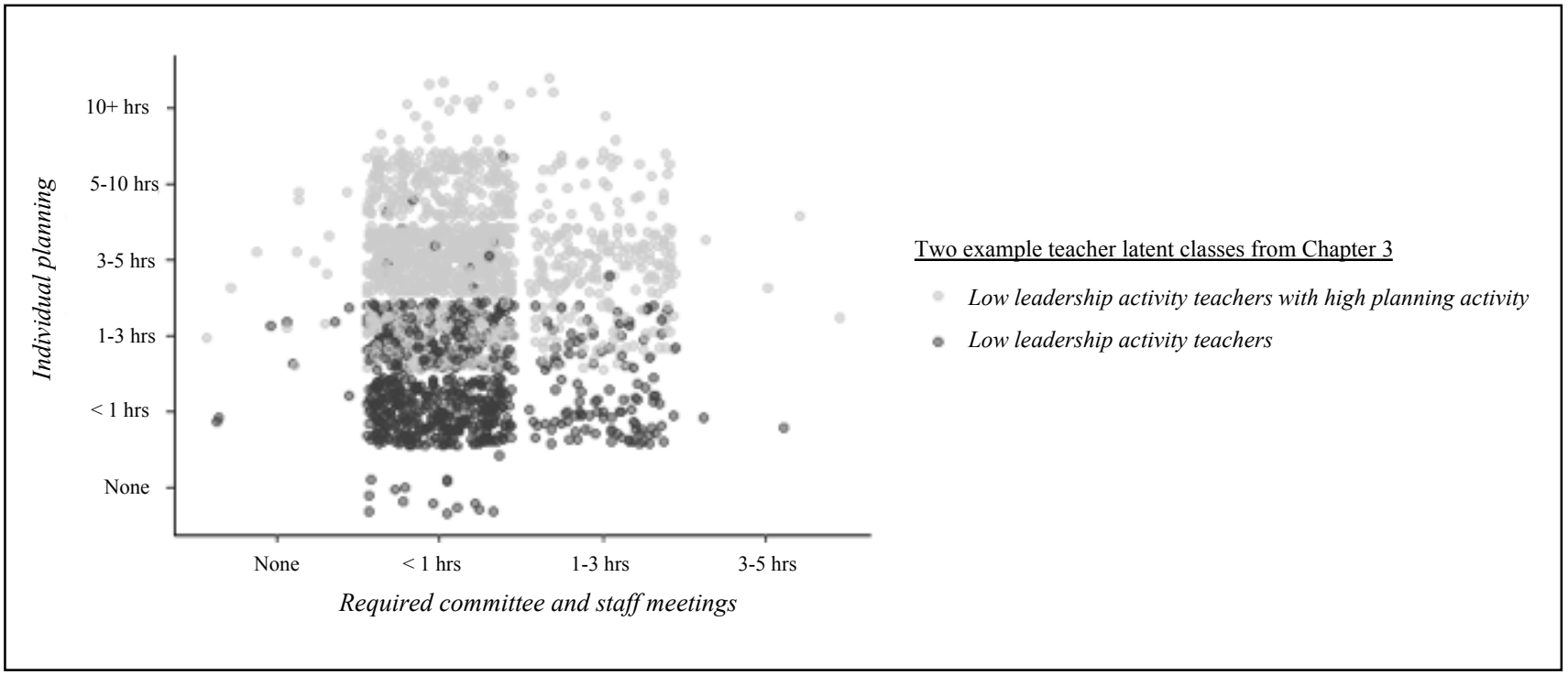
However, this study was also focused on other dimensions, particularly two conceptualizations of leadership activity: *individual activities* and *sets of activities*. Given the dominant *net leadership activity* effect, evidence of the other two dimensions would have likely been washed out if more reductive methods that constricted possibilities for identification (e.g., through orthogonal and linearity assumptions) were used. In Figure 2, evidence of the *individual activities* conceptualization might have shown up as a larger portion of teachers spending more time on one of the activities but less time on the other—it may have resulted in a significantly more positive or less positive relationship between the two variables. Figure 2 shows minor evidence of this effect: There seem to be more responses in which teachers reported spending more time on attending required committee staff meetings than collaborative planning time. However, the effect is not pronounced and would likely be washed out using normative regression methods, as previously stated.

However, the effect could have lied along a different dimension in a multidimensional subject space. Both LCA and LPA allow for the identification of variability along these dimensions. Figure 3 shows the distinct effect between two leadership activities, *individual planning time* and *required committee and staff meetings* in a rotated, clustered dimension captured by two example teacher latent classes from Chapter 3. Again, these latent classes were mostly defined by *net leadership activity*. However, Figure 3 shows decisive separation across

two classes for these two variables. Teachers in both classes generally reported spending small amounts of time on teacher leadership activities, but they distinctly varied in *individual planning*. While responses were almost identical across other activities (see distribution across required committee and staff meetings in Figure 3), teachers in the *low leadership activity teachers with high planning activity* class rarely reported between 1 and 3 hours per week dedicated to *individual planning*. Instead, they almost always reportedly spent between 3 and 5 and between 5 and 10 hours per week on *individual planning*. This effect was evidence that *individual leadership activities* are a particularly meaningful source of variability in teacher leadership activity.

**Figure 3**

*Jittered Scatter Plot of Two Example Leadership Activities for Two Example Teacher Classes*



Most of the teacher leadership literature provides evidence for *salient individual leadership activities* as a potential meaningful source of variability. If a method that did not allow this dimensional clustering had been used, it is likely that there would be no evidence of this effect. Instead, the mixture modeling technique allowed more opportunities to detect this effect as well as additional interpretable ability to contextualize the effect. Namely, specific individual activities may be important sources of variability in teacher leadership activity, but specific *individual leadership activities* account for less variability than *net leadership activity* across the range of leadership activities in which teachers regularly engage.

The third conceptualization of leadership activity of interest was *subsets of leadership activities*. It is difficult to visualize evidence of this property in a single two-dimensional scatter plot, considering that the pattern occurs across multiple components in a multidimensional subject space (e.g., a six-dimensional plot might be necessary). However, if multiple scatter plots showed many more positive relationships between two variables and significantly fewer positive relationships among others, those plots would possibly provide evidence for *subsets of leadership activities*. Nevertheless, this effect can be visualized more clearly (see Figures 7 and 11) in common LCA and LPA visuals because these methods reduce dimensions. These visualizations could have shown lines that switch over at different points but instead showed lines that consistently separated across latent classes. Switched lines would have represented classes with teachers who generally reported high scores for some variables and lower scores for others and provided evidence of *subsets of leadership activities* as a meaningful source of variability. Instead, the classes did not switch and thus varied most by *net time spent on leadership*.

**Evaluating the meaningfulness of this variability.** *Net leadership activity* appeared to be a primary source of variability while several *individual activities* appeared to be secondary sources explaining teacher leadership activity. Without connecting these sources of variability with antecedents and consequences of teacher leadership activity, it is a challenge to judge the value of these findings. In this study, multinomial logistic regression was used to assess connections among these sources of variability with organizational climate for teacher leadership and classroom climate for classroom instruction. These were both proximal constructs in York-Barr & Duke's (2004) conceptual framework for teacher leadership. Details of these results are included in Chapters 3 and 4. In summary, *net teacher and faculty leadership* activity shows clear, consistent, and significant positive associations with both organizational and classroom climate. Given that *net leadership activity* strongly and positively associated with desired organizational climate factors, it was concluded that *net leadership activity* was also a substantively meaningful primary source of variability for understanding the teacher leadership process.

**Additional reflections on this method.** Taken together, LCA and LPA were useful tools for unpacking jointly changing conceptualizations of teacher leadership activities to find primary sources of variability in teacher leadership activity. Teacher leadership and teacher leadership activities are complicated and multidimensional. Because primary sources of variability within this complicated phenomenon have not been identified in the literature, measurement, theory, and practice suffer. Measurement, like the measures included in the secondary dataset used in this study, represented justified guesses about the best ways to capture teacher leadership. Without clearly identified primary sources of variability, these remain as just guesses. Once primary sources of variability are identified, they may become more targeted measures of

phenomena that meaningfully and clearly describe observed differences. For example, results of this study suggest that measurement of leadership activity should include overall *net leadership activity* as a meaningful construct. Examples of this measurement are provided in Chapter 5.

Theory development suffers because primary sources of variation are yet to be identified in the literature. Thus, theory cannot identify concrete, consistent relationships among core components. The use of theory suffers because underdeveloped theories cannot meaningfully and consistently represent observed phenomena. Also, because both theory and measurement suffer, research cannot meaningfully inform practice. As described in this technical note, the exploratory approach used in this dissertation was especially useful in solving this problem.

Although quantifying this underdevelopment and the contribution of this study is largely intractable (because there are too many parameters across too many dimensions and relations to quantify and adequately capture all of the ways these phenomena vary), two quantifications are useful to demonstrate the magnitude of the contribution this study made. The first are the study correlations and the variance inflation factor scores. Both suggested extreme multicollinearity. Many correlations (Tables 2, 3, 7, 8) were above .30 and variance inflation scores were above 10 ( > 10 is commonly considered as an indicator of multicollinearity) ranging from approximately 144 to over 5,500. Yet this study was able to use multiple exploratory techniques to identify clear patterns and defined separation across these patterns, like those visually presented in Figure 3. Moreover, logged odds in Tables 5 and 10 show very large logged odds, in some cases, which demonstrate very clear demarcation in variability (i.e., in this case, membership in classes or profiles given 1-unit changes in predictor variables). These results suggest that this study used analyses that proved very effective at interpreting multicollinearity in ways that isolated and identified clear and distinct patterns. Commonly used regression approaches do not engage in

this kind of analysis, simply assuming that variables are orthogonal.

However, LCA and LPA adjusted interpretation of this leadership activity phenomena by being focused on teachers and faculties, respectively. Adjusted interpretations were focused on accounting for variability that differentiated subpopulations of teachers and school faculties from one another as opposed to directly accounting for variability with outcomes. That is, these interpretations did not measure net leadership activity specifically and regress net leadership activity on outcomes. However, similar relationships were measured using a separate logistic regression model (e.g., predicting class membership by reports of climate dimensions).

Despite this, units of teachers and schools have an applied benefit. Training and professional development programs and school reform efforts typically target teachers and school faculties. A training program might target an activity a teacher might perform, but a teacher's perspective generally shapes the way he or she performs leadership activities. Given this person-level dynamic, effective programs might account for person-level dynamics and thus benefit from results in person-level units. Similarly, a school reform effort might target improving a particular leadership activity among faculty, but a school is an inherently interconnected system in which the implications of those reform efforts likely impact other aspects of the faculty's leadership. Given this school-level dynamic, effective programs might account for these school-level faculty dynamics and benefit from results in faculty-level units. The results of these analyses offered insight directly applicable to practice.

# CHAPTER III

## MAPPING AND MEASURING RELATIONS BETWEEN TEACHERS AND THE CONDITIONS WITHIN WHICH THEY TEACH: A LATENT CLASS ANALYSIS

Teacher leadership as a concept is rapidly evolving as it becomes increasingly present in K–12 (kindergarten through Grade 12) public schools across the United States (Gronn, 2003; Nguyen et al., 2019). Some have even suggested that a super majority of America's teachers now lead over the course of a typical week in contemporary schools (Urick, 2012). As teacher leadership becomes more common, researchers continue to clarify related concepts, for example, teachers' means of school influence through leadership activities, conditions that enable teacher leadership, and dimensions of organizational climate that support classroom instruction (see York-Barr & Duke, 2004 for seminal systematic review). Harris and Jones (2019), however, highlighted that key conceptual questions remain, including the ways teacher leadership itself should be measured (i.e., the activities teachers use to influence their schools). Is it important to measure specific activities? If so, what measurable dimensions of those activities are most meaningful— time spent performing those activities, or perhaps the frequency of such activity? A clearer understanding of such issues would help advance understanding ways to utilize and integrate teacher leadership in school reform efforts.

Extant literature offers multiple compelling attributes on which research on teacher leadership might be focused, one of the primary attributes being the leadership activities used by teachers to influence their schools (Bush & Glover, 2014). Despite a lack of teacher-specific research informing clear measures of this chief attribute, decades of research on principals and

administrators who share leadership with teachers set forth three compelling conceptualizations of leadership activities for investigation among a sample of teachers: (1) *particular salient individual activities* (Fairman & Mackenzie, 2015), (2) *salient subsets of activities* (Marks & Printy, 2003), and (3) *net time spent on leadership activity* (Urick, 2012). No study includes an assessment of the relative importance of these possibilities within a sample of teachers. Moreover, no researchers have assessed these activities in relation to the elements of classroom or school climate that might promote teacher leadership or improve instruction.

The current study used variable- and person-centered quantitative statistics to explore a state-wide dataset of over 60,000 teachers. It explored teacher leadership activity and associations among teacher leadership activities with theoretically salient dimensions of organizational and classroom climate. It found clear evidence for which conceptualization of leadership activity may account for the most explanatory power in context of the teacher leadership process and clarified relationships between teacher leadership and important dimensions of school organizational and classroom climate.

## Teacher Leadership and Student Learning

Teacher leaders are teachers who "lead within and beyond the classroom" (Nguyen et al., 2019), and teacher leadership is a process by which teachers—individually and collectively—influence people and their schools with the purpose of advancing student learning and improving the school environment (York-Barr & Duke, 2004). Teacher leadership could serve as an important lever in addressing widespread, persistent, and harmful student-related challenges (Nguyen et al., 2019). Some of these persistent challenges include reducing academic and disciplinary disparities among students from racial and socioeconomic subgroups and meeting

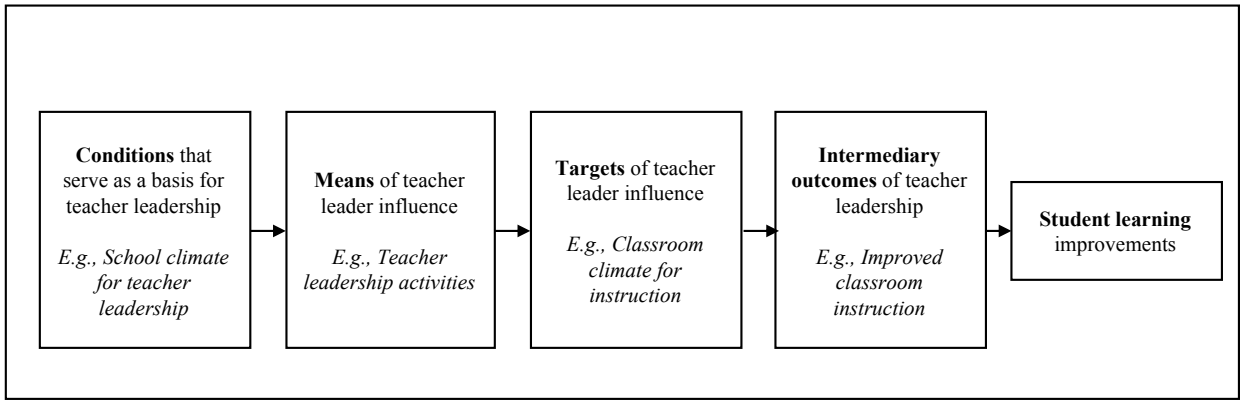
the needs of students who have experienced trauma in challenging community settings (Balfanz & Byrnes, 2006; Gregory, Skiba, & Noguera, 2010; Pearman et al., 2019).

Teachers who lead are in great positions to make impactful decisions, given their proximity to students and students' challenges (Camburn, Rowan, & Taylor, 2003; Robinson, 2007), their sheer numbers at a school, and representation across the school (Wenner & Campbell, 2017). Given teachers' proximity to students and their challenges and evidence that teachers can positively influence schools (Nguyen et al., 2019), there is shared understanding that empowering teachers to lead may be a valuable intervention in addressing challenging school problems (see Saultz et al., 2017), including more persistent challenges.

Several quantitative studies show a consistent and indirect association between school leadership and student learning (Gumus, Bellibas, Esen, & Gumus, 2018), and a smaller set of studies show similar results, specifically for teachers (Shen et al., 2020; Wenner & Campbell, 2017). According to these studies, an array of intermediary factors interact with teacher behavior to prompt student learning and school improvement. York-Barr and Duke (2004) offered an initial conceptual framework for teacher leadership to organize teacher leadership constructs (Figure 4).

**Figure 4**

*Summary of York-Barr & Duke (2004) Conceptual Framework for Teacher Leadership*



Per this conceptual framework, some forms of school climate (e.g., dimensions of school climate that support teacher leadership like an atmosphere of trust and mutual respect among faculty and staff) may provide a context that influences teachers to lead. In turn, teacher leadership activities strategically influence key targets relevant to student learning (e.g., elements of the classroom climate like teachers have sufficient time to meet students' needs) that influence the amount and quality of classroom instruction and ultimately student outcomes.

## Three Conceptualizations of Teacher Leadership Activity

York-Barr and Duke (2004) offered few specifics of the mechanisms/levers by which teachers influence their schools. More particularly, the means of teacher leadership, or teacher leadership itself, are primarily operationalized as the leadership activities teachers perform. Although the others that teachers share power with may play important roles, teacher leadership activities have been proven to be stronger, more consistent predictors of desired outcomes (Bush & Glover, 2014; Marks & Printy, 2003; Robinson et al., 2008). However, there is no universally accepted taxonomy of teacher leadership activities in which activities are organized by relative importance, use, or activity type.

Nevertheless, dozens of the activities teachers use to lead have been highlighted in reviews of teacher leadership (Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017; York-Barr & Duke, 2004). Some of these activities include collaborative planning, participating in faculty and staff meetings where decisions are made, and designing and delivering professional development programs. These behaviors have variously been associated with positive changes in school climate (Nguyen et al., 2019). Three conceptualizations for describing

and organizing teacher leadership activities have emerged from the literature: *individual leadership activities*, *sets of leadership activities*, and *net leadership activity*.

**Individual leadership activities.** In this conceptualization, teacher leadership activities are operationalized as *salient individual activities* in which teachers may engage relative to their classroom or school. Multiple small-scale case studies document individual leadership activities that appear to be influential and are associated with desired outcomes (e.g., Du, 2007; Fairman & Mackenzie, 2015; Riveros et al., 2013). For instance, teachers who reportedly collaborate and communicate with parents reported more trust and mutual respect among school leadership and the community (Fairman & Mackenzie, 2015). This trust, in turn, has been particularly documented as an important condition in improving classroom instructional quality across a school (Bryk & Schneider, 2003). Like collaborating and communicating with parents, other individual leadership activities, in particular, may be strongly associated with targets of leadership influence, for example, classroom climate for quality classroom instruction.

Teachers engage in many different types of individual activities, yet no systematic reviews (i.e., Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004) have included a taxonomy of teacher leadership activities. Instead, these reviews include brief accounts of many activities with some evidence of teacher activity being linked to desired outcomes. Planning (Lai & Cheung, 2015), participating in decision-making meetings (Thornton, 2010), supervising and supporting other teachers (Tyagi, 2010), contributing to student behavior management across the school (Furtado & Anderson, 2012), and completing administrative paperwork (Margolis & Huggins, 2012) are all examples of individual activities showing evidence of association with desired classroom instructional outcomes (see Nguyen et al., 2019).

**Sets of leadership activities.** Another conceptualization is that teacher leadership activity

may be operationalized by a *set of activities* or combinations of activities performed together. For example, teachers who believe that effective leaders should focus on instructional practices might orient their leadership activity toward improvement in classroom instruction such as designing professional development related to instruction, supervising junior teacher instruction, and securing teacher-supportive instructional resources. *Subsets of activities* aligned with these philosophies may appear in normative teacher leadership practice.

In instructional leadership theory, emphasis is placed on activities that enhance classroom instruction as based on a philosophy that enhancing classroom instruction is the most important goal of school leadership (Leithwood et al., 1999). Exemplar activities include supervising other teachers' teaching and preparing the school and other teachers for standardized assessments. Teachers trained in instructional leadership theory would be expected to orient their leadership activities to those aligned with this philosophical orientation. Primary critics of this theory have noted that other leadership goals and activities are also important, for example, improving organizational functioning through efficient resource distribution (Hallinger & Heck, 2002; Marks & Printy, 2003). Instructional leadership theory may be insufficient in bringing about desired outcomes.

In contrast, activities that facilitate and enhance school functioning, including completing administrative paperwork and participating in staff meetings (Hoyle & Wallace, 2005), are emphasized in managerial leadership theory. From this perspective, effective leadership enables the school to function more effectively so that goals are easier to achieve. Yet, similar critiques note that managerial approaches do not account for some of the most meaningful ways teachers should lead, including motivating their workforce (Simkins, 2005).

In the transformational, moral, and authentic leadership theories, emphasis rests on

activities associated with professional development as a means to increase faculty and staff motivation, commitment, and capacity to carry out organizational goals (Leithwood, 1994). As suggested in corollary leadership philosophy, school faculty and staff cannot achieve organizational objectives if they lack capacity and commitment (Stefkovich & Begley, 2007). Similarly, each of these theories is limited in scope.

Shared instructional theory (Marks & Printy, 2003) partly addresses these critiques, suggesting that effective principals both motivate others and emphasize activities focused on instruction. Yet, contingency leadership theory (Bush & Glover, 2014) more holistically addresses these critiques, arguing that effective leaders employ activities across all major theories. Theoretically, school leaders who perform *subsets of leadership activities* aligned with contingency leadership theory engage in a wide range of leadership behaviors although the scope of these activities is undefined (Bush & Glover, 2014).

**Net leadership activity.** The *total amount of leadership activity* in which teachers engage during a typical week may be another conceptualization of teacher leadership activity to account for meaningful variance in the teacher leadership process. Evidence of this conceptualization comes from a study (Urick, 2012) on principal-faculty pairs within a school. Urick (2012) operationalized *total amounts of activity as time spent on leadership activity* throughout a typical week. Subpopulations of principal-faculty pairs appeared to vary most by *the net amount of time* principals spent on leadership activities and principals' perceptions of teacher leadership influence at their schools. Thus, overall time spent on leadership activities appeared to be an important source of variability.

Considering these three conceptualizations, the particular conceptualization or combination of conceptualizations that appear(s) most salient may have implications in

measuring teacher leadership activity. If an individual activity appears particularly salient, then future research might offer an investigation of those specific activities (e.g., how activities are performed, how frequently they are performed, the contexts within which they are performed). If, however, *net leadership activity* is a particularly salient conceptualization relative to the other conceptualizations, then researchers investigating teacher leadership activity might survey teachers about the amount of time they spend on leadership activities over a common unit of time. There are many ways to operationalize teacher leadership activities, but the literature fails to provide evidence of the conceptualizations most meaningful to our understanding of teacher leadership activity.

