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AIR is one of the world's largest behavioral and social science research and evaluation organizations. AIR's mission is to conduct and apply the best behavioral and social science research and evaluation toward improving people's lives, with a special emphasis on the disadvantaged.

# Iowa's Teacher Leadership and Compensation Program: Findings From 2016–17

## Evaluation of the Teacher Leadership and Compensation Program

The Iowa Teacher Leadership and Compensation (TLC) program was launched in the 2014–15 academic year with the following five goals<sup>1</sup>:

- (1) Attract able and promising new teachers by offering competitive starting salaries and offering short-term and long-term professional development and leadership opportunities.
- (2) Retain effective teachers by providing enhanced career opportunities.
- (3) Promote collaboration by developing and supporting opportunities for teachers in schools and school districts statewide to learn from each other.
- (4) Reward professional growth and effective teaching by providing pathways for career opportunities that come with increased leadership responsibilities and involve increased compensation.
- (5) Improve student achievement by strengthening instruction.

The TLC program was rolled out in three successive district cohorts, each covering approximately one third of Iowa's students:

- Cohort 1 in 2014–15 ( $n = 39$  districts)
- Cohort 2 in 2015–16 ( $n = 76$  districts)
- Cohort 3 in 2016–17 ( $n = 218$  districts)

The Iowa Department of Education contracted American Institutes of Research (AIR) to evaluate TLC in June 2015. The evaluation was designed to inform the Iowa Department of Education about TLC's progress related to implementation and intended goals.

The report updates the Year 1 implementation and outcome findings based on 2015–16 data. The findings on implementation are based on teacher and administrator surveys, interviews, and focus groups. Findings on outcomes include teacher retention and student achievement in TLC.

<sup>1</sup>These goals are available on the Iowa Department of Education's website: <https://www.educateiowa.gov/teacher-leadership-and-compensation-system>

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# Summary of Findings on Teacher Leadership and Compensation Implementation

Iowa educators overall held favorable views of the Teacher Leadership and Compensation (TLC) program, with views becoming more favorable over time. Large majorities of teachers and administrators perceived that TLC is effective for improving instruction and professional climate. Survey respondents in 2017 had more positive perceptions about teacher leadership roles, professional development supports for teachers, teacher collaboration, school climate, and effectiveness of TLC than in 2016. Increases in positive perceptions were found across all cohorts between 2016 and 2017, but were often the highest among respondents in Cohort 3 districts, which had not implemented the program at the time of the 2016 survey.

Teacher and administrator input on TLC implementation was generally consistent with expected progress in implementation of the program's services. Respondents perceived that TLC has provided teachers with additional opportunities for leadership and supports for collaboration and professional learning. Evidence also showed that TLC has encouraged teachers to stay in the profession, especially teacher leaders. Respondents from early adopting TLC cohorts (Cohorts 1 and 2) were more likely to perceive greater availability, frequency, or quality in TLC focus areas, including teacher leadership roles, professional development supports, and teacher collaboration. However, among the early adopting TLC cohorts, respondents in Cohort 2 districts often had more positive responses, on average, than respondents in Cohort 1 districts, where implementation had occurred for a longer period.

Surveys and focus groups indicated areas for improvement in teacher awareness and buy-in. Teachers who did not have teacher leadership roles and early career teachers were less familiar with the roles and supports provided by the program and tended to have less positive perceptions. Teachers also highlighted need for further clarity around the roles, responsibilities, and contributions of teacher leaders with respect to supporting teacher professional growth.

## Evaluation of TLC Implementation

To examine TLC implementation in 2016–17, we administered surveys and conducted focus groups and interviews in spring 2017. The findings about implementation in this report are based on the perspectives of four respondent groups: teachers, teacher leaders, school administrators, and district administrators.

### Surveys

We administered statewide online surveys to Iowa teachers, including teacher leaders, and to school and district administrators to obtain perspectives on TLC program implementation. The survey included items related to four potential areas of change related to the TLC program: teacher leadership roles and responsibilities, professional development and supports for teachers, opportunities for teacher collaboration, and perceived outcomes of TLC implementation. All Iowa

districts were included in the target survey sample, and all Iowa districts received the same set of survey items. This was the second administration of the TLC statewide surveys. The first administration was in spring 2016.

Overall, 42% of teachers ( $n = 16,949$ ), 58% of school administrators ( $n = 936$ ), and 30% of district administrators ( $n = 377$ ) in the Iowa Department of Education's (DE's) Basic Educational Data Survey database completed the survey. The survey sample was similar to the populations of teachers and administrators across the state, with a few exceptions (see Appendix A).<sup>2</sup> To reduce a large number of survey items to a smaller set of key constructs, we constructed scale scores by combining related survey items and calculated response percentages for the scale scores.<sup>3</sup> (See Box 1.).

### Box 1. Survey Scale Scores

Scale scores indicate the degree to which a measured construct is present (for example, the degree to which respondents agree to a set of statements about the utility of supports provided). Higher scores indicate a more positive perception, whereas lower scores indicate a more negative perception. We categorized these scores along the original response options for each construct (e.g., *disagree strongly*, *disagree somewhat*, *agree somewhat*, or *agree strongly*), where the lowest scale scores were categorized in the lowest response categories, and the highest scale scores were in the highest response categories. We then calculated percentages of respondents in each category in the scale to highlight the typical responses from surveyed teachers and administrators. For example, when we asked a series of questions about the presence of opportunities to advance into leadership roles, 86% of surveyed teachers were in either the *agree strongly* or *agree somewhat* range, indicating opportunities to advance were available and attainable in their school or district. We calculated overall percentages, as well as percentages by cohort and other subgroupings of respondents. For the findings presented in this report, we tested for cohort differences in the extreme category percentages, such as *agree strongly*. The survey methodological approach is presented in more detail in Appendix A.

The TLC cohort structure allowed us to compare survey responses among districts with different years of experience implementing the program (comparing Cohorts 1, 2, and 3). At the time this survey was conducted, Cohort 1 was in its third year of implementation, Cohort 2 was in its second year of implementation, and Cohort 3 was in its first year of implementation.

We also examined whether survey responses varied across districts based on district size tier (an approach for categorizing districts based on the number of students they serve),<sup>4</sup> Area Education Agency (AEA) that serves the districts, and the grade band the teacher and school administrators

<sup>2</sup> We examined the representativeness of our sample along years of experience, degree earned, and teacher role (whether the respondent is a teacher leader or a classroom teacher) using a raking technique (Battaglia, Hoaglin, & Frankel, 2009). Compared with the population of teachers and school and district administrators in Iowa, survey respondents were more experienced, earned more advanced degrees, and held higher level roles in their school or district (see Appendix A for details).

<sup>3</sup> We used the Rasch rating scale model (Wright & Masters, 1982), using Winsteps® (Linacre, 2015) for these analyses.

<sup>4</sup> District size tiers, as defined by the DE are as follows: 9,000 or more students (Tier 1), 2,500 students to 8,999 students (Tier 2), 1,000 students to 2,499 students (Tier 3), 600 students to 999 students (Tier 4), 300 students to 599 students (Tier 5), and fewer than 300 students (Tier 6).

serve (Grades K–5, 6–8, and 9–12).<sup>5</sup> For teacher respondents, we compared survey responses by teaching experience (early career vs. veteran teachers)<sup>6</sup> and teacher role (whether the respondent is a teacher leader or a classroom teacher<sup>7</sup>).<sup>8</sup>

Last, we compared responses for survey items that remained unchanged from the 2016 to the 2017 survey to examine whether the responses changed—overall or by cohort—across years.

## Focus Groups and Interviews

We invited a randomly selected group of Cohort 1, Cohort 2, and Cohort 3 teachers and teacher leaders collectively across six randomly selected districts to participate in 12 90-minute focus groups on TLC program implementation.<sup>9</sup> Forty classroom teachers (10 from Cohort 1, 12 from Cohort 2, and 18 from Cohort 3) and 45 teacher leaders (19 from Cohort 1, 11 from Cohort 2, and 15 from Cohort 3) participated in the focus groups. Teacher leaders included those in lead teacher, mentor teacher, model teacher, instructional coach, professional learning team leader, and curriculum or professional development leader roles. Focus groups utilized iClicker software, which allowed for quick and anonymous polling of the respondents.

We also interviewed a superintendent or assistant superintendent from each of the six districts, an AEA staff member from each region, and two education consultants at the DE.

AIR analyzed iClicker response data and transcripts for patterns, themes, and categories to determine the most important findings and key similarities and differences across the focus group and interview responses. Specifically, the themes, sentiments, and quotations presented herein represent common or similar sentiments expressed across two or more of the six participating districts as well as two or more individuals within a given focus group.

## Findings on TLC Program Implementation

The following sections provide findings related to the early implementation of TLC that focus on four main areas of potential change: teacher leadership roles and responsibilities, professional development and supports for teachers, opportunities for teacher collaboration, and perceived outcomes of TLC implementation. Each section begins with findings from the 2017 survey, followed by differences between the 2016 and 2017 surveys, and then by relevant or supporting findings from the focus groups. We highlight differences across the three TLC cohorts, between teacher

<sup>5</sup> Only teacher and school administrators' survey responses were examined by grade band, as district administrators were not asked about the grade bands with which they work (most likely all grade bands). Respondents could select multiple grade bands if they worked across the three populations; thus, a respondent could be included in multiple grade bands in the survey analysis.

<sup>6</sup> Early career teachers were defined as teachers who had been teaching for 3 years or less, and veteran teachers were defined as teachers who had been teaching at least 4 years.

<sup>7</sup> Classroom teachers were defined as teachers not in a formally designated leadership position.

<sup>8</sup> Teachers and teacher leaders completed the same survey.

<sup>9</sup> At each district, AIR conducted one focus group each with teachers and teacher leaders.

leaders and classroom teachers,<sup>10</sup> and between early career and veteran teachers. We further present contrasts between teachers in different grade bands, respondents from different AEAs, and respondents from different district size tiers in Appendix B.<sup>11</sup>

The findings are correlational and descriptive in nature and do not provide evidence about the effects of TLC in a causal framework. Differences in responses could be due to preexisting differences among districts and respondents.

## Perceived Outcomes and Teacher Satisfaction: Survey Findings

### **A large majority of teachers and administrators reported that TLC is effective in improving instruction.**

A majority of respondents (87% of teachers and 93% of administrators) were in the *agree somewhat* or the *agree strongly* range on a series of questions about the effectiveness of the TLC program in improving instruction. Respondents in Cohort 1 (39% of teachers and 53% of administrators) and Cohort 2 (38% of teachers and 47% of administrators) were significantly more likely to be in the *agree strongly* range than those in Cohort 3 (27% of teachers and 35% of administrators), indicating that TLC cohorts with more implementation experience were more likely to view the TLC program as effective.

### **A large majority of teachers and administrators reported that TLC had a positive impact on their professional work climate.**

Survey respondents were asked a series of questions about TLC-related changes in professional climate. Most teachers and administrators indicated that TLC is positively affecting their professional work climate. Larger percentages of administrators (95%) than teachers (84%) reported positive perceptions, in either the *agree somewhat* or the *agree strongly* range. Respondents in Cohort 1 (29% of teachers and 60% of administrators) and Cohort 2 (32% of teachers and 62% of administrators) were significantly more likely to be in the *agree strongly* range than those in Cohort 3 (23% of teachers and 49% of administrators), indicating that TLC cohorts with more implementation experience were more likely to view the TLC program as positively affecting their professional work climate.

### **A large majority of teachers reported that they look forward to returning to their school next year and that TLC has impacted their interest in returning.**

When asked whether they look forward to returning to their school next year, 92% of teachers responded either *agree somewhat* or *agree strongly*; responses were similar across cohorts. Of those

<sup>10</sup> Contrasts between teacher leaders and classroom teachers were examined for all cohorts combined, as well as separately for each cohort. The pattern of results was similar for the combined cohorts teacher leader versus classroom teacher contrasts and the disaggregated by cohort contrasts; thus, we present only the combined cohort contrasts here (see Appendix B for contrast results disaggregated by cohort).

<sup>11</sup> Significant differences in survey responses for the comparisons among groups are reported only when the percentage difference is at least 5%.

who responded either *agree somewhat* or *agree strongly*, 78% of teachers responded either *agree somewhat* or *agree strongly* that TLC has impacted their desire to return to their school next year.

### **Teacher leaders were more likely to report positive impacts about and satisfaction with TLC outcomes than classroom teachers.**

Compared with classroom teachers, teacher leaders were significantly more likely to be in the *agree strongly* range for perceived effectiveness of TLC (37% vs. 20%), significantly more likely to be in the *agree strongly* range for perceived positive changes in professional climate scale (31% vs. 13%), and significantly more likely to respond *agree strongly* that they look forward to returning to their school next year (70% vs. 63%).

### **Early career teachers were less likely to report positive impacts about and satisfaction with TLC outcomes than veteran teachers.**

Compared with veteran teachers, early career teachers were significantly less likely to be in the *agree strongly* range for perceived effectiveness of TLC (29% vs. 34%) and significantly less likely to be in the *agree strongly* range for perceived positive changes in professional climate (21% vs. 28%).

### **Teachers on the 2017 TLC survey had more positive perceptions about and satisfaction with TLC outcomes than teachers on the 2016 TLC survey.**

Teachers and administrators who responded to the 2017 TLC survey reported significantly more positive perceptions about TLC outcomes than teachers and administrators who responded to the 2016 TLC survey. From 2016 to 2017, there was a 13 percentage point increase in teachers in the *agree strongly* range for perceived effectiveness of TLC, a 10 percentage point increase in teachers in the *agree strongly* range for perceived positive changes in professional climate, and a 6 percentage point increase in teachers who responded *agree strongly* that they look forward to returning to their school next year. Differences between cohorts were small for teacher respondents.

Among administrators, significant differences across years were found only for Cohort 3 districts, which were not implementing the program in 2016. From 2016 to 2017, there was a 32 percentage point increase in Cohort 3 administrators in the *agree strongly* range for perceived effectiveness of TLC and a 46 percentage point increase in Cohort 3 administrators in the *agree strongly* range for perceived positive changes in professional climate.

## **Perceived Outcomes and Teacher Satisfaction: Focus Group and Interview Findings**

Teacher leaders and classroom teachers were asked to respond to the following two prompts during their focus group sessions: “*Through its focus on strengthening instruction, is the TLC initiative as designed, having an impact on student achievement?*” and “*As a direct result of the TLC program being implemented in my school, I am more committed to staying at my school and in the teaching*”

profession.” Respondents were asked to elaborate on how TLC had influenced instruction and whether or not TLC was currently having an impact on student learning and retention.

### **Classroom teachers reported improved learning and instruction through access to coaches.**

Classroom teachers from four districts explicitly noted that by having more opportunities to regularly meet, observe, and receive feedback and support from their full-time TLC teacher leaders their confidence and skills have improved. In turn, they have been able to implement and make changes to their instruction. One teacher who shared an experience about receiving coaching for differentiated instruction in reading:

*I was coached by our instructional coach this year. I was unfamiliar with how to design my own literature circles especially with the younger students. She was able to help me give me feedback and I was able to bounce ideas off of her about how to design those literature circles so that they'd be most effective for students. And that resulted in me being able to differentiate in my classroom a lot more. So, I was able to individualize instruction for groups and then even more so for particular students. So, that was very effective and I'm seeing some benefits from that with my students' engagement and with some of the work they're able to do on their own.*

Another classroom teacher was supported by a coach in implementing reading strategies with struggling students:

*Our TLC coach has given us lots of different ideas to practice fluency for kids and I remember one of the first ideas she gave me I thought, 'Oh, how can that work, one word at a time?' It's amazing how it works, I've never done it that way before. Another way too [the coach suggested] is after every guided reading book, we time them [the student] to see how many words per minute they can read. We can keep an eye on that and then that's how we can, you know, if we want to move them in groups or whatever.*

A third teacher reported on the support received around examining data and how to differentiate instruction based on student needs:

*I had a coach come in and work with me on data, trying to interpret the best route for specific students to take. She came in and helped me collect data from the kids and then use that data to best make decisions on where they need to go. The kids that we were working with specifically is a small group of kids who are non-proficient students from the beginning, and so we were trying to differentiate, based on their needs. The [data] coach was wonderful in coming in and helping me go through the data and figure out best practices for those kids. And then not just one time deal. Make it an ongoing process. So, she checks in with me on a regular basis on working with data, so I appreciate that a lot.*



## Respondents perceived increases in use of formative assessments.

Classroom teachers and teacher leaders from across all six districts reported that the systematic collection, use, or analysis of formative assessments to track student growth has increased since TLC implementation. As one respondent noted, *“At the elementary level, we have goals that are established on improvement in reading and mathematics, and the data is collected either monthly or every other month on those two subject matters.... They’re formative in the sense that we’re tracking it and we’re using that as growth, as baseline data for growth.”*

## Respondents indicated it is too early to determine whether TLC is having impact on student achievement.

More than three quarters of classroom teachers and teacher leaders observed that it is too early to have or see improvements in student achievement through TLC. As one teacher explained:

*I think there are a lot of factors that affect student achievement, and I think TLC is a good one. But like I said...there are a lot of other factors that are involved...different initiatives. Your different types of rules or structures through schools, policies. There are lots of different things.... It’s too early to tell, but I think that we’re going to see an impact on student achievement, because I think that we’re doing a better job.*

## Most teacher leaders indicated that TLC had helped improve retention in their own ranks.

Across the six districts, teacher leaders discussed five key benefits that increased their commitment to the job that could be directly attributed to TLC. These included increased support received from their fellow teacher leaders, reduced feelings of working in silos or on “isolated islands,” opportunities to grow professionally, more opportunities to work with different teachers across districts, and the increase in salary or compensation. As one teacher leader explained, *“There are more opportunities...to work with other teachers within the district. And so that opens you [and them up] for more collaboration.”* Teacher leaders also reported that because of these supports and sense of community, TLC has helped to retain other teacher leaders who would have otherwise left or retired early. As one teacher leader commented, *“I was thinking of what it would be like without TLC, I think I would abandon ship, because I would feel like I’m in this with no support, and it just seems like it [TLC] is going to be here and it changes how we do things here.... And if TLC wasn’t there to help us and support us, I think I would jump ship.”*

## Some teachers reported that TLC was beneficial for teacher retention.

Approximately three fourths of the classroom teachers indicated that there were more important factors than TLC for teachers’ decisions about leaving their school or profession or that TLC had little or no impact on their decisions. As one teacher explained, *“I stay because I love the kids. But it’s not negatively impacting or positively impacting my decision one way or the other having this TLC grant.”* The other quarter of respondents agreed that they were more committed to staying in their schools or in the teaching profession due to TLC.

## Teacher Leadership Roles and Responsibilities: Survey Findings

### **A large majority of teachers and administrators perceived teacher leadership roles as effective.**

When asked a series of questions about the effectiveness of teacher leadership roles, a majority of respondents (92% of teachers and 99% of administrators) were in the *agree somewhat* or *agree strongly* range. Teachers in Cohort 1 (48% of teachers) and Cohort 2 (51% of teachers) were significantly more likely to be in the *agree strongly* range than teachers in Cohort 3 (40% of teachers), indicating that TLC cohorts with more implementation experience were more likely to view the teacher leadership roles as effective.

### **A large majority of teachers and administrators perceived that the teacher leader selection process was fair and transparent.**

A majority of respondents (88% of teachers and 95% of administrators) were in the *agree somewhat* or *agree strongly* range on a series of questions about the fairness and transparency of the teacher leader selection process. Respondents in Cohort 2 (51% of teachers and 71% of administrators) and Cohort 3 (52% of teachers and 71% of administrators) were significantly more likely to be in the *agree strongly* range than those in Cohort 1 (44% of teachers and 48% of administrators), suggesting there was some variation in respondents' perceptions related to the teacher leader selection process by implementation experience.

### **Most teachers and administrators were familiar with teacher leadership roles.**

Survey respondents were asked about how familiar they were with teacher leadership roles in their districts. Teachers in Cohort 1 (77% of teachers) and Cohort 2 (76% of teachers) were significantly more likely to indicate that they are *very familiar* with teacher leadership roles than teachers in Cohort 3 (67% of teachers). Administrators reported greater familiarity than teachers. The differences between cohorts were small and nonsignificant for administrators: 82% in Cohort 1, 89% in Cohort 2, and 82% in Cohort 3.

### **A large majority of teachers reported that opportunities to assume teacher leadership roles were available.**

Overall, 28% of surveyed teachers indicated that they held a teacher leadership role. Differences between cohorts were small: 26% in Cohort 1, 31% in Cohort 2, and 28% in Cohort 3.<sup>12</sup>

Survey respondents were asked to indicate what teacher leadership roles are available in their school or district. All three cohorts were largely similar in the types of teacher leadership roles they identified as available in their schools or districts (Figures 1 and 2). Administrators were more likely than teachers to report the presence of teacher leadership roles.

<sup>12</sup> The percentages presented for this survey item are unadjusted (i.e., raw) percentages so as not to inflate the results when adjusting for teacher role held.

Surveyed teachers also were asked a series of questions about the presence of opportunities to advance into leadership roles. Most teachers perceived there were opportunities for leadership; 86% of surveyed teachers were in the *agree strongly* or *agree somewhat* range. However, teachers in Cohort 2 (44% of teachers) were significantly more likely to be in the *agree strongly* range for perceived presence of opportunities to advance into leadership roles than teachers in Cohort 1 (39% of teachers) and Cohort 3 (38% of teachers).

### **Teacher leaders were more aware of and had more positive perceptions about teacher leadership roles than classroom teachers.**

Teacher leaders reported significantly more positive perceptions about teacher leadership roles than classroom teachers. Compared with classroom teachers, teacher leaders were more likely to indicate that they were *very familiar* with teacher leadership roles (82% vs. 41%), more likely to be in the *agree strongly* range for perceived presence of opportunities to advance into leadership roles (49% vs. 13%), more likely to be in the *agree strongly* range for perceived effectiveness of teacher leadership roles (47% vs. 38%), and more likely to be in the *agree strongly* range for perceived fairness and transparency of the teacher leader selection process (54% vs. 36%).

### **Early career teachers were less familiar with and had less positive perceptions about teacher leadership roles than veteran teachers.**

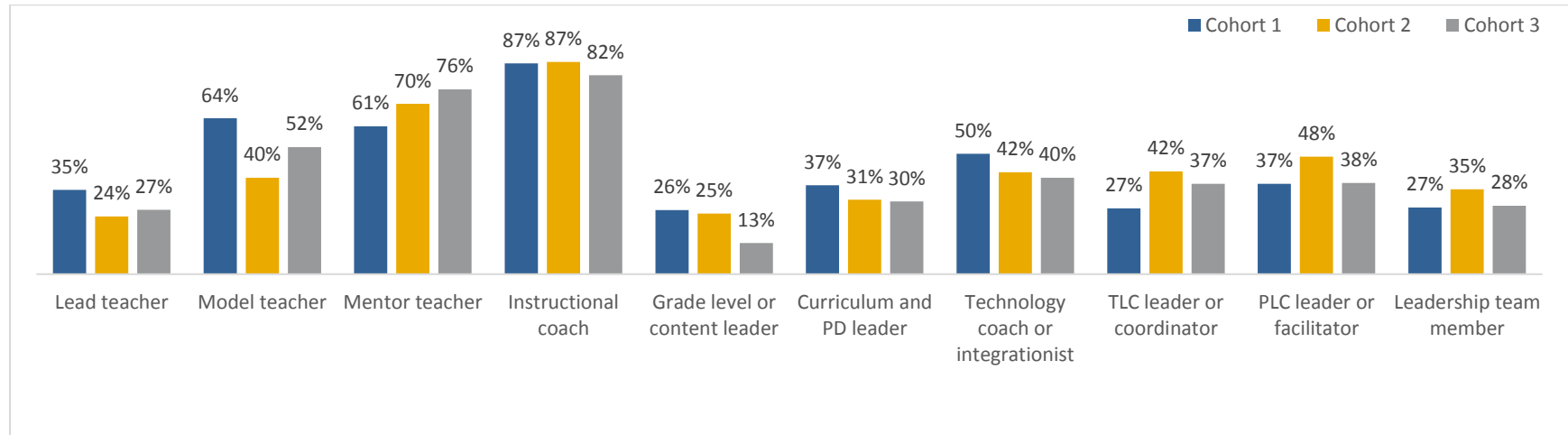
Early career teachers were significantly less likely to indicate they were *very familiar* with teacher leadership roles than veteran teachers (51% vs. 77%). Early career teachers were also significantly less likely than veteran teachers to be in the *agree strongly* range for perceived presence of opportunities to advance into leadership roles (31% vs. 42%) and for perceived fairness and transparency of the teacher leader selection process (43% vs. 51%).