### Teacher Leadership and School Climate

Multiple conditions are empirically known to serve as a basis for teacher leadership, but no meta-analyses offer evaluations of the relative magnitude and direction of these relationships with aspects of teacher leadership. Rather, systematic reviews documented four categories of conditions that seem to enable or constrain teacher leadership: (1) school climate, (2) teacher peer relationships, (3) principal leadership, and (4) teacher personal factors. Of these categories, school climate is widely understood to be the most consistent and greatest influence on school leadership in the literature (Fullan, 2001; Harris, 2014). Some cultural and contextual dimensions of schools associated with higher levels of school leadership include a shared, school-wide perception of teacher leadership as an established norm (Talbert & McLaughlin, 1994); teachers' sustained focus on professional learning (Katzenmeyer & Moller, 2002); a shared school vision to improve instruction and learning (Ghamrawi, 2010); and a collective desire to empower teachers as leaders (Ghamrawi, 2010). Each of these dimensions has been linked with teacher

leadership in schools, but they have not been specifically linked with teacher leadership activities or associated conceptualizations. More exploration is needed to identify associations between school climate for teacher leadership and teacher leadership activity.

### Teacher Leadership and Classroom Climate

Several quantitative studies document indirect pathways between teacher leadership and student learning. Across all of these studies, the impact of teacher leadership on classroom climate dimensions specifically relevant to instruction have been reported (see Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017). In turn, a higher quality of classroom instruction directly improves student learning (Sebastian & Allensworth, 2012; Vandevoort et al., 2004). Supovitz et al. (2010) used survey data from 721 teachers across 38 schools to examine the effects of teacher leadership on teachers' instructional practices and student learning. Significant models linked teacher leadership influence with student learning mediated through classroom instructional quality.

Additionally, Yost et al. (2009) and Sebastian et al. (2016) also identified this mediation relationship using smaller, but independent, samples. These studies linked teacher leadership with improved instruction via at least three dimensions: sufficient time and resources to support students' learning, high expectation and supports for delivering quality instruction, and a social and behavioral environment conducive to student learning. Additional evidence—independent of teacher leadership—corroborates these links with quality classroom instruction (see Greenwood et al., 1991; Wang et al., 2020). To date, no literature reports a link between these intermediary outcomes of teacher leadership with teacher leadership conceptualizations.

**Relevant Prior Research**

To date, no randomized control trials have been used to assess differential associations among each of the conceptualizations of teacher leadership activities (e.g., constraining some teachers to the use of one leadership activity and others to varying activity subsets in a blocked design) and either school or classroom climate for teachers. Similarly, no quasi-experimental designs have been used to assess the relative contributions of each conceptualization. Also, no meta-analyses have shown integration and assessment of the relative effect sizes associated with these conceptualizations across studies. Finally, no descriptive or analytic studies directly assesses all three conceptualizations and the relations among these conceptualizations with conceptually proximal conditions (e.g., organizational climate).

The most conceptually similar study, Urick (2012) sought to identify subpopulations of principal-faculty and teacher-principal pairs by assessing individual activities, sets of activities, and other related perceptions (Urick, 2012). In this study, national data from the 1999–2000 School and Staffing Survey (SASS) dataset collected by the National Center for Education Statistics (NCES) were used to investigate typologies of (1) principals and their faculty and (2) teachers and their principals' joint leadership, both in relation to teacher attrition. Urick (2012) did not draw from a teacher-related leadership conceptual framework or theory. This study's results modeled three latent subpopulations of principal-faculty pairings based on principals' reports of their leadership activity and their reports of the faculty members' general leadership activity. Urick (2012) also modeled four latent subpopulations of teacher-principal pairs based on teachers' reports of their leadership activity and their principal's leadership activity.

Principals in Urick's (2012) study were modeled based on a combination of principals' reports of the frequency of various leadership activities and 14 different aspects of school

organizations that were assumed to be manifestations of their leadership. Their reports of faculty leadership were perceptions of teachers' influence across a number of leadership activities at their schools. Teachers' reports of principals were perceptions of school aspects considered manifestations of principal leadership as well as one variable measuring principals' discussions of instructional practices at their schools. Teachers' reports of their own leadership were perceptions of the extent to which they had influence over various activities.

Across all seven subpopulations in the study (Urick, 2012)—both from principal-faculty pairs and teacher-principal pairs—the best fitting latent class analysis models indicated that the pairs appeared to perform multiple sets of leadership activities (consistent with contingent leadership theory). The *integrated* subpopulations were aptly named to reflect the integration of multiple subtypes based on either the most use of multiple leadership theories (i.e., instructional leadership theory, transformational leadership theory, shared instructional leadership theory), the greatest perceived teacher influence, and the greatest presence of organizational aspects attributed to principals (Urick, 2012).

Other subpopulations in the study (Urick, 2012) appeared to be mixed combinations of either high reports of principal leadership and low reports of teacher leadership influence (*transitioned*), or low reports of teacher leadership and high reports of principal leadership (*balkanized*). *Transitioned* referred to teachers in greater transition to being leaders, and *balkanized* referred to principals seemingly diminished amidst teachers much more active in leadership across the school. The *integrated* subpopulations, which most resembled principal-teacher pairs with the most leadership activity or influence, appeared to be associated with the lowest teacher attrition and passing standardized assessments.

Urick (2012) offered the closest approximation to the current study by offering an

assessment of both leadership activities and sets of leadership activities, and, in one case, for principals' reports of their own leadership activity. Conceptually, it appeared as if a similar set of constructs was used; however, direct translation of Urick's (2012) results to the results of the current study is more challenging. Principal-faculty and teacher-principal pairs cannot be directly translated to assess teacher leadership, and these pairs also represent a mix of multiple components of the conceptual framework for teacher leadership (York-Barr & Duke, 2004) from different phases of the leadership process. Per that conceptual framework, principal types were estimated from means of leadership influence and intermediary outcomes of leadership. Moreover, manifest variables used to estimate teacher types in Urick's (2012) study reflected perceived influence, not activity.

## The Present Study

There are significant gaps in the conceptualization of the teacher leadership process. The ways in which teachers go about influencing the conditions within which they teach is a critical, yet understudied, part of that process. The literature suggests three conceptualizations of the leadership activities teachers use to influence their schools that may be meaningful in understanding relationships between teacher leadership activities and the classroom climate under which instruction occurs. This study is an investigation of observed variability in teacher leadership activity. It assesses the relative explanatory power of three conceptualizations of teacher leadership activity in context of a broader teacher leadership process. To further assess this explanatory power, it also models relationships between teacher leadership activities and both school and classroom climate for teachers. Three core research questions were addressed in the current study:

*(1) To what degree are teachers involved in leadership activity?*

*(2) Are there subpopulations of teachers based on the activities they use to influence their schools? And if so, which property of activities teachers use to influence their schools most accounts for heterogeneity among teacher subpopulations?*

*(3) What are associations among teacher subpopulations and organizational climate?*

*(4) What are associations among teacher subpopulations and classroom climate?*

## Methods

### Sample

This study utilized the 2012–2013 Teaching Empowerment, Leading, and Learning (TELL) Survey collected by the Tennessee Department of Education and the New Teacher Center. These organizations commissioned the survey to help state and district leaders gather data to inform school improvement efforts. The 2012–2013 TELL survey offered a unique opportunity to leverage statewide data representing a diverse array of schools to address the goals of this study. The TELL dataset included various teacher leadership activities representing multiple leadership philosophies, dimensions of organizational climate serving as a basis for teacher leadership, and classroom climate dimensions known to support classroom instructional quality. Moreover, response options permitted investigation of all three teacher leadership activity conceptualizations.

Schools were the primary sampling unit in this dataset, and teacher samples were drawn from each school. There are over 1,700 public schools across 147 districts in Tennessee, and it is anchored by six mid- to large-sized urban districts in Nashville, Memphis, Knoxville,

Chattanooga, Clarksville, and Murfreesboro, with the remaining districts spread throughout suburban areas, small cities, and rural districts. In 2013, $8,208 was spent per pupil, which was ranked at 46 among the 50 U.S. states (Cornman, 2016). In the 2012–2013 year, Tennessee had more Caucasian students (66.29%) and African American students (23.03%) than the national averages of 51.04% and 15.69%, respectively (Keaton, 2014). Tennessee's graduation rate in 2013 was above the national average at 86.3% (Keaton, 2014). In 2013, Tennessee teachers were compensated at an average salary of $48,289, which was less than the U.S. average of $56,383 (Cornman, 2016).

The survey was advertised at all public schools in Tennessee and available to all teachers. Participation was voluntarily, and teachers self-reported responses through an online survey. Approximately 86% of all eligible teachers completed the survey. Teachers referred to school-based, licensed teachers, but no individual identifying information, including demographic information, was reported. The initial dataset contained data from approximately 62,000 licensed public schoolteachers. Listwise deletion was used for teacher data systematic missingness at the school level. Assessment of district-level bias did not reveal significant differences between missingness across urban, suburban, and rural districts. Once systematic missingness was accounted for, random missingness accounted for under 3% of any variable in the dataset. Variable means were used to replace missing data (see Myers, Well, & Lorch, 2010 for discussion of this missingness best practice). The final sample consisted of 53,079 licensed public schoolteachers.

**Measures**

All measures were items self-reported by teachers from the 2012–2013 TELL survey.

Psychometric and design conceptualizations were both valid and reliable across teaching and non-teaching school leadership samples (New Teacher Center, 2013). These measures include teacher perceptions of leadership activity, school climate, and classroom climate.

**Teacher perceptions of personal leadership activity**. The first measure used in this study was *teacher perceptions of leadership activity*. Nine items were included in this scale to assess the amount of time spent per week on nine different teacher leadership activities. These variables were aligned with multiple leadership theories, including managerial leadership theory, transformational leadership theory, instructional leadership theory, shared instructional leadership theory, and contingent leadership theory. Items included individual planning; collaborative planning completed with other faculty and staff; supervisory duties; required committee and staff meeting attendance and participation; required administrative paperwork; communication with parents, guardians, and the community; professional development design, delivery, and participation; addressing student behavioral issues across the school; and preparation for federal, state, and local assessments.

Response options for all items in this scale included the following: 0 (None), 1 (Less than or equal to one hour), 2 (More than 1 hour but less than or equal to 3 hours), 3 (More than 3 hours but less than or equal to 5 hours), 4 (More than 5 hours but less than or equal to 10 hours), and 5 (More than 10 hours). The scale demonstrated moderate but acceptable reliability ($\alpha = .71$) given that there were only nine items from a wide range of possible leadership activities and representing a wide range of leadership theories.

**School climate for teacher leadership**. The second measure used in this study captured dimensions of *school climate* that promote teacher leadership, and 14 items were included in the scale. These items included the following: faculty have effective processes for making group

decisions to solve problems; parents and guardians are influential decision makers in the school; faculty work in a safe environment; faculty and leadership have a shared vision; there is an atmosphere of mutual trust and respect among leadership; faculty feel comfortable raising issues and concerns; school leadership consistently supports teachers; the procedures for teacher evaluation are consistent; the school improvement team provides effective leadership; leadership addresses concerns about teacher leadership; leadership addresses community support and involvement concerns; sufficient resources for professional development are available at the school; appropriate amounts of time are provided for professional development; and professional development is differentiated to meet the needs of individual teachers. Response options for all items were 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. This scale demonstrated sufficient reliability ($\alpha = .86$).

**Classroom climate for instruction.** The third measure used in this study captured dimensions of *classroom climate* that support classroom instruction, and 11 items were used to represent 3 climate dimensions known to support classroom instructional quality: sufficient time and resources to support student learning, high expectations and support for delivering quality instruction, and a social and behavioral environment conducive to student learning in the classroom. Items, by dimension, included (1) teachers are protected from duties that interfere with their essential role of educating students, teachers have sufficient instructional time to meet the needs of all students, teachers are allowed to focus on educating students with minimal interruptions, class sizes are reasonable such that teachers have the time available to meet the needs of all students, (2) teachers are held to high professional standards for delivering instruction, leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices, (3) students follow rules of conduct, students at this school understand

expectations for their conduct, administrators consistently enforce rules for student conduct, teachers consistently enforce rules for student conduct, and student conduct policies and procedures are clearly understood by the faculty. Response options for all items were 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. This scale demonstrated sufficient reliability ($\alpha = .84$).

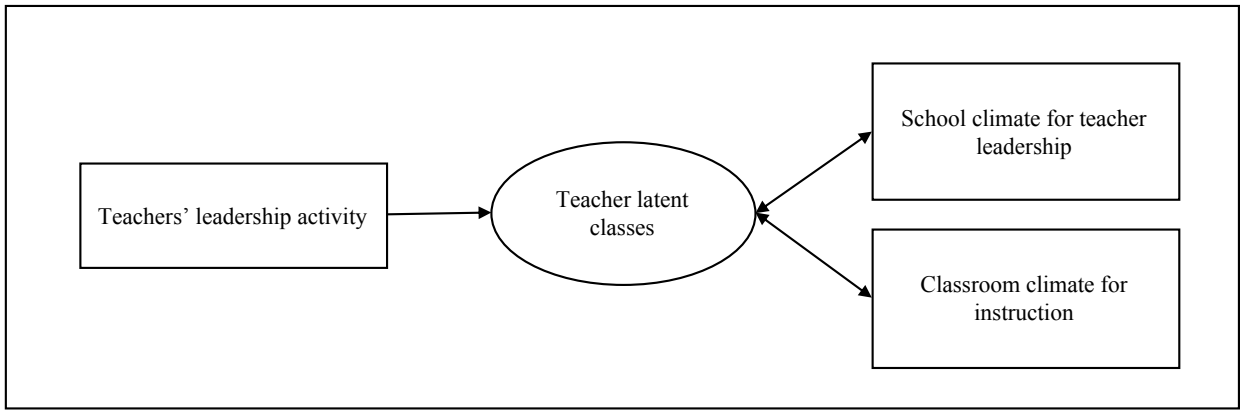
**Analytic Model**

Data analysis involved three separate analytic approaches to address the research questions. For the first question, analyses included exploratory descriptive techniques including means, standard deviations, frequency distributions, and bivariate correlations. Latent class analysis (LCA) was then used to find evidence of the three conceptualizations for measuring teacher leadership activities. Latent class analysis offers effective means for exploring clear dependencies among leadership activity items observed in correlations across multiple dimensions (i.e., all three conceptualizations). It also offers advantages over alternate approaches, including cluster analysis, because it permits testing and a comparison of hypothesized model configurations to determine the best model based on fit to the data (Collins & Lanza, 2010). Posterior probabilities were used to estimate any participant's membership within a given leadership type. Multinomial logistic regression was used to answer the second and third research questions. These analyses predicted the likelihood of class membership in each teacher subpopulation (dependent variable) given a corresponding one-unit increase in agreement of the presence of a climate dimension. Across all analyses, tidyverse packages in R were used for exploration and visualization, Mplus8 was used for model estimation, Stata 15 was used for data preparation, and SPSS 24 was used to calculate descriptives. A conceptual model for all

analyses is shown in Figure 5.

**Figure 5**

*A Conceptual Model for Latent Class Analyses*




## Results

According to descriptive results, approximately 98% of the measured teacher sample reported performing some leadership activity every week. Table 1 displays teachers' reports of the number of hours per week generally spent on nine different leadership activities, and values correspond to the percent of responses in each response category. For example, 11.6% of 52,573 teachers providing responses about the number of hours they spend on *collaborative planning* reportedly spent no time per week on *collaborative planning*. Similarly, 45.5% of this same group reported performing less than one hour weekly on *collaborative planning*. Across all leadership activities, most teachers reported performing these activities at least weekly, generally for less than three hours per week. All measured activities demonstrated unimodal distributions that were positively skewed. Two measured activities skewed slightly more negatively, indicating that teachers spent more time per week performing those activities. So generally, teachers reportedly performed *individual planning leadership activities* and *preparing for state*

*assessments* for more time per week, on average, than other leadership activities.

**Table 1**

*Teachers' Perceptions of Hours Per Week Spent on Nine Leadership Activities*

| | | Hours per week categories* | | | | | | *Total # of responses* | *Missing %* |
|---|---|---|---|---|---|---|---|---|---|
| | | None | 0 to 1 | 1 to 3 | 3 to 5 | 5 to 10 | More than 10 | | |
| | | *% of responses in hours per week category* | | | | | | | |
| 1 | Individual planning time | 1.6 | 19.7 | 29.9 | 31.8 | 14.3 | 2.1 | 52701 | 0.7 |
| 2 | Collaborative planning time | 11.6 | 45.5 | 30.7 | 9.0 | 2.0 | 0.3 | 52573 | 1.0 |
| 3 | Supervisory duties | 9.5 | 40.7 | 31.9 | 10.9 | 4.4 | 1.2 | 52291 | 1.5 |
| 4 | Required committee and staff meeting attendance and participation | 4.1 | 56.0 | 32.1 | 5.0 | 1.2 | 0.4 | 52371 | 1.3 |
| 5 | Required administrative paperwork completion | 4.5 | 50.2 | 30.9 | 8.7 | 2.9 | 1.1 | 52213 | 1.6 |
| 6 | Communication with parents, guardians, and the community | 1.9 | 50.6 | 36.9 | 7.1 | 1.9 | 0.6 | 52592 | 0.9 |
| 7 | Professional development design, delivery, and participation | 11.7 | 51.5 | 24.8 | 5.7 | 2.2 | 2.2 | 52070 | 1.9 |
| 8 | Addressing student behavioral issues | 3.8 | 55.4 | 27.7 | 7.9 | 3.1 | 1.6 | 52749 | 0.6 |
| 9 | Prepare for required federal, state and local assessments | 6.8 | 27.5 | 30.5 | 16.4 | 9.5 | 8.1 | 52393 | 1.3 |

* Categories were operationalized as: $0$; $0 < x \leq 1$; $1 < x \leq 3$; $3 < x \leq 5$; $5 < x \leq 10$; $10 < x$

Correlations and mean scores for all items included in the analyses are reported in Tables 2 and 3. In Table 2, correlations among teacher leadership activities and school climate are shown. Few strong and significant bivariate correlations were found between any activities and school climate. This lack of relationships may stem from incongruence between teacher-level activities and perceived school-level climate. Nevertheless, stronger correlations ($r >$. 20) were observed among *collaborative planning* and *faculty have effective processes for making group decisions to solve problems*, *sufficient resources for professional development are available at the school*, *appropriate amounts of time are provided for professional development*, and *professional development is differentiated to meet the needs of individual teachers*.

**Table 2**

*Means, Standard Deviations, and Correlation Matrix of Teachers' Leadership Activity and School Climate*

| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Teachers' Leadership Activities* | 1 | Individual planning time | | | | | | | | | | 3.44 | 1.07 |
| | 2 | Collaborative planning time | .34* | | | | | | | | | 2.44 | 0.90 |
| | 3 | Supervisory duties | .18* | .20* | | | | | | | | 2.63 | 1.03 |
| | 4 | Required committee and staff meeting attendance and participation | .10* | .30* | .26* | | | | | | | 2.44 | 0.74 |
| | 5 | Required administrative paperwork completion | .10* | .17* | .24* | .42* | | | | | | 2.58 | 0.91 |
| | 6 | Communication with parents, guardians, and the community | .16* | .25* | .23* | .37* | .43* | | | | | 2.58 | 0.78 |
| | 7 | Professional development design, delivery, and participation | .08* | .28* | .15* | .43* | .29* | .33* | | | | 2.41 | 1.00 |
| | 8 | Address student behavioral issues | .07* | .13* | .22* | .27* | .30* | .39* | .20* | | | 2.56 | 0.93 |
| | 9 | Prepare for required federal, state and local assessments | .13* | .16* | .13* | .18* | .25* | .25* | .23* | .22* | | 3.19 | 1.34 |
| *School Climate Dimensions for Teacher Leadership* | 10 | Faculty have effective processes for making group decisions to solve problems | .06* | .20* | -.02* | -.02* | -.07* | .03* | .09* | -10* | -.01* | 2.92 | 0.77 |
| | 11 | Parents and guardians are influential decision makers in the school | .04* | .10* | .01* | .00 | .02* | .10* | .05* | -.07* | .02* | 2.76 | 0.75 |
| | 12 | Faculty work in a safe school environment | .07* | .11* | -.03* | -.07* | -.08* | -.01* | .01* | -.18* | -.00 | 3.32 | 0.63 |
| | 13 | Faculty and leadership have a shared vision | .07* | .11* | -.03* | -.07* | -.08* | -.01* | .01* | -.18* | -.00 | 3.10 | 0.71 |
| | 14 | There is an atmosphere of trust and mutual respect among leadership | .09* | .15* | -.04* | -.08* | -.11* | -.01 | .03* | -.14* | -.03* | 2.99 | 0.83 |
| | 15 | Faculty feel comfortable raising issues and concerns | .08* | .14* | -.04* | -.09* | -.11* | -.01 | .03* | -.14* | -.03* | 2.93 | 0.86 |
| | 16 | School leadership consistently supports teachers | .08* | .15* | -.04* | -.09* | -.12* | -.02* | .03* | -.16* | -.03* | 3.08 | 0.79 |
| | 17 | The procedures for teacher evaluation are consistent | .07* | .16* | -.03* | -.07* | -.10* | -.00 | .04* | -.12* | -.02* | 3.00 | 0.85 |
| | 18 | The school improvement team provides effective leadership | .07* | .18* | -.02* | -.03* | -.07* | .02* | .08* | -.11* | -.01* | 3.03 | 0.76 |
| | 19 | Leadership addresses concerns about teacher leadership | .09* | .19* | -.02* | -.04* | -.08* | .01 | .08* | -.11* | -.01* | 3.00 | 0.69 |
| | 20 | Leadership addresses community support and involvement concerns | .07* | .16* | -.02* | -.04* | -.07* | .01 | .05* | -.12* | -.01 | 3.05 | 0.65 |
| | 21 | Sufficient resources for professional development are available at the school | .05* | .20* | -.01 | .04* | -.02* | .02 | .15* | -.06* | .01* | 3.02 | 0.68 |
| | 22 | Appropriate amounts of time are provided for professional development | .07* | .21* | .00 | .02* | -.03* | .02* | .15* | -.07* | .02* | 3.02 | 0.67 |
| | 23 | Professional development is differentiated to meet the needs of individual teachers | .06* | .22* | -.01 | .03* | -.02* | .05* | .15* | -.05* | .02* | 2.76 | 0.82 |

* $p < .01$

In Table 3, correlations among teacher leadership activities and classroom climate are presented. Correlations among the variables in the table were similarly sized. Only *addressing student behavioral issues* appeared to share a strong inverse correlation ($r < –.20$) with *students follow rules of conduct* and *administrators support teachers' efforts to maintain discipline in the classroom*. Also, *collaborative planning* shared a strong correction ($r > .20$) with *leadership*

*provides ongoing opportunities for teachers to work with colleagues to refine teacher leadership practices*.