### **Respondents on the 2017 TLC survey had more positive perceptions about teacher leadership roles than respondents on the 2016 TLC survey.**

Teachers and administrators who responded to the 2017 TLC survey reported significantly more positive perceptions about teacher leadership roles and responsibilities than teachers and administrators who responded to the 2016 TLC survey. From 2016 to 2017, there was a 30 percentage point increase in teachers who were *very familiar* with teacher leadership roles, a 20 percentage point increase in teachers in the *agree strongly* range for perceived presence of opportunities to advance into leadership roles, and a 5 percentage point increase in teachers in the *agree strongly* range for perceived effectiveness of teacher leadership roles. In addition, there was a 14 percentage point increase in administrators who were *very familiar* with teacher leadership roles and a 15 percentage point increase in administrators in the *agree strongly* range for perceived effectiveness of teacher leadership roles.

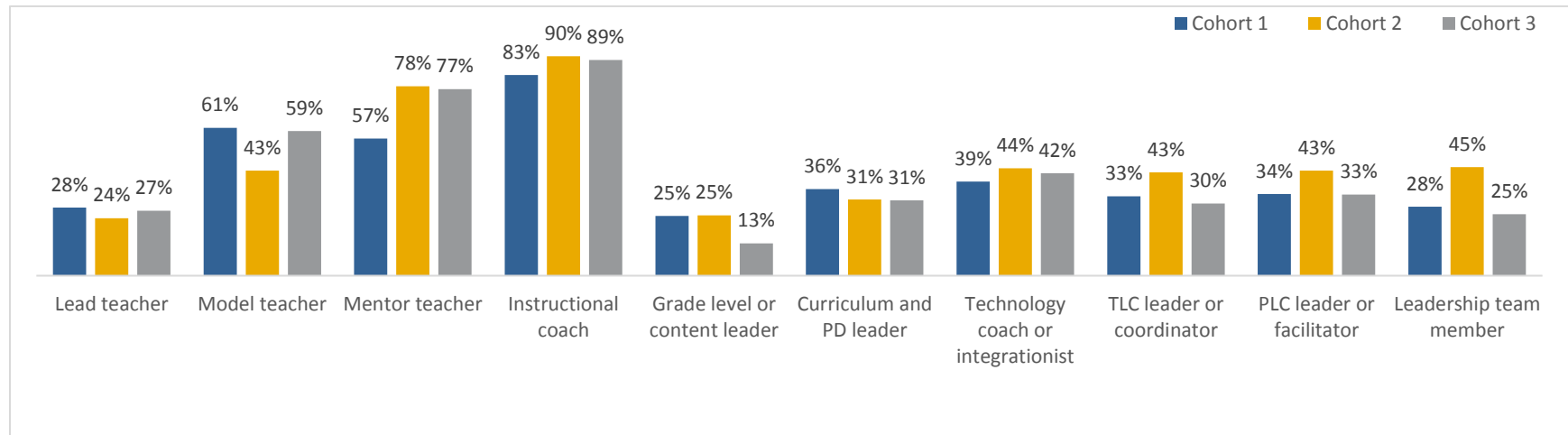
Increases in positive perceptions about teacher leadership roles were found across all cohorts; however, increases were generally highest for Cohort 3, which started implementing TLC in 2016–17 (i.e., Cohort 3 was not implementing TLC when the 2016 TLC survey was administered).

**Figure 1. Percentage of Surveyed Teachers Who Reported Available Teacher Leadership Roles in Their School or District**



Note. Sample sizes for surveyed teachers and teacher leaders:  $n_{c1} = 4,944$ ,  $n_{c2} = 4,370$ ,  $n_{c3} = 7,024$ . Response options selected by less than 10% of respondents, on average, and response options *Other* and *Do not know* were omitted.

**Figure 2. Percentage of Surveyed Administrators Who Reported Available Teacher Leadership Roles in Their School or District**



Note. Sample sizes for surveyed administrators:  $n_{c1} = 341$ ,  $n_{c2} = 379$ ,  $n_{c3} = 578$ . Response options selected by less than 10% of respondents, on average, and response options *Other* and *Do not know* were omitted.

## Teacher Leadership Roles and Responsibilities: Focus Group and Interview Findings

To assess the extent to which TLC has rewarded teachers with professional growth opportunities, teacher leader and classroom teacher focus group respondents were asked to respond to the prompt, “As a result of TLC implementation, there are more meaningful opportunities for teachers to assume leadership roles at our schools.” Teachers and teacher leaders were then asked a series of key follow-up questions asking them to identify the types of teacher leadership roles available and to discuss the selection process for teacher leaders and whether teacher leadership roles were clearly defined, communicated, and transparent.

### TLC provides teachers opportunities to assume an array of leadership roles.

Classroom teachers and teacher leaders from all six districts reported that TLC provided both new and different leadership role opportunities in their schools. As one teacher leader explained, “Before the TLC program we didn’t have some of these opportunities to showcase other talents as educators.” When asked to identify the types of positions that were created as a result of TLC, respondents most frequently cited formalized instructional, technology, and data coach positions. These coaching positions were held by a select few individuals, who were often responsible for providing school-wide support to teachers. As one respondent explained:

*Usually, the coaches ask to meet with you sometimes, on a regular basis....then I feel free to also contact them if I need to have something clarified.... They’re around. We’re not that big a school, so you usually see your, guy right across the hallway. I think it can be informal, formal, and I don’t think that [the need] has to be in the classroom [in order for them] to provide help [to you] either. It comes in a variety of ways.”*

Other teacher leader positions such as mentors, model teachers, and professional learning team (PLT) leaders were described as being more accessible and available to any interested subject and grade-level teacher as a result of TLC implementation.

However, respondents across all six districts also noted that these types of positions were already in place prior to TLC.

### The process for filling full-time teacher leadership positions follows a formal process in the majority of districts, which was seen as fair and transparent by most respondents.

Classroom teachers from five districts reported that their district’s process for selecting full-time teacher leaders was clear. According to respondents, the process often entailed the submission of formal application, followed by interviews with administrators or members of the school’s

The information is out there. If you want one of those [teacher leader] positions, you know what [you have] to do to apply for it [and] what the criteria are.... The information was very clear. They [classroom teachers] had multiple meetings at multiple buildings about what the [TLC] program would entail and the application process. Everything was very transparent.”

- Cohort 2 teacher leader

instructional leadership team (ILT). One classroom teacher highlighted the district's process by stating, *"The positions are posted and everyone knows what they need to do to apply. An e-mail is also sent out about the application process."* Classroom teachers from the sixth district were unaware or unsure of their district's process.

Similarly, teacher leader focus group respondents from across five districts confirmed that candidates for full-time TLC teacher leader roles had to submit their résumé and application as well as be interviewed by the superintendent, school principal, and teachers. As one teacher leader explained, *"I participated last year and it was a very balanced interview committee and a very balanced process."* The selection process often focused on a candidate's knowledge of instructional design and cultural competency.

The process for selecting individuals for these full-time teacher leadership positions was perceived as fair and transparent by about three fourths of all focus group respondents.

### **Some respondents perceived their district's process for selecting part-time teacher leadership positions as too informal.**

Teacher leader positions available through the district that were considered supplemental to a full-time teaching position (e.g., mentors, model teachers, PLT leaders, and curriculum coordinators) often had a less formal application process. According to respondents in three districts, the selection process was informal and included open principal requests, being "volunteered by the school administration if no one expressed interest," or nominations for less experienced teachers because they "needed the experience" or the veteran teachers "did not want to leave the classroom." This approach, according to six classroom teachers from three districts, it often meant that individuals who were not the most invested or qualified were selected.

When asked to elaborate on this less formal approach, 14 teachers indicated that it signaled that school or district leaders did not value these positions as much as the full-time TLC teacher leader positions. As one classroom teacher explained, *"I can't help but to think...does this process really get you the best candidate? I question that. I don't know if our current process always gets you the best candidates by just sending out an e-mail and hoping someone responds."*

### **Teachers expressed some concerns about clarity and expectations for teacher leader roles.**

Most respondents were aware of the various TLC leadership opportunities in their schools or districts. However, classroom teachers from five out of the six districts reported concerns about transparency and limited communication regarding expectations for individuals serving in certain roles, such as mentors and model teachers, and the length of time required of someone in those leadership positions. Teacher leaders from two districts also expressed the need for more clarity from their administration about what is expected of them. As one teacher leader commented, *"You just kind of got to chart those seas as you go.... You don't know what the administrative team thinks that you're going to accomplish on the job."* This lack of clarity resulted in some individuals stating that they personally opted not to apply for these positions.

## Supports for Teachers: Survey Findings

### **A large majority of teachers indicated that professional development supports were useful and of high quality.**

Surveyed teachers responded to two sets of items on professional development, one about the utility of available supports and the other about the quality of available supports for improving instruction. Most teachers were in either the *agree somewhat* or *agree strongly* range for perceptions about the utility (86%) and quality (86%) of the supports provided. Teachers in Cohort 2 (38% of teachers) were significantly more likely to be in the *agree strongly* range for perceived utility of supports than teachers in Cohort 3 (32% of teachers). Similarly, teachers in Cohort 2 (37% of teachers) were significantly more likely to be in the *agree strongly* range for perceived high quality of supports than teachers in Cohort 3 (32% of teachers).

### **Teacher leaders were more likely to perceive professional development supports as useful than classroom teachers.**

Teacher leaders were significantly more likely than classroom teachers to be in the *agree strongly* range for perceived utility of supports (37% vs. 26%) and for perceived high quality of supports (36% vs. 27%).

### **Nearly all teachers participated in professional development.**

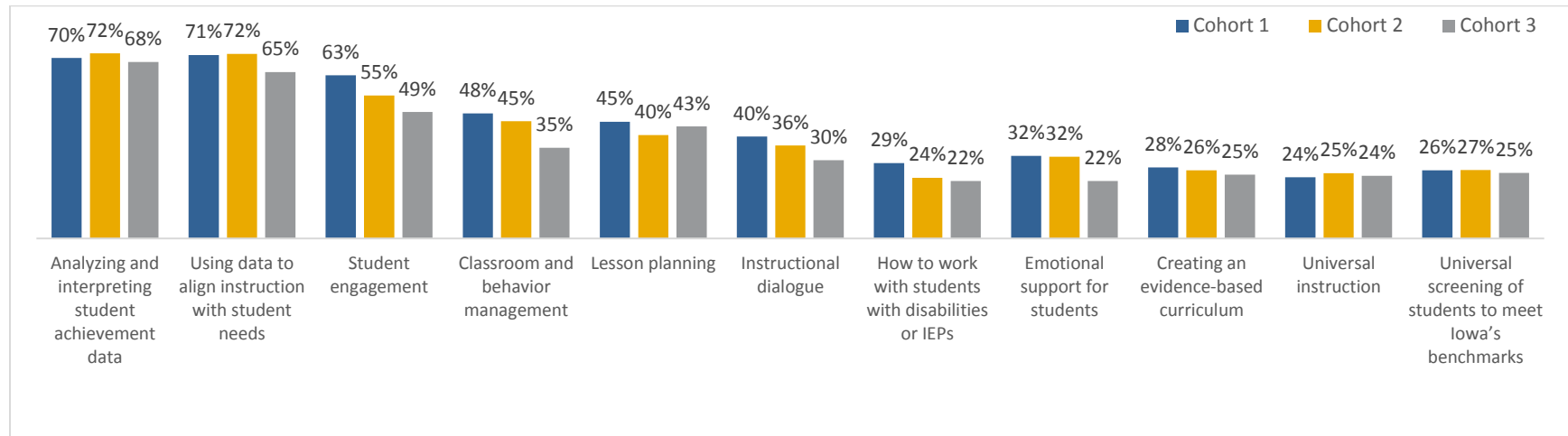
Survey respondents were asked about the professional development supports available in their school or district. Across all three TLC cohorts, 99% of surveyed teachers indicated that they participated in some kind of professional development in the 2016–17 school year.

Teachers and administrators across all three cohorts reported professional development supports covering a variety of topics (Figures 3 and 4). Teachers in Cohort 1 and 2 districts were more likely to indicate that most of the professional development supports listed are offered than teachers in Cohort 3 districts, suggesting that TLC cohorts with more implementation experience had more supports available. In nearly all cases, a higher percentage of administrators indicated that professional development supports are offered than teachers.

### **Teachers in 2017 reported more favorable views of professional development supports than teachers in 2016.**

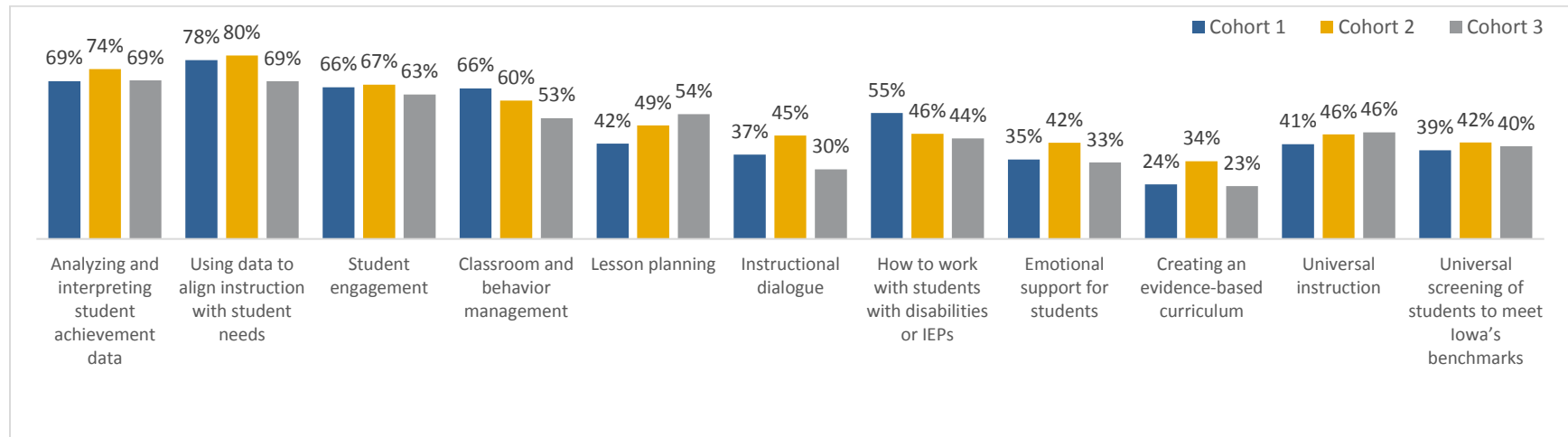
Teacher respondents in 2017 were more likely to agree that professional development supports were useful and of high quality than 2016 teacher respondents. There was a 12 percentage point increase in teachers in the *agree strongly* range for perceived utility of supports and a 10 percentage point increase in teachers in the *agree strongly* range for perceived high quality of supports. Increases in positive perceptions about professional development supports between 2016 and 2017 were found across all cohorts. The increases were slightly higher for Cohort 3 (an increase of 15 percentage points for support utility and an increase of 14 percentage points for support quality) than other cohorts.

**Figure 3. Percentage of Surveyed Teachers Who Reported the Following Teacher Supports Offered in Their School or District**



Note. Sample sizes for surveyed teachers:  $n_{c1} = 4,975$ ,  $n_{c2} = 4,366$ ,  $n_{c3} = 7,032$ . Omitted response options include *Other* and *None of the above*.

**Figure 4. Percentage of Surveyed Administrators Who Reported the Following Teacher Supports Offered in Their School or District**



Note. Sample sizes for surveyed administrators:  $n_{c1} = 337$ ,  $n_{c2} = 369$ ,  $n_{c3} = 576$ . Omitted response options include *Other* and *None of the above*.



## Supports for Teachers: Focus Group and Interview Findings

Focus group respondents were asked to respond to the prompt, *“I have participated in targeted professional development opportunities geared at specifically improving my skills or effectiveness as a classroom teacher [or teacher leader].”* This prompt and follow-up questions gathered perceptions about the extent to which professional development since TLC implementation commenced was job-embedded, individualized, and high quality, and insights on the roles of teacher leaders in facilitating professional development opportunities.

### **Classroom teachers perceived their professional development opportunities as being tailored to their needs, drawing from a mixture of job-embedded and one-size fits all approaches.**

Respondents were asked if the professional development opportunities they received since TLC were tailored to their unique needs or considered more of a one-size-fits-all model. Classroom teachers across four districts reported that elements of their professional development were often predetermined by the school administration or ILT, but sometimes teachers were given an opportunity to select or engage in professional development based on their interests. A small subset of respondents noted that an added benefit of TLC was having the opportunity to select and attend trainings on topics that were tailored to help them build their own skills while addressing the needs of their students. According to one classroom teacher, *“It [the PD] has been very beneficial.... We did some stuff [in our PLT] about some common misconceptions in math and some of the mistakes that we all make as math teachers... These are the misconceptions the kids are making. So, that [PD] was very beneficial. We did a half-day and then we did the standards stuff in the afternoon, so it was good.”* Prior to TLC, professional development was perceived as being one size fits all and did not always address the unique needs of the teachers or students in the classroom.

### **Professional development for teacher leaders was perceived as being of good quality, with some areas for improvement.**

Teacher leader focus group respondents across four districts reported that their own professional development through TLC, facilitated primarily by AEAs or outside providers, was of good quality. From the perspective of one teacher leader, *“There have been some very, very good workshops that have come out of this whole teacher leadership compensation thing such as that workshop on instructional design. It was great. It was really well done.”* The teacher leaders from the two other districts identified several topic areas in which they wanted additional support. This included methods on how to teach to adults, strategies on how to engage reluctant PLT members, tips on getting buy-in from peers, and working with colleagues to develop data-informed goals.

### **Some classroom teachers were unsure about the roles of their teacher leaders in providing professional development support.**

District administrators and teacher leader focus group respondents perceived teachers as having access to a range of professional development opportunities through TLC teacher leaders. The primary mechanism for professional development was through PLTs or Professional Learning

Communities (PLCs). According to one district administrator:

*[Teachers] are provided the opportunities to go to things provided by the AEA.... And then they participate in the PLCs and the discussion here at the district in our monthly meetings with the PLC leaders. So they have that support ongoing monthly and then they also have the opportunity to go to other...trainings to grow. Beyond PLCs, they have...regularly scheduled time around building goals that TLC will support."*

Classroom teachers from three districts reported that although they were aware of the professional development opportunities available to them, they were unclear about the roles of some of the part-time teacher leaders who were charged with providing this support. Ambiguity or inadequate communication about the role of the model teachers in two of these districts resulted in limited understanding about the purpose of some teacher leader positions and how they support classroom teachers. As one respondent stated, *"It's just the lack of communication of what their role is... They [the teacher leaders themselves] may not even know exactly what their role is, so they're not able to even communicate that piece of it. It's just a lot of unknown."* Teacher leaders from these same three districts reported that steps were being taken to increase awareness and clarity to all staff.

For the three remaining districts, respondents reported more clarity about the role of their teacher leaders and the supports they were responsible for providing, due in part to the smaller size and rural location of their districts and schools. This dynamic lent itself to people having to work more closely with one another because of fewer resources or individuals wearing multiple hats. According to one respondent, *"It's much easier for us [as a rural district] to know who the teacher leaders are because we're all friends and we all know each other."*

## Teacher Collaboration: Survey Findings

### **A large majority of teachers were satisfied with teacher collaboration and perceived collaboration as effective.**

Surveyed teachers responded to two sets of items related to the quality of teacher collaboration: one about their satisfaction with and perceived utility of teacher collaboration, and the other about the effectiveness of teacher collaboration in improving student achievement and teacher instruction. Most teachers were in either the *agree somewhat* or *agree strongly* range on survey scales for their perceptions about the satisfaction with (88%) and effectiveness of (85%) teacher collaboration. Teachers in Cohort 2 (32% of teachers) were significantly more likely to be in the *agree strongly* range for perceived satisfaction with teacher collaboration than teachers in Cohort 1 (26% of teachers) and Cohort 3 (24% of teachers). Teachers in Cohort 1 (37% of teachers) and Cohort 2 (40% of teachers) were significantly more likely to be in the *agree strongly* range for perceived effectiveness of teacher collaboration than teachers in Cohort 3 (32% of teachers), indicating that respondents in TLC cohorts with more implementation experience were more likely to view teacher collaboration as effective.

### **Teacher leaders were more likely to perceive collaboration as effective than classroom teachers.**

Compared with classroom teachers, teacher leaders (37%) were significantly more likely to be in the *agree strongly* range for perceived effectiveness of teacher collaboration (30%).

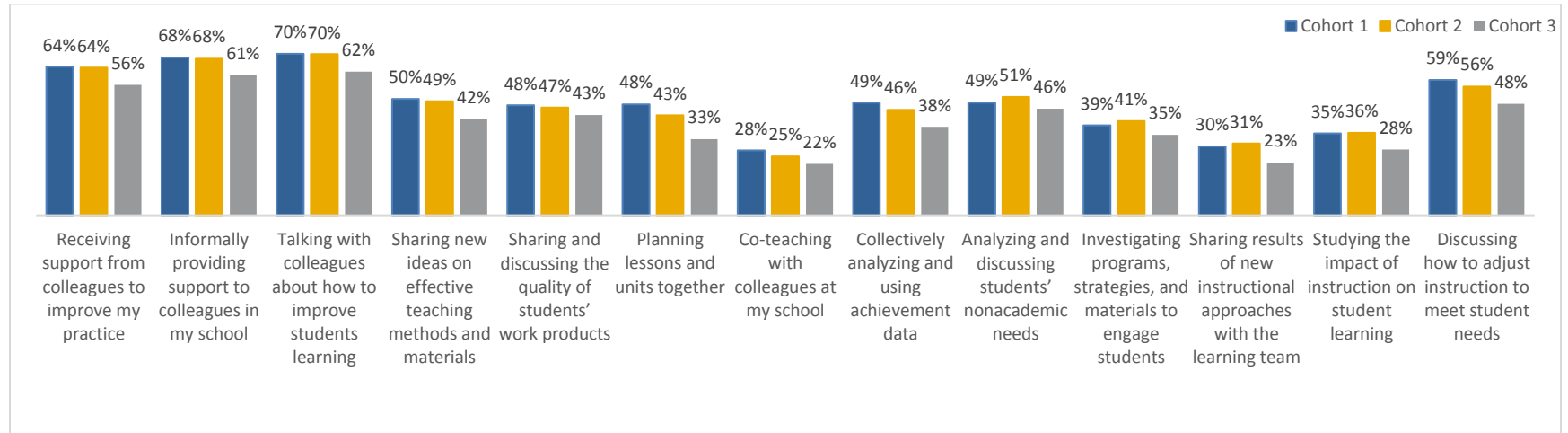
### **More respondents in Cohort 1 and 2 districts reported participating in weekly teacher collaboration activities than respondents in Cohort 3 districts.**

The types of collaboration activities teachers participated in differed across Cohort 1 and 2 districts (Figures 5 and 6). Respondents in Cohort 1 and 2 districts were more likely to report that teachers participate in weekly collaboration activities than respondents in Cohort 3 districts, suggesting that TLC cohorts with more implementation experience more frequently participate in weekly collaboration activities. In all cohorts, teachers and administrators generally had similar perceptions about the frequency of collaboration.

### **Teachers reported similar perceptions about satisfaction with teacher collaboration in 2016 and 2017.**

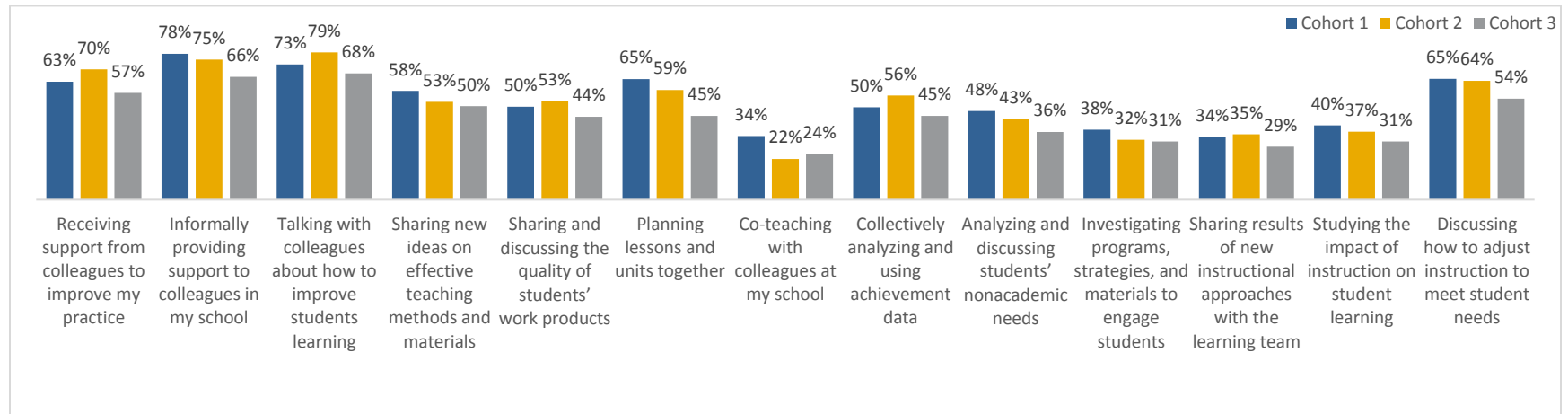
From 2016 to 2017, there was no change in the overall percentage of teachers in the *strongly agree* range for perceived satisfaction with teacher collaboration. However, there were small significant changes in the percentage of teachers in the *strongly agree* range from 2016 to 2017 within cohorts: a 3 percentage point increase for teachers in Cohorts 2 and 3 and a 4 percentage point decrease for teachers in Cohort 1.