**Table 3**

*Means, Standard Deviations, and Correlation Matrix of Teachers' Leadership Activity and Classroom Climate*

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | *M* | *SD* |
| *Teachers' Leadership Activities* | 1 | Individual planning time | | | | | | | | | | 3.44 | 1.07 |
| | 2 | Collaborative planning time | .34* | | | | | | | | | 2.44 | 0.90 |
| | 3 | Supervisory duties | .18* | .20* | | | | | | | | 2.63 | 1.03 |
| | 4 | Required committee and staff meeting attendance and participation | .10* | .30* | .26* | | | | | | | 2.44 | 0.74 |
| | 5 | Required administrative paperwork completion | .10* | .17* | .24* | .42* | | | | | | 2.58 | 0.91 |
| | 6 | Communication with parents, guardians, and the community | .16* | .25* | .23* | .37* | .43* | | | | | 2.58 | 0.78 |
| | 7 | Professional development design, delivery, and participation | .08* | .28* | .15* | .43* | .29* | .33* | | | | 2.41 | 1.00 |
| | 8 | Address student behavioral issues | .07* | .13* | .22* | .27* | .30* | .39* | .20* | | | 2.56 | 0.93 |
| | 9 | Prepare for required federal, state and local assessments | .13* | .16* | .13* | .18* | .25* | .25* | .23* | .22* | | 3.19 | 1.34 |
| *Classroom Climate Dimensions for Classroom Instruction* | | | | | | | | | | | | | |
| Sufficient time and resources to support student learning | 24 | Teachers are protected from duties that interfere with their essential role of educating students | .10* | .16* | -.10* | -.12* | -.18* | -.04* | .02* | -.15* | -.03* | 2.85 | 0.79 |
| | 25 | Teachers have sufficient instructional time to meet the needs of all students | .11* | .15* | -.01* | -.06* | -.12* | -.02* | .04* | -.13* | -.05* | 2.78 | 0.79 |
| | 26 | Teachers are allowed to focus on educating students with minimal interruptions | .09* | .14* | -.03* | -.08* | -.13* | -.03* | .03* | -.20* | -.04* | 2.84 | 0.82 |
| | 27 | Class sizes are reasonable such that teachers have the time available to meet the needs of all students | .08* | .11* | -.01* | -.05* | -.07* | -.02* | .03* | -.14* | -.20* | 2.80 | 0.85 |
| High expectation and supports for delivering quality instruction | 28 | Teachers are held to high professional standards for delivering instruction | .05* | .11* | -.01* | -.03* | -.04* | .01 | .03* | .07* | .02* | 3.42 | 0.62 |
| | 29 | Leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices | .07* | .26* | .01 | .04* | -.03* | .04* | .16* | -.05* | .01 | 2.95 | 0.72 |
| A social and behavioral environment conducive to student learning in the classroom | 30 | Students follow rules of conduct | .05* | .11* | -.03* | -.08* | -.08* | -.01* | .01 | -.30* | -.02* | 2.83 | 0.72 |
| | 31 | Students at this school understand expectations for their conduct | .05* | .11* | -.02* | -.04* | -.05* | .00 | .03* | -.19* | .00 | 3.15 | 0.70 |
| | 32 | Administrators consistently enforce rules for student conduct | .05* | .14* | -.03* | -.05* | -.07* | -.00 | .06* | -.18* | -.03* | 2.95 | 0.85 |
| | 33 | Administrators support teachers' efforts to maintain discipline in the classroom | .07* | .12* | -.04* | -.08* | -.10* | -.02* | .03* | -.20* | -.03* | 3.13 | 0.78 |
| | 34 | Teachers consistently enforce rules for student conduct | -.00 | .14* | -.01* | .01 | -.03* | .04* | .07* | -.04* | .03* | 3.10 | 0.70 |
| | 35 | Student conduct policies and procedures are clearly understood by the faculty | .05* | .13* | -.02* | -.02* | -.04* | .02* | .06* | -.13* | .01 | 3.14 | 0.70 |

* $p < .01$

## Teacher Latent Classes Based on Their Leadership Activity

To answer the first research question, an iterative model-building and validating

procedure that started with a simple one-class model and progressively freed parameters to assess each $K + 1$ model based on its fit to the data. The sample size permitted more nuanced separation among classes, thus allowing more possible model solutions but also risking substantive redundancy across possible solutions due to only nuanced model differences among classes.

Results from the iterative model-building procedures showed that an eight-class LCA solution demonstrated the best statistical fit to the data (Table 4). Results from the LMR test for $K - 1$ classes indicated that the nine-class solution did not offer a significantly better fit than the eight-class solution (Akaike information criterion (AIC) = 1140535.56, Bayesian information criterion (BIC) = 1144202.81, LMR test = 1602.69, $p = .760$). Thus, each of the one- to eight-class solutions consecutively offered incrementally and significantly better fit than the $K - 1$ class solution (i.e., the six-class solution offered a better fit than the five-class solution, and the five-class solution offered better fit than the four-class solution).

**Table 4**

*Teacher Latent Class Analysis Results and Fit Indices*

| Model | AIC | BIC | LMR test for *K*-1 Classes | p-value |
|---|---|---|---|---|
| 1-class | 1225586.03 | 1225985.61 | - | - |
| 2-class | 1175807.54 | 1176615.58 | 49766.524 | $p < 0.001$ |
| 3-class | 1162049.08 | 1163265.58 | 13822.84 | $p < 0.001$ |
| 4-class | 1153932.83 | 1155557.78 | 8191.89 | $p < 0.001$ |
| **5-class** | **1150354.62** | **1152388.04** | **3662.88** | **$p < 0.001$** |
| 6-class | 1146474.47 | 1148916.34 | 3964.24 | $p < 0.001$ |
| 7-class | 1143809.54 | 1146659.88 | 2751.42 | $p < 0.001$ |
| 8-class | 1142053.00 | 1145311.79 | 1844.86 | $p < 0.001$ |
| 9-class | 1140535.56 | 1144202.81 | 1602.69 | $p = 0.760$ |
| 10-class | 1139148.87 | 1143224.58 | 1475.74 | $p = 0.865$ |

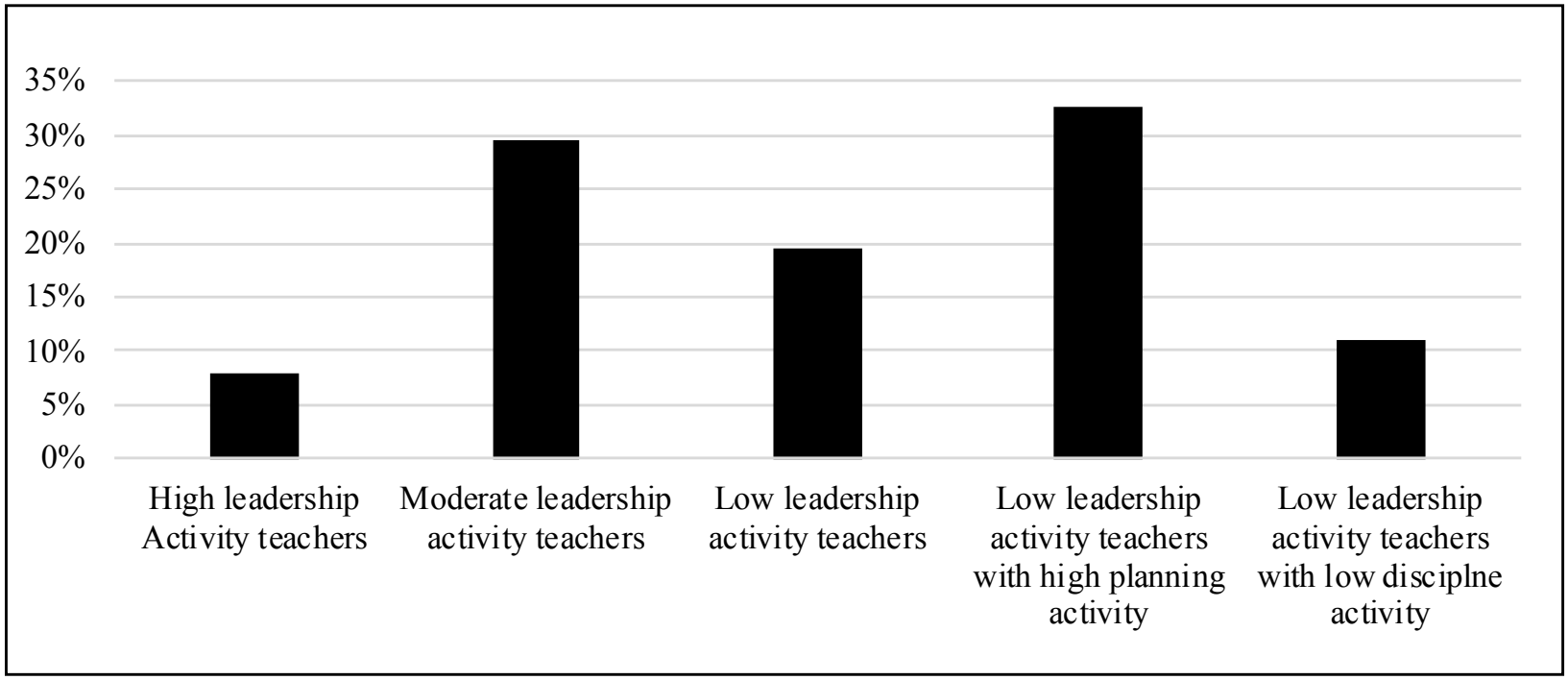
Because between-class differences only possibly reflected nuanced differences, visual inspection of classes across raw data mean scores was used to identify if there were, indeed, substantively meaningful differences across solutions. Visual inspection of the six-, seven-, and eight-class solutions showed very little substantive differentiation. Moreover, each of these classes appeared to include at least two classes that appeared largely redundant (e.g., the six-class solution had two classes that shared an almost identical pattern). Visual inspection of the three-class solution demonstrated substantial meaningful loss of interpretive information when compared to the four-class solution. Further visual inspection of the four-class solution demonstrated additional meaningful loss of interpretive information specific to the conceptualizations of interest when compared with the five-class solution. Planning variables

appeared to meaningfully contribute to class separation in the five-class solution, but much less so in the four-class solution. Thus, the five-class solution was selected for statistical and substantive reasons.

The five-class solution was the simplest statistically significant model that retained meaningful differences across varied classes. Classes in the five-class solution were named *High leadership activity teachers* (7.9%), *Moderate leadership activity teachers* (29.5%), *Low leadership activity teachers* (19.5%), *Low leadership activity teachers with high planning activity* (32.7%), and *Low leadership activity teachers with low discipline activity* (10.9%) (see Figure 6).

**Figure 6**

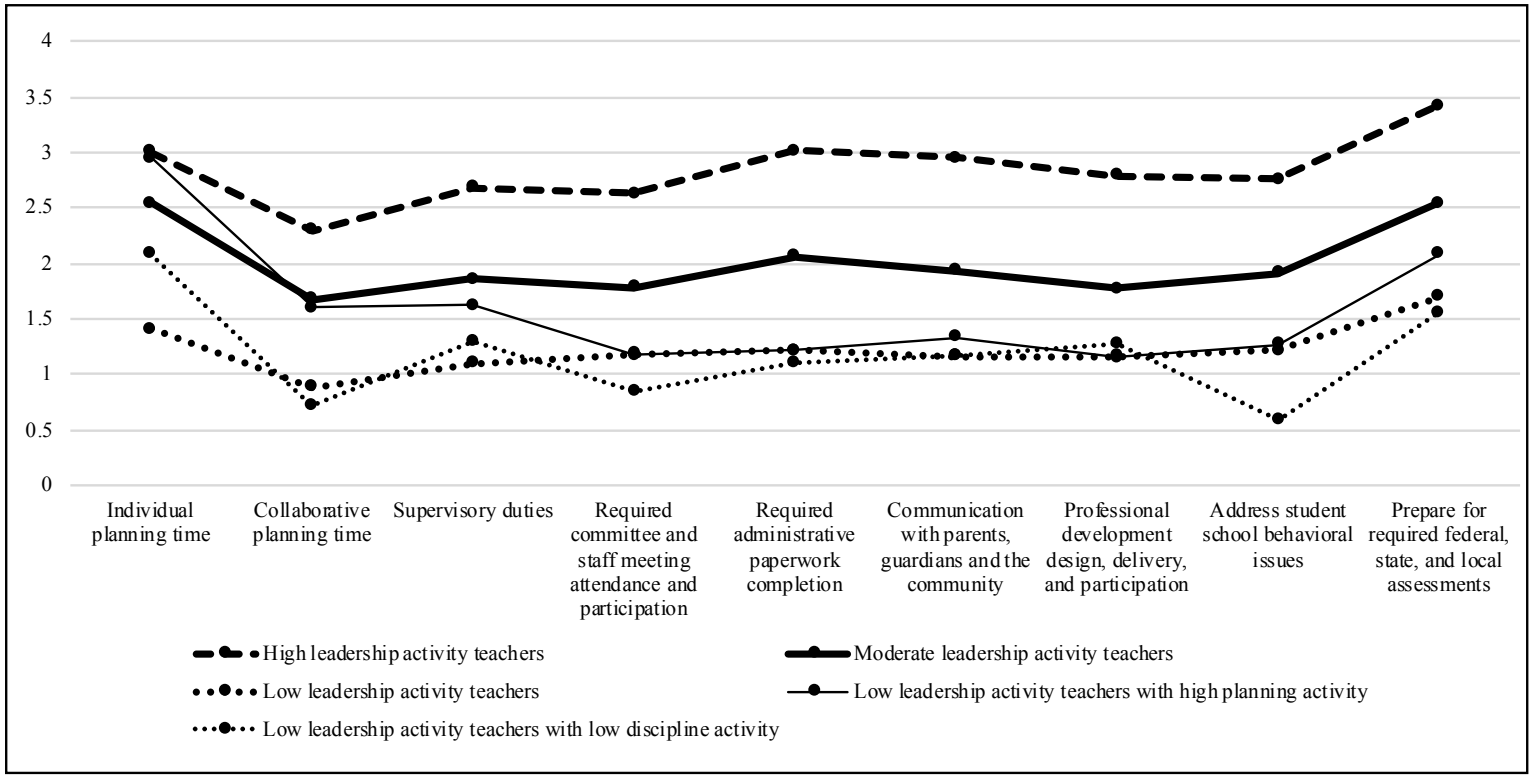
*Percentage of Respondents Assigned to Each Teacher Class*



Names were chosen based on raw mean values of reported leadership activities associated with each class (see Figure 7).

**Figure 7**

*Five Teacher Latent Classes*



The *high leadership activity teachers* class represented teachers who reported spending most time per week on all leadership activities. On average, they appeared to report spending nearly 3 to 5 hours on many leadership activities over the course of a typical week. *Moderate leadership activity teachers* represented teachers who reportedly engaged in average amounts of time each week on all leadership activities, which was between 1 and 3 hours per week on most leadership activities. *Low leadership activity teachers* represented teachers who reported fewer than one hour a week on all leadership activities. *Low leadership activity teachers with high planning activity* represented teachers who, in general reportedly engaged in similar levels of leadership activities as *low leadership activity teachers* but reported individual planning and collaborative planning closer to that of *moderate leadership activity teachers* and *high leadership activity teachers*.

**Individual Activities, Sets of Activities, Net Leadership Activity, or a Combination?**

Given that classes were most separated by the amount of time spent on leadership (Figure 7), *net leadership activity* appeared to be a meaningful conceptualization of teacher leadership activity. It appeared to account for the most teacher leadership activity variability of all three conceptualizations of teacher leadership activity. However, all leadership activities appeared to be performed by all teacher subpopulations. Given that these activities represented aspects of managerial, transformational, and instructional leadership theories, a contingent leadership theory approach may be appropriate for these results. That is, teachers appeared to perform a *set of leadership activities* associated with a contingent leadership theory approach.

Finally, subpopulations did not seem to vary by *individual activities*. However, there was evidence that individual and collaborative planning appeared to meaningfully account for

variability among subpopulations. Teachers' classified in the *low leadership activity teachers with high planning activity* class generally reported that they engaged in high relative amounts of both individual and collaborative planning. The differences across these two activities appeared to fully differentiate this class from *low leadership activity teachers*. Similarly, the student discipline leadership activity also appeared to account for differences among the *low leadership activity teachers with low discipline activity* and the *low leadership activity teachers* classes.

Given all of this evidence, there appeared to be strongest evidence for *net leadership activity* measured across a range of variables although some *individual activities* may be valuable measures as well. *Sets of leadership activities* may also be a useful conceptualization of teacher leadership insofar as the conceptualization of the set corresponds with contingent leadership theory.

**Teacher Leadership and School Climate**

Multinomial logistic regression analyses were conducted to identify associations among teacher classes and school climate dimensions that may promote teacher leadership. The *high leadership activity teachers* class was the selected reference class because it uniformly represented the teachers who reported spending the most time on leadership activities. Table 5 includes means and odds ratios of an omnibus model for teacher classes by school climate. Means were calculated for individual variables, and odds ratios were estimated from models in which all other dimensions of school climate were treated as covariates. These odds ratios demonstrate that the risk of an outcome falls in a comparison class compared to the risk of the outcome falling into the reference class following changes in the variable in question. Odds ratios greater than 1 indicate a greater risk of the respondent being classified in that particular

class as the variable response rises one unit as compared with the risk of being classified in the reference class.

**Table 5**

*Means and Relative Changes in Logged Odds for Teacher Classes by School Climate*

| *School Climate Dimensions for Teacher Leadership* | High leadership activity teachers | | Moderate leadership activity teachers | | Low leadership activity teachers | | Low leadership activity teachers with high planning activity | | Low leadership activity teachers with low discipline activity | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *OR* | *M* | *OR* | *M* | *OR* | *M* | *OR* | *M* | *OR* |
| The faculty has an effective process for making group decisions to solve problems | 2.90 | - | 2.91 | 0.97 | 2.91 | 0.98 | 3.00 | 0.93 | 2.73 | 0.77* |
| Teachers feel comfortable raising issues and concerns | 2.81 | - | 2.85 | 0.96 | 2.92 | 1.03 | 3.07 | 1.04 | 2.79 | 1.06 |
| The school improvement team provides effective leadership | 2.99 | - | 3.02 | 1.07 | 3.02 | 1.02 | 3.12 | 0.95 | 2.83 | 0.86* |
| Parents and guardians are influential decision makers in the school | 2.82 | - | 2.79 | 0.92* | 2.73 | 0.83* | 2.79 | 0.81* | 2.62 | 0.74* |
| Leadership addresses community support and involvement concerns | 3.02 | - | 3.05 | 1.00 | 3.03 | 0.95 | 3.13 | 0.98 | 2.92 | 1.04 |
| Teachers work in a safe environment | 3.24 | - | 3.27 | 1.11* | 3.30 | 1.11* | 3.40 | 1.24* | 3.27 | 1.31* |
| The procedures for teacher evaluation are consistent | 2.93 | - | 2.95 | 0.97 | 3.00 | 1.08 | 3.12 | 1.06 | 2.88 | 1.10* |
| Faculty and leadership have a shared vision | 3.03 | - | 3.07 | 1.11* | 3.09 | 1.09 | 3.19 | 1.10 | 2.96 | 1.09 |
| There is an atmosphere of trust and mutual respect | 2.87 | - | 2.92 | 1.04 | 2.99 | 1.09 | 3.13 | 1.14* | 2.86 | 1.11 |
| Leadership addresses concerns about teacher leadership | 2.98 | - | 2.99 | 0.96 | 2.98 | 0.89* | 3.09 | 0.90 | 2.83 | 0.80* |
| School leadership consistently supports teachers | 2.95 | - | 3.01 | 1.06 | 3.08 | 1.18* | 3.20 | 1.18* | 2.96 | 1.14* |
| Sufficient resources for professional development are available at the school | 3.06 | - | 3.05 | 1.11* | 2.98 | 0.98 | 3.07 | 0.99 | 2.79 | 0.87* |
| Appropriate amounts of time are provided for professional development | 3.06 | - | 3.04 | 0.96 | 2.98 | 0.91 | 3.08 | 0.99 | 2.80 | 0.83* |
| Professional development is differentiated to meet the needs of individual teachers | 2.86 | - | 2.79 | 0.86* | 2.73 | 0.86* | 2.81 | 0.76* | 2.48 | 0.75* |

*$p < .01$

According to these results, school climate appears to be associated with membership in a

different teacher class. Also, given that *net leadership activity* was a primary driver of heteroneity among classes, *net leadership activity* is likely associated with school climate.

Mean scores clearly demonstrate that teachers assigned to the *low leadership activity teachers with high planning activity* class also reported the greatest positive presence of school climate. Teachers in the *low leadership activity teachers* and *moderate leadership activity teachers* classes reported the next most positive school climate. Teachers who were assigned to extreme classes – *high leadership activity teachers* and *low leadership activity teachers with low discipline activity* reported being in schools with a less desirable school climate.

Given the nature of the omnibus model, with many variables and associated covariance structures, the odds ratios appeared to reflect more of separation amongst classes across school climate. Thus, responses associated with *teachers work in a safe environment* appeared to more clearly fall along class assignments. In contrast, responses associated with *community support and involvement* appeared to overlap much more across class assignments.

**Teacher Leadership and Classroom Climate**

In Table 6, multinomial logistic regression results on teacher leadership activity and classroom climate variables are summarized with mean scores (Figure 8 provides a corresponding visual of the same mean scores). Mean scores clearly demonstrated that teachers assigned to the *low leadership activity teachers with high planning activity* class also reported the greatest positive presence of desirable classroom climates (see Figure 8 for visual). Teachers in the *low leadership activity teachers* and *moderate leadership activity teachers* classes reported the next most positive presence of classroom climate. Teachers assigned to extreme classes—*high leadership activity teachers* and *low leadership activity teachers with low discipline*

*activity*—reported being in schools with the least desirable classroom climates.