**Figure 5. Percentage of Surveyed Teachers Who Reported That Teachers Participate in the Following Collaboration Activities at Their School at Least Once a Week**



Note. Sample sizes for surveyed teachers:  $n_{c1} = 4,974$ ,  $n_{c2} = 4,383$ ,  $n_{c3} = 7,078$ . Responses for *observing colleagues teaching practice* and *having colleagues observe my teaching practice* were endorsed by less than 15% of respondents, on average, and were not included in this figure.

**Figure 6. Percentage of Surveyed Administrators Who Reported That Teachers Participate in the Following Collaboration Activities in Their School at Least Once a Week**



Note. Sample sizes for surveyed administrators:  $n_{c1} = 329$ ,  $n_{c2} = 364$ ,  $n_{c3} = 568$ . Responses for *observing colleagues teaching practice* and *having colleagues observe my teaching practice* were endorsed by less than 15% of respondents, on average, and were not included in this figure.

## Teacher Collaboration: Focus Group and Interview Findings

Focus group respondents were given the prompt, “*With the implementation of TLC, there are opportunities for teachers to engage in high-quality collaboration with their peers in their school.*” Respondents were then asked a series of questions about how the quality of collaboration opportunities had changed since TLC implementation and what benefit, if any, they received by participating in such opportunities. A description of these collaborative opportunities, as experienced by classroom teachers and teacher leaders, are highlighted next.

### Since implementation, TLC has offered teachers more flexibility and opportunities to collaborate with their peers.

Classroom teachers and teacher leaders from across all six focus group districts reported that TLC had offered teachers opportunities and flexibility to determine how they wanted to engage in collaboration with their peers. As one teacher leader explained, “*I’ve been here long enough to see how things looked compared to TLC. And I am a data team facilitator too.... For me the change from the last couple of years to now is the flexibility of what we can do within our collaborative teams.*” These respondents also reported that TLC has provided more opportunities to engage in intentional collaboration with their peers than was in place prior to the program, such as classroom or peer observations or weekly mandatory PLC or PLT meetings. When asked how TLC has specifically impacted teacher collaboration, teacher leaders reported that TLC, through the use of PLTs or PLCs, created an environment in which dedicated time was spent each week for all staff to collaborate.

According to some veteran teachers, this dedicated time and sense of community did not exist prior to TLC. From the perspective of one respondent:

*I’ve taught for 30 years, and so I’m kind of set in what I’m thinking I’m going to be doing.... But I think it’s a good opportunity for younger people. I look at PLT kind of like networking, I think, in business where you’re making connections with people. When I first started teaching, I was it. I was the only social studies teacher in the school. And you know, so you didn’t have opportunity. And there was no email or any of that stuff, so you basically figured out on your own or you found another job. And so, things have changed, and I can see that as a positive.*

### Teachers shared concerns that the relevance of PLCs or PLTs was limited for non-core teachers.

Several non-core subject teachers (e.g., art, physical education, special education) across four districts reported feeling that the PLTs were not applicable or helpful to them. As one respondent explained, “*I think some challenges for some happens to be the makeup of the team. For example, in a content area, sometimes you will have other people who are not really a part of that content, but there’s not really any other place for them to go. So, sometimes what is happening in a meeting is not necessarily relevant to all members that are part of that PLT.*” Another respondent elaborated by stating, “*There’s a few people that they just don’t fit because of what they teach, so within our group, if you’re a math teacher, it [the PLT] works very well for you, but if you’re not a math teacher, you could have a hard time finding how this is this relevant.*”

## Summary of Findings on Teacher Leadership and Compensation Outcomes

Teacher retention and student achievement from the first 3 years of program implementation indicate that the program has not resulted in substantial change, on average, at this point. Retention at the school and district levels remained largely unchanged after TLC implementation for all three TLC cohorts. Similarly, achievement on the Iowa Assessments remained largely unchanged among all students on average within TLC cohorts, compared with pre-TLC averages. Slight negative changes (1 to 2 points) were detected for Cohort 1 and slight positive changes (1 to 2 points) were detected for Cohort 2. However, the methods used, with a large statewide sample, allow detecting small changes of this magnitude that may not be meaningful in practice.

There was some evidence of differential effects for different samples of students. After TLC implementation, achievement tended to increase in smaller districts and decline in larger districts, and it tended to decline in elementary grades and either increase or remain unchanged in higher grades. These differential effects suggest that local TLC programs may face more challenges in certain types of districts and schools. In addition, after TLC implementation, achievement tended to decline somewhat for English language learners (ELLs), students eligible for free or reduced-price lunch (FRPL), and students with an individualized education program (IEP), relative to pre-TLC averages. These differential effects for students may indicate challenges in equitable access to supports provided through TLC.

Considering the favorable perspectives and perceived benefits of TLC among teachers and administrators, it may take more time to observe any impacts of TLC-related supports on outcomes like achievement and teacher retention.

## Evaluation of TLC Teacher Retention

To examine the relationship between TLC and teacher retention, we calculated the percentages of teachers retained at their schools and districts from 2005–06 to 2016–17 for each TLC cohort separately. We then plotted the percentages across the school years to compare teacher retention trends prior to TLC implementation and after TLC implementation for each cohort. This approach allowed examining teacher retention for 3 years of TLC implementation for Cohort 1, for 2 years of TLC implementation for Cohort 2, and for 1 year of TLC implementation for Cohort 3. In addition, we estimated predicted post-TLC probabilities of teacher retention (estimated using the DE's administrative data prior to TLC implementation) for each cohort and post-TLC school year to examine whether the observed post-TLC retention rates are what we would expect them to be for each cohort.

We also plotted school- and district-level retention rates by years of teaching experience (0–3 years, 4–9 years, 10–19 years, and 20 or more years) and the grade band in which the teacher teaches (Grades 0–5, 6–8, and 9–12) to determine whether teacher retention varied by teaching experience and grade band taught.

## Findings on TLC Program Teacher Retention

This section describes findings about the relationship between TLC and teacher retention in the first 3 years of program implementation, including overall retention of teachers in schools and districts in Iowa followed by retention related to subgroups.

The findings are correlational and descriptive in nature, and the findings should be interpreted with caution. Differences in retention could be due to preexisting differences among districts and teachers. Additional details about the analyses are provided in Appendix C, and tables of the findings are presented in Appendix D.

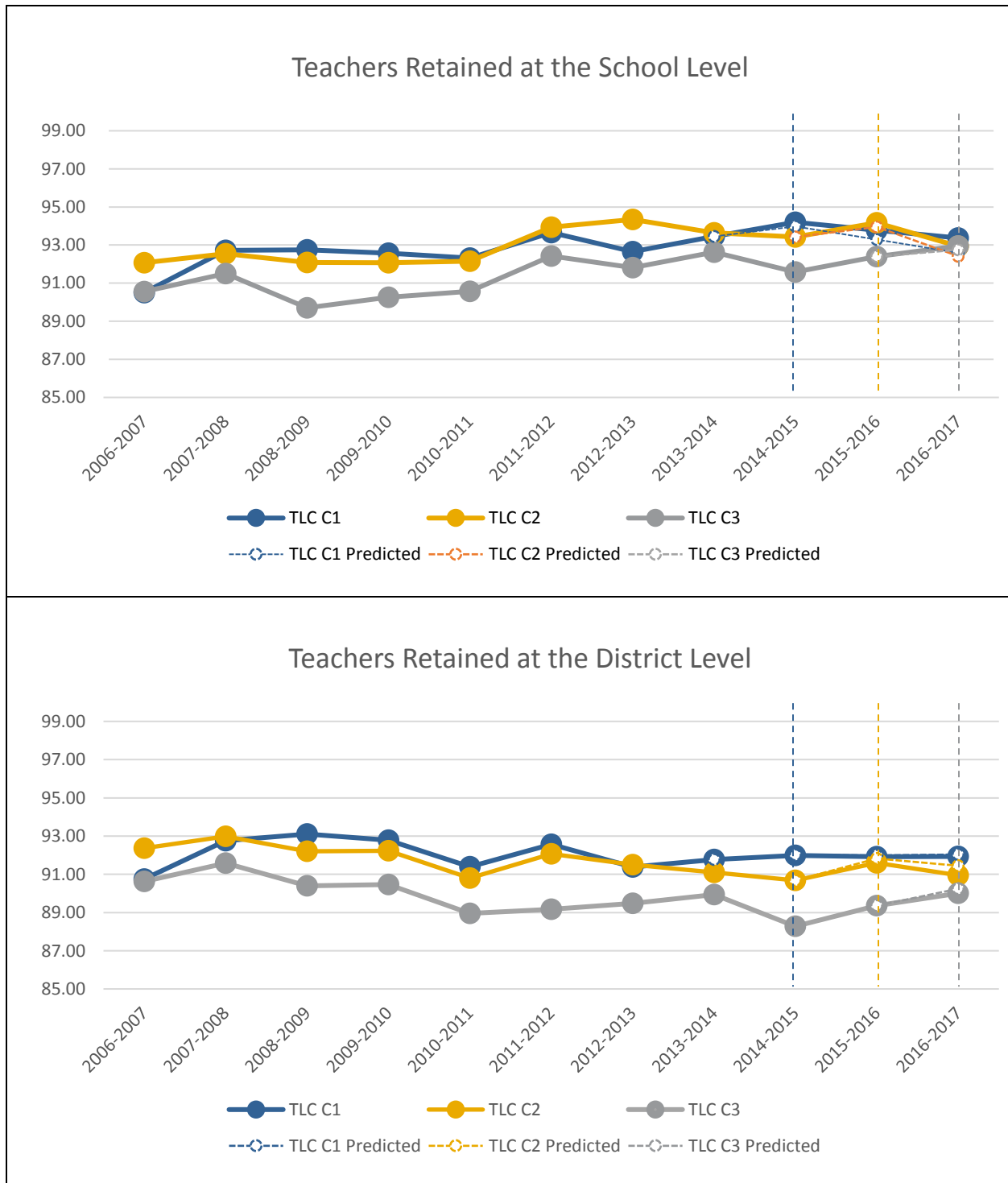
### **Teacher retention trends remained stable at both schools and districts before and after TLC implementation for all three TLC cohorts.**

Teacher retention trends remained stable from prior to TLC implementation to after TLC implementation for all three TLC cohorts. Across all years, on average, schools retained 86% of their teachers and districts retained 90% of their teachers (see Figure 7 and Tables D1 and D2 in Appendix D).<sup>13</sup> The percentage of teachers retained at the school and district levels varies within 2 percentage points of these averages across the pre- and post-TLC implementation years. We found a similar pattern among teachers grouped by years of experience (0–3 years, 4–9 years, 10–19 years, and 20 or more years) and grade band (Grades 0–5, 6–8, and 9–12), where the teacher retention trends remained largely unchanged before and after TLC implementation (see Figures D1 through D4 and Tables D3 through D6 in Appendix D).

In addition, when comparing the observed post-TLC implementation retention trends with the predicted post-TLC implementation retention trends for each cohort, the lines mostly overlap. Thus, overall, and for each subgroup, we do not see a change in teacher retention from prior to TLC implementation to after TLC implementation.

<sup>13</sup> The district-level analysis includes more teachers because it includes district teachers who are not assigned to a particular school (see Appendix C for details).

**Figure 7. Percentage of Teachers Retained in a School Staff Position by School Year and TLC Cohort**



Note. Figure 7 presents the percentage of teachers retained in a school staff position from the prior school year to the school year indicated in the plot. The solid trend lines represent the observed teacher retention rates calculated from the DE’s administrative data. The dotted trend lines represent the predicted probabilities of teacher retention after TLC implementation based on the observed retention rates prior to TLC implementation for each cohort. The vertical lines indicate the year in which each cohort started implementing TLC.



# Evaluation of TLC Impacts on Student Achievement

We examined TLC’s impact on student achievement in the first 3 years of program implementation based on an interrupted time series (ITS) design.<sup>14</sup> The ITS design used historical (pre-TLC) performance of all students to predict post-TLC student achievement outcomes. The analyses used Iowa Assessment scores in reading and mathematics from 2005–06 to 2016–17, standardized so that scores from different assessments were on the same scale over time.<sup>15</sup>

The ITS design uses historical (pre-TLC) student achievement to predict future (post-TLC) student achievement.

Program impacts were estimated as the difference between the realized student achievement outcomes and those predicted by past performance. All comparisons are made within cohort (i.e., before and after TLC implementation). Because TLC was implemented in three successive cohorts, this design had multiple baseline or pre-TLC periods that allowed us to examine the effects of TLC across 1, 2, and 3 years of implementation.

We also examined the impact of TLC within district, school, and student subgroups, including district size tiers,<sup>16</sup> grade bands (Grades 3–5, 6–8, and 10–11), students eligible for FRPL, ELLs, students with an IEP, and TLC schools’ participation in the New York City Leadership Academy (NYCLA).

## Findings on TLC Program Student Achievement Impact

This section describes findings about the impact of TLC on student achievement in the first, second, and third years of program implementation, including overall impact estimates based on data from nearly all students in Iowa followed by findings related to subgroups. We present our results in effect sizes, which convey the direction and magnitude of a relationship.<sup>17</sup> Positive effect sizes indicate that districts are performing better in post-TLC implementation years than in pre-TLC implementation years, whereas negative effect sizes indicate that districts are performing more poorly in post-TLC implementation years. We also provide context on how observed effect sizes translate into score differences on the Iowa Assessments.

Additional details about the analyses are provided in Appendix E and a table of the findings is presented in Appendix F.

<sup>14</sup> Student achievement analyses reported in 2016 used a comparative interrupted time series design (CITS), leveraging districts that had not yet implemented TLC as a comparison group. Because all districts were implementing TLC by the 2016–17 school year, we modified the design to an ITS. The ITS design is not as strong as the CITS design because it relies on only one estimate of the counterfactual (i.e., deviations from historical performance) whereas the CITS uses two estimates of the counterfactual simultaneously (i.e., deviations from historical performance and deviations from a comparison group).

<sup>15</sup> AIR standardized assessment scores by grade, subject, and year. Since Iowa has multiple testing windows (fall, midyear, and spring) for data provided to AIR, the DE calibrated student scale scores to match the spring testing window.

<sup>16</sup> District size tiers, as defined by the DE, include: 9,000 or more students (Tier 1), 2,500 students to 8,999 students (Tier 2), 1,000 students to 2,499 students (Tier 3), 600 students to 999 students (Tier 4), 300 students to 599 students (Tier 5), and fewer than 300 students (Tier 6).

<sup>17</sup> Effect sizes here are presented in standard deviation units. The standard deviation is a measure of variation or dispersion around the mean; larger values indicate greater variation and smaller values closer to zero indicate less variation.

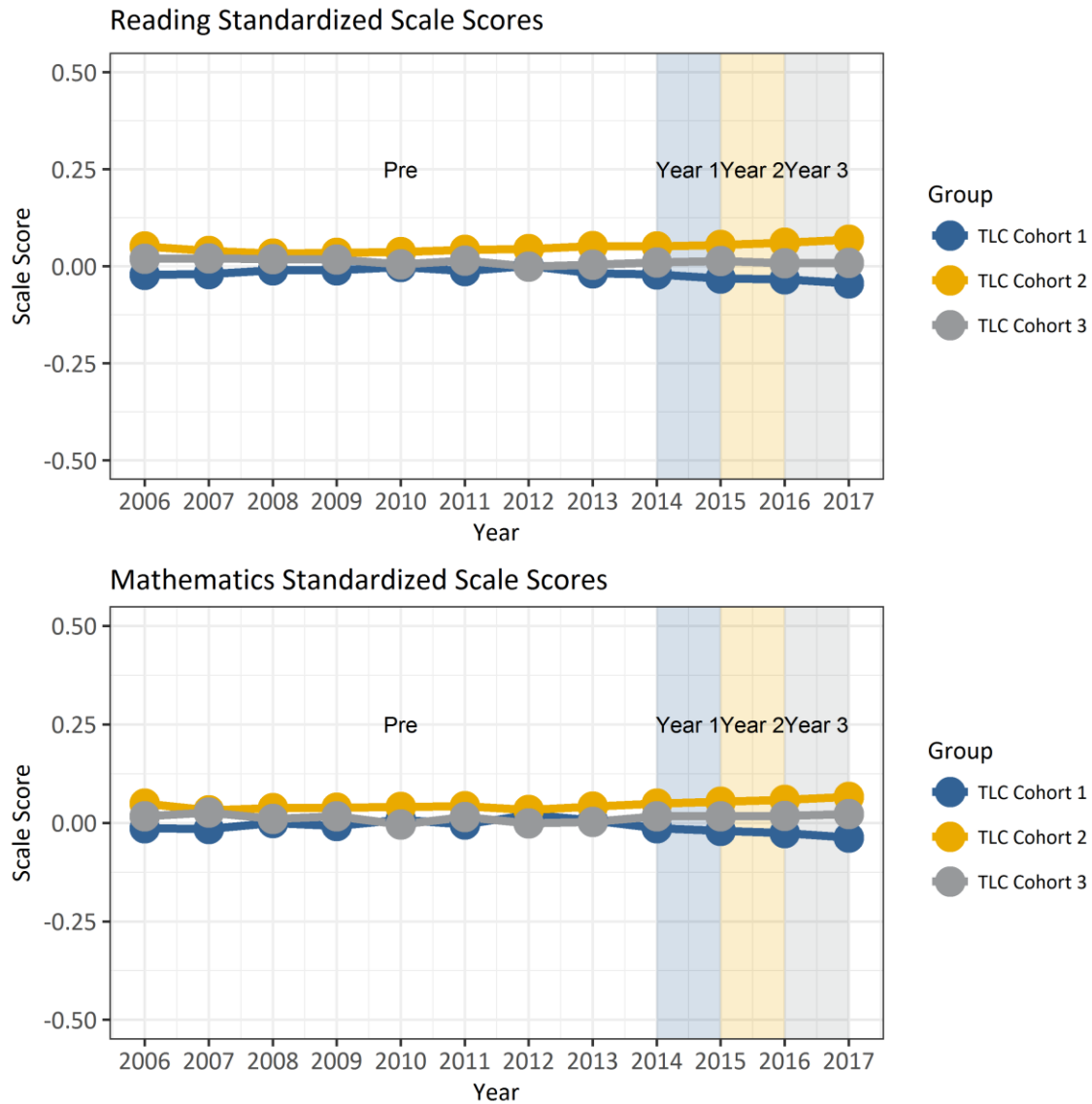
## **Student achievement remained largely unchanged after TLC implementation compared with pre-TLC averages.**

Student achievement in the first year of implementation (i.e., 2014–15 for Cohort 1, 2015–16 for Cohort 2, and 2016–17 for Cohort 3) remained unchanged compared with the pre-TLC implementation years. Historically, TLC Cohort 1 districts performed marginally below the state averages in reading and mathematics, whereas TLC Cohort 2 districts performed marginally above and TLC Cohort 3 districts performed at about the state average levels (see Figure 8). Our results show that in the first year of implementation, Cohort 1 districts performed slightly below their pre-TLC average by about 0.02 standard deviations (approximately 1 point on the Iowa Assessment) in both reading and mathematics. Cohort 2 districts performed slightly above their pre-TLC average by about 0.02 standard deviations (approximately 1 point on the Iowa Assessment) in reading, and Cohort 3 districts remained unchanged (see Figure 9 and Table F1 in Appendix F).

In the second year of implementation (i.e., 2015–16 for Cohort 1 and 2016–17 for Cohort 2), overall student achievement continued to remain unchanged compared with achievement in pre-TLC years. Cohort 1 districts slightly underperformed relative to their pre-TLC average by about 0.02 standard deviations (approximately 1 point on the Iowa Assessment) in reading. Cohort 2 districts slightly outperformed their pre-TLC average by about 0.03 standard deviations (approximately 1 point on the Iowa Assessment) in reading and by about 0.02 standard deviations (approximately 1 point on the Iowa Assessment) in mathematics (see Figure 9 and Table F1 in Appendix F).

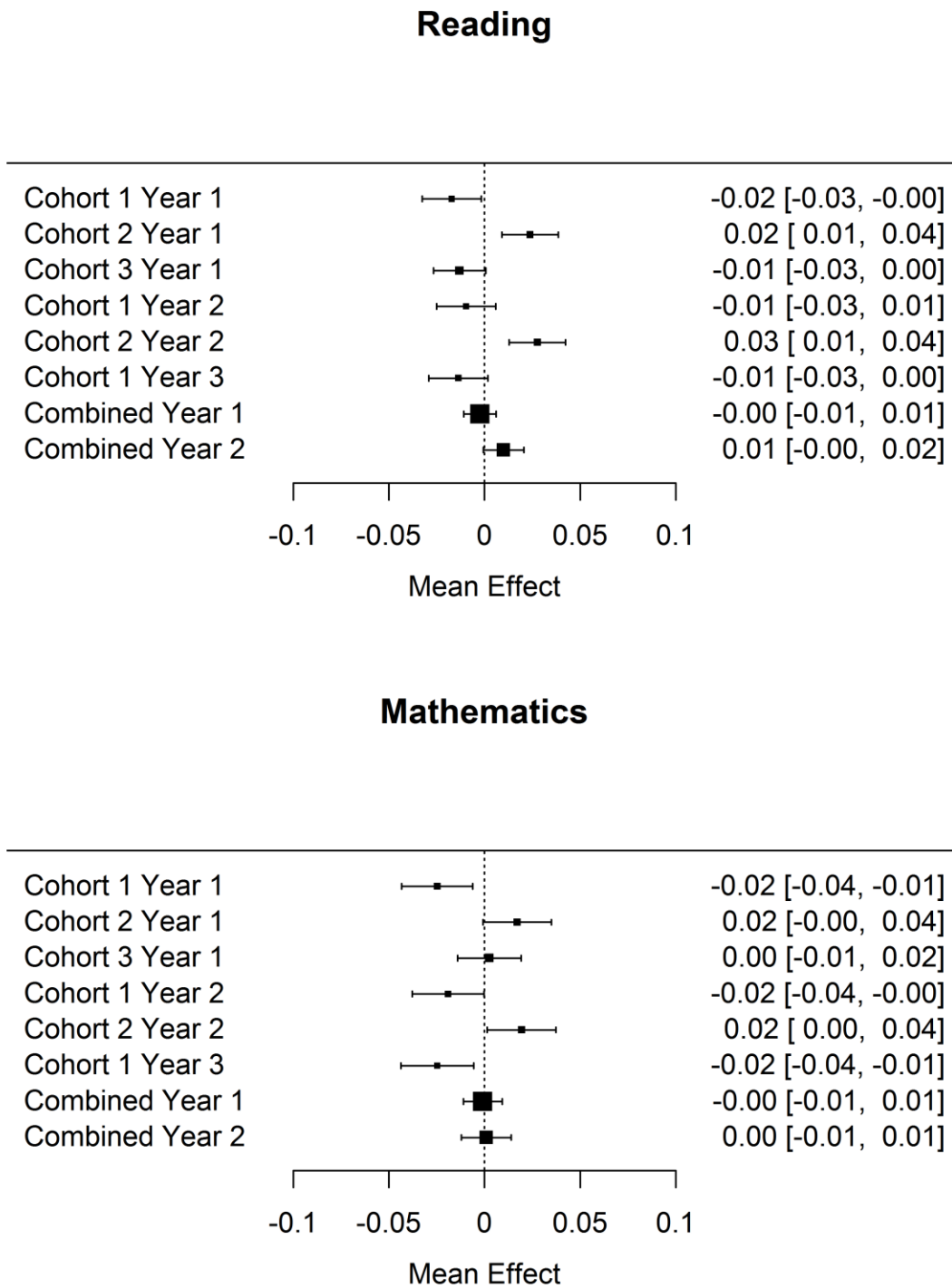
Cohort 1 districts in the third year of implementation demonstrated a similar pattern as they had in prior years. Student achievement was slightly below the pre-TLC average in mathematics by about 0.04 standard deviations (approximately 1–2 points on the Iowa Assessment) (see Figure 9 and Table F1 in Appendix F).