To assess significant differences among classes regarding classroom climate, between-class pairwise post hoc means comparisons were calculated using Tukey's tests. Significant differences among means (Table 6) between classes were found regarding *teachers are protected from duties that interfere with their essential role of educating students*, $F(4, 52099) = 293.50$, $p < .001$; *teachers have sufficient instructional time to meet the needs of all students* $F(4, 52492) = 162.81$, $p < .001$; *teachers are allowed to focus on educating students with minimal interruptions* $F(4, 52642) = 228.43$, $p < .001$; *class sizes are reasonable such that teachers have the time available to meet the needs of all students* $F(4, 52758) = 111.59$, $p < .001$; *teachers are held to high professional standards for delivering instruction* $F(4, 52596) = 71.70$, $p < .001$; *leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices* $F(4, 51539) = 269.92$, $p < .001$; *students follow rules of conduct* $F(4, 52398) = 194.64$, $p < .001$; *students at this school understand expectations for their conduct* $F(4, 52372) = 84.50$, $p < .001$; *administrators consistently enforce rules for student conduct* $F(4, 52044) = 127.01$, $p < .001$; *teachers consistently enforce rules for student conduct* $F(4, 52081) = 50.21$, $p < .001$; and *student conduct policies and procedures are clearly understood by the faculty* $F(4, 52157) = 67.05$, $p < .001$.

**Table 6**

*Means for Teacher Classes by Classroom Climate*

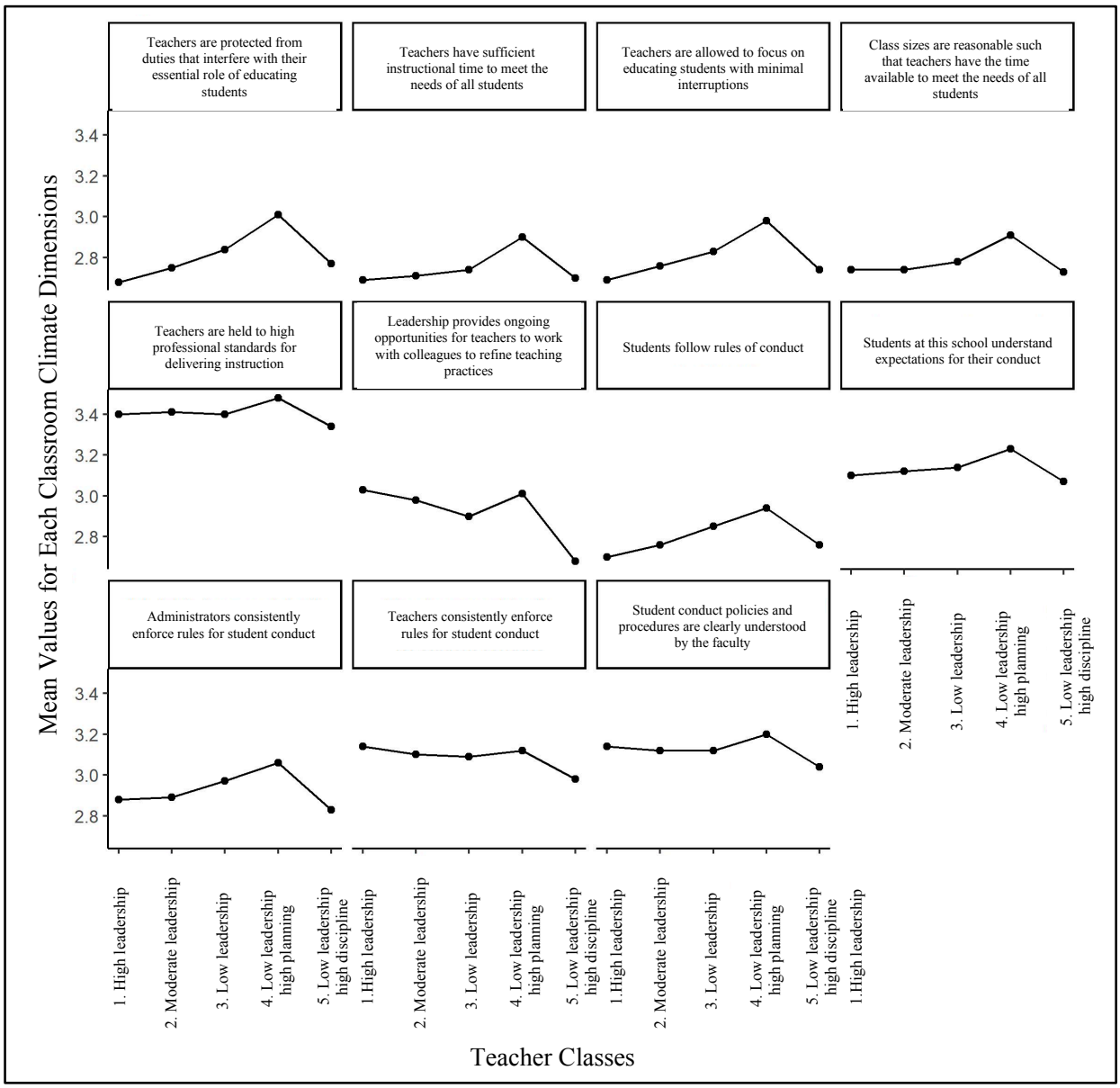
| Variables | | Teacher Class Means | | | | | Between-class Post Hoc Comparisons* |
|---|---|---|---|---|---|---|---|
| *Classroom Climate Dimensions for Classroom Instruction* | | 1 High leadership activity teachers | 2 Moderate leadership activity teachers | 3 Low leadership activity teachers | 4 Low leadership activity teachers with high planning activity | 5 Low leadership activity teachers with low discipline activity | |
| | | *Means* | *Means* | *Means* | *Means* | *Means* | |
| Sufficient time and resources to support student learning | Teachers are protected from duties that interfere with their essential role of educating students | 2.68 | 2.75 | 2.84 | 3.01 | 2.77 | 4 > 3 > 5, 2 > 1** |
| | Teachers have sufficient instructional time to meet the needs of all students | 2.69 | 2.71 | 2.74 | 2.90 | 2.70 | 4 > 3 > 2, 5, 1 |
| | Teachers are allowed to focus on educating students with minimal interruptions | 2.69 | 2.76 | 2.83 | 2.98 | 2.74 | 4 > 3 > 2 > 5, 1 |
| | Class sizes are reasonable such that teachers have the time available to meet the needs of all students | 2.74 | 2.74 | 2.78 | 2.91 | 2.73 | 4 > 3, 2, 1, 5 |
| High expectation and supports for delivering quality instruction | Teachers are held to high professional standards for delivering instruction | 3.40 | 3.41 | 3.40 | 3.48 | 3.34 | 4 > 2, 1, 3 > 5 |
| | Leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices | 3.03 | 2.98 | 2.90 | 3.01 | 2.68 | 1, 4 > 2 > 3 > 5 |
| A social and behavioral environment conducive to student learning in the classroom | Students follow rules of conduct | 2.70 | 2.76 | 2.85 | 2.94 | 2.76 | 4 > 3 > 2, 5 > 1 |
| | Students at this school understand expectations for their conduct | 3.10 | 3.12 | 3.14 | 3.23 | 3.07 | 4 > 3, 2 > 1 > 5 |
| | Administrators consistently enforce rules for student conduct | 2.88 | 2.89 | 2.97 | 3.06 | 2.83 | 4 > 3 > 2, 1 > 5 |
| | Teachers consistently enforce rules for student conduct | 3.14 | 3.10 | 3.09 | 3.12 | 2.98 | 1, 4 > 2, 3 > 5 |
| | Student conduct policies and procedures are clearly understood by the faculty | 3.14 | 3.12 | 3.12 | 3.20 | 3.04 | 4 > 1, 2, 3 > 5 |

**Post hoc comparisons (using Tukey's tests) indicate which profile means differ significantly at $p < .001$.*

*** For this variable, class 4 was greater than 3. Both 4 and 3 are greater than 5, 2 and 1. It is unclear if 5 is greater than 2, but 5 and 2 are greater than 1.*

**Figure 8**

*Visual of Means for Teacher Classes by Classroom Climate*




## Discussion

It has been noted in multiple recent systematic reviews that teacher leadership can be an important intervention to improve classroom instruction, but that the concept of teacher

leadership is still emerging (Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004). Significant gaps regarding teacher leadership measurement and evidence-based insights for enhancing or increasing teacher leadership remain (Shen, Wu, Reeves, Zheng, Ryan, & Anderson, 2020; Wenner & Campbell, 2017). In extant theory, researchers have synthesized and integrated findings from school and teacher leadership literature into a teacher leadership process with set of five conceptual components and the relationships among them. Teacher leadership activities (i.e., teacher leadership itself) is a central conceptual part of this process, and gaps remain in differentiating among the different ways to conceptualize teacher leadership activities and assessing their relative ability to capture meaningful sources of variability within a broader teacher leadership process. Consequently, data collection is likely not as refined and may be messier (i.e., dependent and collinear). Clearer measurement would sharpen the fields' collective understanding of teacher leadership functioning. In turn, research might more deftly inform teacher leadership interventions.

These gaps were investigated in the current study. Latent class analyses (LCA) were used to explore variability within teacher leadership activities and identify a primary source or sources of variability. Results clearly demonstrated one primary source of variability within teacher leadership activity and clearly differentiated among teachers based most on this source of variability. Five subpopulations of teachers (*high leadership activity teachers*, *moderate leadership activity teachers*, *low leadership activity teachers*, *low leadership activity teachers with high planning activity*, and *low leadership activity teachers with low discipline activity*) were modeled based on their self-reports of the time they spent engaging in personal leadership activities. This was the first result in teacher leadership literature to demonstrate latent teacher subpopulations.

The subpopulations, also referred to as classes, were named based on substantive differences among the classes that corresponded to classes' *net leadership activity*. Teachers classified into the *high leadership activity teachers* class were teachers who, on average, spent more time per week performing leadership activities (i.e., between 1 and 3 hours per week and, in some cases, between 3 and 5 hours per week on all 9 measured leadership activities). In contrast, *low leadership activity teachers* spent relatively little time per week performing leadership activities (i.e., between 0 and 1 hours per week on all 9 leadership activities). A majority (roughly 60%) of teachers were classified into either the *moderate leadership activity teachers* or the *low leadership activity teachers with high planning activity* classes (i.e., generally less than 3 hours a week on the 9 measured leadership variables). These behaviors could possibly be performed concurrently, so specific total hours for each of these classes could not be calculated given the structure of the survey responses. For example, teachers likely engaged in collaborative planning while attending and participating in required staff and committee meetings.

**Individual Activities, Sets of Activities, Net Leadership Activity, or a Combination?**

These analyses investigated three possible conceptualizations of teacher leadership activity as primary sources of variability. Each property was derived from the literature on school and teacher leadership. *Net leadership activity* showed clear functioning as a primary source of variability relative to the other two conceptualizations, *salient individual activities* and *sets of activities* (see Figure 7). As this result suggests, while teachers perform a range of leadership activities, they differ most by the amount of time they spend on those activities. This study was first to find this primary source of variability in a teacher sample and corroborates.

However, unlike decades of previous results, there was limited evidence of the importance of *single leadership activities* in addition to *net leadership activity*. Extant evidence seems to suggest that particular activities largely account for meaningful variability in understanding teacher leadership activities. For example, *communication with parents and community members* was reported as an influential teacher leadership activity (Fairman & Mackenzie, 2015). However, *individual activities* did not account for most of the variability in these results. Instead, only two activities, *individual* and *collective planning*, relatively accounted for some variability. The *low leadership activity teachers with high planning activity* class was specifically named for this observed phenomenon. Teachers in this subpopulation generally reported spending little time on seven of the measured leadership activities, but high amounts of time on the two activities, *individual* and *collaborative planning*. Thus, individual activities may be important, but secondarily important behind *net leadership activity*. *Individual* and *collaborative planning* might be two meaningful activities among a range of possibilities not included in the dataset analyzed by this study.

There was questionable evidence that *sets of activities* were meaningful, despite decades of research promoting subsets of influential leadership activities based on different leadership philosophies (Gumus et al., 2018). Associated theories include transformational leadership theory, instructional leadership theory, managerial leadership theory, moral leadership theory, and authentic leadership theory. In each of these, a different set of activities are emphasized, all of which were prominent in different decades. The nine measured activities in this study each aligned with at least one of these theories. *Planning* and *administrative paperwork* activities reflected tasks and thus aligned with managerial leadership theory. *Supervisory duties* and *preparation for required assessments* emphasized influencing instruction and thus aligned with

instructional leadership theory. *Professional development* and *communication with parents and community members* emphasized building capacity and thus aligned with transformational leadership theory. Despite overwhelming numbers of studies that argue the import of these approaches and that they have been implemented through training programs over decades (Gumus et al., 2018), no variable subsets meaningfully accounted for variance in relation to teacher leadership activity. These subsets of activities do not reflect variability in contemporary practice as well as overall *net leadership activity*.

Contingent leadership theory appears to align with this result. This theory suggests that effective leaders employ a range of activities across multiple philosophies. Teachers in all classes generally reported engaging in all nine leadership activities in these results. As these nine activities are a small subset of possible leadership variables, the generalizability of these results is limited for making a claim that a contingent leadership approach is an applicable descriptor of contemporary teacher leadership practice. Instead, results merely appeared to suggest the usefulness of a range of leadership activities and also that individual teachers engage in a range of activities.

**Teacher Leadership and School Climate**

Logistic regression was used in this study to identify relationships among modeled classes and dimensions of school climate that promote teacher leadership. The relative magnitude and direction of these regression results were used to evaluate the conceptual value of the primary source of variability, *net leadership activity*. The teacher leadership literature, to date, does not link school climate with teacher subpopulations based on their leadership activity. Instead, literature generally links climate dimensions that enable or constrain discrete leadership

activities in schools with leadership activities. School climate has been the most dominant dimensions consistently linked with teacher leadership (Fullan, 2001; Harris, 2014). This study is first to directly link these dimensions with teacher subpopulations aligned with the primary source of variability of *net leadership activity*. Given this connection, *net leadership activity* appeared to be both technically and substantively meaningful.

Substantively, it was found that the presence of desirable school climates were most strongly and positively associated with *low leadership activity teachers with high planning activity*. Both *low leadership activity teachers* and *moderate leadership activity teachers* classes shared less strong and positive associations with desirable school climates. *High leadership activity teachers* and *low leadership activity teachers with low discipline activity* classes shared the least strong relationships with desirable school climates. This generally suggests that less individual teacher leadership, with significant time spent on planning, appeared to more strongly associate with desirable climates dimensions. This finding stands in contrast with reviews of relations among these constructs (Nguyen et al., 2019; Wenner & Campbell, 2017) that consistently describe positive linear relationships between school climate and the presence of teacher leadership. Instead, these results suggested that more climate supports for teacher leadership lead to teachers who perform modest amounts of teacher leadership over the course of a week but do spend more time on both individual and collective planning. *Net leadership activity* appears to be a meaningful source of variability within teacher leadership activities in context of a broader teacher leadership process. However, the behavior of *net leadership activity* variability in relation to proximal constructs (e.g., school climate for teacher leadership) appear to be nonlinear.

**Teacher Leadership and Classroom Climate**

To additionally evaluate the meaningfulness of *net leadership activity* as a source of variability, logistic regression was used in this study to identify relations among modeled classes and dimensions of classroom climate known to support classroom instruction. In recent systematic reviews (Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017), few quantitative studies reported links between teacher leadership and classroom climate (Sebastian et al., 2016; Supovitz et al., 2010; Yost et al., 2009). In these studies, teacher leadership is consistently linked with improved instruction through three climate dimensions: sufficient time and resources to support students' learning, high expectations and supports for delivering quality instruction, and a social and behavioral environment conducive to student learning in the classroom. In this study, interpretable evidence of these relationships was found, further corroborating this link but specifying the link more precisely between teacher leadership activity (conceptualized most clearly by *net leadership activity*) and classroom climate. Moreover, these associations provided additional evidence that *net leadership activity*, as a key source of variability, is both technically and substantively meaningful.

Substantively, trends (see Table 7 and Figure 8) largely followed those observed among school climate and teacher leadership activity. In general, the *low leadership activity teachers with planning activity* class shared the most positive associations with classroom climate. Figure 8 visually shows this consistent relationship across all but one of the climate dimensions. Generally, *low leadership activity teachers* and *moderate leadership activity teachers* classes shared moderate relationships with classroom climate, and both *high leadership activity teachers* and *low leadership activity teachers with low discipline activity* classes shared the least strongest

relationships. These results suggest that low to moderate enactment of teacher leadership activity by a particular teacher most clearly associate with desirable classroom climates. This result clearly nuances existing findings that suggest a linear relationship between teacher leadership and classroom climate (Sebastian et al., 2016; Wenner & Campbell, 2017). Instead, teacher leadership activity associated most closely with *low leadership activity with high planning activity* class leadership activity patterns appears to most strongly associate desired classroom climates. Extreme amounts of leadership—extremely high and extremely low—appeared to be less associated with desired outcomes.

**Implications for Practice**

The results of the current study have implications for practitioners. First, it appeared that most teachers regularly engage in some leadership activity. Therefore, *all* teachers may benefit from professional development that enhances their ability to effectively perform these leadership activities rather than just those teachers formally designated to lead. Nevertheless, teachers appear to lead in a nonhomogeneous fashion. The heterogeneity in teacher leadership and these differences were associated with school-level climate. Professional development could be better suited for differences among individual teachers and their contexts so that individuated support is available.

Teacher leadership, however, is not a linear construct, meaning that the relationship between teacher leadership frequency and desired outcomes is not linear. Instead, it appears that lower levels of teacher leadership activity, with more time spent on individual and collective planning, is associated with the most positive classroom climates. At schools where there is a general target for the time teachers spend on leadership, that aim could be shifted to

characteristics most similar to those that align with the *low leadership activity teachers with high planning activity* class modeled in this study.

If producing different forms of teacher leadership is a goal set in a school, school leaders should be aware that a greater presence of desirable school climates for teacher leadership tend to co-occur with lower frequencies of general teacher leadership activity and higher frequencies of individual and collective planning activity. That is, more desirable school climates tend to be related to subpopulations of teachers who report generally engaging in lower frequencies of teacher leadership activity but higher frequencies of planning activity. If school leaders wish to evaluate the success of climate interventions for teacher leadership, they should recognize that better outcomes do not necessarily reflect the highest levels of teacher leadership. Instead, more ideal outcomes are reflective of lower amounts of teacher leadership activity with higher planning activity.

Individual *high leadership activity teachers*, accounting for less than 10% of all teachers in the sample, did not appear to be strongly associated with desirable classroom climates. The only outcome condition clearly associated with more *net leadership activity* was that school leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices. It may be that teachers classified in the *high leadership activity teachers* class work to bring about more instructional supports, or perhaps other contextual variables explain this relationship. School leaders might examine their broader school faculty to understand relationships among teacher leadership influence and school-level outcomes as reliance on a single teacher to make school-level changes appears to be an unreasonable expectation.

**Implications for Theory and Measurement**

Primary sources of variability in teacher leadership activity were sought in this study to inform theory and measurement in teacher leadership research. Overall *net leadership activity* was identified as a conceptualization of teacher leadership activity that functioned as a primary source of variability within a broader teacher leadership process. *Individual leadership activities* appeared to be a conceptualization of teacher leadership activity that functioned as a modest source of variability insofar as individual and collective planning are considered. Other individual activities did not appear to meaningfully account for variability. Both of these conceptualizations functioned as sources of variability and proved substantively meaningful through relationships with school and classroom climate and should be considered when operationalizing teacher leadership activity.

Theoretical implications can be drawn from results of this study. First, teacher leadership activity could meaningfully be conceptualized as *overall net leadership activity* given evidence that *net leadership activity* overwhelmingly appeared to account of teacher leadership activity in relation to other constructs in the teacher leadership process. Second, teacher leadership activity shares nonlinear relations with school and classroom climate. Low teacher leadership activity with high planning activity was most strongly associated with meaningful dimensions of school climate, not outstanding high or low amounts of teacher leadership. Thus, in the conceptual framework for teacher leadership (York-Barr & Duke, 2004), the means teachers use to influence their schools might be meaningfully specified as *overall net leadership activity*. In addition, the means teachers use to influence their schools appears to be best specified as a nonlinear construct.

To operationalize and measure teacher leadership activity, measurement may be enhanced with a focus on *net leadership activity* given that this was a primary source of

variability. A simple measure would be a direct inquiry into the amount of time teachers spend on leadership activity each week, but clearly defining the activities considered "teacher leadership." Measurement could also be designed to probe individual activities, given evidence that some activities meaningfully accounted for variability. Those activities measured in this study proved to be useful, but additional activities could be considered.

**Limitations**

Cross-sectional data were used in this study and were not designed to identify causal relationships among teacher leadership activity, school climate, and classroom climate. Instead, assumed relations among variables were drawn from a conceptual framework that was formulated following a systematic review of studies that assessed directionality among teacher leadership constructs (York-Barr & Duke, 2004). Longitudinal designs might be able to discern causation among those variables specifically used in this study, and now evidence suggests important conceptualizations to measure in such designs. Nevertheless, the amount of time it takes for each of these constructs to bring about changes in theoretically related constructs is unclear. Future researchers could attempt to document changes over time before further clarifying and designing investigations into causation.

This study was an examination of the co-occurrence of individual-level phenomena with school-level phenomena. School-level analyses of school-level faculty leadership activity and school-level climate might make for a more conceptually direct analysis. Similarly, individual-level analyses of individual level teacher leadership activity and individual perceptions of more mirco group dynamics and relational quality might make for a conceptually more direct analysis.

Other features of the study design limited generalizability. The sample was large, with a

response and completion rate exceeding 80%. However, the secondary dataset included limited information that could be used to account for or eliminate sampling bias. Regions and school size were checked as sources of bias using multiple-group mean comparisons, but conflicting information from different datasets about defining characteristics of regions and school size rendered analyses somewhat inconclusive. The generalizability of these results was unclear.