**Figure 8. Average Standardized Reading and Mathematics Scale Scores by School Year and TLC Cohort**



Note. Figure 8 presents the average standardized scores for reading and mathematics for the various TLC cohort comparisons by year of implementation. The scores presented in these figures are simple averages; thus, they do not adjust for student- or district-level differences between the TLC and non-TLC districts. Values above zero indicate that group's average was above the state average. Values below zero indicate that group's average was below the state average.

**Figure 9. Estimated TLC Impact on Student Achievement by Cohort and Year**

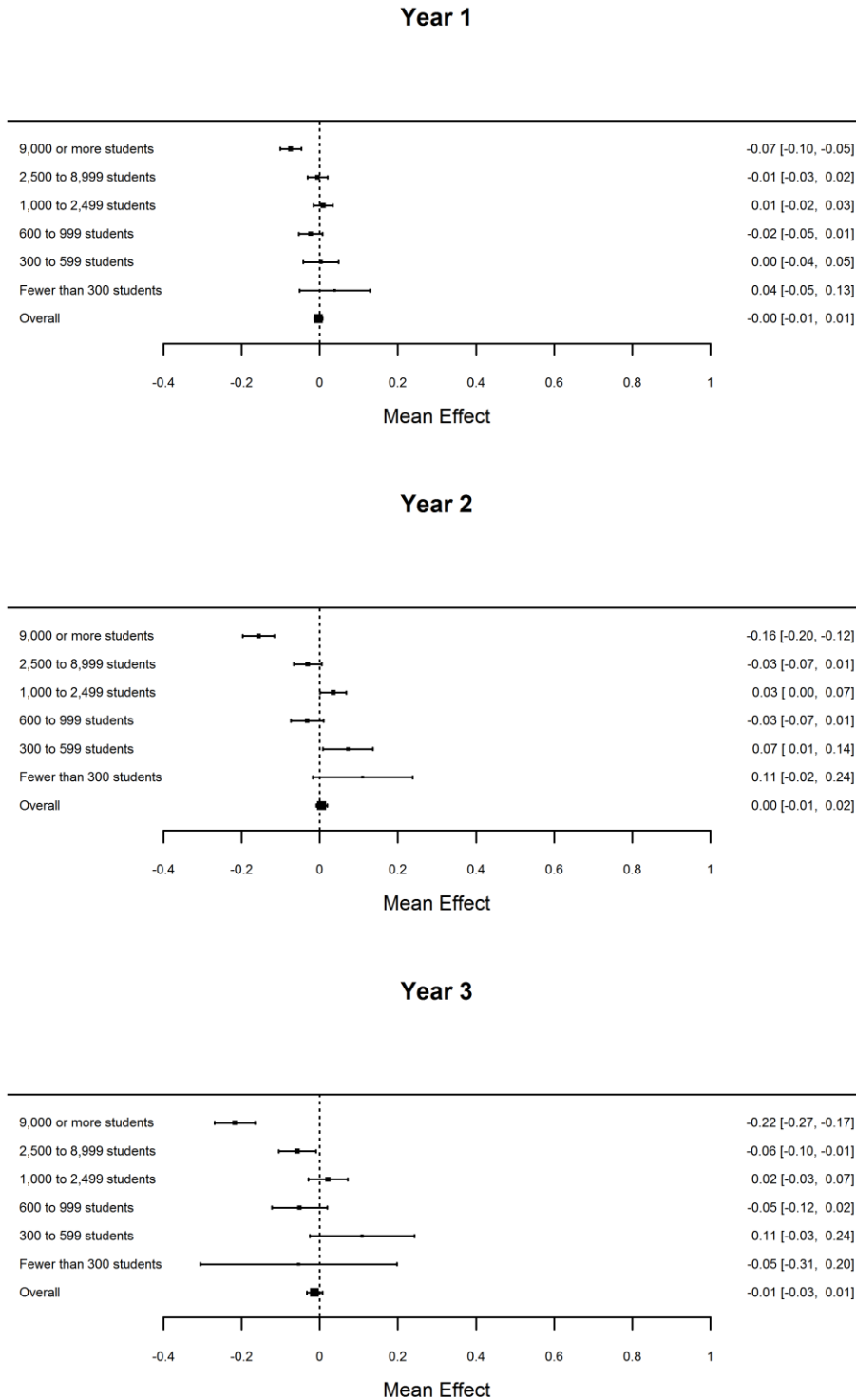


Note. Figure 9 presents forest plots of impact estimates for student achievement by TLC cohort and by combined Year 1 (Cohorts 1, 2, and 3) and Year 2 (Cohorts 1 and 2). Combined estimates were pooled using inverse variance weighted meta-analysis. The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**Smaller districts had increases in student achievement whereas larger districts had decreases in student achievement compared with pre-TLC averages.**

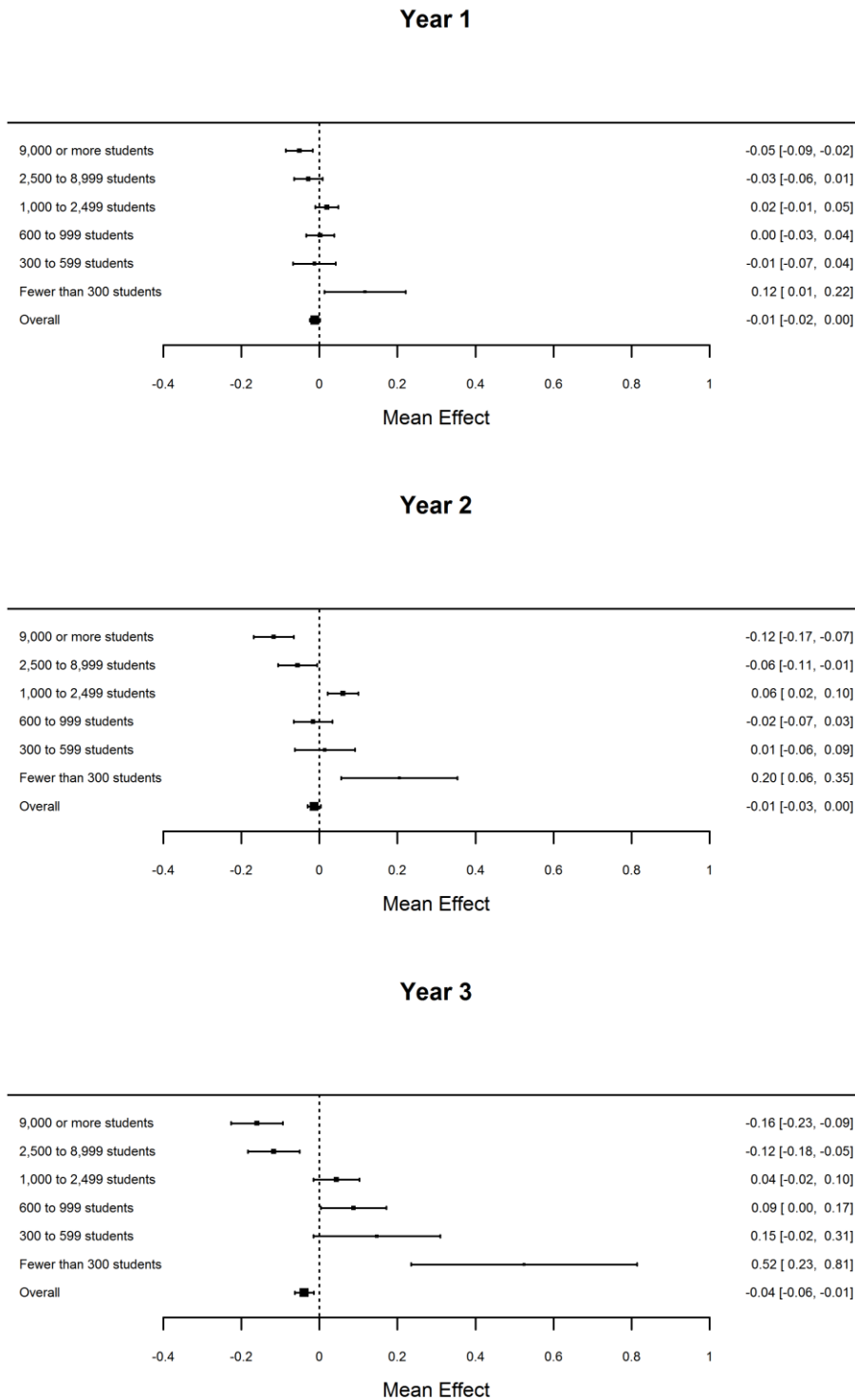
We estimated the impact of TLC on student achievement *within* each district size tier and examined the differences in estimates between tiers (see Figures 10 and 11 and Table F1 in Appendix F). Smaller districts (i.e., districts with less than 2,499 students) showed significant positive changes in achievement, relative to their pre-TLC average, in all three post-TLC implementation years in mathematics (0.06 to 0.52 standard deviations) and in the second year of implementation in reading (0.03 to 0.07 standard deviations). Larger districts (i.e., districts with 2,500 or more students) showed significant negative changes in achievement, relative to their pre-TLC average, in mathematics (-0.16 to -0.05 standard deviations) and reading (-0.22 to -0.06 standard deviations) in all three post-TLC implementation years.

**Figure 10. Estimated TLC Impact on Student Achievement in Reading by District Size Tier and Year**



Note. Figure 10 presents forest plots of TLC impact estimates in reading within each district size tier and TLC implementation year. The overall impact estimates represent the effects estimated from the main model (i.e., the overall, not pooled, impact estimates). The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**Figure 11. Estimated TLC Impact on Student Achievement in Mathematics by District Size Tier and Year**



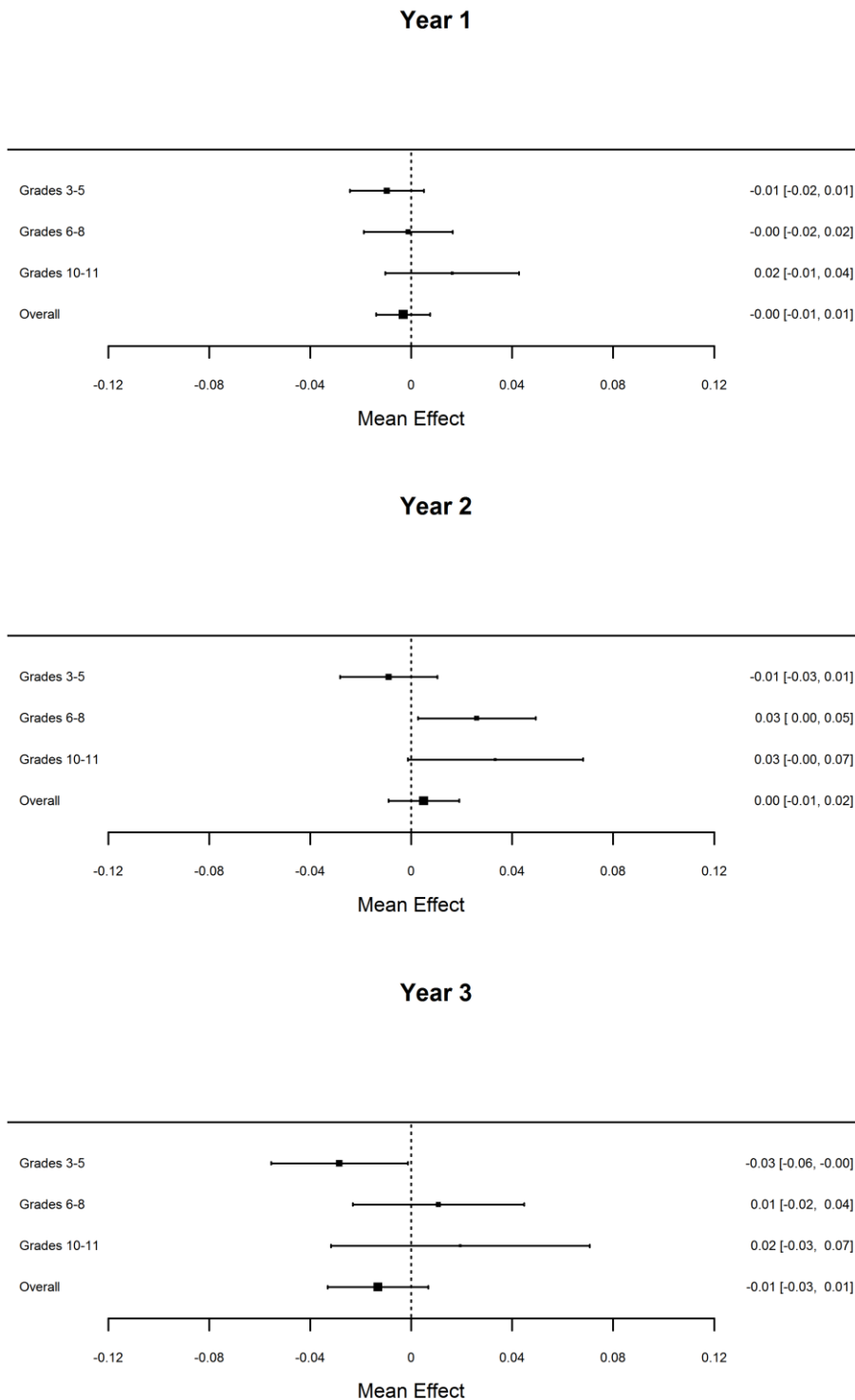
Note. Figure 11 presents forest plots of TLC impact estimates in mathematics within each district size tier and TLC implementation year. The overall impact estimates represent the effects estimated from the main model (i.e., the overall, not pooled, impact estimates). The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**Students in Grades 6–8 had some increases in student achievement whereas students in Grades 3–5 had decreases in achievement, compared with pre-TLC averages.**

In a similar fashion, we examined whether the impact of TLC on student achievement differed by grade band (Grades 3–5, 6–8, and 10–11) by estimating the impact *within* each grade band and examining the differences in estimates between grade bands (see Figures 12 and 13 and Table F1 in Appendix F). For students in Grades 3–5, achievement in TLC districts was lower, relative to their pre-TLC average, in all three post-TLC implementation years in mathematics (-0.08 to -0.02 standard deviations) and in the third year of implementation in reading (-0.03 standard deviations). For students in Grades 6–8, student achievement in TLC districts was higher in mathematics (0.03 standard deviations) and reading (0.03 standard deviations) in the second year of implementation only. No significant changes were found for students in Grades 10 and 11.

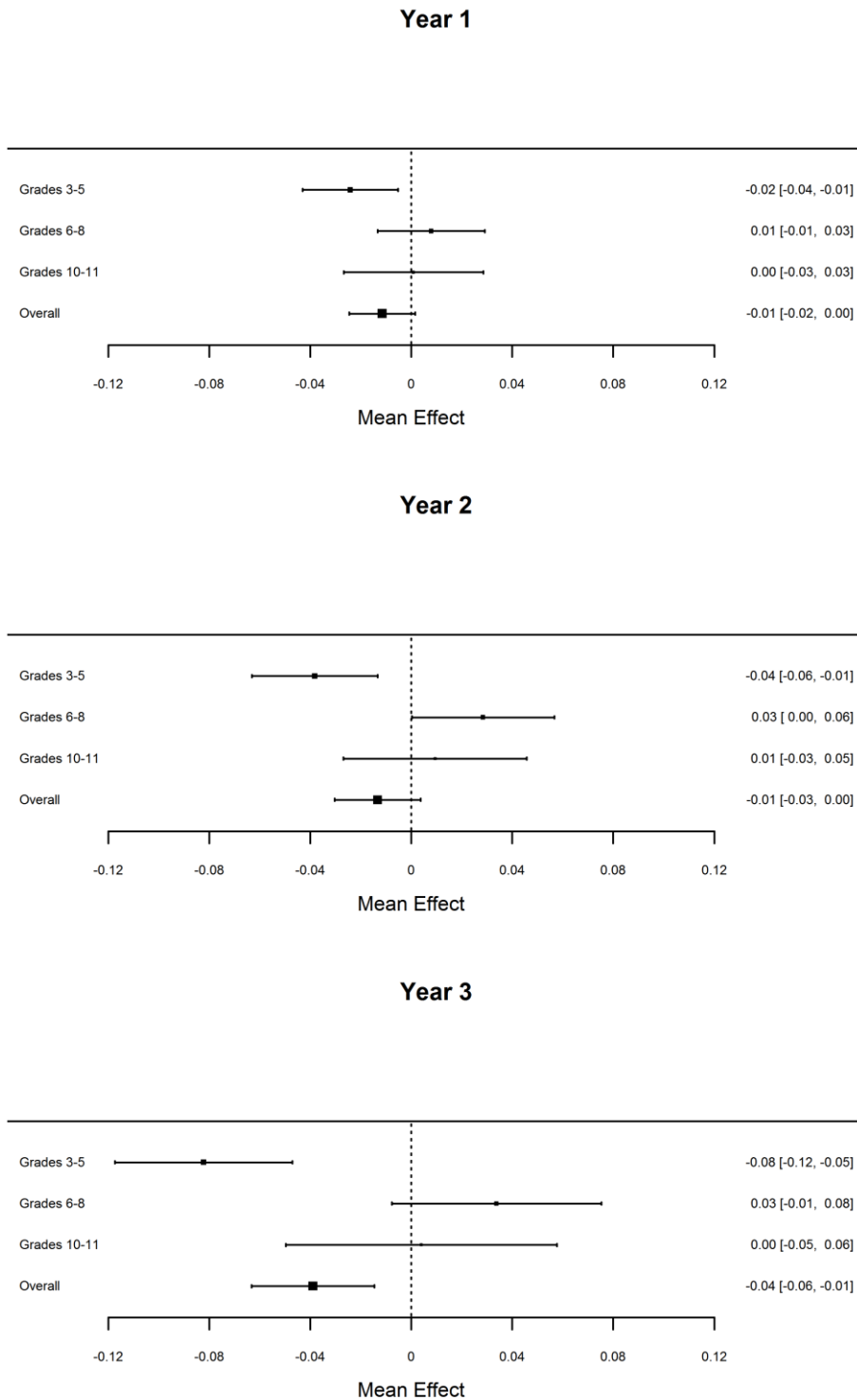


**Figure 12. Estimated TLC Impact on Student Achievement in Reading by Grade Band and Year**



Note. Figure 12 presents forest plots of TLC impact estimates in reading within each grade band and TLC implementation year. The overall impact estimates represent the effects estimated from the main model (i.e., the overall, not pooled, impact estimates). The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**Figure 13. Estimated TLC Impact on Student Achievement in Mathematics by Grade Band and Year**

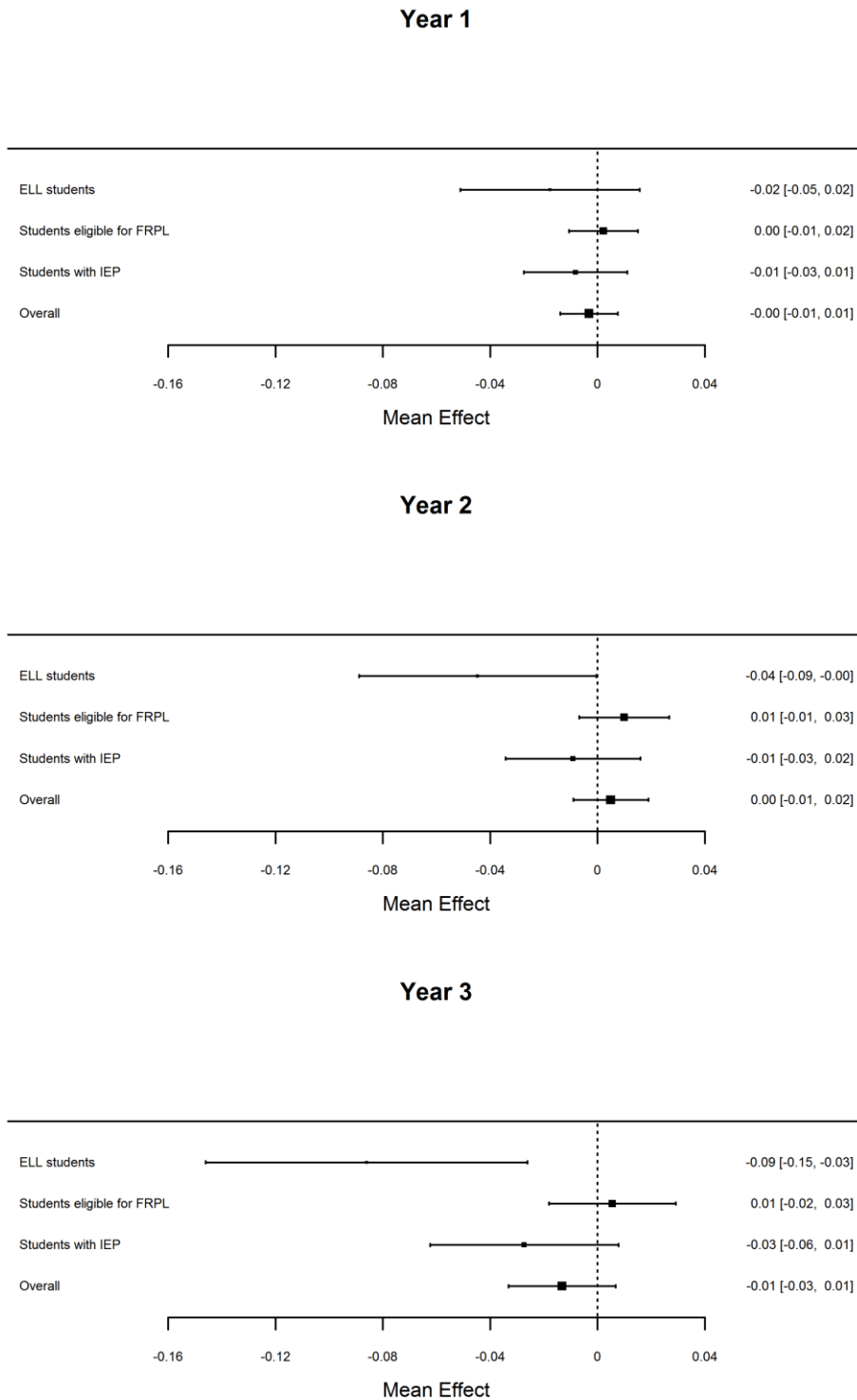


Note. Figure 13 presents forest plots of TLC impact estimates in mathematics within each grade band and TLC implementation year. The overall impact estimates represent the effects estimated from the main model (i.e., the overall, not pooled, impact estimates). The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**ELLs, students eligible for FRPL, and students with an IEP had some decreases in achievement compared with their pre-TLC averages.**

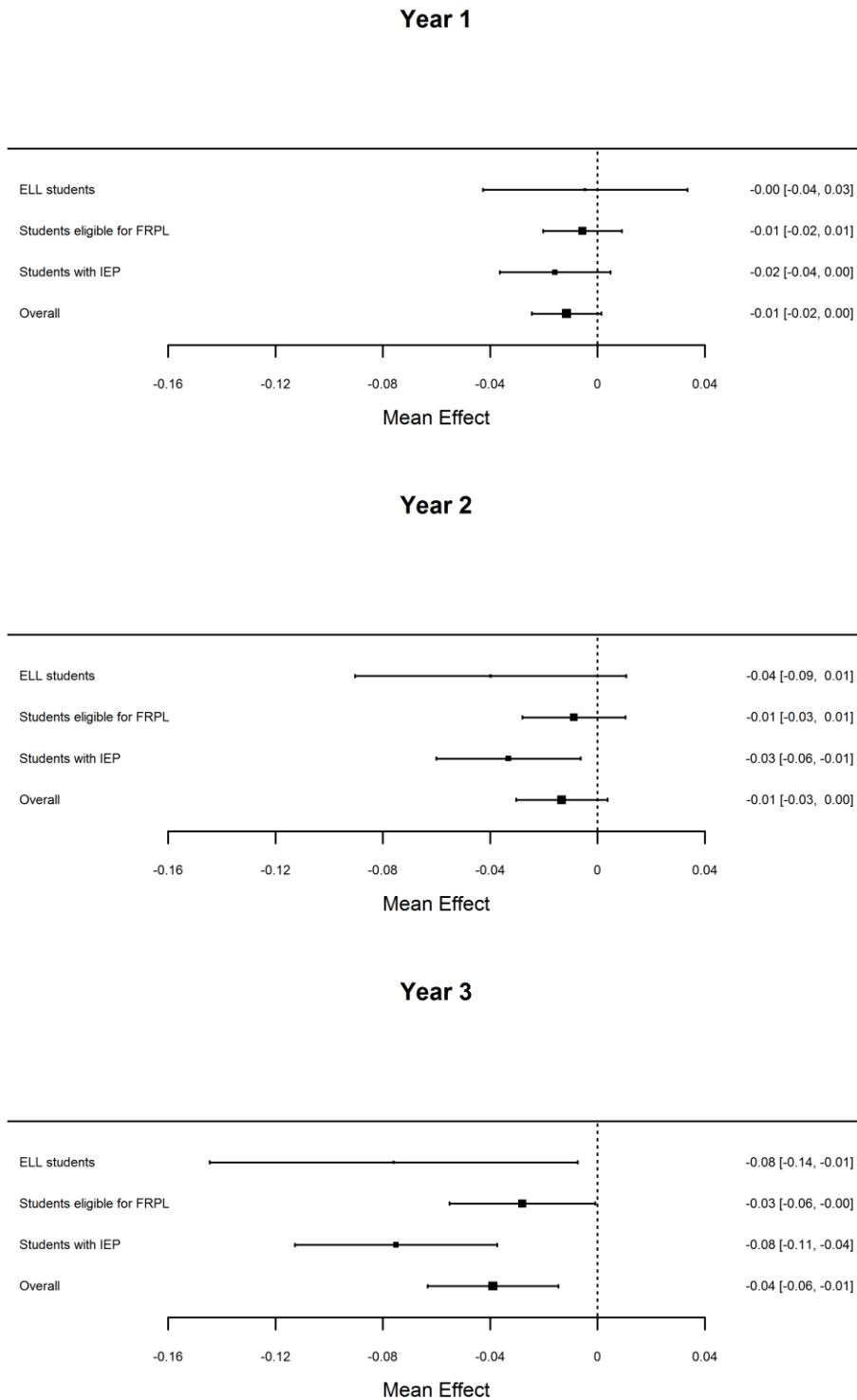
We also estimated the impact of TLC on student achievement *within* each of the different student subgroups, including ELLs, students eligible for FRPL, and students with an IEP (see Figures 14 and 15 and Table F1 in Appendix F). ELLs showed significant negative changes in achievement, relative to their pre-TLC average, in the third year of implementation in mathematics (-0.08 standard deviations) and in the second and third years of implementation in reading (-0.04 to -0.09 standard deviations). Students eligible for FRPL showed significant negative changes in achievement, relative to their pre-TLC average, in the third year of implementation in mathematics (-0.03 standard deviations). Students with an IEP showed significant negative changes in achievement, relative to their pre-TLC average, in the second and third years of implementation in mathematics (-0.03 to -0.08 standard deviations).

**Figure 14. Estimated TLC Impact on Student Achievement in Reading by Special Population and Year**



Note. Figure 14 presents forest plots of TLC impact estimates in reading within each special population and TLC implementation year. The overall impact estimates represent the effects estimated from the main model (i.e., the overall, not pooled, impact estimates). The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**Figure 15. Estimated TLC Impact on Student Achievement in Mathematics by Special Population and Year**



Note. Figure 15 presents forest plots of TLC impact estimates in mathematics within each special population and TLC implementation year. The overall impact estimates represent the effects estimated from the main model (i.e., the overall, not pooled, impact estimates). The black squares represent the impact estimates and the error bars represent 95% confidence intervals. Confidence intervals that include zero indicate nonsignificant effects (i.e., no change in achievement).

**Differences in achievement in TLC Cohort 2 districts from pre- to post-TLC implementation did not vary by NYCLA participation.**

Last, we examined whether TLC impacts on student achievement differed for students at 15 TLC Cohort 2 schools that participated in NYCLA in summer 2016, using post-TLC achievement data from the 2016–17 academic year. No significant impacts were found for students in TLC Cohort 2 schools that participated in NYCLA (see Table F1 in Appendix F).



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# Appendix A. Evaluation of the Teacher Leadership and Compensation Program Survey Methods

For the second consecutive year, American Institutes for Research (AIR) administered surveys to teachers and school and district administrators statewide to obtain feedback on changes that accompanied the Teacher Leadership and Compensation (TLC) program implementation. The survey included topics related to changes in school supports, opportunities for teacher professional development and career advancement, teacher collaboration, and perceived quality and effectiveness of the TLC program.<sup>18</sup> This appendix describes the survey administration process, sample, and analytic approaches taken to examine the survey responses.

## Survey Administration

In the statewide survey data collection effort, all teachers, teacher leaders, and school and district administrators (specifically, principals, assistant principals, superintendents, assistant superintendents, directors, department heads, curriculum officers, central office assessment leaders, and any other district administrators in charge of teaching and learning) in all 333 Iowa school districts were invited to participate in the Evaluation of the Teacher Leadership and Compensation Program and Teacher Support Survey. We developed three versions of the survey: one for teachers, one for school administrators, and one for district administrators. We administered the surveys online during a 5-week period, from March to April 2017.<sup>19</sup>

We sent the appropriate Area Education Agency (AEA) survey links<sup>20</sup> and accompanying survey information to all principals and superintendents, whom we asked to distribute the survey link to eligible respondents and follow up with those who had not completed the survey. Superintendents were asked to distribute the district administrator survey invitation, and principals were asked to send an invitation with both the teacher<sup>21</sup> and school administrator survey links. In follow-up e-mails, we shared survey response rates with AEA directors and superintendents, thus allowing AEA directors and superintendents to reach out to individuals to encourage survey participation. In addition, the Iowa Department of Education (DE) contacted district administrators and AEA directors to encourage survey participation. Our survey team included a survey administrator who was

<sup>18</sup> To allow for comparison of staff perceptions from the 2016 to the 2017 Evaluation of the Teacher Leadership and Compensation Program and Teacher Support Survey, the changes from the 2016 to the 2017 survey were minimal. The key changes include (a) the number of response options were decreased in large item banks to reduce respondent burden, particularly in the teacher survey; (b) background questions were updated to align with the DE's definitions; (c) the school climate domain was removed from the administrator surveys; (d) perceived fairness and transparency of teacher leadership items were added to all surveys; and (e) perceived effectiveness of teacher collaboration items were added to the teacher survey. In addition, because all three cohorts were implementing the TLC program in the 2016–17 school year, all staff received questions regarding TLC (i.e., not only Cohorts 1 and 2).

<sup>19</sup> Although no reminder e-mails or survey links were sent out by AIR after week 5 in April 2017, the survey remained open 1 week longer to allow for districts to schedule time for staff to complete the survey.

<sup>20</sup> Unique survey links were created for the teacher, school administrator, and district administrator surveys for all nine AEAs, resulting in 27 survey links.

<sup>21</sup> Teachers and teacher leaders completed the teacher survey.



available through e-mail and a toll-free telephone number to help individuals who had trouble opening the survey or had any concerns regarding the survey or use of survey results.

All survey respondents were eligible for a raffle as an incentive. Each week, for all 5 weeks of survey administration, teachers and school and district administrators who completed the survey were entered into a raffle for a chance to win one of three iPad Mini 2s or one of 10 \$50 Amazon gift cards. In addition, we produced a customized district-level report that summarized teacher survey responses for each district that had a 50% or higher teacher survey response rate. One hundred eighty-three districts obtained a teacher response rate of 50% or greater and thus obtained a district-level report.

## Sample

For a second consecutive year, we obtained large samples of the statewide target populations. In the 2016–17 school year, Iowa staff included 40,095 teachers, 1,612 school administrators, and 1,261 district administrators. Of these, 16,949 teachers, 936 school administrators, and 377 district administrators completed the 2017 TLC survey, resulting in statewide response rates of 42% for teachers, 58% for school administrators, and 30% for district administrators.<sup>22</sup>

Table A1 presents the survey response rates and sample sizes by various district-level and respondent characteristics.<sup>23</sup> The table indicates that the majority of respondents were teacher leaders, veteran teachers, teachers from smaller size tier districts, those in AEAs 5, 7, and 12, those who work in elementary schools, and those from Cohort 3.

<sup>22</sup> Completers were defined as respondents who completed at least 50% of their survey items. In addition, the survey data were systematically examined and cleaned according to the following criteria:

1. First, 2,812 teacher surveys and 1,827 administrator surveys were removed because of responding to less than 50% of their survey. The total count of how many items a respondent was required to answer was adjusted by the way in which they answered a few key questions. For example, if a teacher indicated that professional development was not offered in the current school year, the teacher did not receive the six questions pertaining to professional development. As such, the total number of questions the teacher received was 25 instead of the full 31 questions.
2. Surveys were examined for patterns that suggested respondents simply “clicked through” and responded to items without reading them. Based on these patterns, respondents who completed the teacher survey in less than 5 minutes or who completed the administrator survey in less than 3 minutes were removed from the final data set. As a result, 131 teacher surveys and six administrator surveys were removed.
3. Although it was required for respondents to select the district in which they work, some chose to write in a district that we were unable to match to the existing set of districts (e.g., some respondents wrote “Other”). These records were removed from the final data set. This did not affect the administrator survey, but three teacher surveys were removed.
4. Last, respondents who started the survey on multiple occasions and had duplicate records were removed such that the less complete set of responses was removed from the final data set. If all records were completed, the records with the later dates were removed. As a result, 483 teacher surveys and 88 administrator surveys were removed.

<sup>23</sup> Completion rates were calculated as the total number of respondents who completed the survey in the sample divided by the total number of staff in the population. Population counts were obtained using the Basic Educational Data Survey data provided by the DE.

**Table A1. Survey Response Rates and Sample Sizes by District-Level and Respondent Characteristics**

Characteristic	Teacher Survey		School Administrator Survey		District Administrator Survey	
	N Respondents	Response Rate	N Respondents	Response Rate	N Respondents	Response Rate
All respondents	16,949	42.3%	936	58.1%	377	29.9%
<b>TLC Cohorts</b>						
Cohort 1	5,131	39.2%	270	51.9%	73	27.9%
Cohort 2	4,524	34.2%	280	57.0%	103	23.4%
Cohort 3	7,294	52.9%	386	64.2%	201	36.0%
<b>Teacher Leaders Versus Classroom Teachers</b>						
Teacher leaders	4,609	48.2%	—	—	—	—
Classroom teachers	11,707	38.4%	—	—	—	—
<b>Veteran Versus Early Career Teacher</b>						
Veteran teachers	14,473	44.5%	—	—	—	—
Early career teachers	2,476	32.8%	—	—	—	—
<b>District Size Tiers</b>						
9,000 or more students	3,107	24.8%	213	45.6%	49	15.7%
2,500 to 8,999 students	3,254	41.2%	161	54.0%	52	30.1%
1,000 to 2,499 students	5,363	52.2%	275	64.3%	110	36.4%
600 to 999 students	3,080	56.1%	164	72.2%	96	39.8%
300 to 599 students	1,793	56.3%	98	65.8%	52	27.8%
Fewer than 300 students	352	49.0%	25	58.1%	18	40.0%
<b>Area Education Agencies</b>						
AEA 1	1,170	43.5%	64	56.1%	20	25.3%
AEA 5	1,303	49.8%	80	67.8%	39	39.0%
AEA 7	2,774	52.3%	153	67.1%	55	32.9%
AEA 9	1,808	45.2%	63	41.2%	19	25.3%
AEA 10	2,110	38.1%	126	57.8%	60	38.7%
AEA 11	3,561	33.3%	209	54.6%	83	23.1%
AEA 12	1,582	48.0%	88	62.9%	37	39.4%
AEA 13	1,419	45.2%	80	60.2%	39	34.8%
AEA 15	1,222	43.2%	73	58.4%	25	21.0%
<b>School Level</b>						
Elementary school (Grades 0–5)	8,924	39.5%	486	54.9%	—	—
Middle school (Grades 6–8)	5,468	37.9%	314	42.4%	—	—
High school (Grades 9–12)	5,327	37.6%	293	50.9%	—	—

Note. Early career teachers were defined as teachers who had been teaching for 3 years or less, and veteran teachers were defined as teachers who had been teaching at least four years.

## Differences Between Samples and Populations

Similar to the 2016 survey, teachers in the 2017 survey sample were similar to teachers in the population on most characteristics, although the sample appears more experienced<sup>24</sup> on average and the percentage of subjects the sample of teachers taught differed from the population. In addition, teachers in the sample earned higher degrees than those in the population, and the sample includes a larger percentage of teacher leaders than the population. Table A2 presents the demographic characteristics for the sample of teachers who completed the survey and the population of teachers in Iowa.

School and district administrators in the 2017 survey sample were more experienced,<sup>25</sup> held higher-level roles in their school or district, and earned higher degrees than the population. In addition, similar percentages of school administrators worked in elementary and high schools compared with the population, but a smaller percentage of the sample worked in middle schools. Tables A3 and A4 present the demographic characteristics for school and district administrators, respectively.

Some of these differences in our sample of respondents and the population of teachers and school and district administrators in Iowa are due to differences in data definitions, but some are also likely due to actual differences in the two groups. We recommend caution in interpreting these differences because we cannot verify what might have caused the differences.

**Table A2. Teacher Demographic Characteristics, Sample Versus Population**

Characteristic	Sample		Population	
	N	Percentage	N	Percentage
<b>Years of Experience</b>				
0–3 years	2,476	14.6%	7,558	18.9%
4–9 years	3,390	20.0%	9,273	23.1%
10–19 years	5,507	32.6%	12,343	30.8%
20 or more years	5,535	32.7%	10,921	27.2%
<b>School Level</b>				
Elementary school (Grades 0–5)	8,924	54.8%	22,581	56.3%
Middle school (Grades 6–8)	5,468	33.6%	14,420	36.0%
High school (Grades 9–12)	5,327	32.7%	14,178	35.4%
<b>Subject Taught</b>				
English language arts	4,958	30.4%	4,858	12.1%
Mathematics	3,781	23.2%	2,866	7.1%
Science	2,723	16.7%	2,384	5.9%
Social studies	2,712	16.7%	2,463	6.1%

<sup>24</sup> We updated the years of experience question in the 2017 teacher survey to match the question in the DE's administrative data. Nonetheless, the pattern remained the same from the 2016 to the 2017 survey.

<sup>25</sup> We updated the years of experience question in the 2017 administrator survey to match the question in the DE's administrative data. This changed the pattern from the 2016 survey such that the sample appears to have more experience than the population in 2017 (the opposite was true for the 2016 survey).

Characteristic	Sample		Population	
	N	Percentage	N	Percentage
Elementary (multiple subjects)	5,765	35.4%	13,122	32.7%
<b>Degree Earned</b>				
Bachelor's degree	8,782	52.0%	25,805	65.7%
Master's degree	7,269	43.0%	13,346	34.0%
Certificate above master's degree	792	4.7%	33	0.1%
Doctorate or professional degree	55	0.3%	84	0.2%
<b>Teacher Leadership Role</b>				
Yes	4,609	28.2%	9,570	23.9%
No	11,707	71.8%	30,525	76.1%

Note. The background questions on the TLC teacher survey were not required; thus, table cells do not always add up to  $n = 16,949$  (or 100%) due to missing data. Similarly, not all demographic characteristics may be available for the population of Iowa's teachers. The table cells may also add up to more than 100% because some teachers hold multiple positions and teach multiple subjects in multiple schools (and school levels). They were allowed to indicate this on the survey by checking all available response options.

**Table A3. School Administrator Demographic Characteristics, Sample Versus Population**

Characteristic	Sample		Population	
	N	Percentage	N	Percentage
<b>Years of Experience</b>				
0-3 years	5	0.5%	88	5.5%
4-9 years	45	4.8%	189	11.7%
10-19 years	348	37.3%	564	35.0%
20 or more years	535	57.3%	771	47.8%
<b>Role</b>				
Principal	808	86.3%	1,266	78.5%
Assistant principal	128	13.7%	348	21.6%
<b>School Level</b>				
Elementary school (0-5)	486	52.4%	886	55.0%
Middle school (6-8)	314	33.8%	741	46.0%
High school (9-12)	293	31.6%	576	35.7%
<b>Degree Earned</b>				
Bachelor's degree	5	0.5%	226	14.3%
Master's degree	631	67.5%	1,220	77.3%
Certificate above master's degree	263	28.1%	90	5.7%
Doctorate or professional degree	36	3.9%	42	2.7%

Note. Most background questions on the TLC school administrator survey were not required (indicating one's role was required); thus, table cells do not always add up to  $n = 936$  (or 100%) due to missing data. Similarly, not all demographic characteristics may be available for the population of Iowa's school administrators. The table cells may also add up to more than 100% because some school administrators hold multiple positions in multiple schools (and school levels). They were allowed to indicate multiple school levels on the survey by checking all available response options. However, they were not allowed to indicate multiple positions on the survey as they could only choose one response option.

**Table A4. District Administrator Demographic Characteristics, Sample Versus Population**

Characteristic	Sample		Population	
	N	Percentage	N	Percentage
<b>Years of Experience</b>				
0–3 years	4	1.1%	68	5.4%
4–9 years	14	3.7%	191	15.1%
10–19 years	86	22.9%	398	31.6%
20 or more years	272	72.3%	604	47.9%
<b>Role</b>				
Superintendent	206	54.6%	286	22.7%
Assistant superintendent	17	4.5%	27	2.1%
Director/coordinator/department head	113	30.0%	665	52.7%
Other administrator	41	10.9%	302	23.9%
<b>Degree Earned</b>				
Bachelor’s degree	13	3.4%	351	28.4%
Master’s degree	92	24.4%	674	54.6%
Certificate above master’s degree	211	56.0%	129	10.4%
Doctorate or professional degree	61	16.2%	81	6.6%

Note. Most background questions on the TLC district administrator survey were not required (indicating one’s role was required); thus, table cells do not always add up to  $n = 377$  (or 100%) due to missing data. Similarly, not all demographic characteristics may be available for the population of Iowa’s district administrators. Some district administrators hold multiple positions in multiple districts. However, they were *not* allowed to indicate this on the survey as they could only choose one response option.

## Analytic Approach

The survey included four topics (or domains) related to changes that accompanied the TLC program implementation:

1. **Teacher leadership**, including teacher leadership responsibilities and activities, perceived effectiveness, knowledge of the teacher leadership roles, opportunities for career advancement, and perceived fairness and transparency of the teacher leader selection process
2. **Supports for teachers**, including supports and professional development opportunities, perceived utility of the supports, and perceived quality of the supports
3. **Teacher collaboration**, including collaboration activities, perceived satisfaction with teacher collaboration, and perceived effectiveness of teacher collaboration
4. **Perceived outcomes**, including perceived effectiveness of the TLC program and perceived change in professional structure as a result of TLC program implementation

Items (or questions) in the survey closely align to these four domains. Within each domain, we chose constructs (or concepts) that are important for understanding each domain (see Table A5).

For example, to obtain a comprehensive view of teacher leadership in TLC schools, we asked respondents questions related to five constructs, including (1) teacher leadership responsibilities and activities, (2) perceived effectiveness of these roles, (3) knowledge and understanding of the teacher leadership roles, (4) opportunities to advance into teacher leadership roles, and (5) perceived fairness and transparency of the teacher leader selection process.

For most constructs, we included several items on the surveys to obtain a comprehensive view on the given topic. For other constructs (e.g., quality of supports), only one survey item was necessary to obtain a respondents' perception. For constructs that included multiple survey items, we combined those items into one scale score (discussed in the next section). For individual survey items, the results were reported directly (i.e., without scaling).

## **Scaling**

Using the question-construct links presented in Table A5, we first conducted a psychometric analysis (separately for teachers and school and district administrators) to ensure that appropriate survey items were combined to represent a particular construct (or concept). We combined items to reduce a large set of items to a small number of summary scores that represent each construct. As a result, one or two scale scores, rather than (for example) five or 10 individual survey items, may summarize a construct. After we combined the items, we created Rasch scale scores for each construct using Winsteps (Linacre, 2015), a Rasch analysis software program.<sup>26</sup> The scales were examined for item fit and internal consistency. Scale reliability ranged from 0.73 to 0.90 on the teacher survey and from 0.51 to 0.73 on the administrator survey (see Table A5).<sup>27</sup> After the scales were deemed reliable, we re-scaled (or re-combined) the items by anchoring the 2017 scale scores on the 2016 scale scores to allow for comparisons across years. The anchored scale scores then were converted back into their original metric (i.e., the Likert scale) for ease of interpretation and merged with the DE's administrative data.

## **Weighting**

As previously described, our sample of respondents differs from the population of teachers and school and district administrators in Iowa on various respondent-level characteristics, including years of experience, degree earned, teacher role (whether the respondent is a teacher leader or a classroom teacher), and subjects taught. To address these differences, we adjusted, or weighted, the survey sample responses to ensure the responses are representative of the full population of teachers and administrators in Iowa. We weighted the survey results using the raking method, which ensures that the sample sizes of the specified sample characteristics match the corresponding sample sizes for the population (Battaglia et al., 2009). The characteristics by which we weighted the survey results include years of experience, degree earned, and teacher role.

<sup>26</sup> Items that were not combined into a single construct were analyzed individually (i.e., item-level frequencies).

<sup>27</sup> A principal component analysis also was conducted to examine multidimensionality. All scale scores were unidimensional (i.e., measure one construct).

## Descriptive Analyses

We conducted descriptive analyses on the converted scale scores as well as on individual survey items.<sup>28</sup> Specifically, we calculated percentages for both converted scale scores and individual survey items to determine the dominant response patterns for each item. The individual item percentages represent the percentage of respondents who selected a specific response option. The converted scale score percentages, in contrast, identify the percentage of respondents who were most likely to indicate a specific response option to the set of survey items included in the scale score. For example, in Figure A1, we compare teachers in terms of their perceptions about teacher leadership role effectiveness by TLC cohort. Notice that a greater percentage of Cohort 1 and 2 teachers' scores were in the *agree strongly* range than those in Cohort 3. This pattern suggests that teachers in early adopting TLC cohorts were more likely to view the teacher leadership roles as effective than teachers in Cohort 3.

We also conducted descriptive analyses on subgroups of individuals in order to examine how survey responses differ by various district-level and respondent characteristics. First, for both the teacher surveys and the school and district administrator surveys, we examined how survey responses differ by TLC cohort. Second, we examined how teacher survey responses differ by the following characteristics: years of teaching experience (early career versus veteran teachers),<sup>29</sup> teacher role (teacher leader versus classroom teacher),<sup>30</sup> district size tier,<sup>31</sup> AEA, and grade band (Grades K–5, 6–8, and 9–12).<sup>32</sup> Third, we examined how administrator survey responses differ by district size tier, AEA, and grade band (school administrators only). For subgroups with more than two possible categories of respondents (e.g., AEA), we conducted pairwise comparisons of respondents from each category to respondents in each of the other categories.

We examined whether differences in extreme category percentages (e.g., *agree strongly* or *at least once a week*) are statistically significant (i.e., if they vary by more than chance) between *each* of these subgroups by conducting postestimation Wald tests. Wald tests are used to determine whether two variables are associated, allowing us to test whether the responses to a given research question are associated with subgroup membership (i.e., whether the results differ significantly for various

<sup>28</sup> Scale scores were not produced for research questions and constructs that included fewer than three survey items. For these questions, item-level frequencies were calculated.

<sup>29</sup> Early career teachers were defined as teachers who had been teaching for 3 years or less, and veteran teachers were defined as teachers who had been teaching at least four years.

<sup>30</sup> Contrasts between teacher leaders and classroom teachers were examined for all cohorts combined, as well as separately for each cohort.

<sup>31</sup> District size tiers, as defined by the DE, are as follows: 9,000 or more students (Tier 1), 2,500 students to 8,999 students (Tier 2), 1,000 students to 2,499 students (Tier 3), 600 students to 999 students (Tier 4), 300 students to 599 students (Tier 5), and fewer than 300 students (Tier 6). The 2014–15 school-level enrollment data were used to define the tiers.

<sup>32</sup> Respondents could select multiple grade bands if they worked across the three populations; thus, a respondent could be included in multiple grade bands in the survey analysis. Of the 16,283 teachers and 928 school administrators who indicated the grade span(s) they work with, 10% of teachers ( $n = 1,584$ ) and 6% of school administrators ( $n = 55$ ) indicated working in both grade spans K–5 and 6–8, 11% of teachers ( $n = 1,764$ ) and 12% of school administrators ( $n = 107$ ) indicated working in both grade spans 6–8 and 9–12, and 4% of teachers ( $n = 601$ ) and 3% of school administrators ( $n = 26$ ) indicated working in both grade spans K–5 and 9–12.

subgroups). We reported significant differences in survey responses only when the extreme category percentage difference between the two subgroups was at least 5%.