The data, which were self-reported and measured a limited set of constructs, were also limited to that collected via the TELL survey. Teachers' self-reports have been shown to lack external validity (Smylie & Denny, 1990), yet teachers' reports of the activities in which they engage may be a better metric than the things they believe they should do as it relates to describing teacher leadership and the way it happens (Wenner & Campbell, 2017; York-Barr & Duke, 2004). *Net leadership activity* appeared to be a meaningful conceptualization of teacher leadership activity, and *sets of leadership activities* did not appear to function as a meaningful source of variability for conceptualizing teacher leadership activity in context of a teacher leadership process. Yet, a broader set of leadership activity items may demonstrate that sets of leadership behaviors aligned with leadership philosophies do appear to meaningfully account for differences among subpopulations of teachers. Only nine leadership variables were used in this study to find evidence of each property and more variables could have been used to strengthen inferences made from this finding.

Finally, future researchers might investigate broader contextual factors that may account for more variation in the teacher leadership process. Teachers might lead differently based on broader community or socioeconomic resources, social and behavioral norms and structures at the school, or other structural explanations. Similarly, teacher leadership may be a less powerful explanatory construct than power generally shared at the school. Schools where parents,

community members, staff, and even students share power in particular ways may more meaningfully bring about improvements in classroom instructional quality.

## Conclusion

Teacher leadership is becoming increasingly more common in K–12 public schools across the United States (Nguyen et al., 2019); however, key conceptual questions remain that also have implications for measurement. Three proposed conceptualizations of the activities teachers use to influence their schools were investigated in the current study, and overall *net leadership activity* was found to best capture the variability associated with teacher leadership activities.

Moreover, considering that teacher leadership is increasingly viewed as an effective intervention to improve classroom instruction, researchers and policymakers are calling for more teacher leadership. Results of the current study suggest that individual teachers who spend a lot of time on a range of leadership activities every week may not be the most ideal for the school. Instead, those teachers spending between zero and one hour per week on most leadership activities but between three and five hours per week on individual and collective planning reported that their schools had classroom climates that were best for supporting quality classroom instruction. More detailed investigation is needed to deepen our understanding of the way results of the current study are related to the broader teacher leadership process. In particular, school-level analyses on faculty leadership contributions would be helpful to contextualize these results.

# CHAPTER IV

## MAPPING AND MEASURING RELATIONS BETWEEN FACULTY AND THE CONDITIONS WITHIN WHICH THEY TEACH: A LATENT PROFILE ANALYSIS

Students in the United States consistently underperform in math and science as compared to students from Japan, South Korea, and Finland, and these differences are particularly pronounced for racially and socioeconomically minoritized U.S. students (Wolff et al., 2014). Multitudes of school reform efforts are underway to improve students' learning experiences so that all students have the support they need to be successful (Berube, 1994; Gross & Shapiro, 2015). Leadership efforts made by faculty (a school's collective teaching staff) can be an important intervention for improving student learning as teacher leadership indirectly impacts student learning through influencing the conditions within which instruction and learning occurs (Sebastian et al., 2016; Supovitz et al., 2010; Yost et al., 2009).

Yet, relationships between faculty leadership influence and the conditions in which faculty teach may be influenced by teachers' leadership activity and the school conditions that enable or constrain faculty leadership (Gardella, 2022). To date, these relationships remain largely unexplored in the literature. Three conceptualizations of the means faculty leaders use to influence their schools are examined in the current study in context of a latent profile analysis, and relations among subpopulations of school faculties with both (1) school climate and (2) classroom climate are assessed in this study.

**Faculty Leadership Definition**

As Nguyen et al. (2019) acknowledge, teacher leaders "lead within and beyond" the classroom, and York-Barr and Duke (2004) further describe teacher leadership as an individual and collective process by which teachers wield influence on people and other aspects of their school for the purpose of advancing student learning and development. Faculty leadership refers to a school's collective teacher leadership contribution or perception of collective teacher involvement in leadership. The faculty leadership process refers to an organization-level perspective of the teacher leadership process although faculty leadership has been investigated in very few studies (e.g., Angelle & Teague, 2014).

One reason for the low number of studies of faculty leadership may be that both the concept and the practice of teacher leadership has seen rapid change and expansion in U.S. schools over the past three decades (Gronn, 2010; Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004). In the past, teacher leadership typically referred to a few teachers engaging in designated leadership roles. Research has typically been focused on these few teachers (York-Barr & Duke, 2004), not on the leadership contributions of teachers not formally designated as leaders.

As the definition of teacher leadership has expanded over time, it now includes leadership occurring outside of designated leadership roles in recognition of more teachers leading (Wenner & Campbell, 2017). By 2010, various studies reported that many teachers engaged in leadership activities. In a Metlife (2013) study of 1000 teachers weighted to reflect a national population (across gender, region, school type, school location, and years of teaching experience), approximately 51% of teachers reported performing leadership activities. In a 2013 study involving over 60,000 teachers in a southeastern state, 98% of the teachers reportedly engaged in

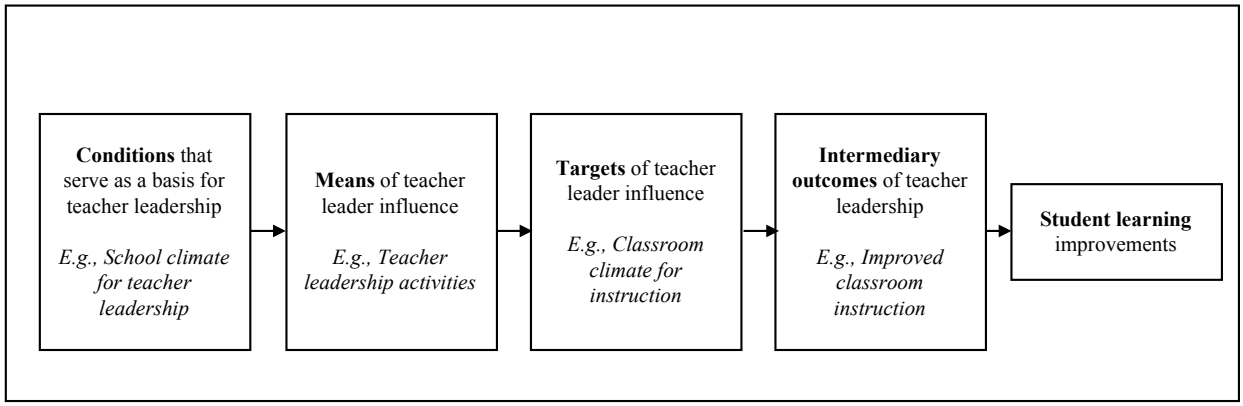
at least one of nine common leadership activities each week (Gardella, 2022). Although definitions of leadership and associated counts of how many teachers lead vary widely, these counts that show a lot of teachers lead justify focus on collective faculty leadership contributions. Moreover, these changes in teacher leadership give rise to questions about the ways in which teacher leadership results might extend to faculty leadership.

## Faculty Leadership and Student Learning

Rigorous quantitative research shows a consistent, indirect association between school leadership and student learning (see Gumus et al., 2018). A smaller set of quantitative studies show similar results for teachers (i.e., Sebastian, et al., 2016; Supovitz, et al., 2010; Yost et al., 2009). These studies collectively link teacher leadership to improvements in student learning outcomes through influencing classroom climates that promote quality classroom instruction. Quality classroom instruction, in turn, facilitates student learning. York-Barr and Duke (2004) offer an organizing conceptual framework for a teacher leadership process that links teacher leadership, intermediary constructs, and student learning outcomes (Figure 9).

**Figure 9**

*Summary of York-Barr & Duke (2004) Conceptual Framework for Teacher Leadership*



In this framework, the means teachers use to influence their schools (i.e., teacher leadership activities) are targeted at particular people (e.g., teachers), groups (e.g., professional learning communities), or organizational structures (e.g., classroom climate). Work with and at these targets produce the intermediary outcomes (e.g., classroom climate conditions that support quality classroom instruction) that can associate with improved quality of classroom instruction. The performance of those means (i.e., teacher leadership activities) are influenced by conditions that promote teacher leadership (e.g., school climate).

This framework remains underdeveloped in some key ways. To date, only one study (Gardella, 2022) has investigated how to conceptualize and then operationalize teacher leadership activity, a central component of the teacher leadership process. In addition, Gardella (2022) is the only study to have investigated relations among teacher leadership activity and both school climate and classroom climate. Yet, the relationships between these constructs have not been assessed at the faculty level, only among teachers at an individual level. Although teachers' leadership activities appear to be linked to both (1) school climate and (2) classroom climate (Gardella, 2022), it is unclear if those same connections would be produced when exploring faculty leadership activity with organizational climate. In turn, clearer specification of these relationships might help concretize this conceptual framework for use in teacher leadership research.

Teacher leadership largely remains *atheoretical* in part because there is no clear, well-specified organizing conceptual framework for researchers to use (Nguyen et al., 2019; Schott, van Roekel, & Tummers, 2020; Wenner & Campbell, 2017; York-Barr & Duke, 2004). Instead, the conceptual framework for teacher leadership (York-Barr & Duke, 2004) remains the most promising relevant framework in need of further conceptual development regarding its core

constructs. In its developing state, it has been used in two studies (Fairman & Mackenzie, 2012; Gardella, 2022) to date. Clearer specifications of constructs and relationships among these constructs may enhance its applicability to more investigations, including faculty leadership research.

**Three Conceptualizations of Faculty Leadership Activity**

York-Barr & Duke (2004) summarize evidence on multiple meaningful parts of the means teachers use to influence their school, and report that some are more strongly associated with desired outcomes than others. The other individuals with whom teachers share power are an important but secondary part (see Bush & Glover, 2003; Robinson et al., 2008). Instead, the activities in which teachers engage to influence others at their school (e.g., providing input on the school's budget) are stronger and more consistent predictors of desired outcomes (Marks & Printy, 2003; Robinson et al., 2008). Given that teachers engage in these actions and that teachers form school faculties, this assertion is directly relevant to conceptualizing faculty leadership.

However, the direct translation of what we know about teacher leadership activities to faculty leadership activity remains unclear. In part, this is because there is no definitive evidence of teacher leadership activities and ways to meaningfully operationalize these activities to quantify their relationships with desired outcomes. No taxonomy of meaningful teacher leadership activities exists, despite evidence from case studies suggesting a number of activities in which teachers enact. For example, teachers are known to make decisions about educational issues, including selecting instructional materials and resources, devising teaching techniques, and setting assessment practices (Cassata & Allensworth, 2021). Poekert (2012) documents that teachers develop professional development for other teachers and school improvement. Teachers

also establish student disciplinary procedures (Ngang & Abdullah, 2015), engage in managerial tasks like providing budgeting input (Urick, 2012), and aid in the selection of new teachers (Urick, 2012). No studies directly compare the relative frequencies these activities are performed or the comparative influence of activities on outcomes of interest. No study comprehensively captures all activities teachers might possibly perform during a typical work week.

Instead, systematic reviews (Nguyen et al., 2019; Wenner & Campbell, 2017) attempt to scope leadership activities as relevant to teachers or not relevant to teachers by documenting a set of five common goals that teachers tend to try and bring about. The use these goals as guides to define those leadership activities that might be relevant to teachers or not. These five goals include communicating and setting the school vision and mission to direct general activities; understanding people and promoting professional growth; designing and implementing change in an organization and building a sense of community; coordinating instructional and learning programs across the school; and participating in school decision-making. Thus, extant evidence suggests that those teacher leadership activities that might be relevant to assess at the faculty level are likely leadership activities that align with one or more of these goals. Recent analyses (Gardella, 2022) help clarify how to conceptualize and possibly meaningfully quantify these teacher leadership activities, but no study has assessed how best to meaningfully quantify these activities at the faculty level.

Gardella (2022) drew from decades of teacher leadership literature findings that suggested three conceptualizations of teacher leadership activities may be particularly meaningful for operationalizing and measuring teacher leadership activities in research: *individual leadership activities*, *sets of activities*, and *overall net time spent on leadership activity*. As previously mentioned, a wide body of evidence suggests numerous *activities* that

teachers could enact that are also linked with outcomes of interest. This conceptualization of teacher leadership activity suggests that measuring particular leadership activities capture the most variability when it comes to measuring teacher leadership activity. Separately, a well-established leadership literature (see Gumus et al., 2018 for review) suggests *sets of leadership activities* that could have the most ideal influence on a school. These sets align with multiple school leadership theories each that emphasize a particular leadership philosophy of what activities have the greatest influence on a school. These theories include: transformational leadership (activities that transform others through motivation, professional development, or other capacity building are most important), instructional leadership (the most influential activities are those that focus directly on improving instruction), shared instructional leadership (important activities focus on improving instruction while also transforming others), managerial leadership (the most important activities increase organizational functioning and efficiency), moral leadership (the most important activities focus on transforming others through building capacity in ethical, moral ways), and contingent leadership (the most effective leaders engage in a range of behaviors aligned with more than one of these approaches at a time). Finally, in a recent study (Urick, 2012), the *net amount of time* principals spent on leadership activities appeared to be a meaningful property for operationalizing leadership activity at schools.

Gardella, (2022) assessed the relative ability of each of these three conceptualizations to account for observed variability associated with teacher leadership activity and determined that the *net amount of time* proved to overwhelmingly account for the most observed variability associated with teacher leadership activity. Yet taken together, the applicability of these findings to faculty leadership is not clear. For one, particular salient *leadership activities* may be a less salient source of variability in models that link individual teacher actions with impacts on school-

level teaching conditions. If a collective faculty, however, performs that *individual leadership activity*, that activity may suddenly account for much more variability in associations with teaching conditions at a school.

**Faculty Leadership and School Climate**

In multiple systematic reviews of teacher leadership (Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017), the empirical attention given to aspects of school climate that promote teacher leadership is emphasized. However, these reviews also emphasize an absence of relevant organizing and integrative frameworks that specify associations between these constructs. This result suggests that school climate is widely recognized as important to study because it can enhance the presence and influence of teacher leadership; however, there is no clear, organized indication of which school climate dimensions are more strongly linked to the possible forms of teacher leadership. No meta-analyses or systematic reviews offer evaluations of the relative magnitude and direction of these relationships with any aspects of teacher or faculty leadership. More information on these relationships could inform translations of research to practice that aim to enhance teacher leadership in schools.

Instead, the literature collectively offers an array of possible school climate dimensions empirically supported by discrete studies, often with case study designs. Multiple systematic reviews (Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004) summarize more commonly found relevant dimensions of school climate including (1) a shared school-wide perception of teacher leadership as an established norm (Chews & Andrews, 2010; Gardella, 2022; Muijs & Harris, 2006); (2) teachers' sustained focus on professional learning (Gardella, 2022; Katzenmeyer & Moller, 2002); (3) a shared school-wide vision of improving instruction

and learning (Gardella, 2022; Ghamrawi, 2010; Hargreaves, 2010); and (4) a collective desire to empower teachers as leaders (Gardella, 2022; Ghamrawi, 2010). Associations among these dimensions and the presence of teacher leadership activity have been established (Gardella, 2022), but specific links to faculty level leadership activity have not.

### Faculty Leadership and Classroom Climate

Relationships among faculty leadership and classroom climate are largely absent in teacher leadership literature (Nguyen et al., 2019). Instead, a small but growing body of evidence, links teacher leadership with classroom climates that support classroom instruction (Gardella, 2022; Sebastian & Allensworth, 2012; Supovitz et al., 2010; Vandevoort & Berliner, 2004). These studies link particular teachers who engage in leadership activities, particular teacher leadership activities, or general perceptions of if teachers contribute to school decision-making with at least three organizational climate dimensions: sufficient time and resources to support student learning, high expectations and support for quality instruction, and a social and behavioral environment conducive to student learning. In addition, several of these studies (Sebastian & Allensworth, 2012; Supovitz et al., 2010; Vandevoort & Berliner, 2004) reported significant mediational models in which the presence of teacher leadership in a school was linked with improvements in student learning through changes in classroom instruction. However, aside from variability in the presence or absence of teacher leadership at a school, none of these studies show links between different forms of faculty leadership with classroom climate. As a result, the literature lacks clear details about the relationships among these constructs and if insights from teacher-level results might apply directly to faculty-level phenomenon.

**Relevant Prior Research**

No randomized control trials have been conducted to assess associations between faculty leadership activity and (1) school climates and (2) classroom climates. No meta-analyses have been used to aggregate associated effect sizes, and no quasi-experimental studies have been used to assess these relationships. Despite a teacher leadership conceptual framework (York-Barr & Duke, 2004) that connects these three variable sets, there are few, if any, descriptive or analytic studies in which all three sets were considered.

Gardella (2022; Chapter 3 of this dissertation) offers the most applicable study designed to determine relationships among all three of these variables. Though, it operationalized teachers' leadership activity at the individual teacher level and operationalized both sets of climate as individual-level perceptions of school-level phenomena. Data from the 2012–2013 Teaching Empowerment, Leading and Learning (TELL) Survey were used; this survey was administered to teachers at approximately 1,700 schools. The conceptual framework for teacher leadership established by York-Barr and Duke (2004) guided the analysis design. Five subpopulations of teachers were identified in the study based on the amount of time they reportedly spent on nine leadership activities.

These subpopulations were labeled according to the conceptualization of teacher leadership activity that accounted for the most variability associated with teacher leadership activity: *the net amount of time* they spent on leadership activity. The subpopulation, or class, of teachers that spent the most time on leadership activity was called *high leadership activity teachers*, and the subpopulation that reportedly spent the least time engaged in leadership activity was the *low leadership activity teachers* class. Teachers classified as *high leadership activity teachers* reported, on average, spending between 3 and 5 hours a week on all nine leadership

activities. Teachers classified as *low leader activity teachers* reported an average of between 1 and 3 hours a week across all nine leadership activities.

One other conceptualization of teacher leadership activity accounted for some observed variability: *salient individual activities*. *Planning*, both *individually* and *collaboratively*, differentiated the *low leadership activity teachers* class from the *low leadership activity teachers with high planning activity* class. Teachers classified in the *low leadership activity teachers with high planning activity* class reported, on average performing between 1 and 3 hours a week across all leadership activities except for *individual* and *collaborative* planning. For those planning activities, these teachers tended to perform between 3 and 5 hours per week. Yet, because only a subsample of leadership activities was used in this study, these results simply suggest that *salient individual activities* may be one conceptualization of teacher leadership activity that meaningfully accounts for variability within the teacher leadership process. Other salient leadership activities could also be important than those associated with planning.

Results also linked classes with both (1) school climate and (2) classroom climate. A nonlinear relationship was observed between teacher leadership activities and both sets of climate such that both extremes – high leadership activity and low leadership activity – shared the least strong and positive relationships with climate. Instead, teachers classified in the *low leadership activity teachers with high planning activity* class consistently reported being in schools with the greatest presence of desirable school and classroom climates. Teachers in the *moderate leadership activity teachers* class tended to report the next greatest presence of desirable climates. Together these results suggested that teacher leadership activity in the form of low activity leadership teachers with high planning activity appeared to be the most desirable form of teacher leadership. It is unclear if and how this finding extends to the faculty level.

This study (Gardella, 2022; Chapter 3 of this dissertation) offers the closest approximation to the current study as the same constructs, but at the individual-teacher level, were assessed. Study results cannot be directly translated to faculty-level leadership and school-level outcomes. No study, to date, offers an assessment of these relationships at the faculty and school levels.

## The Present Study

Gaps remain in the conceptualization of the relationships between a faculty's leadership activity and both (1) school climate and (2) classroom climate. This study was informed by Gardella (2022; presented in Chapter 3 of this dissertation) and York-Barr and Duke's (2004) conceptual framework for teacher leadership as the goal was an investigation of possible primary sources of variability among faculty leadership activities. Evidence of variability for three possible conceptualizations of faculty leadership activities were sought, and the meaningfulness of each conceptualization was explored. Three core research questions guided this inquiry:

(1) *To what degree are faculty involved in faculty leadership?*

(2) *Are there subpopulations of faculty based on the schools' reliance on faculty to perform leadership activities? And if so, which conceptualizations of those activities drives heterogeneity among faculty subpopulations?*

(3) *What are associations among faculty subpopulations and school climate?*

(4) *What are associations among faculty subpopulations and classroom climate?*

## Methods

**Sample**

A statewide sample of 1,532 schools from the 2012–2013 Teaching, Empowerment, Leading and Learning (TELL) Survey administered by the Tennessee Department of Education and the New Teacher Center was used in the current study. This survey was designed to provide state and district leaders with data to inform school improvement efforts. The 2012–2013 TELL survey also offered unique access to statewide data that represents an array of teacher leadership activities, leadership philosophies, dimensions of school climate that promote teacher leadership, and classroom climate dimensions that support instruction. Moreover, TELL survey response option permitted investigation of a third property, overall volume of leadership activity, which was operationalized as perceived reliance on faculty to perform activities.

Schools were the primary sampling unit in this dataset, and teachers within these schools completed the surveys. There are approximately 1,700 public schools across 147 rural, suburban, and urban districts in Tennessee, the state is home to six mid- to large-sized districts (i.e., Nashville, Memphis, Knoxville, Chattanooga, Clarksville, Murfreesboro). The remaining districts include a mixture of suburban areas, small cities, and rural districts. According to Cornman (2016), the state spent $8,208 per pupil in 2013, which ranked at 46 of 50 in terms of the highest amount across the U.S. In 2012–2013, Tennessee has a student population with more Caucasian (66.29%) and African American (23.03%) students than the national averages of 51.04% and 15.69%, respectively (Keaton, 2014). In 2012, Tennessee's graduation rate in 2013 was higher than the national average of 86.3% (Keaton, 2014), and teachers earned an average salary of $48,289, which was below the national average of $56,383 (Cornman, 2016).

The voluntary, web-based survey was made available to all licensed teachers in public schools across the state. Approximately 86% of eligible teachers completed the survey, and no

identifying individual information was collected. The initial dataset included 1,708 public schools, and listwise deletion was used for systematic missingness at the school level. Assessment of district-level bias did not reveal significant differences between missingness across urban, suburban, and rural districts. Once systematic missingness was accounted for, random missingness did not account for over 3% of any variable in the dataset. Variable means were used to replace any missing data, and the final sample included 1,532 schools. Elementary schools comprised 47% of the final sample, middle schools comprised 30%, and high schools comprised the smallest portion of schools at 23%.

## Measures

All measures were items self-reported by teachers participating in the New Teacher Center's Teaching, Empowerment, Leading and Learning (TELL) 2012–2013 survey. Psychometric and design conceptualizations were documented and demonstrated both validity and reliability across teaching and nonteaching school leadership samples (New Teacher Center, 2013). The three measures included teacher perceptions of their school's reliance on faculty leadership activity, school climate for teacher leadership, and classroom climate for instruction.