### **Comparisons Across Years**

We examined whether changes in survey responses for individual survey items and scale scores that remained unchanged from the 2016 to the 2017 survey were statistically significant by conducting *t*-tests.<sup>33</sup> *T*-tests are used to compare the means of two groups on a given outcome. Specifically, we tested for year-to-year percentage differences in the extreme categories, such as *agree strongly* or *very familiar*, for all cohorts combined and separately for each cohort. The resulting estimates represent the percentage change in extreme category responses from the 2016 to the 2017 TLC survey. For example, an estimate of 0.30 on the familiarity with teacher leadership roles teacher survey item indicates that, from 2016 to 2017, there was a 30 percentage point increase in teachers who indicated that they are *very familiar* with teacher leadership roles.

<sup>33</sup> To account for dependent observations across years (e.g., a respondent taking the survey in both 2016 and 2017), we adjusted the standard errors from the estimates of the *t* tests using bootstrapping. Bootstrapping is a nonparametric statistical technique that uses repeated random sampling (with replacement) of study observations to approximate standard errors (Efron & Tibshirani, 1993).



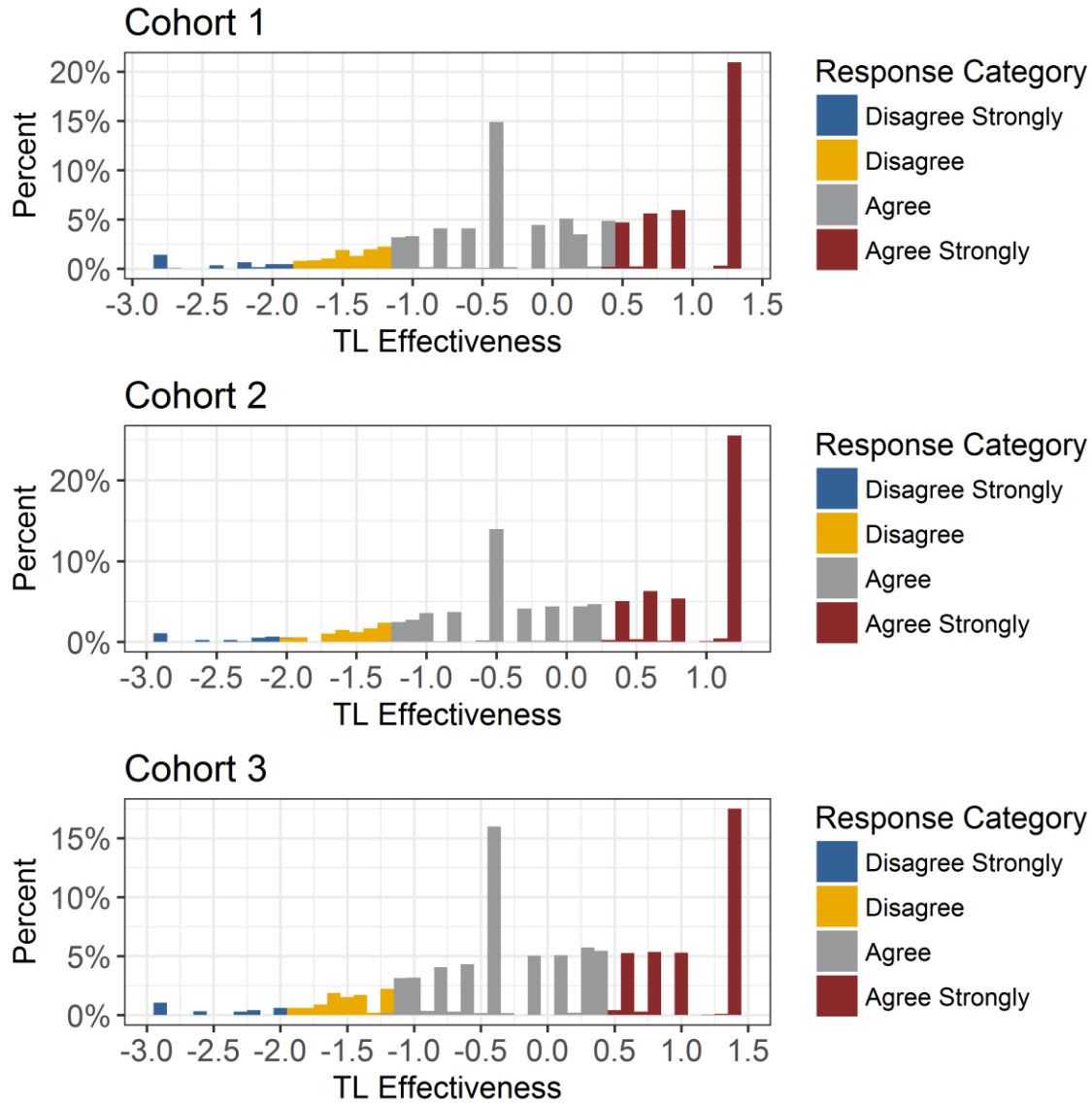
**Table A5. TLC Program and Teacher Support Survey Research Question to Survey Item Analysis Crosswalk**

Research Questions	TLC Goals	Domain	Construct	Teacher Survey Scale Score Reliability	School/District Administrator Survey Scale Score Reliability
Has the development of TLC created multiple new leadership roles for teachers? What are the responsibilities of teacher leaders?	Goals 1, 2, and 4	Teacher leadership	Responsibilities/ activities	NA	NA
To what extent do teachers and school and district administrators report that teacher leaders are effective in their roles?	Goals 1, 2, and 4	Teacher leadership	Perceived effectiveness	0.89	0.69
To what extent do teachers and school and district administrators report that teachers have a clear understanding of the teacher leadership roles?	NA	Teacher leadership	Knowledge	NA	NA
To what extent do teachers and school and district administrators report that opportunities are available to advance into teacher leadership roles?	Goals 1, 2, 4, and 5	Teacher leadership	Opportunity for career advancement	0.73	NA
To what extent do teachers and school and district administrators report that the selection process of teacher leaders is fair and transparent?	Goals 1, 2, and 4	Teacher leadership	Perceived fairness and transparency	0.78	0.51
To what extent do teachers and school and district administrators report that supports are being provided to new and senior teachers? What supports are being provided?	Goals 1 and 2	Supports for teachers	Supports and professional development provided	NA	NA
To what extent do teachers report that the supports provided are associated with teachers' impact on instructional practice, satisfaction, and efficacy?	Goals 1, 2, 4, and 5	Supports for teachers	Perceived utility	0.90	NA
To what extent do teachers report that the supports provided are associated with teachers' impact on instructional practice, satisfaction, and efficacy?	Goals 1, 2, 4, and 5	Supports for teachers	Perceived quality	NA	NA
To what extent do teachers and school and district administrators report that there is time for teacher collaboration? How is this time being used?	Goal 3	Teacher collaboration	Collaboration activities	NA	NA

Research Questions	TLC Goals	Domain	Construct	Teacher Survey Scale Score Reliability	School/District Administrator Survey Scale Score Reliability
To what extent do teachers report that teacher collaboration is associated with teacher productivity and satisfaction?	Goal 3	Teacher collaboration	Perceived satisfaction	0.82	NA
To what extent do teachers report that teacher collaboration is effective?	Goal 3	Teacher collaboration	Perceived effectiveness	0.76	NA
To what extent do teachers and school and district administrators report that TLC is associated with teachers' impact on instructional practice, satisfaction, and efficacy?	Goals 4 and 5	Perceived outcomes	Perceived effectiveness of TLC	0.85	0.73
To what extent do teachers and school and district administrators perceive a positive change in the professional structure after TLC implementation?	Goals 4 and 5	Perceived outcomes	Perceived change in professional structure	0.86	0.61

Note. NA = not available. The TLC goals refer to the following five goals: (1) attract able and promising new teachers by offering competitive starting salaries and offering short-term and long-term professional development and leadership opportunities, (2) retain effective teachers by providing enhanced career opportunities, (3) promote collaboration by developing and supporting opportunities for teachers in schools and school districts statewide to learn from each other, (4) reward professional growth and effective teaching by providing pathways for career opportunities that come with increased leadership responsibilities and involve increased compensation, and (5) improve student achievement by strengthening instruction.

**Figure A1. Example Percentage of Teachers That Fall Into the Four Response Categories Based on Their Teacher Leader Effectiveness Scale Scores**



## Appendix B. Teacher Leadership and Compensation Program Survey Results

This appendix presents the survey results. Tables B1 through B18 present subgroup analyses for the key constructs included in Table A5 in Appendix A, including items related to teacher leadership, supports for teachers, teacher collaboration, and perceived outcomes of Teacher Leadership and Compensation (TLC). Teacher and administrator survey responses were examined by TLC cohort, years of teaching experience (early career vs. veteran teachers),<sup>34</sup> teacher role (teacher leader vs. classroom teacher; for all cohorts combined and separately), district size tier,<sup>35</sup> Area Education Agency (AEA), and grade band (Grades K–5, 6–8, and 9–12). Specifically, we examined whether differences in extreme category percentages (e.g., *agree strongly* or *very familiar*) were statistically significant between *each* of these subgroups. We reported significant differences in survey responses in the “Differs from” column only when the extreme category percentage difference between the two subgroups was at least 5%.

**Table B1. Percentage of Teachers Who Responded *Very Familiar* to Familiarity With Teacher Leadership Roles**

Group	Percentage <i>Very Familiar</i>	N	Differs From
All teachers	72%	9,258	NA
<b>TLC Cohorts</b>			
Cohort 1	77%	3,112	Cohort 3
Cohort 2	76%	2,659	Cohort 3
Cohort 3	67%	3,487	Cohort 1, Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	82%	3,878	Classroom teachers
Classroom teachers	41%	5,272	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	88%	1,124	Classroom teachers
Classroom teachers	48%	1,957	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	85%	1,164	Classroom teachers
Classroom teachers	45%	1,465	Teacher leaders

<sup>34</sup> Early career teachers were defined as teachers who had been teaching for 3 years or less, and veteran teachers were defined as teachers who had been teaching at least four years.

<sup>35</sup> District size tiers, as defined by the Iowa Department of Education, are as follows: 9,000 or more students (Tier 1), 2,500 students to 8,999 students (Tier 2), 1,000 students to 2,499 students (Tier 3), 600 students to 999 students (Tier 4), 300 students to 599 students (Tier 5), and less than 300 students (Tier 6).

Group	Percentage Very Familiar	N	Differs From
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	78%	1,590	Classroom teachers
Classroom teachers	34%	1,850	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	77%	8,360	Early career teachers
Early career teachers	51%	898	Veteran teachers
<b>District Size Tiers</b>			
9,000 or more students	71%	1,754	
2,500 to 8,999 students	76%	1,923	600 to 999 students, 300 to 599 students
1,000 to 2,499 students	73%	3,021	
600 to 999 students	69%	1,534	2,500 to 8,999 students
300 to 599 students	70%	846	2,500 to 8,999 students
Fewer than 300 students	72%	180	
<b>Area Education Agencies</b>			
AEA 1	74%	640	AEA 9, AEA 12
AEA 5	69%	664	AEA 10, AEA 11
AEA 7	70%	1,374	AEA 11
AEA 9	68%	973	AEA 1, AEA 10, AEA 11, AEA 15
AEA 10	74%	1,211	AEA 5, AEA 9, AEA 12
AEA 11	76%	2,109	AEA 5, AEA 7, AEA 9, AEA 12
AEA 12	66%	791	AEA 1, AEA 10, AEA 11, AEA 13, AEA 15
AEA 13	73%	814	AEA 12
AEA 15	74%	682	AEA 9, AEA 12
<b>Grade Bands</b>			
Grades K-5	70%	4,825	
Grades 6-8	70%	2,823	
Grades 9-12	70%	2,718	

Note. NA = not available.

**Table B2. Percentage of Administrators Who Responded *Very Familiar* to Familiarity With Teacher Leadership Roles**

Group	Percentage Very Familiar	N	Differs From
All administrators	83%	1192	NA
<b>TLC Cohorts</b>			
Cohort 1	82%	318	
Cohort 2	89%	349	
Cohort 3	82%	525	
<b>District Size Tiers</b>			
9,000 or more students	88%	239	
2,500 to 8,999 students	78%	195	
1,000 to 2,499 students	87%	352	
600 to 999 students	79%	233	
300 to 599 students	82%	135	
Fewer than 300 students	89%	38	
<b>Area Education Agencies</b>			
AEA 1	92%	78	
AEA 5	93%	109	
AEA 7	90%	187	
AEA 9	94%	77	
AEA 10	76%	170	
AEA 11	86%	265	
AEA 12	76%	110	
AEA 13	77%	108	
AEA 15	79%	88	
<b>Grade Bands</b>			
Grades K-5	87%	446	
Grades 6-8	93%	293	
Grades 9-12	89%	263	

Note. NA = not available.

**Table B3. Percentage of Teachers Who Were in the *Agree Strongly* Range for the Perceived Opportunities to Assume Teacher Leadership Roles Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	40%	3,499	NA
<b>TLC Cohorts</b>			
Cohort 1	39%	993	Cohort 2
Cohort 2	44%	1,077	Cohort 1, Cohort 3

Group	Percentage Agree Strongly	N	Differs From
Cohort 3	38%	1,429	Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	49%	2,251	Classroom teachers
Classroom teachers	13%	1,208	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	49%	622	Classroom teachers
Classroom teachers	13%	364	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	52%	708	Classroom teachers
Classroom teachers	16%	355	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	46%	489	Classroom teachers
Classroom teachers	12%	921	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	42%	3,047	Early career teachers
Early career teachers	31%	452	Veteran teachers
<b>District Size Tiers</b>			
9,000 or more students	39%	609	
2,500 to 8,999 students	40%	670	
1,000 to 2,499 students	40%	1,147	
600 to 999 students	40%	624	
300 to 599 students	40%	357	
Fewer than 300 students	43%	92	
<b>Area Education Agencies</b>			
AEA 1	45%	241	AEA 7, AEA 15
AEA 5	39%	269	
AEA 7	35%	495	AEA 1, AEA 10, AEA 11, AEA 13
AEA 9	40%	345	
AEA 10	43%	472	AEA 7, AEA 15
AEA 11	43%	826	AEA 7, AEA 15
AEA 12	38%	305	
AEA 13	43%	322	AEA 7, AEA 15
AEA 15	35%	224	AEA 1, AEA 10, AEA 11, AEA 13
<b>Grade Bands</b>			
Grades K-5	39%	1,783	
Grades 6-8	38%	1,041	
Grades 9-12	36%	950	

Note. NA = not available.

**Table B4. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Effectiveness of Teacher Leadership Roles Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	45%	6,176	NA
<b>TLC Cohorts</b>			
Cohort 1	48%	1,875	Cohort 3
Cohort 2	51%	1,898	Cohort 3
Cohort 3	40%	2,403	Cohort 1, Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	47%	2,233	Classroom teachers
Classroom teachers	38%	3,939	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	52%	652	Classroom teachers
Classroom teachers	37%	1,222	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	53%	740	Classroom teachers
Classroom teachers	43%	1,155	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	41%	841	Classroom teachers
Classroom teachers	35%	1,562	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	45%	5,157	
Early career teachers	45%	1,019	
<b>District Size Tiers</b>			
9,000 or more students	48%	1,128	
2,500 to 8,999 students	46%	1,174	300 to 599 students
1,000 to 2,499 students	46%	2,086	
600 to 999 students	44%	1,090	
300 to 599 students	41%	576	2,500 to 8,999 students
Fewer than 300 students	43%	122	
<b>Area Education Agencies</b>			
AEA 1	50%	451	AEA 7, AEA 12, AEA 15
AEA 5	48%	460	
AEA 7	43%	946	AEA 1
AEA 9	45%	658	
AEA 10	45%	821	
AEA 11	47%	1,340	
AEA 12	42%	528	AEA 1



Group	Percentage Agree Strongly	N	Differs From
AEA 13	44%	551	
AEA 15	42%	421	AEA 1
<b>Grade Bands</b>			
Grades K–5	48%	3,459	Grades 6–8, Grades 9–12
Grades 6–8	42%	1,875	Grades K–5
Grades 9–12	38%	1,659	Grades K–5

Note. NA = not available.

**Table B5. Percentage of Administrators Who Were in the Agree Strongly Range for the Perceived Effectiveness of Teacher Leadership Roles Scale**

Group	Percentage Agree Strongly	N	Differs From
All administrators	68%	854	NA
<b>TLC Cohorts</b>			
Cohort 1	73%	235	
Cohort 2	69%	263	
Cohort 3	65%	356	
<b>District Size Tiers</b>			
9,000 or more students	65%	171	2,500 to 8,999 students
2,500 to 8,999 students	79%	155	9,000 or more students, 600 to 999 students, 300 to 599 students, fewer than 300 students
1,000 to 2,499 students	72%	258	
600 to 999 students	65%	163	2,500 to 8,999 students
300 to 599 students	55%	82	2,500 to 8,999 students
Fewer than 300 students	55%	25	2,500 to 8,999 students
<b>Area Education Agencies</b>			
AEA 1	69%	59	
AEA 5	70%	78	
AEA 7	64%	133	
AEA 9	76%	58	
AEA 10	64%	116	
AEA 11	67%	188	
AEA 12	67%	78	
AEA 13	75%	82	
AEA 15	72%	62	
<b>Grade Bands</b>			
Grades K–5	69%	325	
Grades 6–8	64%	193	
Grades 9–12	65%	185	

Note. NA = not available.

**Table B6. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Fairness and Transparency of the Teacher Leader Selection Process Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	50%	6,408	NA
<b>TLC Cohorts</b>			
Cohort 1	44%	1,625	Cohort 2, Cohort 3
Cohort 2	51%	1,787	Cohort 1
Cohort 3	52%	2,996	Cohort 1
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	54%	2,477	Classroom teachers
Classroom teachers	36%	3,924	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	49%	630	Classroom teachers
Classroom teachers	29%	995	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	54%	749	Classroom teachers
Classroom teachers	37%	1,035	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	56%	1,098	Classroom teachers
Classroom teachers	40%	1,894	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	51%	5,511	Early career teachers
Early career teachers	43%	897	Veteran teachers
<b>District Size Tiers</b>			
9,000 or more students	41%	902	1,000 to 2,499 students, 600 to 999 students, 300 to 599 students, fewer than 300 students
2,500 to 8,999 students	44%	1,071	1,000 to 2,499 students, 600 to 999 students, 300 to 599 students, fewer than 300 students
1,000 to 2,499 students	51%	2,223	9,000 or more students, 2,500 to 8,999 students, 300 to 599 students, Fewer than 300 students
600 to 999 students	52%	1,273	9,000 or more students, 2,500 to 8,999 students, Fewer than 300 students
300 to 599 students	57%	782	9,000 or more students, 2,500 to 8,999 students, 1,000 to 2,499 students
Fewer than 300 students	63%	157	9,000 or more students, 2,500 to 8,999 students, 1,000 to 2,499 students, 600 to 999 students

Group	Percentage Agree Strongly	N	Differs From
<b>Area Education Agencies</b>			
AEA 1	48%	420	
AEA 5	54%	531	AEA 9, AEA 11, AEA 15
AEA 7	52%	1,124	AEA 11, AEA 15
AEA 9	46%	622	AEA 5, AEA 10, AEA 12
AEA 10	53%	843	AEA 9, AEA 11, AEA 15
AEA 11	46%	1,252	AEA 5, AEA 7, AEA 10, AEA 12, AEA 13
AEA 12	53%	592	AEA 9, AEA 11, AEA 15
AEA 13	52%	593	AEA 11, AEA 15
AEA 15	44%	431	AEA 5, AEA 7, AEA 10, AEA 12, AEA 13
<b>Grade Bands</b>			
Grades K-5	52%	3,482	Grades 9-12
Grades 6-8	50%	2,048	
Grades 9-12	45%	1,881	Grades K-5

Note. NA = not available.

**Table B7. Percentage of Administrators Who Were in the Agree Strongly Range for the Perceived Fairness and Transparency of the Teacher Leader Selection Process Scale**

Group	Percentage Agree Strongly	N	Differs From
All administrators	64%	888	NA
<b>TLC Cohorts</b>			
Cohort 1	48%	208	Cohort 2, Cohort 3
Cohort 2	71%	275	Cohort 1
Cohort 3	71%	405	Cohort 1
<b>District Size Tiers</b>			
9,000 or more students	51%	163	1,000 to 2,499 students, 300 to 599 students, fewer than 300 students
2,500 to 8,999 students	59%	132	1,000 to 2,499 students, 300 to 599 students
1,000 to 2,499 students	73%	274	9,000 or more students, 2,500 to 8,999 students
600 to 999 students	61%	176	300 to 599 students
300 to 599 students	81%	109	9,000 or more students, 2,500 to 8,999 students, 600 to 999 students
Fewer than 300 students	75%	34	9,000 or more students

Group	Percentage Agree Strongly	N	Differs From
<b>Area Education Agencies</b>			
AEA 1	67%	57	
AEA 5	81%	91	AEA 7, AEA 9, AEA 10, AEA 11, AEA 12, AEA 15
AEA 7	62%	133	AEA 5
AEA 9	65%	60	AEA 5
AEA 10	63%	119	AEA 5
AEA 11	68%	198	AEA 5, AEA 12
AEA 12	44%	85	AEA 5, AEA 11, AEA 13
AEA 13	75%	85	AEA 12
AEA 15	57%	60	AEA 5
<b>Grade Bands</b>			
Grades K-5	65%	322	
Grades 6-8	66%	207	
Grades 9-12	69%	203	

Note. NA = not available.

**Table B8. Percentage of Teachers Who Indicated That Professional Development Support Was Offered at the School and District Levels**

Group	Percentage Yes	N	Differs From
All teachers	75%	12,347	NA
<b>TLC Cohorts</b>			
Cohort 1	79%	3,941	Cohort 3
Cohort 2	75%	3,283	
Cohort 3	73%	5,123	Cohort 1
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	76%	3,487	
Classroom teachers	72%	8,440	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	80%	1,011	
Classroom teachers	77%	2,795	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	76%	1,030	
Classroom teachers	73%	2,142	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	74%	1,446	Classroom teachers
Classroom teachers	70%	3,503	Teacher leaders

Group	Percentage Yes	N	Differs From
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	75%	10,524	
Early career teachers	74%	1,823	
<b>District Size Tiers</b>			
9,000 or more students	78%	2,356	
2,500 to 8,999 students	77%	2,457	
1,000 to 2,499 students	75%	3,863	
600 to 999 students	72%	2,171	
300 to 599 students	73%	1,253	
Fewer than 300 students	69%	247	
<b>Area Education Agencies</b>			
AEA 1	80%	908	
AEA 5	74%	935	
AEA 7	78%	2,031	
AEA 9	77%	1,325	
AEA 10	76%	1,581	
AEA 11	75%	2,585	
AEA 12	71%	1,126	
AEA 13	70%	996	
AEA 15	72%	860	
<b>Grade Bands</b>			
Grades K-5	75%	6,521	
Grades 6-8	74%	3,968	
Grades 9-12	75%	3,772	

Note. NA = not available.

**Table B9. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Utility of Teacher Supports Provided Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	34%	4,280	NA
<b>TLC Cohorts</b>			
Cohort 1	35%	1,241	
Cohort 2	38%	1,347	Cohort 3
Cohort 3	32%	1,692	Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	37%	1,660	Classroom teachers
Classroom teachers	26%	2,518	Teacher leaders

Group	Percentage Agree Strongly	N	Differs From
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	39%	474	Classroom teachers
Classroom teachers	24%	741	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	53%	535	Classroom teachers
Classroom teachers	43%	777	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	41%	651	Classroom teachers
Classroom teachers	35%	1,000	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	34%	3,557	
Early career teachers	33%	723	
<b>District Size Tiers</b>			
9,000 or more students	36%	797	
2,500 to 8,999 students	32%	775	
1,000 to 2,499 students	33%	1,399	
600 to 999 students	35%	781	
300 to 599 students	35%	436	
Fewer than 300 students	33%	92	
<b>Area Education Agencies</b>			
AEA 1	36%	289	AEA 7, AEA 15
AEA 5	35%	321	AEA 15
AEA 7	30%	614	AEA 1, AEA 10, AEA 11, AEA 13
AEA 9	34%	426	AEA 15
AEA 10	36%	604	AEA 7, AEA 15
AEA 11	36%	941	AEA 7, AEA 15
AEA 12	34%	370	AEA 15
AEA 13	39%	441	AEA 7, AEA 15
AEA 15	27%	274	AEA 1, AEA 5, AEA 9, AEA 10, AEA 11, AEA 12, AEA 13
<b>Grade Bands</b>			
Grades K-5	36%	2,463	Grades 6-8, Grades 9-12
Grades 6-8	32%	1,282	Grades K-5, Grades 9-12
Grades 9-12	26%	1,005	Grades K-5, Grades 6-8

Note. NA = not available.

**Table B10. Percentage of Teachers Who Responded Agree Strongly That the Teacher Supports Provided Are of High Quality**

Group	Percentage Agree Strongly	N	Differs From
All teachers	34%	4,440	NA
<b>TLC Cohorts</b>			
Cohort 1	33%	1,249	
Cohort 2	37%	1,408	Cohort 3
Cohort 3	32%	1,783	Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	36%	1,627	Classroom teachers
Classroom teachers	27%	2,687	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	37%	460	Classroom teachers
Classroom teachers	25%	760	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	38%	516	
Classroom teachers	34%	847	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	34%	651	Classroom teachers
Classroom teachers	25%	1,080	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	34%	3,720	
Early career teachers	30%	720	
<b>District Size Tiers</b>			
9,000 or more students	33%	797	
2,500 to 8,999 students	33%	825	
1,000 to 2,499 students	34%	1,430	Fewer than 300 students
600 to 999 students	35%	840	Fewer than 300 students
300 to 599 students	35%	461	Fewer than 300 students
Fewer than 300 students	26%	87	1,000 to 2,499 students, 600 to 999 students, 300 to 599 students
<b>Area Education Agencies</b>			
AEA 1	36%	312	AEA 15
AEA 5	35%	332	AEA 15
AEA 7	30%	669	AEA 10, AEA 13
AEA 9	33%	435	
AEA 10	36%	617	AEA 7, AEA 15
AEA 11	35%	987	AEA 15
AEA 12	33%	382	

Group	Percentage Agree Strongly	N	Differs From
AEA 13	38%	429	AEA 7, AEA 15
AEA 15	27%	277	AEA 1, AEA 5, AEA 10, AEA 11, AEA 13
<b>Grade Bands</b>			
Grades K-5	35%	2,480	Grades 9-12
Grades 6-8	33%	1,382	
Grades 9-12	28%	1,126	Grades K-5

Note. NA = not available.

**Table B11. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Satisfaction With Teacher Collaboration Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	27%	4,066	NA
<b>TLC Cohorts</b>			
Cohort 1	26%	1,185	Cohort 2
Cohort 2	32%	1,322	Cohort 1, Cohort 3
Cohort 3	24%	1,559	Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	27%	1,267	
Classroom teachers	25%	2,698	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	27%	343	
Classroom teachers	25%	818	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	32%	435	
Classroom teachers	32%	849	
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	25%	489	
Classroom teachers	22%	1,031	
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	27%	3,439	
Early career teachers	25%	627	
<b>District Size Tiers</b>			
9,000 or more students	28%	758	300 to 599 students
2,500 to 8,999 students	28%	806	300 to 599 students
1,000 to 2,499 students	27%	1,379	
600 to 999 students	27%	703	



Group	Percentage Agree Strongly	N	Differs From
300 to 599 students	23%	349	9,000 or more students, 2,500 to 8,999 students
Fewer than 300 students	21%	71	
<b>Area Education Agencies</b>			
AEA 1	28%	279	
AEA 5	25%	265	
AEA 7	28%	688	
AEA 9	28%	423	
AEA 10	28%	592	
AEA 11	27%	894	
AEA 12	26%	337	
AEA 13	25%	320	
AEA 15	25%	268	
<b>Grade Bands</b>			
Grades K–5	31%	2,459	Grades 6–8, Grades 9–12
Grades 6–8	25%	1,214	Grades K–5, Grades 9–12
Grades 9–12	20%	929	Grades K–5, Grades 6–8

Note. NA = not available.

**Table B12. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Effectiveness of Teacher Collaboration Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	36%	4,883	NA
<b>TLC Cohorts</b>			
Cohort 1	37%	1,480	Cohort 3
Cohort 2	40%	1,543	Cohort 3
Cohort 3	32%	1,860	Cohort 1, Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	37%	1,680	Classroom teachers
Classroom teachers	30%	3,068	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	39%	482	Classroom teachers
Classroom teachers	31%	963	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	41%	557	Classroom teachers
Classroom teachers	37%	943	Teacher leaders

Group	Percentage Agree Strongly	N	Differs From
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	33%	641	Classroom teachers
Classroom teachers	27%	1,162	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	35%	4,045	
Early career teachers	37%	838	
<b>District Size Tiers</b>			
9,000 or more students	39%	931	600 to 999 students, 300 to 599 students, fewer than 300 students
2,500 to 8,999 students	40%	1,030	600 to 999 students, 300 to 599 students, fewer than 300 students
1,000 to 2,499 students	36%	1,629	600 to 999 students, 300 to 599 students, fewer than 300 students
600 to 999 students	31%	808	9,000 or more students, 2,500 to 8,999 students, 1,000 to 2,499 students
300 to 599 students	31%	401	9,000 or more students, 2,500 to 8,999 students, 1,000 to 2,499 students
Fewer than 300 students	25%	84	9,000 or more students, 2,500 to 8,999 students, 1,000 to 2,499 students
<b>Area Education Agencies</b>			
AEA 1	37%	346	AEA 12, AEA 15
AEA 5	36%	335	
AEA 7	37%	815	AEA 12, AEA 13, AEA 15
AEA 9	37%	518	AEA 12, AEA 15
AEA 10	37%	687	AEA 12, AEA 13, AEA 15
AEA 11	38%	1,092	AEA 12, AEA 13, AEA 15
AEA 12	31%	397	AEA 1, AEA 7, AEA 9, AEA 10, AEA 11
AEA 13	31%	383	AEA 7, AEA 10, AEA 11
AEA 15	30%	310	AEA 1, AEA 7, AEA 9, AEA 10, AEA 11
<b>Grade Bands</b>			
Grades K-5	40%	2,893	Grades 6-8, Grades 9-12
Grades 6-8	33%	1,445	Grades K-5, Grades 9-12
Grades 9-12	26%	1,137	Grades K-5, Grades 6-8

Note. NA = not available.

**Table B13. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Effectiveness of TLC Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	33%	3,586	NA
<b>TLC Cohorts</b>			
Cohort 1	39%	1,169	Cohort 3
Cohort 2	38%	1,156	Cohort 3
Cohort 3	27%	1,261	Cohort 1, Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	37%	1,738	Classroom teachers
Classroom teachers	20%	1,783	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	45%	561	Classroom teachers
Classroom teachers	22%	596	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	42%	569	Classroom teachers
Classroom teachers	24%	563	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	30%	608	Classroom teachers
Classroom teachers	16%	624	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	34%	2,970	Early career teachers
Early career teachers	29%	616	Veteran teachers
<b>District Size Tiers</b>			
9,000 or more students	37%	696	1,000 to 2,499 students, 600 to 999 students, 300 to 599 students
2,500 to 8,999 students	36%	716	600 to 999 students
1,000 to 2,499 students	32%	1,156	9,000 or more students
600 to 999 students	30%	604	9,000 or more students 2,500 to 8,999 students
300 to 599 students	31%	330	9,000 or more students
Fewer than 300 students	30%	84	
<b>Area Education Agencies</b>			
AEA 1	39%	249	AEA 5, AEA 7, AEA 10, AEA 12, AEA 15
AEA 5	30%	250	AEA 1, AEA 11
AEA 7	30%	502	AEA 1, AEA 11
AEA 9	35%	412	AEA 12, AEA 15
AEA 10	32%	470	AEA 1, AEA 11

Group	Percentage Agree Strongly	N	Differs From
AEA 11	37%	843	AEA 5, AEA 7, AEA 10, AEA 12, AEA 15
AEA 12	28%	280	AEA 1, AEA 9, AEA 11, AEA 13
AEA 13	35%	348	AEA 12, AEA 15
AEA 15	27%	232	AEA 1, AEA 9, AEA 11, AEA 13
<b>Grade Bands</b>			
Grades K-5	35%	2,024	Grades 6-8, Grades 9-12
Grades 6-8	28%	985	Grades K-5
Grades 9-12	25%	807	Grades K-5

Note. NA = not available.

**Table B14. Percentage of Administrators Who Were in the Agree Strongly Range for the Perceived Effectiveness of TLC Scale**

Group	Percentage Agree Strongly	N	Differs From
All administrators	44%	501	NA
<b>TLC Cohorts</b>			
Cohort 1	53%	155	Cohort 3
Cohort 2	47%	179	
Cohort 3	5%	167	Cohort 1
<b>District Size Tiers</b>			
9,000 or more students	55%	114	600 to 999 students, fewer than 300 students
2,500 to 8,999 students	41%	90	
1,000 to 2,499 students	46%	154	
600 to 999 students	35%	84	9,000 or more students
300 to 599 students	39%	43	
Fewer than 300 students	31%	16	9,000 or more students
<b>Area Education Agencies</b>			
AEA 1	47%	34	AEA 7
AEA 5	45%	47	AEA 7
AEA 7	27%	67	AEA 1, AEA 5, AEA 9, AEA 10, AEA 11, AEA 13
AEA 9	47%	38	AEA 7
AEA 10	51%	64	AEA 7
AEA 11	41%	121	AEA 7
AEA 12	46%	53	
AEA 13	57%	44	AEA 7
AEA 15	36%	33	

Group	Percentage Agree Strongly	N	Differs From
<b>Grade Bands</b>			
Grades K-5	47%	209	Grades 9-12
Grades 6-8	40%	126	
Grades 9-12	37%	105	Grades K-5

Note. NA = not available.

**Table B15. Percentage of Teachers Who Were in the Agree Strongly Range for the Perceived Positive Changes in Professional Climate Scale**

Group	Percentage Agree Strongly	N	Differs From
All teachers	27%	2,623	NA
<b>TLC Cohorts</b>			
Cohort 1	29%	815	Cohort 3
Cohort 2	32%	874	Cohort 3
Cohort 3	23%	934	Cohort 1, Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	31%	1,469	Classroom teachers
Classroom teachers	13%	1,109	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	34%	440	Classroom teachers
Classroom teachers	14%	367	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	37%	487	Classroom teachers
Classroom teachers	16%	372	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	26%	542	Classroom teachers
Classroom teachers	11%	370	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	28%	2,214	Early career teachers
Early career teachers	21%	409	Veteran teachers
<b>District Size Tiers</b>			
9,000 or more students	30%	521	
2,500 to 8,999 students	29%	528	
1,000 to 2,499 students	25%	827	
600 to 999 students	26%	447	
300 to 599 students	26%	240	
Fewer than 300 students	24%	60	
<b>Area Education Agencies</b>			
AEA 1	30%	160	AEA 7, AEA 12

Group	Percentage Agree Strongly	N	Differs From
AEA 5	28%	194	
AEA 7	24%	383	AEA 1, AEA 9, AEA 11
AEA 9	30%	324	AEA 7, AEA 12, AEA 13
AEA 10	27%	350	
AEA 11	29%	613	AEA 7, AEA 12, AEA 13
AEA 12	23%	202	AEA 1, AEA 9, AEA 11
AEA 13	24%	222	AEA 9, AEA 11
AEA 15	27%	175	
<b>Grade Bands</b>			
Grades K-5	27%	1,409	Grades 9-12
Grades 6-8	25%	753	Grades 9-12
Grades 9-12	19%	582	Grades K-5, Grades 6-8

Note. NA = not available.

**Table B16. Percentage of Administrators Who Were in the Agree Strongly Range for the Perceived Positive Changes in Professional Climate Scale**

Group	Percentage Agree Strongly	N	Differs From
All administrators	55%	668	NA
<b>TLC Cohorts</b>			
Cohort 1	60%	185	
Cohort 2	62%	226	Cohort 3
Cohort 3	49%	257	Cohort 2
<b>District Size Tiers</b>			
9,000 or more students	61%	133	
2,500 to 8,999 students	61%	119	
1,000 to 2,499 students	58%	206	
600 to 999 students	47%	129	
300 to 599 students	47%	59	
Fewer than 300 students	44%	22	
<b>Area Education Agencies</b>			
AEA 1	65%	49	AEA 7
AEA 5	50%	59	
AEA 7	44%	98	AEA 1, AEA 9, AEA 11
AEA 9	66%	52	AEA 7
AEA 10	56%	77	
AEA 11	61%	167	AEA 7
AEA 12	49%	63	
AEA 13	58%	51	

Group	Percentage Agree Strongly	N	Differs From
AEA 15	58%	52	
<b>Grade Bands</b>			
Grades K–5	54%	1244	
Grades 6–8	50%	5153	
Grades 9–12	50%	5142	

Note. NA = not available.

**Table B17. Percentage of Teachers Who Responded Agree Strongly That They Look Forward to Returning to Their School Next Year**

Group	Percentage Agree Strongly	N	Differs From
All teachers	69%	10,495	NA
<b>TLC Cohorts</b>			
Cohort 1	66%	3,006	
Cohort 2	70%	2,861	
Cohort 3	69%	4,628	
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	63%	3,146	Classroom teachers
Classroom teachers	70%	7,009	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	68%	840	Classroom teachers
Classroom teachers	59%	2,064	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	71%	1,835	Classroom teachers
Classroom teachers	66%	940	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	71%	1,366	Classroom teachers
Classroom teachers	64%	3,110	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	68%	8,894	
Early career teachers	69%	1,601	
<b>District Size Tiers</b>			
9,000 or more students	62%	1,784	2,500 to 8,999 students, 1,000 to 2,499 students, 600 to 999 students, 300 to 599 students
2,500 to 8,999 students	69%	1,981	9,000 or more students
1,000 to 2,499 students	68%	3,337	9,000 or more students, 300 to 599 students
600 to 999 students	72%	2,002	9,000 or more students

Group	Percentage Agree Strongly	N	Differs From
300 to 599 students	73%	1,172	9,000 or more students, 1,000 to 2,499 students
Fewer than 300 students	64%	219	
<b>Area Education Agencies</b>			
AEA 1	75%	768	AEA 9, AEA 10, AEA 11, AEA 13, AEA 15
AEA 5	69%	812	AEA 15
AEA 7	71%	1,810	AEA 9, AEA 10, AEA 15
AEA 9	64%	1,063	AEA 1, AEA 7, AEA 12
AEA 10	65%	1,290	AEA 1, AEA 7, AEA 12
AEA 11	68%	2,168	AEA 1, AEA 12, AEA 15
AEA 12	74%	1,012	AEA 9, AEA 10, AEA 11, AEA 13, AEA 15
AEA 13	68%	870	AEA 1, AEA 12
AEA 15	62%	702	AEA 1, AEA 5, AEA 7, AEA 11, AEA 12
<b>Grade Bands</b>			
Grades K-5	71%	5,736	Grades 9-12
Grades 6-8	68%	3,311	
Grades 9-12	64%	3,111	Grades K-5

Note. NA = not available.

**Table B18. Percentage of Teachers Who Responded Agree Strongly That TLC Has Impacted Their Desire to Return to Their School Next Year**

Group	Percentage Agree Strongly	N	Differs From
All teachers	29%	3,152	NA
<b>TLC Cohorts</b>			
Cohort 1	31%	953	
Cohort 2	33%	962	Cohort 3
Cohort 3	27%	1,237	Cohort 2
<b>Teacher Leaders Versus Classroom Teachers</b>			
Teacher leaders	34%	1,602	Classroom teachers
Classroom teachers	16%	1,483	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 1)</b>			
Teacher leaders	37%	478	Classroom teachers
Classroom teachers	15%	458	Teacher leaders
<b>Teacher Leaders Versus Classroom Teachers (Cohort 2)</b>			
Teacher leaders	37%	493	Classroom teachers
Classroom teachers	18%	443	Teacher leaders



Group	Percentage Agree Strongly	N	Differs From
<b>Teacher Leaders Versus Classroom Teachers (Cohort 3)</b>			
Teacher leaders	30%	631	Classroom teachers
Classroom teachers	15%	582	Teacher leaders
<b>Veteran Versus Early Career Teachers</b>			
Veteran teachers	31%	2,676	Early career teachers
Early career teachers	24%	476	Veteran teachers
<b>District Size Tiers</b>			
9,000 or more students	32%	602	
2,500 to 8,999 students	31%	628	
1,000 to 2,499 students	28%	1,019	
600 to 999 students	28%	527	
300 to 599 students	30%	316	
Fewer than 300 students	26%	60	
<b>Area Education Agencies</b>			
AEA 1	35%	253	AEA 5, AEA 7, AEA 15
AEA 5	28%	219	AEA 1
AEA 7	28%	482	AEA 1, AEA 15
AEA 9	31%	354	AEA 15
AEA 10	29%	392	AEA 15
AEA 11	31%	702	AEA 15
AEA 12	29%	266	AEA 15
AEA 13	31%	290	AEA 15
AEA 15	22%	194	AEA 1, AEA 7, AEA 9, AEA 10, AEA 11, AEA 12, AEA 13
<b>Grade Bands</b>			
Grades K-5	29%	1,678	Grades 9-12
Grades 6-8	25%	863	
Grades 9-12	23%	758	Grades K-5

Note. NA = not available.

Table B19 presents the *t*-test results for the 2016 to the 2017 survey comparisons. The estimates represent the percentage change in extreme category responses (e.g., *agree strongly* or *very familiar*) from the 2016 to the 2017 TLC survey.

**Table B19. Percentage Change in Extreme Category Responses From the 2016 to the 2017 TLC Survey**

Group	Teacher Survey		Administrator survey	
	Estimates	Confidence Interval	Estimates	Confidence Interval
<b>Familiarity with Teacher Leadership Roles</b>				
All respondents	30%** (1%)	[28%, 31%]	14%* (6%)	[3%, 25%]
Cohort 1	21%** (1%)	[19%, 22%]	-3% (6%)	[-14%, 8%]
Cohort 2	24%** (1%)	[22%, 26%]	8% (6%)	[-3%, 19%]
Cohort 3	45%** (1%)	[43%, 46%]	32%** (6%)	[20%, 43%]
<b>Perceived Opportunities to Assume Teacher Leadership Roles Scale</b>				
All respondents	20%** (1%)	[18%, 22%]	—	—
Cohort 1	19%** (1%)	[17%, 21%]	—	—
Cohort 2	23%** (1%)	[21%, 24%]	—	—
Cohort 3	19%** (1%)	[17%, 21%]	—	—
<b>Perceived Effectiveness of Teacher Leadership Roles Scale</b>				
All respondents	5%** (1%)	[3%, 7%]	15%* (6%)	[4%, 27%]
Cohort 1	6%** (1%)	[4%, 8%]	4% (6%)	[-6%, 15%]
Cohort 2	9%** (1%)	[7%, 11%]	14%* (6%)	[2%, 26%]
Cohort 3	13%** (1%)	[12%, 15%]	55%** (6%)	[44%, 67%]
<b>Support Offered at the School and District Levels</b>				
All respondents	2%** (1%)	[1%, 4%]	—	—
Cohort 1	1% (1%)	[-1%, 2%]	—	—
Cohort 2	4%** (1%)	[3%, 6%]	—	—

Group	Teacher Survey		Administrator survey	
	Estimates	Confidence Interval	Estimates	Confidence Interval
Cohort 3	3%** (1%)	[2%, 5%]	—	—
<b>Perceived Utility of Teacher Supports Provided Scale</b>				
All respondents	12%** (1%)	[10%, 14%]	—	—
Cohort 1	10%** (1%)	[8%, 11%]	—	—
Cohort 2	12%** (1%)	[11%, 14%]	—	—
Cohort 3	15%** (1%)	[13%, 16%]	—	—
<b>Teacher Supports Provided are of High Quality</b>				
All respondents	10%** (1%)	[8%, 12%]	—	—
Cohort 1	7%** (1%)	[6%, 9%]	—	—
Cohort 2	10%** (1%)	[8%, 11%]	—	—
Cohort 3	14%** (1%)	[12%, 15%]	—	—
<b>Perceived Satisfaction With Teacher Collaboration Scale</b>				
All respondents	0% (1%)	[-1%, 2%]	—	—
Cohort 1	-4%** (1%)	[-5%, -2%]	—	—
Cohort 2	3%** (1%)	[1%, 4%]	—	—
Cohort 3	3%** (1%)	[2%, 5%]	—	—
<b>Perceived Effectiveness of TLC Scale</b>				
All respondents	13%** (1%)	[11%, 15%]	10% (6%)	[-2%, 22%]
Cohort 1	16%** (1%)	[15%, 18%]	15%* (6%)	[3%, 27%]
Cohort 2	18%** (1%)	[16%, 19%]	12% (6%)	[0%, 24%]
Cohort 3	17%** (1%)	[15%, 19%]	32%** (6%)	[21%, 44%]

Group	Teacher Survey		Administrator survey	
	Estimates	Confidence Interval	Estimates	Confidence Interval
<b>Perceived Positive Changes in Professional Climate Scale</b>				
All respondents	10%** (1%)	[8%, 11%]	6% (6%)	[-6%, 19%]
Cohort 1	11%** (1%)	[10%, 13%]	10% (6%)	[-2%, 23%]
Cohort 2	13%** (1%)	[12%, 15%]	7% (6%)	[-5%, 20%]
Cohort 3	12%** (1%)	[10%, 14%]	46%** (6%)	[34%, 58%]
<b>Teachers Look Forward to Returning to Their School Next Year</b>				
All respondents	6%** (1%)	[5%, 8%]	—	—
Cohort 1	6%** (1%)	[4%, 7%]	—	—
Cohort 2	6%** (1%)	[4%, 7%]	—	—
Cohort 3	7%** (1%)	[6%, 9%]	—	—

Note. Standard errors, adjusted using bootstrapping, are presented in parentheses.  
 \* $p \leq .05$ . \*\* $p \leq .01$ .

# Appendix C. Teacher Leadership and Compensation Program Teacher Retention Methodological Approach

American Institutes for Research (AIR) examined the relationship between Teacher Leadership and Compensation (TLC) and teacher retention. This appendix describes the data and methodological approach taken to examine teacher retention.

## Data

To examine teacher retention across the three TLC cohorts, AIR used the Iowa Department of Education's (DE) Basic Education Data Survey (BEDS) data from the last 11 years (2005–06 to 2016–17). Using the BEDS, the DE collects information on staff positions, assignments, programs, demographics, degrees and certificates earned, years of experience, and compensation from public and nonpublic schools and Area Education Agencies (AEAs) in the fall of each school year.

In cleaning and organizing the BEDS data, we conferred with the DE to ensure we are using the same rules as the DE uses when calculating teacher retention for their school report cards. Key rules include the following:

1. Prior to the 2010–11 school year, teachers working across multiple school districts may be included in each district report.
2. Starting with the 2010–11 school year, teachers may no longer be included in multiple districts and thus should only have one record in the BEDS data.<sup>36</sup>
3. A teacher is considered retained if he or she is in a licensed staff position the following school year (e.g., teacher, principal) and has a base salary above \$0.<sup>37</sup>
4. For school-level retention, district-level teachers that are not assigned a primary (school) building identification number (ID) are excluded from the retention analysis. However, we included district-level teachers in the district-level retention analysis.

## Analysis

### School-Level Teacher Retention

To calculate school-level retention rates for each school year, we first counted the number of teachers assigned to a building (or school) in Iowa in a given year. We then counted how many of

<sup>36</sup> To ensure only one record per teacher was included in the BEDS data, we used the following hierarchical criteria to determine which record to retain: (a) higher full-time equivalent, (b) higher salary, and (c) higher district experience.

<sup>37</sup> Staff in licensed positions include those who (a) have a "folder" ID and (b) have a position ID above 500, excluding 698 (nurses) and 699 (coaches). Teachers are defined as staff with position IDs ranging from 726 to 800.

those teachers were in a licensed staff position in the same school the following school year. We divided the number of teachers retained in their school in the following school year by the number of teachers assigned to a building in the prior school year. The school-level retention rates were multiplied by 100 to calculate the percentage of teachers retained at their school. We followed the same procedure to calculate retention rates for two subgroups, years of teaching experience (0–3 years, 4–9 years, 10–19 years, and 20 or more years) and the grade band in which the teacher teaches (Grades 0–5, 6–8, and 9–12).

### **District-Level Teacher Retention**

To calculate district-level retention rates for each school year, we first counted the total number of teachers in Iowa in a given year. We then counted how many of those teachers were in a licensed staff position in the same district the following school year. We divided the number of teachers retained in their district in the following school year by the total number of teachers in the prior school year. The district-level retention rates were multiplied by 100 to calculate the percentage of teachers retained at their district. We followed the same procedure to calculate retention rates for two subgroups, years of teaching experience (0–3 years, 4–9 years, 10–19 years, and 20 or more years) and the grade band in which the teacher teaches (Grades 0–5, 6–8, and 9–12).