**Teacher perceptions of school reliance on faculty leadership activity.** The first measure captured school-level aggregated values of teachers' reports of their school's reliance on faculty to complete leadership activities. Nine leadership activities were included and aligned with multiple leadership theories, including transformational leadership theory, instructional leadership theory, managerial leadership, shared instructional leadership theory, and contingent leadership theory. Each item assessed the degree to which teachers' perceived faculty were relied upon to complete leadership activities. Items included teachers being relied on to (1) make

decisions about educational issues, (2) select instructional materials and resources, (3) devise teaching techniques, (4) set grading and student assessment practices, (5) determine content of in-service professional development, (6) establish student discipline procedures, (7) provide input on how the school budget will be spent, (8) select new teachers to the school, and (9) engage in school improvement planning. Response options for all items were 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. School-level values were calculated as averages of all reporting teachers' responses within a given school. This scale demonstrated sufficient reliability ($\alpha = .88$).

**School climate**. The second measure captured aggregated school-level values of teachers' perceptions of their school's climate conditions that promote teacher leadership. These items were (1) faculty have effective processes for making group decisions to solve problems; (2) parents and guardians are influential decision makers in the school; (3) faculty work in a safe environment; (4) faculty and leadership have a shared vision; (5) there is an atmosphere of mutual trust and respect among leadership; (6) faculty feel comfortable raising issues and concerns; (7) school leadership consistently supports teachers; (8) the procedures for teacher evaluation are consistent; (9) the school improvement team provides effective leadership; (10) leadership addresses concerns about teacher leadership; (11) leadership addresses community support and involvement concerns; (12) sufficient resources for professional development are available at the school; (13) appropriate amounts of time are provided for professional development; (14) professional development is differentiated to meet the needs of individual teachers; (15) teachers are recognized as educational experts; (16) teachers are trusted to make sound professional decisions about instruction; (17) teachers are encouraged to participate in school leadership roles; and (18) teachers are effective leaders in this school. These last four

items could be considered "norms," but they are also dimensions of school climate known to support teacher leadership. Response options included 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. School-level values were calculated as averages of all reporting teachers' responses, and sufficient reliability was demonstrated ($\alpha = .97$).

**Classroom climate**. Eleven items were used to capture teachers' reports of three classroom climate mechanisms known to support classroom instruction: (1) sufficient time and resources to support student learning, (2) high expectations and support for delivering quality instruction, and (3) a social and behavioral environment conducive to student learning in the classroom. Specific items, by mechanism, were (1) teachers are protected from duties that interfere with their essential role of educating students, teachers have sufficient instructional time to meet the needs of all students, teachers are allowed to focus on educating students with minimal interruptions, class sizes are reasonable such that teachers have the time available to meet the needs of all students; (2) teachers are held to high professional standards for delivering instruction, leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices; (3) students follow rules of conduct, students at this school understand expectations for their conduct, administrators consistently enforce rules for student conduct, teachers consistently enforce rules for student conduct, and student conduct policies and procedures are clearly understood by the faculty. Response options included 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. School-level values were calculated as averages of reporting teachers' responses, and sufficient reliability was demonstrated ($\alpha = .94$).

## Analytic Model

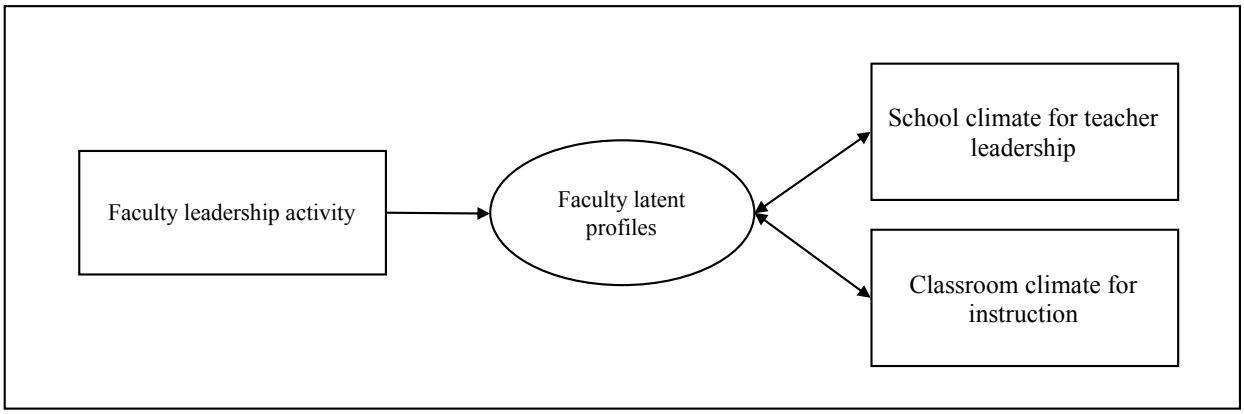
Three analytic approaches were used to probe the research questions guiding the current

inquiry. Latent profile analysis (LPA) was then used to find evidence for each of three faculty leadership activity conceptualizations. The use of LPA allowed exploration and identification of primary sources of variation (i.e., across all three conceptualizations) within clearly dependent (i.e., high correlations) leadership activity data. It also offered an advantage over other clustering and dimensional reduction approaches because it enabled fewer linearity restrictions and allowed comparison between hypothesized model configurations to determine the best model fit to the raw data (Collins & Lanza, 2010).

Posterior probabilities were used to classify schools and create faculty subpopulations. Multinomial logistic regression was used to answer research questions 2 and 3. These analyses predicted the likelihood of membership in a given faculty class, given a corresponding one-unit increase in agreement of a dimension's presence while accounting for the presence of other dimensions. Across all analyses, tidyverse packages in R were used for exploration and visualization, and Stata 15 was used for model estimation and data preparation. In addition, SPSS 24 was used to calculate descriptives. Figure 10 presents an overall conceptual model for all analyses.

**Figure 10**

*A Conceptual Model for Latent Profile Analyses*



## Results

Descriptive statistics indicated that teachers generally agreed that faculty were relied upon to complete the following activities at their schools: *making decisions about educational issues* ($M = 3.94$, $SD = 0.43$), *selecting instructional materials and resources* ($M = 3.14$, $SD = 0.33$), *devising teaching techniques* ($M = 3.41$, $SD = 0.29$), and *setting grading and assessment practices* ($M = 3.08$, $SD = 0.33$). In contrast, teachers generally disagreed that faculty were relied upon to complete the following activities: *determining content of in-service professional development* ($M = 2.41$, $SD = 0.40$), *establishing student disciplinary procedures* ($M = 2.87$, $SD = 0.41$), *providing input on the school budget* ($M = 2.02$, $SD = 0.45$), *selecting new teachers to the school* ($M = 1.77$, $SD = 0.54$), and *engaging in school improvement planning* ($M = 2.97$, $SD = 0.40$). See Table 7 for a summary of these values.

In addition, correlations and mean scores for all items included in analyses are reported in Tables 7 and 8. Table 7 includes correlations among faculty leadership activities and school climate. Correlations among these variable sets ranged from moderately strong relationships ($r > .20$) to strong relationships ($r > .30$). In general, these correlations suggested a co-occurrence of desirable school climates and teachers reports that faculty at their school were relied upon to perform all nine leadership activities.

In Table 8, correlations among leadership activities that schools depend on faculty to perform and classroom climate. Correlations among nearly all values were very strong ($r > .30$). These values suggested strong relations among faculty influence across a number of leadership activities with classroom climate.

**Table 7**

*Means, Standard Deviations, and Correlation Matrix of Faculty Leadership Activity and School Climate*

| | | Faculty are relied upon to… | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Faculty Leadership Activities* | 1 | Make decisions about educational issues | | | | | | | | | | 3.94 | 0.43 |
| | 2 | Select instructional materials and resources | .56* | | | | | | | | | 3.14 | 0.33 |
| | 3 | Devise teaching techniques | .67* | .73* | | | | | | | | 3.41 | 0.29 |
| | 4 | Set grading and student assessment practices | .51* | .62* | .68* | | | | | | | 3.08 | 0.33 |
| | 5 | Determine content of in-service professional development | .53* | .48* | .47* | .47* | | | | | | 2.41 | 0.40 |
| | 6 | Establish student discipline procedures | .63* | .35* | .43* | .29* | .51* | | | | | 2.87 | 0.41 |
| | 7 | Provide input on how the school budget will be spent | .46* | .36* | .33* | .25* | .58* | .54* | | | | 2.02 | 0.45 |
| | 8 | Select new teachers to the school | .33* | .23* | .23* | .21* | .48* | .38* | .52* | | | 1.77 | 0.54 |
| | 9 | Engage in school improvement planning | .59* | .46* | .49* | .34* | .56* | .59* | .56* | .40* | | 2.97 | 0.40 |
| *School Climate Dimensions for Teacher Leadership* | 10 | Faculty have effective processes for making group decisions to solve problems | .81* | .49* | .52* | .37* | .53* | .66* | .52* | .35* | .67* | 3.73 | 0.50 |
| | 11 | Parents and guardians are influential decision makers in the school | .41* | .28* | .29* | .11* | .27* | .35* | .25* | .23* | .37* | 3.45 | 0.57 |
| | 12 | Faculty work in a safe school environment | .57* | .42* | .43* | .27* | .31* | .46* | .31* | .19* | .46* | 4.29 | 0.35 |
| | 13 | Faculty and leadership have a shared vision | .79* | .49* | .54* | .37* | .49* | .62* | .46* | .30* | .66* | 4.02 | 0.45 |
| | 14 | There is an atmosphere of trust and mutual respect among leadership | .77* | .50* | .56* | .39* | .45* | .55* | .42* | .25* | .60* | 3.82 | 0.59 |
| | 15 | Faculty feel comfortable raising issues and concerns | .80* | .49* | .57* | .40* | .45* | .55* | .43* | .26* | .59* | 3.74 | 0.59 |
| | 16 | School leadership consistently supports teachers | .80* | .50* | .57* | .41* | .47* | .60* | .45* | .28* | .60* | 3.97 | 0.51 |
| | 17 | The procedures for teacher evaluation are consistent | .72* | .48* | .51* | .39* | .45* | .55* | .43* | .32* | .55* | 3.89 | 0.50 |
| | 18 | The school improvement team provides effective leadership | .75* | .51* | .53* | .36* | .53* | .60* | .48* | .35* | .70* | 3.91 | 0.46 |
| | 19 | Leadership addresses concerns about teacher leadership | .80* | .52* | .56* | .41* | .57* | .62* | .50* | .37* | .68* | 3.90 | 0.40 |
| | 20 | Leadership addresses community support and involvement concerns | .73* | .48* | .49* | .34* | .52* | .60* | .50* | .37* | .65* | 3.97 | 0.38 |
| | 21 | Sufficient resources for professional development are available at the school | .43* | .36* | .28* | .26* | .59* | .43* | .46* | .37* | .48* | 3.86 | 0.41 |
| | 22 | Appropriate amounts of time are provided for professional development | .49* | .40* | .33* | .32* | .55* | .43* | .43* | .32* | .49* | 3.88 | 0.37 |
| | 23 | Professional development is differentiated to meet the needs of individual teachers | .59* | .43* | .40* | .37* | .67* | .51* | .47* | .35* | .54* | 3.50 | 0.47 |
| *Norms* | 24 | Teachers are recognized as educational experts | .90* | .56* | .66* | .47* | .54* | .59* | .46* | .33* | .59* | 3.97 | 0.41 |
| | 25 | Teachers are trusted to make sound professional decisions about instruction | .94* | .58* | .71* | .53* | .49* | .56* | .41* | .27* | .57* | 4.02 | 0.43 |
| | 26 | Teachers are encouraged to participate in school leadership roles | .80* | .50* | .57* | .40* | .53* | .60* | .50* | .36* | .64* | 4.11 | 0.36 |
| | 27 | Teachers are effective leaders in this school. | .82* | .52* | .55* | .37* | .49* | .62* | .47* | .34* | .64* | 4.08 | 0.38 |

* $p < .01$

## Table 8

*Means, Standard Deviations, and Correlation Matrix of Faculty Leadership Activity and Classroom Climate*

| | Faculty are relied upon to… | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Faculty Leadership Activities* | 1 | Make decisions about educational issues | | | | | | | | | | 3.94 | 0.43 |
| | 2 | Select instructional materials and resources | .56* | | | | | | | | | 3.14 | 0.33 |
| | 3 | Devise teaching techniques | .67* | .73* | | | | | | | | 3.41 | 0.29 |
| | 4 | Set grading and student assessment practices | .51* | .62* | .68* | | | | | | | 3.08 | 0.33 |
| | 5 | Determine content of in-service professional development | .53* | .48* | .47* | .47* | | | | | | 2.41 | 0.40 |
| | 6 | Establish student discipline procedures | .63* | .35* | .43* | .29* | .51* | | | | | 2.87 | 0.41 |
| | 7 | Provide input on how the school budget will be spent | .46* | .36* | .33* | .25* | .58* | .54* | | | | 2.02 | 0.45 |
| | 8 | Select new teachers to the school | .33* | .23* | .23* | .21* | .48* | .38* | .52* | | | 1.77 | 0.54 |
| | 9 | Engage in school improvement planning | .59* | .46* | .49* | .34* | .56* | .59* | .56* | .40* | | 2.97 | 0.40 |
| *Classroom Climate Dimensions for Classroom Instruction* | 28 | Class sizes are reasonable such that teachers have the time available to meet the needs of all students | .38* | .35* | .31* | .30* | .25* | .26* | .21* | .14* | .25* | 3.58 | 0.55 |
| | 29 | Teachers have sufficient instructional time to meet the needs of all students | .51* | .48* | .43* | .44* | .38* | .28* | .24* | .16* | .30* | 3.51 | 0.46 |
| | 30 | Teachers are protected from duties that interfere with their essential role of educating students | .61* | .47* | .46* | .40* | .42* | .42* | .37* | .20* | .41* | 3.64 | 0.45 |
| | 31 | Teachers are allowed to focus on educating students with minimal interruptions | .60* | .47* | .43* | .36* | .38* | .43* | .32* | .19* | .42* | 3.62 | 0.49 |
| | 32 | Efforts are made to minimize the amount of routine administrative paperwork teachers are required to do | .65* | .52* | .52* | .25* | .37* | .36* | .31* | .19* | .35* | 3.47 | 0.55 |
| | 33 | Teachers are held to high professional standards for delivering instruction | .60* | .39* | .38* | .48* | .38* | .51* | .38* | .27* | .46* | 4.41 | 0.27 |
| | 34 | Leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices | .57* | .35* | .33* | .32* | .62* | .52* | .47* | .39* | .53* | 3.79 | 0.41 |
| | 35 | Student conduct policies and procedures are clearly understood by the faculty | .56* | .34* | .37* | .26* | .36* | .60* | .37* | .25* | .51* | 4.07 | 0.40 |
| | 36 | Administrators consistently enforce rules for student conduct | .60* | .41* | .37* | .26* | .35* | .61* | .38* | .23* | .49* | 3.82 | 0.58 |
| | 37 | Administrators support teachers' efforts to maintain discipline in the classroom | .64* | .21* | .46* | .34* | .36* | .58* | .38* | .22* | .49* | 4.05 | 0.50 |
| | 38 | Teachers consistently enforce rules for student conduct | .48* | .33* | .21* | .06* | .28* | .60* | .35* | .23* | .44* | 4.02 | 0.42 |
| | 39 | Students at this school understand expectations for their conduct | .55* | .33* | .37* | .25* | .32* | .57* | .34* | .24* | .46* | 4.10 | 0.42 |
| | 40 | Students follow rules of conduct | .48* | .52* | .34* | .18* | .25 | .49* | .30* | .16* | .42* | 3.65 | 0.60 |

* $p < .01$

**Faculty Profiles Based on School Reliance on Faculty Leadership Activity**

An iterative model-building and validating procedure to fit a simple one-profile latent profile model to the raw data was used in this study. Each iteration progressively freed parameters to assess the fit of each $K + 1$ model to the data. The large sample size permitted more nuanced separation among classes, thus allowing more possible solutions. However, each subsequent solution with one additional profile risked substantive redundancies across profiles.

Results from the iterative LPA found that a six-profile model was a better statistical fit for the data than all $K - 1$ profile models (Table 9). However, visual inspection of profiles across raw data scores was used to identify if there were, indeed, substantively meaningful differences across model solutions. Visual inspection of the six-, five-, and four-profile solutions showed little substantive differentiation. Each appeared to include at least one profile with high reliance on faculty leadership, one profile with moderate reliance on faculty leadership, and two or more profiles with lower reliance on faculty leadership. Given the redundancy between these profiles, a four-profile solution was chosen as the simplest statistically significant model that retained meaningful differences across profiles without redundant profiles.

**Table 9**

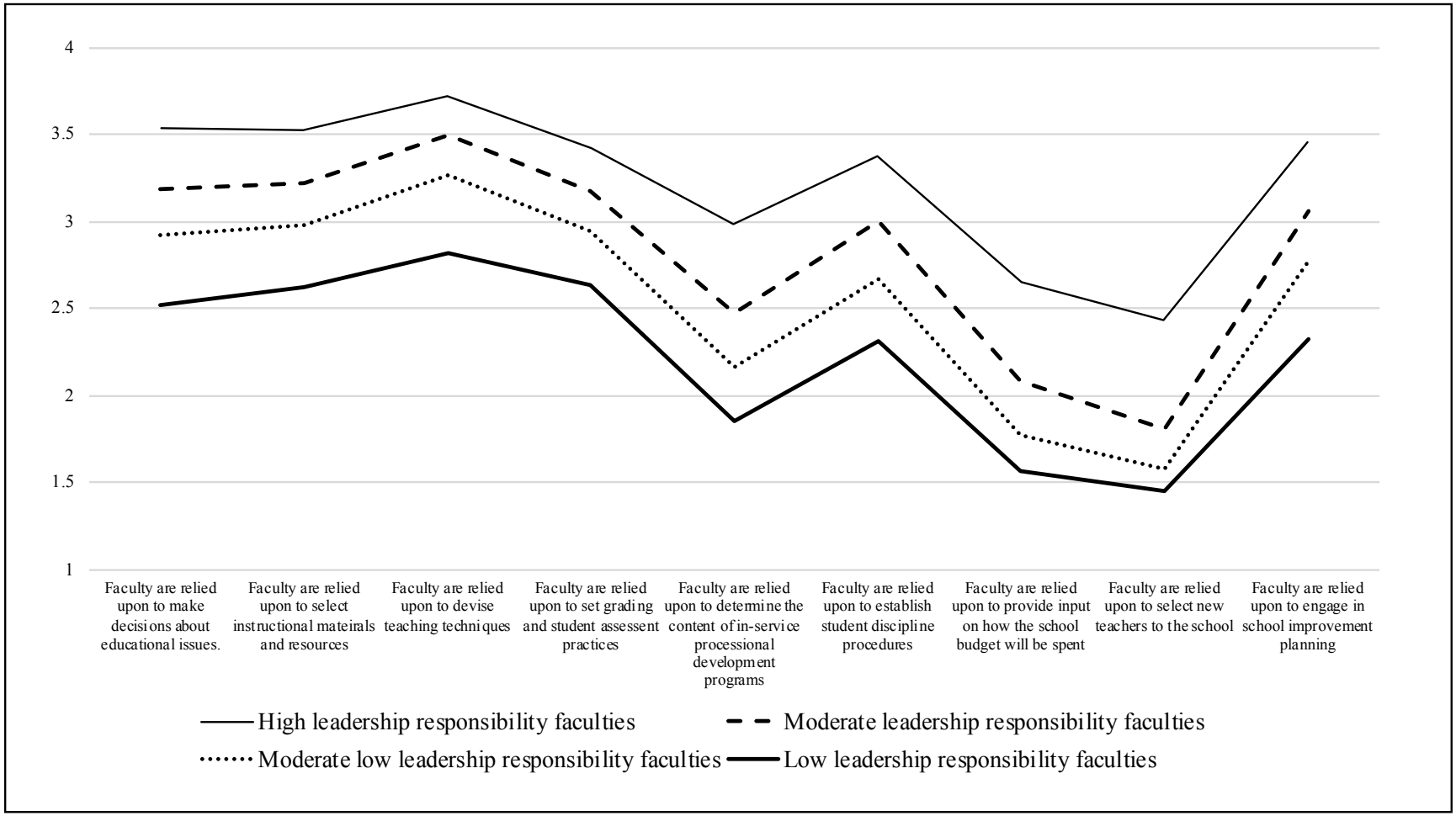
*Faculty Latent Profile Analysis Results and Fit Indices*

| Model | AIC | BIC |
|---|---|---|
| 1 profile | 13552.13 | 13650.52 |
| 2 profile | 9949.792 | 10102.85 |
| 3 profile | 8269.65 | 8477.36 |
| **4 profile** | **7475.95** | **7738.329** |
| 5 profile | 7264.53 | 7581.594 |
| 6 profile | 6963.56 | 7335.26 |

**Four-profile solution.** Faculty profiles in the four-profile solution were named *low leadership responsibility faculties* (9.8%), *moderate low leadership responsibility faculties* (42.2%), *moderate leadership responsibility faculties* (40.7%), and *high leadership responsibility faculties* (7.4%). Profile names were chosen based on raw mean values of reported leadership activities associated with each profile (Figure 11). Profiles varied most consistently by *overall net reliance* on faculty leadership.

**Figure 11**

*Four Faculty Latent Profiles*



The faculties classified as *high leadership responsibility faculties* represented faculties at schools in which faculty were, relative to other profiles, relied upon most to perform all nine leadership activities. Teachers at these schools, on average, agreed that faculty were relied upon to complete most of these activities, with exceptions for two activities, providing input on the school budget and selecting new teachers to the school. For those variables, teachers who disagreed that faculty were involved in those processes were generally included in all profiles. The faculties classified as *high leadership responsibility faculties* tended to disagree the least relative to all profiles regarding those two activities, but there was still general disagreement across the profile.

*Moderate leadership responsibility faculties* represented faculties with teachers who reported that faculty were relied on at their schools to perform all nine leadership activities to a lesser extent than schools with high reliance, but more than the other profiles. Teachers in these schools, on average, agreed that faculty were relied on to complete five of the nine leadership activities. On average, teachers in these schools disagreed that faculty generally were relied on to perform activities associated with managerial and transformational leadership theories.

*Moderate low leadership responsibility faculties* represented faculties with teachers reporting that they were relied on at their schools to perform all nine leadership activities to an even lesser extent. In general, these teachers were relied upon to perform only activities aligned with instructional leadership theory. Finally, *low leadership responsibility faculties* represented faculties with teachers who reported that their schools did not rely on faculty to perform any of the nine leadership activities. On average, teachers for this profile selected the "disagree" response across all items.

**Individual Activities, Sets of Activities, Net Leadership Activity, or a Combination?**

Given that profiles appeared to separate most by a school's *overall reliance* on a faculty's leadership activities (Figure 11), *net leadership activity* appeared to be a meaningful measure of faculty leadership. It clearly represented the primary source of variability associated with faculty leadership activity. However, *sets of activities* also appeared to be meaningful for differentiating among school subpopulations. The first four activities in Figure 11 (listed from left to right) were aligned with instructional leadership theory. The three subpopulations with greater relative reliance on faculty leadership generally agreed with reliance on faculty to perform activities aligned with instructional leadership. However, only among two subpopulations, *high leadership responsibility faculties* and *moderate leadership responsibility faculties*, did teachers generally agree that faculty are relied upon at their schools to perform activities aligned with transformational leadership theory (i.e., professional development activity).

Similarly, faculties in all subpopulations appeared to disagree that they were relied on to complete managerial leadership activities (i.e., activities related to budgets/spending and selecting new teachers). Activities related to school improvement and student discipline were aligned with multiple leadership theories, making alignment less clear. There was no evidence of a *salient individual activity* that meaningfully differentiated profiles from one another (see Figure 11) and thus this conceptualization of faculty leadership was deemed to not be a meaningful source of variability.

**Faculty Leadership and School Climate**

Multinomial regression results showed strong and consistent connections between faculty leadership and school climate dimensions that promote teacher leadership (Table 10). The faculty

profile with the lowest school reliance on teacher leadership, *low leadership responsibility faculties*, was chosen as the reference class because it allowed easy conceptual comparisons. It also uniformly represented least reliance on faculty leadership across activities. Table 10 includes the means and odds ratios from a model that predicts membership in subpopulations by school climate. Means were calculated for individual variables, and odds ratios were estimated from models that treated all other climate dimensions as covariates. The odds ratios represent the likelihood of a faculty classified into a profile as compared with the reference class with a one-unit change in response (e.g., from 2 = disagree to 3= agree). Odds ratios greater than 1 indicated a greater risk of faculty being classified into that particular profile as the response rises one unit compared with risk of classification in the reference profile.

**Table 10**

*Means and Relative Changes in Logged Odds for Faculty Profiles by School Climate*

| *School Climate Dimensions for Teacher Leadership* | Low leadership responsibility faculties | | Moderate low leadership responsibility faculties | | Moderate leadership responsibility faculties | | High leadership responsibility faculty | |
|---|---|---|---|---|---|---|---|---|
| | *M* | *OR* | *M* | *OR* | *M* | *OR* | *M* | *OR* |
| The faculty has an effective process for making group decisions to solve problems | 2.42 | - | 2.79 | 0.81 | 3.07 | 2.14 | 3.43 | 46.74* |
| Parents and guardians are influential decision makers in the school | 2.40 | - | 2.69 | 2.12 | 2.80 | 1.81 | 3.04 | 3.06 |
| Teachers work in a safe environment | 2.99 | - | 3.24 | 2.47 | 3.40 | 2.12 | 3.61 | 0.86 |
| Faculty and leadership have a shared vision | 2.58 | - | 2.97 | 2.56 | 3.26 | 6.20 | 3.56 | 1.71 |
| There is an atmosphere of trust and mutual respect | 2.33 | - | 2.83 | 0.06* | 3.18 | 0.02* | 3.53 | 0.03* |
| Teachers feel comfortable raising issues and concerns | 2.28 | - | 2.77 | 6.00 | 3.12 | 9.06 | 3.48 | 6.25 |
| School leadership consistently supports teachers | 2.49 | - | 2.93 | 0.25 | 3.26 | 0.26 | 3.57 | 0.15 |
| The procedures for teacher evaluation are consistent | 2.55 | - | 2.87 | 0.76 | 3.18 | 0.83 | 3.52 | 1.18 |
| The school improvement team provides effective leadership | 2.51 | - | 2.90 | 3.64 | 3.18 | 3.17 | 3.49 | 2.14 |
| Leadership addresses concerns about teacher leadership | 2.53 | - | 2.88 | 13.69 | 3.13 | 196.1* | 3.43 | 651.86* |
| Leadership addresses community support and involvement concerns | 2.65 | - | 2.95 | 1.93 | 3.16 | 3.32 | 3.44 | 2.99 |
| Sufficient resources for professional development are available at the school | 2.75 | - | 2.90 | 0.34 | 3.08 | 1.06 | 3.34 | 2.42 |
| Appropriate amounts of time are provided for professional development | 2.73 | - | 2.92 | 15.18* | 3.09 | 9.90* | 3.33 | 4.73 |
| Professional development is differentiated to meet the needs of individual teachers | 2.40 | - | 2.64 | 4.58 | 2.87 | 13.44* | 3.24 | 151.56* |
| Teachers are recognized as educational experts | 2.58 | - | 2.94 | 0.22 | 3.21 | 0.23 | 3.52 | 0.56 |
| Teachers are trusted to make sound professional decisions about instruction | 2.56 | - | 2.98 | 8210.67* | 3.27 | 2095723.72* | 3.57 | 2229693 1.9* |
| Teachers are encouraged to participate in school leadership roles | 2.78 | - | 3.06 | 9.01* | 3.28 | 31.75* | 3.59 | 1704.97* |
| Teachers are effective leaders in this school | 2.73 | - | 3.04 | 0.28 | 3.27 | 0.15 | 3.57 | 0.11 |

*$p < .01$

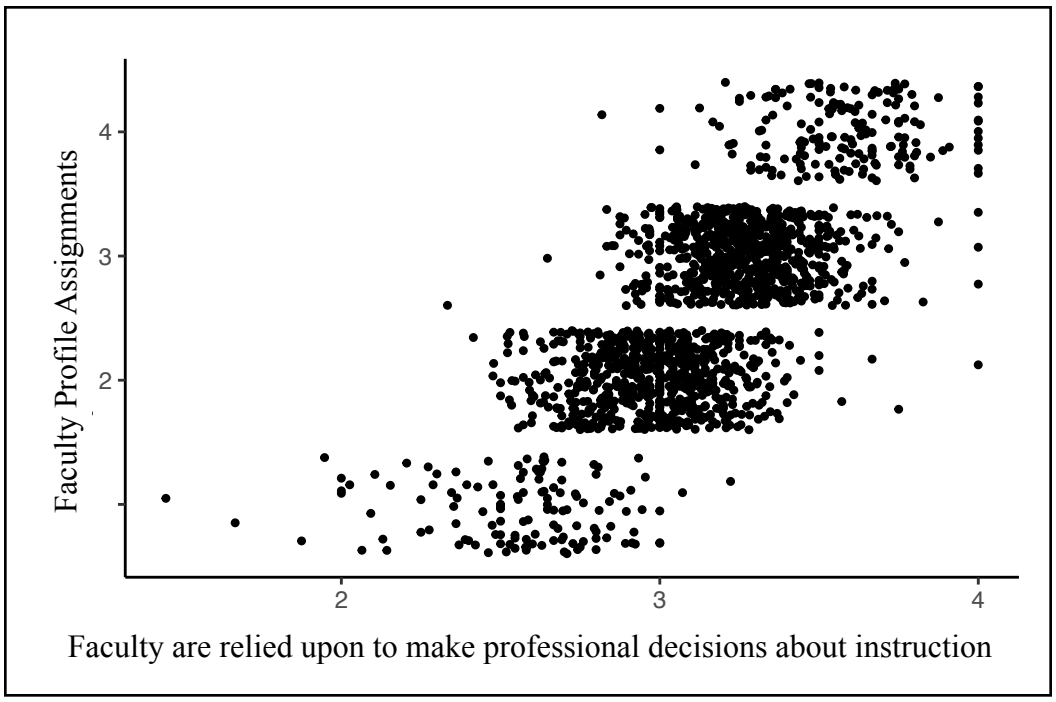
These results strongly suggest that faculty in schools with high reliance on faculty to lead also had more desirable school climates. Across every variable, the same pattern was observed. The more a faculty was relied upon to lead at the school, the greater the presence was of desirable school climates. No exception to this pattern was observed.

Some odds ratios were particularly large. Rather than markers of the magnitude of the

relationship between variables, these numbers indicated clear distinction between subpopulations in which one unit change in a school-wide response average virtually always coincided with classification in a different profile. The odds ratios associated with teachers being trusted to make sound professional decisions about instruction was particularly large, thus demonstrating this separation well (see Figure 12). There was exceedingly small overlap between scores in profile 1 (low reliance on faculty leadership) and scores in profile 4 (high reliance on faculty leadership), hence the exceedingly large odds ratios.

**Figure 12**

*Responses to Example Faculty Leadership Activity By Faculty Profile Assignments*




**Faculty Leadership and Classroom Climate**

Multinomial logistic regression results showed strong connections between a school's reliance on faculty leadership and classroom climates (Table 11; Figure 13 provides a corresponding visual of the same mean scores). This suggests that faculty heavily influence the

conditions within which they teach. Or, given that these data were cross-sectional, these classroom climates co-occurred with a school's reliance on faculty to lead. Without exception, mean scores across all classroom climate dimensions increased across each profile as each profile represented more reliance on faculty leadership (Table 11).

To assess significant differences among profiles regarding the dimensions of classroom climate, between-profile pairwise post hoc means comparisons were calculated using Tukey's tests. Significant differences among means (Table 11) between profiles were found regarding *teachers are protected from duties that interfere with their essential role of educating students*, $F(3, 1744) = 278.59$, $p < .001$; *teachers have sufficient instructional time to meet the needs of all students* $F(3, 1744) = 169.57$, $p < .001$; *teachers are allowed to focus on educating students with minimal interruptions* $F(3, 1744) = 242.95$, $p < .001$; *class sizes are reasonable such that teachers have the time available to meet the needs of all students* $F(3, 1744) = 83.71$, $p < .001$; *teachers are held to high professional standards for delivering instruction* $F(3, 1744) = 215.54$, $p < .001$; *leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices* $F(3, 1743) = 312.33$, $p < .001$; *students follow rules of conduct* $F(3, 1744) = 142.73$, $p < .001$; *students at this school understand expectations for their conduct* $F(3, 1744) = 192.33$, $p < .001$; *administrators consistently enforce rules for student conduct* $F(3, 1743) = 228.12$, $p < .001$; *teachers consistently enforce rules for student conduct* $F(3, 1743) = 138.49$, $p < .001$; and *student conduct policies and procedures are clearly understood by the faculty* $F(3, 1744) = 227.53$, $p < .001$.

**Table 11**

*Means for Faculty Profiles by Classroom Climate for Classroom Instruction*

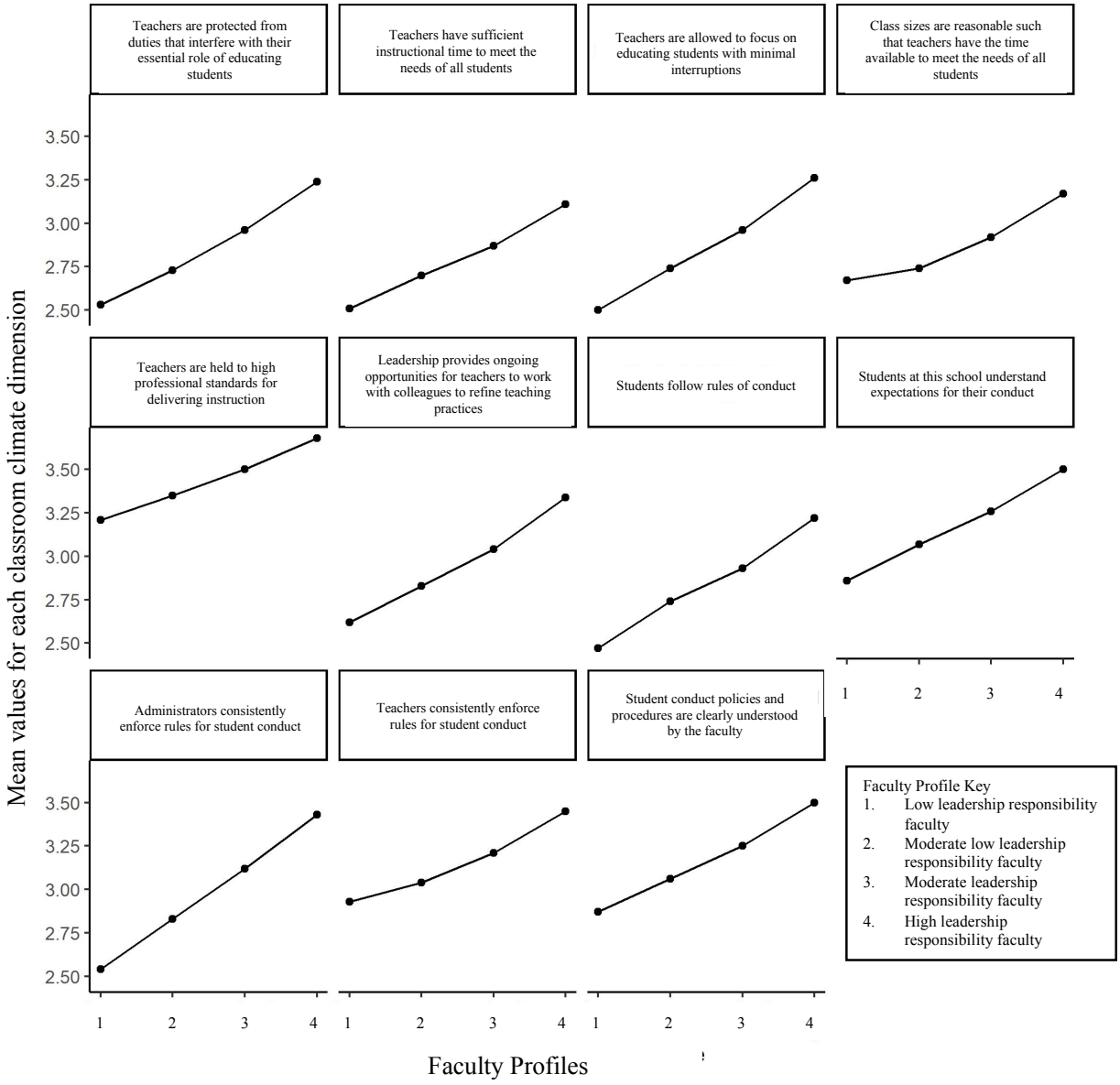
| Variables | | Faculty Profile Means | | | | Between-profile Post Hoc Comparisons* |
|---|---|---|---|---|---|---|
| *Classroom Climate Dimensions for Classroom Instruction* | | 1 Low leadership responsibility faculties | 2 Moderate low leadership responsibility faculties | 3 Moderate leadership responsibility faculties | 4 High leadership responsibility faculty | |
| | | *Means* | *Means* | *Means* | *Means* | |
| Sufficient time and resources to support student learning | Teachers are protected from duties that interfere with their essential role of educating students | 2.53 | 2.73 | 2.96 | 3.24 | 4 > 3 > 2 > 1** |
| | Teachers have sufficient instructional time to meet the needs of all students | 2.51 | 2.70 | 2.87 | 3.11 | 4 > 3 > 2 > 1 |
| | Teachers are allowed to focus on educating students with minimal interruptions | 2.50 | 2.74 | 2.96 | 3.26 | 4 > 3 > 2 > 1 |
| | Class sizes are reasonable such that teachers have the time available to meet the needs of all students | 2.67 | 2.74 | 2.92 | 3.17 | 4 > 3 > 2 > 1 |
| High expectation and supports for delivering quality instruction | Teachers are held to high professional standards for delivering instruction | 3.21 | 3.35 | 3.50 | 3.68 | 4 > 3 > 2 > 1 |
| | Leadership provides ongoing opportunities for teachers to work with colleagues to refine teaching practices | 2.62 | 2.83 | 3.04 | 3.34 | 4 > 3 > 2 > 1 |
| A social and behavioral environment conducive to student learning in the classroom | Students follow rules of conduct | 2.47 | 2.74 | 2.93 | 3.22 | 4 > 3 > 2 > 1 |
| | Students at this school understand expectations for their conduct | 2.86 | 3.07 | 3.26 | 3.50 | 4 > 3 > 2 > 1 |
| | Administrators consistently enforce rules for student conduct | 2.54 | 2.83 | 3.12 | 3.43 | 4 > 3 > 2 > 1 |
| | Teachers consistently enforce rules for student conduct | 2.93 | 3.04 | 3.21 | 3.45 | 4 > 3 > 2 > 1 |
| | Student conduct policies and procedures are clearly understood by the faculty | 2.87 | 3.06 | 3.25 | 3.50 | 4 > 3 > 2 > 1 |

**Post hoc comparisons (using Tukey's tests) indicate which profile means differ significantly at p < .001.*

*** For this variable, profile 4 was greater than 3, 2, and 1. 3 was greater than 2 and 1. 2 was greater than 1.*

**Figure 13**

*Visual of Means for Faculty Profiles by Classroom Climate*



## Discussion

Systematic reviews (Harris & DeFlaminis, 2016; Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004) report a rich, growing literature that assets teacher leadership has the potential to be an important intervention for improving classroom instruction. One central aim of research on teacher leadership continues to be the identification of the most meaningful components of teacher leadership to measure. Technically, this means that researchers are working to identify primary sources of variability within teacher leadership. Without clarity on the primary sources of variation within teacher leadership, measurement is dependent upon a "scatter-gun" approach in which variables and response sets are constructed based on best guesses about the aspects of teacher leadership that are most important to capture. As a result, statistical models are likely to perform suboptimally or lose drastic amounts of information because these models are not focused on the most meaningful sources of variation.

This information gap was addressed in the current study via a focus on the core conceptual part of the teacher leadership process, teacher leadership itself (i.e., teachers' leadership activity) at the school-level, and the exploration of three evidence-informed conceptualities of teacher leadership activity (at the school level) that may function as primary sources of variability. The meaningfulness of each conceptualization was also assessed through relationships between school climate and classroom climate.

### Faculty Profiles

Using latent profile analysis (LPA), teacher leadership activity was explored in the current study for primary sources of variation. Results provided first evidence of faculty subpopulations. These subpopulations, or profiles, were modeled using teachers' averaged

perceptions of their school's reliance on faculty to engage in nine different leadership activities. In essence, the best-fitting LPA model showed that the overall reliance of a school on their faculty to perform leadership activities was a primary source of variation. The best-fitting model showed clear separation among four substantively different profiles along this primary source of variation. These four profiles were *low leadership responsibility faculties, moderate low leadership responsibility faculties, moderate leadership responsibility faculties,* and *high leadership responsibility faculties.*

These profiles were named based on substantive differences among profiles that corresponded with differences in net reliance on faculty leadership activity. Faculties classified in the *high leadership responsibility faculties* profile were faculties with teachers who, on average agreed that their schools relied on faculty to perform seven out of nine activities—the two exceptions were managerial activities focused on informing the school budget and hiring new teachers. In contrast, faculties classified in the *low leadership responsibility faculties* profile were faculties with teachers who, on average, disagreed that their schools relied on faculty to perform all nine leadership activities.

**Individual Activities, Sets of Activities, Net Leadership Activity, or a Combination?**

The activities in which faculty engage to influence their schools are central to York-Barr and Duke's (2004) conceptual framework for teacher leadership and, in light of a dearth of directly relevant studies, require clearer conceptualization. In particular, the primary source(s) of variability among the activities that teachers use was largely not known (see Bush & Glover, 2014; Robinson et al., 2008). Decades of findings from school leadership literature have suggested three possible meaningful conceptualizations of leadership activity that could be

applicable to specifying and operationalizing faculty leadership: *salient individual activities*, *sets of activities*, and *net leadership activity*.

The clearest evidence for any of these conceptualizations for teacher leadership (not faculty leadership) as a meaningful conceptualizations was found recently (Gardella, 2022*). Net leadership activity* proved to be a meaningful source of variability for capturing teacher leadership activity within a broader teacher leadership process. There was also evidence for *salient individual behaviors*, but there was negligible evidence for *subsets of behaviors*. Instead of a focus on teachers (as in that study), faculty (an assemblage of teachers at a school) and evidence of these three conceptualizations in the activities used by faculty to influence their schools are the focus on the current investigation.

According to the study results, profiles differentiated most by *net reliance* on faculty to engage in leadership activities (see Figure 11). This was similar to Gardella (2022; Chapter 3 this dissertation) focused on teachers. However, unlike that study, which was focused on teachers, evidence from this study also suggests that *subsets of leadership activities* might be a useful property in making sense of differences in school-level faculty leadership, meaning *that subsets of leadership activities* aligned with specific leadership philosophies appeared to account for some variance in teacher leadership activities.

Four leadership activity variables were more closely aligned with instructional leadership theories: teachers are relied upon to (1) make decisions about instructional issues, (2) select instructional materials and resources, (3) devise teaching techniques, and (4) set grading assessment practices. Across all four variables, teachers in the three school profiles with heavier reliance on faculties to lead the most generally reported that they agreed that faculty were relied on to complete those activities. Only faculties in the *low leadership responsibility faculties*

profile generally disagreed with the statement that faculty at their school were relied on to complete those tasks.

One activity variable was aligned with transformational leadership theory: teachers are relied upon to determine the content of in-service professional development programs. Only in schools with faculties classified in the *high leadership responsibility faculties* profile did teachers agree that the school relied on faculty to complete this activity. Finally, no faculties generally agreed that faculty were relied on to complete the two activity variables that were more aligned with managerial leadership theory—teachers are relied upon to provide input on school budgeting and to select new teachers. Taken together, these results suggest that *subsets of leadership activities* may be a meaningful property that differentiates one subpopulation at a school from another based on their reliance on faculty leadership. More research is needed on a wider array of activity variables that are aligned with leadership theories before more generalizable inferences might be made.

Finally, no evidence of *particular leadership activity* variables were identified as meaningful contributors to profile separation. Individual activities may be less pronounced within a group of faculty members that likely engages in a range of behaviors than individual teachers who may engage in one activity over another (Gardella, 2022). This contrasting result suggests that different conceptualizations of leadership activity may be meaningful to measure across different levels of teacher leadership.

**Faculty Leadership and School Climate**

A growing body of teacher leadership literature details the ways specific school climates that promote teacher leadership are related to the different types or amounts of teacher leadership

within a school (see Gardella, 2022). Within this literature, detailed relationships among school climate and faculty leadership activities have remained unclear until the present study. According to the present study's results (Table 10), a school's reliance on faculty leadership activity clearly and directly relates with school climates such that the more a school has desirable school climates, the more a school relies on faculty to complete leadership activity. The same result was not found for relationships among these constructs in a teacher-level analysis (Gardella, 2022). Those results found a nonlinear relationship such that low-moderate levels of individual teacher leadership were most associated with school climate (Gardella, 2022). Combined, the results from both studies suggest that a greater presence of desirable school climates tend to co-occur with teachers who enact low-moderate levels of leadership activities in schools with faculties that are relied upon the most to perform leadership activities.

Odds ratio results suggested considerable overlap between the presence of climate dimensions and faculty classification into varying profiles. These odds ratios generally suggested that these climate dimensions varied across profiles well. However, in two cases, distinction among classification into profiles was particularly pronounced. Particularly, in schools where teachers strongly agreed that they were trusted to make sound professional decisions about instruction, they also generally perceived that they were at schools where faculties were classified in the *high leadership responsibility faculties* profile. Similarly, when faculties strongly agreed that teachers were generally encouraged to participate in leadership roles at their schools, they were likely to be classified into *high leadership responsibility faculties*. In other words, profile separation was particularly pronounced for these two dimensions.

**Faculty Leadership and Classroom Climate**

Little evidence links particular types or amounts of teacher leadership activity with specific classroom climate dimensions that support classroom instruction. In Chapter 3 (Gardella, 2022), a curvilinear relationship between individual teacher leadership activity and classroom climates is shown. That is, teachers classified into classes with low-moderate teacher leadership activity tended to be at schools with greater reports of classroom climate. Here, per the results of this study, the greater a school's reliance on faculty to perform leadership behaviors, the greater the presence of desirable classroom climates. This was found without exception for all three climate dimensions: sufficient time and resources to support student learning, high expectations and support for delivering quality instruction, and a social and behavioral environment conducive to student learning.

In addition to the general relationship among *net reliance on faculty leadership* with classroom climate, there was some evidence that particular subsets of leadership activities may also be linked with classroom climate. In particular, in schools where teachers generally agreed that that their school relied on faculty to perform activities aligned with instructional leadership theory, those schools reported greater presence of all climate dimensions known to support instruction. The greater a faculty was relied on to perform activities aligned with instructional leadership theory, the greater their school reported the presence of desirable classroom climates. These results suggested that *subsets of activities* based on varying leadership theories may be important to investigate in relation to classroom climate.

**Implications for Practice**

These results had four primary implications for practice. First, relationships among the faculty leadership activity with both (1) school climates that serve as a basis for teacher

leadership and (2) classroom climates that support classroom instruction were much clearer and direct than with individual teacher leadership activity. Individual teachers who spend lots of time on leadership activities do not relate with both sets of climates in the same way as overall school reliance on faculty leadership activity. Practitioners should view teacher leadership and faculty leadership as related but separate phenomena representing two ecological levels, the individual and the organizational.

Second, reliance on faculty to engage in leadership activities appeared to meaningfully account for variance in the teacher leadership process. A reasonable goal for practitioners might be an increase in *overall net leadership activity* of school faculty rather than targeting individual teachers. Overall, faculty reliance was more consistently associated with desired classroom climates known to improve classroom instruction across the school than with individual teacher leadership.

Third, to increase faculty leadership, the conceptual framework for teacher leadership (York-Barr & Duke, 2004) posits that conditions (e.g., dimensions of school climate) serving as a basis for teacher leadership should promote teacher leadership. These results suggest that desirable school climate co-occur with an increase in a school's reliance on faculty leadership. Thus, conditions that serve as a basis for teacher leadership should also serve as a basis for faculty leadership. More analyses of relations among individual activities and school climate are needed before insights about specific faculty leadership activities or climate dimensions might be made.

Finally, faculties that were more heavily relied on to lead tended to be in schools that had a greater presence of desirable classroom climates. Increasing faculty leadership overall appears to be a meaningful intervention for improving classroom instruction. However, increasing

reliance on faculty leadership also appears to co-occur with desirable school climates. Interventions that target faculty leadership or classroom climate should also be considerate of school climate.

**Implications for Theory and Measurement**

Primary sources of variability within faculty leadership activity were sought in the current study. These results clearly showed that *overall net leadership activity* is an overwhelming primary source of variability within the faculty leadership process. These results also suggested that *subsets of leadership activities* may account for a modest portion of variance when modeling and measuring faculty activity. The meaningfulness of these sources of variability were assessed in relation to school and classroom climate for teachers and their instruction. Results demonstrated that faculties who were relied on most to engage in leadership activities tended to be at schools with most support for teacher leadership and schools most supportive of classroom instruction. These two findings demonstrate that *net leadership activity* may be valuable source of variability in the teacher leadership process.

These results had one primary theoretical implication. Foremost, it was suggested that faculty leadership activity might be meaningfully specified as *overall net leadership activity* as opposed to particular leadership activities. This was overwhelmingly a primary source of variability. Thus, in the conceptual framework for teacher leadership by York-Barr and Duke (2004), the means used by faculty to influence their schools might be meaningfully specified as *overall faculty net leadership activity*. In future theory development outside this framework, theory might be built to assess relationships between *net faculty leadership activity* with other components of the teacher leadership process.

When measuring faculty leadership, results suggest that measurement should be primarily focused on *overall net leadership activity* to improve the chances of capturing independent data. The measurement approach used in this study focused on time spent across multiple individual activities. The data from those variables were highly dependent with one another and with school climate. Future measurement might be focused specifically on *net faculty activity* as this could be an aggregated measure of overall time spent per day on leadership activities or another simple measure focused on *net leadership activity*.

**Limitations**

These results were gathered from cross-sectional data; data were not designed to assess causal relations among components. Rather, an aim of this study was to assess if there were relationships among components modeled in York-Barr and Duke's (2004) conceptual framework for teacher leadership. According to this framework, conditions serving as a basis for teacher leadership (e.g., school climate) influence the means (i.e., leadership activities) teachers use to impact their schools. In addition, teachers' means of influence at their schools impact the conditions that support quality classroom instruction (e.g., classroom climate). However, it is noted in this framework that many of these concepts are interrelated, overlapping, and at times interchangeable. For example, consistent teacher evaluations may permit teachers to plan accordingly so that they have both the time and energy to lead. Similarly, consistent teacher evaluations aligned with classroom instructional quality may promote instructional quality. Given both data design and conceptual overlap, causal relations were not assessed in this study; this limitation should be considered in any interpretations.

Second, nine leadership activity variables were used in this study to model faculty

subpopulations. As described in the introduction of this paper, no taxonomy exists that suggests the most important teacher and faculty leadership activities measure. The nine variables used in this study did reflect a wide range of leadership philosophies, and they were also known to be used by teachers and faculties. Future researchers might address a broader set of variables to reflect a wider array of the things teachers do to lead in their schools. A broader variable set aligned with various leadership philosophies might enhance analyses. Only one activity/variable was aligned with transformational leadership theory; thus, related analyses lacked stability.

Additional features of the survey design led to limited generalizability. The secondary dataset did not include many variables that could be used to assess sampling or response bias. Region and school size were checked as sources of response bias via multiple-group means comparisons, but conflicting information from different datasets about the defining characteristics of regions and school size rendered analyses somewhat inconclusive. For example, reports of the numbers of teachers at some schools did not match federal reports of teachers at the school. The generalizability of these results is unclear.

Finally, additional variables would be helpful in contextualizing these results. Additional variables about teacher personal characteristics, activity co-performers, targets of activities, and other details would have provided a more complete picture of the teacher leadership process.

## Conclusion

Teacher leadership can be an important intervention for improving instructional quality in K–12 public schools (see Chapter 3). According to this study, faculty leadership (collective leadership of a school's teaching staff) may be a more effective intervention than individual teacher leadership. Nevertheless, enhancing the impact of faculty leadership also depends, in

part, on an improved understanding of teacher leadership. Primary sources of variability within faculty leadership itself were sought in this study, and *overall net leadership activity*, not particular activities or activity types, was identified as a primary source of variability. Moreover, the greater the reliance of a school on leadership faculty, the better the organizational climate appeared to be for teachers. A school was more likely to rely on faculty to lead if it had a greater presence of a desirable school climate and classroom climate. Finally, these results varied from those that focused on teachers instead of faculty. Differences among teachers and faculty leadership activity were observed, thus suggesting that faculty leadership may be more than just the sum of its parts. Teacher leadership activity and faculty leadership activity are related but distinct constructs and should be treated as such in theory-building and practice.

# CHAPTER V

# OPERATIONALIZING RELATIONSHIPS AMONG TEACHER LEADERSHIP AND SCHOOL CLIMATE

The concepts of teacher and faculty leadership are still taking shape in the literature (Nguyen et al., 2019; Wenner & Campbell, 2017). Multiple separate recent systematic reviews have consistently demonstrated that the field remains largely a-theoretical, in part, because foundational conceptual questions remain (Daniels et al., 2019; Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017). One central area of focus in the literature has been on trying to identify what is most important to measure about teacher leadership. Some scholars have argued that research should be focused on particular leadership activities as they may be most meaningful (Fairman & Mackenzie, 2015). Yet, scholarship on leadership philosophies makes a case for particular leadership approaches and the sets of activities aligned with those approaches as most meaningful (e.g., Bass & Avolio, 1993).

However, little work to date has directly examined multiple conceptualizations of teacher leadership activity to determine which accounts for the most variability in the teacher leadership process. In effect, there are no investigations of the primary source(s) of variability within teacher leadership itself. As a result, measurement tools that may or may not accurately capture the meaningful parts of teacher leadership are currently endorsed in the literature. Ultimately, clearer understanding along with accurate measurement of primary sources of variability could translate to interventions that may target more consequential mechanisms for change.

This gap was addressed in this dissertation with an analysis of teacher leadership itself,

and then the meaningfulness of those results in context of school climate for teachers were assessed. It was found that *overall net leadership activity*, not *particular activities* or *sets of activities*, was overwhelmingly a primary source of variability for teacher and faculty leadership activity. Moreover, robust and unique associations among teacher leadership and then faculty leadership with school climate outcomes were found, signifying *net leadership activity* as a substantively meaningful source of variability. Associations with classroom climate demonstrated that teacher and faculty leadership can be important interventions in improving classroom climate in ways that can improve instruction. This chapter includes collective implications from all prior dissertation chapters with a particular emphasis on the specification and operationalization of teacher leadership activity in the context of teacher leadership literature.

## Operationalizing Teacher and Faculty Leadership Activity

**How extant research has operationalized teacher leadership activity.** The conceptual framework for teacher leadership (York-Barr & Duke, 2004) has used evidence from dozens of studies to develop reasoned ways to focus investigation and identify primary sources of variability within the teacher leadership process (Figure 9). This framework posits that teachers' leadership activities constitute a core component of the teacher leadership process, specifies four other meaningful components, and suggests multiple relationships among these components as sources of variability based on extant evidence. It has suggested that investigations into primary sources of variability focus somewhere in context of these components and relationships to make clearer sense of teacher leadership. However, this framework offers little about clearer specification and then operationalization of these components and their relationships.

Teacher leadership activity is a complex phenomenon with quite possibly (1) multitudes of possible activities, (2) variations in philosophies and styles, and (3) variations in the amount of time a teacher devotes to leadership activities (Gumus et al., 2018; Wenner & Campbell, 2017). Each of these complexities may be different conceptualizations of teacher leadership activity. Among these possible conceptualizations of teacher leadership activity, which one was a greater source of variability in the teacher leadership process? Are all meaningful sources of variability? The first two conceptualizations seem to be supported by decades of the literature, and a recent study (Urick, 2012) offered tenuous evidence of the latter conceptualization. From the current study's (Gardella, 2022) results, evidence suggests that the overall volume of teacher or faculty leadership appeared to be the greater source of variability and that both overall time spent on leadership activity and overall reliance on a faculty to lead are useful ways to operationalize this construct.

Prior to this discovery, teacher leadership research has enabled reasonable guesses about the best measures of teacher leadership activity. This study offers additional reasons to refine these guesses so that they are more accurate, precise, and meaningful. For example, the measures used in this study were focused on nine discrete activities that appear to have a basis in the literature and in which operationalized responses were categories of time spent on those activities. Seminal reviews of teacher leadership (Nguyen et al., 2019; Shen et al., 2020; Wenner & Campbell, 2017) have asserted that no taxonomy of teacher leadership activities exists in which activities are organized based on their commonness or the strength at which they are associated with desired outcomes. In addition to those nine activities, teachers likely engage in leadership activities associated with bell schedules, extra student support, safety issues, parental engagement, etc. among a multitude of additional activities. Similarly, response options for those

variables were just one way to measure teachers' engagement in those activities. Urick (2012) used a different set of leadership items with response options that slightly varied. Each approach was a reasonable guess given extant literature that could also be further refined and improved.

The result of well-reasoned guesses tends to be measurement of a phenomenon that is less precise, accurate, and valid. Initial exploratory descriptive results of the data used in this study show that leadership variables were highly collinear or dependent on one another. While this dependency should be attributed to within-person measurement (i.e., measures of the nine activities were all associated with one person), it also accounted for other meaningful sources of variability. That is, correlations among teacher and faculty leadership activities reflected amounts of time spent on leadership activities, individually meaningful leadership activities (i.e., see the *low leadership activity teachers with high planning activity* class in Chapter 3), and possibly sets of leadership activities aligned with distinct leadership philosophies. This is most clearly shown in Figures 2 and 3 in Chapter 2.

Most statistical models discard sensitivity to this variability in favor of orthogonal and homoscedasticity assumptions and thus lose meaningful information while performing suboptimally. These models perform suboptimally because they try to fit constrained models to data that lack shared assumptions. Both theory development and the translation of research to action are hindered by results that capture a phenomenon less precisely, accurately, or validly. Also in such results, important characteristics of a phenomenon may be missed as has been the case in teacher leadership research and as meaningfully corrected in this dissertation study. These missed but important characteristics are discussed below.

**A refined operationalization of teacher leadership activity**. Several features of teacher leadership activity were observed with implications for clear conceptualization of important but

missed characteristics. First, results presented in Chapter 3 demonstrated that virtually all teachers engage in some form of leadership activity throughout a typical week. Given the numbers of teachers in this sample, teachers in both formally designated leadership roles and teachers not in such roles reportedly engage in leadership activities throughout the week. Hence, if researchers are interested in teacher leadership activity as it occurs in schools, then teacher leadership activity items should include activities in which teachers engage both while in formally designated leadership positions and not in such positions. Moreover, researchers should consider administering these items to all teachers.

In the data used in Chapter 3, most teachers reported that they performed multiple leadership activities over the course of the week. Data used in Chapter 4 showed that faculties typically engage in seven of nine leadership activities (with the exceptions of selecting new teachers and setting school budgets). If future researchers are interested in measuring particular leadership activities, the nine activities measured in Chapter 3 and the seven measured in Chapter 4 were empirically useful in this study. Systematic reviews of the teacher leadership literature suggest other possible leadership activities relevant to teachers that may also be important in operationalizing the construct of teacher leadership activity (Nguyen et al., 2019; Shen et al., 2020).

Finally, some teachers reported spending over 10 hours on multiple leadership activities over the course of a typical work week. A sizable portion reportedly spent 3 to 5 hours on separate activities throughout a typical week. If teachers could only engage in one leadership activity at a time, then some teachers reportedly spent over 90 hours per week on leadership activities. Although participants' responses may have been made in error, it is likely that teachers are engaging in multiple activities simultaneously. For example, teachers can collaboratively

plan while participating in staff meetings. The response options used in this study did not accurately account for this phenomenon, thus offering less precise measurement of teacher leadership activity. More accurate measurement might disambiguate between activities performed and overall time spent on those activities, or a particular property of teacher leadership activity may be prioritized as the focus. Sensible prioritization may involve research focus on a primary source of variability for teacher leadership activity.

In this dissertation, *overall net leadership activity* was identified as the primary source of variability within teacher leadership activity and faculty leadership activity. Two different measurement approaches were used: ordinal responses of time spent on those leadership activities were utilized in Chapter 3, and categorical agreement responses related to schools' reliance on faculty to perform particular leadership activities were utilized in Chapter 4. Both approaches showed utility in accounting for a majority of the variability in teacher or faculty leadership activity. However, analyses in this dissertation could not concretely and precisely identify a latent construct for this source of variability. The latent construct was clearly related to *overall net leadership activity*, but it could be operationalized, for example, as observed counts of teachers engaged in leadership activities, perceptions of net influence, as reported time spent on activities, and school reliance on faculty to lead in schools. Each of these approaches would require different questions and possibly different methods of data collection.

Despite the manner in which this latent construct is measured, the meaningfulness of this primary source of variability was established in this dissertation in both chapters by an assessment of the relationships between teacher/faculty leadership activity and school climate for teachers. These relations revealed key characteristics for operationalizing teacher or faculty leadership activity. First, relationships between teacher leadership activity and organizational

school climate and those between faculty leadership activity and school climate were different. These differences suggest that teacher leadership activity is a multilevel construct in which there is utility in measuring each one separately.

Separate level analyses revealed a unique characteristic that has not been modeled in previous research on teacher and faculty leadership activity. Teacher leadership activity was a nonlinear construct while faculty leadership activity was a linear construct. That is, in relation to school climate for teachers, low-moderate amounts of teacher leadership activity shared the strongest associations with desired climates. Too much or too little teacher leadership activity were less associated with desired climates. In contrast, the more a school relied on faculty to lead, the more teachers reported the presence of desired climates.

However, this effect may have been an artifact of a focus on overall time spent on activities versus a focus on net reliance. It could have been that a faculty leadership activity time metric would demonstrate a nonlinear relationship with desired school climates such that faculties spending moderate amounts of time are most associated with the presence of desired school climates for teacher leadership and instruction. Regardless of the drivers of nonlinearity, teacher leadership activity and faculty leadership activity are, in important ways, a nonlinear phenomenon.

Secondary sources of variability also had utility in refining the operationalization of teacher and faculty leadership activity. *Individual leadership activities* proved to be secondary sources of variability although this did not change any measured trends between teacher leadership activity and dimensions of school climates. Should researchers be interested in *individual teacher leadership activities*, measures should include individual and collective planning. Both proved to meaningfully account for some variability. Future researchers might

also identify other activities that meaningfully account for variability. Regardless of the activities chosen for measurement, teacher leadership activity measurement may benefit from the inclusion of discrete teacher leadership activities. Similarly, activities might reflect sets of leadership activities, but evidence for sets of leadership activities was questionable, at best, in these results. Additional research is needed to determine if activities should reflect *sets of leadership activities*.

### Summary Measure of Net Teacher and Faculty Leadership Activity

Measures of teacher leadership activity should directly measure *net teacher leadership activity*. As previously discussed, leadership activities could be defined, and then teachers could be given questions such as, "How much time do you spend during a typical work week performing leadership activities?" Response options could be ordinal or continuous. This item could complement other questions about specific activities, sets of activities, or other conceptualizations of teacher leadership activity. Nevertheless, this item would capture a primary source of variability for individual-level teacher leadership. A similar item should be used to measure overall school-level net faculty leadership activity. The question, "How large of a role does faculty at your school play in your school's leadership?" could be asked instead, and response options could be *no role*, *a small role*, *a medium role*, or *a large role*.

### Relations Among Teacher Leadership Activity and School Climate for Teachers

This dissertation modeled relations among the activities teachers and faculty use to influence their schools and both (1) school climate and (2) classroom climate. As previously mentioned, patterns clearly showed a nonlinear relationship between teacher leadership and school climate and a linear relationship between faculty leadership and these same dimensions of

school climate. Results from Chapter 3 (Gardella, 2022) showed that teachers who engaged in low-moderate amounts of teacher leadership (*low leadership activity teachers with high planning activity*) more consistently reported the presence of desired school climates. Results from Chapter 4 showed that faculty who were relied on most to perform leadership responsibilities were at schools with greater reports of the presence of desired school climates. Together, these results appear to suggest that a school in which faculty are heavily relied on for important decision making, but one filled with teachers engaged in low-moderate amounts of leadership may provide the optimal balance. More research is needed to verify this claim.

## Two Recommendations for The Conceptual Framework for Teacher Leadership

The conceptual framework for teacher leadership established by York-Barr and Duke (2004) is the only organizing teacher leadership framework or theory of the teacher leadership process (Nguyen et al., 2019). Yet, it remains underspecified and underused. A number of components within this framework and relationships among the components specified by the framework were investigated in this dissertation. Study results offer two concrete recommendations to advance this framework. In addition to these two recommendations, further research is needed to continue the specification and operationalization of components and relationships among these components.

The first recommendation is to treat the teacher leadership process as a multilevel phenomenon. As described in detail, the results from this dissertation showed different relationships among (a) teacher leadership activity and school and classroom climates for teachers and (b) faculty leadership activity and school and classroom climates for teachers. There should be a level of the framework for teachers and another for school-level faculty.

The second recommendation is to include nonlinear relations among components where appropriate. As described, relationships among components are viewed as linearly related. The results and discussion in Chapter 3 noted finding a clear nonlinear relationship between teacher leadership activity and school climate for teachers. Analytic methods like latent class analysis (LCA) and latent profile analysis (LPA) permit the identification and modeling of nonlinearity. This is particularly important for practice as teachers should balance leadership activities with their teaching responsibilities.

## Overall Conclusion

Teacher leadership is overwhelmingly a clear and important part of schools with desirable teaching conditions. As a concept, teacher leadership continues to advance. A core primary source of variability within the teacher leadership process was identified in this study, providing direction for more concrete measurement and theory development. That is, measurement and theory building focused on teacher leadership activity should consider measuring overall net teacher leadership activity as a construct that accounts for meaningful variability. For example, a survey question for teachers might ask, "Over the course of a typical week, how much time do you spend on leadership activity?"

Finally, practitioners should take note. Despite calls for more teacher leadership, extreme amounts of teacher leadership activity do not appear to be ideal. Instead, schools with the most desirable school and classroom climates were those schools that heavily relied on their faculty for leadership but were filled with individual teachers engaging in only low to moderate amounts of leadership activity on a weekly basis. In other words, leadership activity appears to have been spread out among teachers in these schools. Teacher leadership is an important intervention for

positive school transformation, but too much teacher leadership may be counterproductive and may interfere with teachers actually teaching and having the time to genuinely care for their students.

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