### **Estimating Predicted Post-TLC Implementation Teacher Retention Rates**

To examine whether the observed post-TLC retention rates (calculated using the methods above) are what we would expect them to be for each cohort, based on the pre-TLC implementation retention rate trends, we estimated predicted post-TLC implementation teacher retention rates.

Cohort 1 started implementing TLC in 2014–15, allowing us to estimate teacher retention rates for 3 years of TLC implementation. We ran the following logistic regression model for Cohort 1:

$$C1_t = \beta_0 + \beta_1 Time_t + \beta_2 Post1_t + \beta_3 Post2_t + \beta_4 Post3_t + e_t$$

where  $C1_t$  is the retention rate for Cohort 1 in year  $t$ ,  $Time_t$  is the linear outcome trend across time (school years 2005–06 to 2016–17 are coded –7 through 3, respectively), and  $Post1_t$ ,  $Post2_t$ , and  $Post3_t$  are indicators for whether Cohort 1 was in its first (2014–15), second (2015–16), or third (2016–17) year of TLC implementation.

Cohort 2 started implementing TLC in 2015–16, allowing us to estimate teacher retention rates for two years of TLC implementation. We ran the following logistic regression model for Cohort 2:

$$C2_t = \beta_0 + \beta_1 Time_t + \beta_2 Post1_t + \beta_3 Post2_t + e_t$$

where  $C2_t$  is the retention rate for Cohort 2 in year  $t$ ,  $Time_t$  is the linear outcome trend across time (school years 2005–06 to 2016–17 are coded –8 through 2, respectively), and  $Post1_t$  and  $Post2_t$  are indicators for whether Cohort 2 was in its first (2015–16) or second (2016–17) year of TLC implementation.

Cohort 3 started implementing TLC in 2016–17, allowing us to estimate teacher retention rates for one year of TLC implementation. We ran the following logistic regression model for Cohort 3:

$$C3_t = \beta_0 + \beta_1 Time_t + \beta_2 Post1_t + e_t$$

where  $C3_t$  is the retention rate for Cohort 3 in year  $t$ ,  $Time_t$  is the linear outcome trend across time (school years 2005–06 to 2016–17 are coded –9 through 1, respectively), and  $Post1_t$  is an indicator for whether Cohort 3 was in its first (2016–17) year of TLC implementation.

To calculate the predicted post-TLC implementation teacher retention rates, we summed the resulting model estimates of the intercept ( $\beta_0$ ) with the appropriate post-TLC year estimate for each cohort:

- Predicted\_PostYear1 =  $\beta_0 + \beta_2$
- Predicted\_PostYear2 =  $\beta_0 + \beta_3$
- Predicted\_PostYear3 =  $\beta_0 + \beta_4$

We then transformed the predicted logit estimates back into their original retention rate estimates (i.e., probabilities)<sup>38</sup> and multiplied by 100 to obtain the percentage of teachers retained.

We ran each set of models for each cohort and for the school- and district-level retention rates separately. We also ran each set of models for each level of the subgroups, years of teaching experience (0–3 years, 4–9 years, 10–19 years, and 20 or more years) and the grade band in which the teacher teaches (Grades 0–5, 6–8, and 9–12).

<sup>38</sup> The inverse-logit formula to transform logistic values back to probabilities is  $exp(x)/(1 + exp(x))$ , where  $x$  is the logit value.

## Appendix D. Teacher Leadership and Compensation Program Teacher Retention Results

The percentage of teachers retained in a school staff position, along with the number of teachers retained and number of teachers in the prior school year, are presented in Tables D1 and D2. Table D1 presents school-level retention rates and Table D2 presents district-level retention rates.

**Table D1. School-Level Teacher Retention Rates**

Year Retained From	Year Retained To	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
		Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2005-06	2006-07	29,408	9,436	9,271	10,701	25,004	7,881	7,913	9,210	85.02	83.52	85.35	86.07
2006-07	2007-08	29,584	9,451	9,440	10,693	25,219	8,064	7,870	9,285	85.25	85.32	83.37	86.83
2007-08	2008-09	33,682	10,570	10,572	12,540	28,684	9,073	8,975	10,636	85.16	85.84	84.89	84.82
2008-09	2009-10	33,456	10,511	10,597	12,348	28,816	9,128	9,120	10,568	86.13	86.84	86.06	85.58
2009-10	2010-11	33,657	10,699	10,617	12,341	28,579	9,133	9,009	10,437	84.91	85.36	84.85	84.57
2010-11	2011-12	34,447	10,871	10,964	12,612	29,919	9,497	9,548	10,874	86.86	87.36	87.09	86.22
2011-12	2012-13	34,471	10,819	11,070	12,582	29,638	9,148	9,574	10,916	85.98	84.55	86.49	86.76
2012-13	2013-14	34,833	10,926	11,334	12,573	30,097	9,418	9,694	10,985	86.40	86.20	85.53	87.37
2013-14	2014-15	35,006	10,962	11,489	12,555	30,122	9,425	9,879	10,818	86.05	85.98 (85.77)	85.99	86.16
2014-15	2015-16	35,326	11,177	11,621	12,528	30,578	9,719	9,966	10,893	86.56	86.96 (86.56)	85.76 (85.54)	86.95
2015-16	2016-17	35,416	11,222	11,774	12,420	30,541	9,654	10,193	10,694	86.24	86.03 (85.39)	86.57 (86.15)	86.10 (85.97)

Note. Predicted post-Teacher Leadership and Compensation (TLC) program implementation teacher retention rates are included in parentheses. Cells with gray text indicate years prior to TLC implementation for each cohort.



**Table D2. District-Level Teacher Retention Rates**

Year Retained From	Year Retained To	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
		Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2005-06	2006-07	29,737	9,556	9,420	10,761	26,479	8,501	8,479	9,499	89.04	88.96	90.01	88.27
2006-07	2007-08	29,903	9,561	9,592	10,750	26,946	8,680	8,683	9,583	90.11	90.79	90.52	89.14
2007-08	2008-09	33,992	10,645	10,741	12,606	30,444	9,721	9,645	11,078	89.56	91.32	89.80	87.88
2008-09	2009-10	33,819	10,592	10,741	12,486	30,590	9,711	9,781	11,098	90.45	91.68	91.06	88.88
2009-10	2010-11	33,994	10,788	10,729	12,477	30,701	9,860	9,742	11,099	90.31	91.40	90.80	88.96
2010-11	2011-12	34,803	10,956	11,089	12,758	31,727	10,142	10,209	11,376	91.16	92.57	92.06	89.17
2011-12	2012-13	34,936	10,959	11,219	12,758	31,696	10,015	10,265	11,416	90.73	91.39	91.50	89.48
2012-13	2013-14	35,382	11,075	11,473	12,834	32,158	10,163	10,452	11,543	90.89	91.77	91.10	89.94
2013-14	2014-15	35,646	11,102	11,697	12,847	32,160	10,212	10,607	11,341	90.22	91.98 (91.69)	90.68	88.28
2014-15	2015-16	35,977	11,318	11,788	12,871	32,702	10,404	10,797	11,501	90.90	91.92 (91.32)	91.59 (91.45)	89.36
2015-16	2016-17	36,033	11,324	11,960	12,749	32,764	10,411	10,878	11,475	90.93	91.94 (91.03)	90.95 (90.65)	90.01 (89.92)

Note. Predicted post-Teacher Leadership and Compensation (TLC) program implementation teacher retention rates are included in parentheses. Cells with gray text indicate years prior to TLC implementation for each cohort.

Tables D3 and D4 present school- and district-level retention rates, respectively, for teachers with four different levels of experience.

**Table D3. School-Level Teacher Retention Rates by Years of Experience**

Year Retained From	Year Retained To	Years of Experience	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2005-06	2006-07	0-3 years	4,840	1,670	1,543	1,627	3,668	1,290	1,191	1,187	75.79	77.25	77.19	72.96
		4-9 years	6,629	2,183	2,127	2,319	5,574	1,787	1,782	2,005	84.09	81.86	83.78	86.46
		10-19 years	7,635	2,402	2,510	2,723	6,836	2,100	2,249	2,487	89.54	87.43	89.60	91.33
		20 or more years	10,304	3,181	3,091	4,032	8,926	2,704	2,691	3,531	86.63	85.00	87.06	87.57
2006-07	2007-08	0-3 years	5,185	1,785	1,673	1,727	4,046	1,409	1,301	1,336	78.03	78.94	77.76	77.36
		4-9 years	6,510	2,099	2,184	2,227	5,532	1,795	1,809	1,928	84.98	85.52	82.83	86.57
		10-19 years	7,833	2,488	2,546	2,799	6,979	2,208	2,233	2,538	89.10	88.75	87.71	90.68
		20 or more years	10,056	3,079	3,037	3,940	8,662	2,652	2,527	3,483	86.14	86.13	83.21	88.40
2007-08	2008-09	0-3 years	6,149	2,061	1,939	2,149	4,852	1,647	1,534	1,671	78.91	79.91	79.11	77.76
		4-9 years	7,540	2,478	2,436	2,626	6,392	2,149	2,063	2,180	84.77	86.72	84.69	83.02
		10-19 years	8,998	2,771	2,898	3,329	7,979	2,475	2,549	2,955	88.68	89.32	87.96	88.77
		20 or more years	10,995	3,260	3,299	4,436	9,461	2,802	2,829	3,830	86.05	85.95	85.75	86.34
2008-09	2009-10	0-3 years	6,074	1,930	1,970	2,174	4,919	1,606	1,583	1,730	80.98	83.21	80.36	79.58
		4-9 years	7,575	2,568	2,456	2,551	6,516	2,247	2,093	2,176	86.02	87.50	85.22	85.30
		10-19 years	9,079	2,801	2,967	3,311	8,103	2,514	2,622	2,967	89.25	89.75	88.37	89.61
		20 or more years	10,728	3,212	3,204	4,312	9,278	2,761	2,822	3,695	86.48	85.96	88.08	85.69
2009-10	2010-11	0-3 years	5,747	1,821	1,843	2,083	4,622	1,492	1,467	1,663	80.42	81.93	79.60	79.84
		4-9 years	7,556	2,627	2,420	2,509	6,536	2,299	2,071	2,166	86.50	87.51	85.58	86.33
		10-19 years	9,634	3,055	3,099	3,480	8,711	2,756	2,794	3,161	90.42	90.21	90.16	90.83
		20 or more years	10,720	3,196	3,255	4,269	8,710	2,586	2,677	3,447	81.25	80.91	82.24	80.74
2010-11	2011-12	0-3 years	5,618	1,738	1,827	2,053	4,565	1,433	1,502	1,630	81.26	82.45	82.21	79.40
		4-9 years	7,856	2,730	2,523	2,603	6,828	2,376	2,198	2,254	86.91	87.03	87.12	86.59
		10-19 years	10,539	3,327	3,419	3,793	9,540	3,050	3,058	3,432	90.52	91.67	89.44	90.48
		20 or more years	10,434	3,076	3,195	4,163	8,986	2,638	2,790	3,558	86.12	85.76	87.32	85.47

Year Retained From	Year Retained To	Years of Experience	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2011-12	2012-13	0-3 years	5,632	1,685	1,885	2,062	4,500	1,328	1,508	1,664	79.90	78.81	80.00	80.70
		4-9 years	7,901	2,684	2,586	2,631	6,760	2,257	2,235	2,268	85.56	84.09	86.43	86.20
		10-19 years	10,672	3,444	3,428	3,800	9,607	3,042	3,099	3,466	90.02	88.33	90.40	91.21
		20 or more years	10,266	3,006	3,171	4,089	8,771	2,521	2,732	3,518	85.44	83.87	86.16	86.04
2012-13	2013-14	0-3 years	5,995	1,879	1,970	2,146	4,800	1,520	1,568	1,712	80.07	80.89	79.59	79.78
		4-9 years	8,145	2,690	2,719	2,736	7,004	2,322	2,292	2,390	85.99	86.32	84.30	87.35
		10-19 years	10,759	3,471	3,552	3,736	9,730	3,121	3,166	3,443	90.44	89.92	89.13	92.16
		20 or more years	9,934	2,886	3,093	3,955	8,563	2,455	2,668	3,440	86.20	85.07	86.26	86.98
2013-14	2014-15	0-3 years	6,427	2,075	2,139	2,213	5,118	1,629	1,739	1,750	79.63	78.51 (78.11)	81.30	79.08
		4-9 years	7,980	2,546	2,688	2,746	6,835	2,183	2,278	2,374	85.65	85.74 (85.44)	84.75	86.45
		10-19 years	10,857	3,524	3,589	3,744	9,822	3,172	3,260	3,390	90.47	90.01 (89.75)	90.83	90.54
		20 or more years	9,742	2,817	3,073	3,852	8,347	2,441	2,602	3,304	85.68	86.65 (86.82)	84.67	85.77
2014-15	2015-16	0-3 years	6,858	2,299	2,247	2,312	5,545	1,888	1,814	1,843	80.85	82.12 (81.42)	80.73 (80.32)	79.71
		4-9 years	8,067	2,561	2,739	2,767	6,933	2,249	2,317	2,367	85.94	87.82 (87.29)	84.59 (84.36)	85.54
		10-19 years	10,764	3,503	3,620	3,641	9,746	3,157	3,258	3,331	90.54	90.12 (89.60)	90.00 (89.76)	91.49
		20 or more years	9,637	2,814	3,015	3,808	8,354	2,425	2,577	3,352	86.69	86.18 (86.54)	85.47 (85.48)	88.03
2015-16	2016-17	0-3 years	7,000	2,305	2,482	2,213	5,619	1,840	2,032	1,747	80.27	79.83 (78.67)	81.87 (81.08)	78.94 (78.42)
		4-9 years	8,069	2,581	2,747	2,741	6,895	2,222	2,341	2,332	85.45	86.09 (85.19)	85.22 (84.76)	85.08 (84.98)
		10-19 years	10,795	3,520	3,607	3,668	9,820	3,197	3,297	3,326	90.97	90.82 (90.07)	91.41 (90.99)	90.68 (90.55)
		20 or more years	9,552	2,816	2,938	3,798	8,207	2,395	2,523	3,289	85.92	85.05 (85.62)	85.87 (85.88)	86.60 (86.63)

Note. Predicted post-Teacher Leadership and Compensation (TLC) program implementation teacher retention rates are included in parentheses. Cells with gray text indicate years prior to TLC implementation for each cohort.

**Table D4. District-Level Teacher Retention Rates by Years of Experience**

Year Retained From	Year Retained To	Years of Experience	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2005-06	2006-07	0-3 years	4,894	1,684	1,563	1,647	3,979	1,424	1,302	1,253	81.30	84.56	83.30	76.08
		4-9 years	6,716	2,215	2,168	2,333	5,960	1,953	1,939	2,068	88.74	88.17	89.44	88.64
		10-19 years	7,715	2,428	2,554	2,733	7,236	2,270	2,411	2,555	93.79	93.49	94.40	93.49
		20 or more years	10,412	3,229	3,135	4,048	9,304	2,854	2,827	3,623	89.36	88.39	90.18	89.50
2006-07	2007-08	0-3 years	5,239	1,799	1,699	1,741	4,402	1,561	1,445	1,396	84.02	86.77	85.05	80.18
		4-9 years	6,583	2,125	2,212	2,246	5,948	1,944	2,002	2,002	90.35	91.48	90.51	89.14
		10-19 years	7,925	2,523	2,594	2,808	7,485	2,399	2,467	2,619	94.45	95.09	95.10	93.27
		20 or more years	10,156	3,114	3,087	3,955	9,111	2,776	2,769	3,566	89.71	89.15	89.70	90.16
2007-08	2008-09	0-3 years	6,207	2,071	1,977	2,159	5,244	1,816	1,689	1,739	84.49	87.69	85.43	80.55
		4-9 years	7,596	2,490	2,459	2,647	6,804	2,288	2,217	2,299	89.57	91.89	90.16	86.85
		10-19 years	9,088	2,798	2,950	3,340	8,481	2,660	2,749	3,072	93.32	95.07	93.19	91.98
		20 or more years	11,101	3,286	3,355	4,460	9,915	2,957	2,990	3,968	89.32	89.99	89.12	88.97
2008-09	2009-10	0-3 years	6,132	1,936	2,001	2,195	5,301	1,723	1,743	1,835	86.45	89.00	87.11	83.60
		4-9 years	7,627	2,579	2,475	2,573	6,907	2,385	2,240	2,282	90.56	92.48	90.51	88.69
		10-19 years	9,200	2,835	3,009	3,356	8,651	2,697	2,831	3,123	94.03	95.13	94.08	93.06
		20 or more years	10,860	3,242	3,256	4,362	9,731	2,906	2,967	3,858	89.60	89.64	91.12	88.45
2009-10	2010-11	0-3 years	5,793	1,830	1,857	2,106	5,095	1,662	1,646	1,787	87.95	90.82	88.64	84.85
		4-9 years	7,608	2,638	2,440	2,530	7,078	2,480	2,267	2,331	93.03	94.01	92.91	92.13
		10-19 years	9,745	3,092	3,130	3,523	9,315	2,962	3,009	3,344	95.59	95.80	96.13	94.92
		20 or more years	10,848	3,228	3,302	4,318	9,213	2,756	2,820	3,637	84.93	85.38	85.40	84.23
2010-11	2011-12	0-3 years	5,673	1,744	1,842	2,087	4,929	1,569	1,641	1,719	86.89	89.97	89.09	82.37
		4-9 years	7,936	2,746	2,550	2,640	7,293	2,556	2,356	2,381	91.90	93.08	92.39	90.19
		10-19 years	10,637	3,355	3,457	3,825	10,070	3,223	3,281	3,566	94.67	96.07	94.91	93.23
		20 or more years	10,557	3,111	3,240	4,206	9,435	2,794	2,931	3,710	89.37	89.81	90.46	88.21
2011-12	2012-13	0-3 years	5,726	1,721	1,904	2,101	4,918	1,505	1,666	1,747	85.89	87.45	87.50	83.15
		4-9 years	8,012	2,712	2,617	2,683	7,293	2,502	2,396	2,395	91.03	92.26	91.56	89.27
		10-19 years	10,787	3,477	3,474	3,836	10,268	3,330	3,320	3,618	95.19	95.77	95.57	94.32
		20 or more years	10,411	3,049	3,224	4,138	9,217	2,678	2,883	3,656	88.53	87.83	89.42	88.35
2012-13	2013-14	0-3 years	6,107	1,907	1,993	2,207	5,258	1,700	1,731	1,827	86.10	89.15	86.85	82.78
		4-9 years	8,271	2,730	2,740	2,801	7,568	2,529	2,502	2,537	91.50	92.64	91.31	90.57
		10-19 years	10,884	3,502	3,591	3,791	10,314	3,331	3,395	3,588	94.76	95.12	94.54	94.65
		20 or more years	10,120	2,936	3,149	4,035	9,018	2,603	2,824	3,591	89.11	88.66	89.68	89.00
2013-14	2014-15	0-3 years	6,597	2,109	2,195	2,293	5,598	1,820	1,913	1,865	84.86	86.30 (85.69)	87.15	81.33

Year Retained From	Year Retained To	Years of Experience	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
		4-9 years	8,109	2,575	2,727	2,807	7,361	2,397	2,472	2,492	90.78	93.09 (92.66)	90.65	88.78
		10-19 years	11,005	3,556	3,638	3,811	10,399	3,396	3,467	3,536	94.49	95.50 (95.29)	95.30	92.78
		20 or more years	9,935	2,862	3,137	3,936	8,802	2,599	2,755	3,448	88.60	90.81 (90.90)	87.82	87.60
2014-15	2015-16	0-3 years	7,006	2,328	2,276	2,402	6,022	2,042	2,001	1,979	85.95	87.71 (86.58)	87.92 (87.50)	82.39
		4-9 years	8,186	2,585	2,766	2,835	7,473	2,404	2,561	2,508	91.29	93.00 (92.10)	92.59 (92.42)	88.47
		10-19 years	10,956	3,552	3,671	3,733	10,391	3,381	3,507	3,503	94.84	95.19 (94.73)	95.53 (95.42)	93.84
		20 or more years	9,829	2,853	3,075	3,901	8,816	2,577	2,728	3,511	89.69	90.33 (90.52)	88.72 (88.88)	90.00
2015-16	2016-17	0-3 years	7,155	2,323	2,526	2,306	6,179	2,048	2,210	1,921	86.36	88.16 (86.48)	87.49 (86.61)	83.30 (82.89)
		4-9 years	8,194	2,605	2,781	2,808	7,467	2,410	2,516	2,541	91.13	92.51 (91.03)	90.47 (90.04)	90.49 (90.41)
		10-19 years	10,969	3,549	3,667	3,753	10,442	3,409	3,488	3,545	95.20	96.06 (95.47)	95.12 (94.88)	94.46 (94.38)
		20 or more years	9,715	2,847	2,986	3,882	8,676	2,544	2,664	3,468	89.31	89.36 (89.68)	89.22 (89.53)	89.34 (89.39)

Note. Predicted post-Teacher Leadership and Compensation (TLC) program implementation teacher retention rates are included in parentheses. Cells with gray text indicate years prior to TLC implementation for each cohort.

Tables D5 and D6 present school- and district-level retention rates, respectively, for teachers teaching in three different grade bands.

**Table D5. School-Level Teacher Retention Rates by Grade Band**

Year Retained From	Year Retained To	Grade Band	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2005-06	2006-07	Elementary school (0-5)	16,365	5,115	5,157	6,093	14,087	4,345	4,421	5,321	86.08	84.95	85.73	87.33
		Middle school (6-8)	8,808	2,498	2,684	3,626	7,391	2,047	2,273	3,071	83.91	81.95	84.69	84.69
		High school (9-12)	8,762	2,441	2,628	3,693	7,341	1,990	2,273	3,078	83.78	81.52	86.49	83.35
2006-07	2007-08	Elementary school (0-5)	16,485	5,129	5,248	6,108	14,020	4,325	4,291	5,404	85.05	84.32	81.76	88.47
		Middle school (6-8)	8,782	2,491	2,696	3,595	7,495	2,157	2,289	3,049	85.35	86.59	84.90	84.81
		High school (9-12)	8,791	2,439	2,656	3,696	7,466	2,099	2,253	3,114	84.93	86.06	84.83	84.25
2007-08	2008-09	Elementary school (0-5)	17,582	5,423	5,563	6,596	15,098	4,688	4,718	5,692	85.87	86.45	84.81	86.29
		Middle school (6-8)	10,857	2,918	3,230	4,709	9,052	2,484	2,685	3,883	83.37	85.13	83.13	82.46
		High school (9-12)	11,879	3,175	3,480	5,224	9,892	2,677	2,951	4,264	83.27	84.31	84.80	81.62
2008-09	2009-10	Elementary school (0-5)	17,563	5,419	5,607	6,537	15,301	4,774	4,874	5,653	87.12	88.10	86.93	86.48
		Middle school (6-8)	10,623	2,868	3,183	4,572	8,816	2,390	2,641	3,785	82.99	83.33	82.97	82.79
		High school (9-12)	11,751	3,162	3,490	5,099	9,885	2,691	2,961	4,233	84.12	85.10	84.84	83.02
2009-10	2010-11	Elementary school (0-5)	14,348	4,452	4,570	5,326	12,051	3,718	3,837	4,496	83.99	83.51	83.96	84.42
		Middle school (6-8)	10,612	2,800	3,179	4,633	8,878	2,410	2,639	3,829	83.66	86.07	83.01	82.65

Year Retained From	Year Retained To	Grade Band	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
		High school (9-12)	11,814	3,197	3,487	5,130	10,120	2,779	2,998	4,343	85.66	86.93	85.98	84.66
2010-11	2011-12	Elementary school (0-5)	17,821	5,555	5,710	6,556	15,389	4,767	4,970	5,652	86.35	85.81	87.04	86.21
		Middle school (6-8)	10,263	2,747	3,149	4,367	8,754	2,427	2,629	3,698	85.30	88.35	83.49	84.68
		High school (9-12)	11,387	3,152	3,383	4,852	9,999	2,805	3,020	4,174	87.81	88.99	89.27	86.03
2011-12	2012-13	Elementary school (0-5)	17,842	5,498	5,763	6,581	15,184	4,539	4,917	5,728	85.10	82.56	85.32	87.04
		Middle school (6-8)	10,270	2,787	3,180	4,303	8,795	2,374	2,723	3,698	85.64	85.18	85.63	85.94
		High school (9-12)	11,395	3,134	3,458	4,803	9,885	2,719	3,043	4,123	86.75	86.76	88.00	85.84
2012-13	2013-14	Elementary school (0-5)	18,024	5,522	5,917	6,585	15,514	4,667	5,043	5,804	86.07	84.52	85.23	88.14
		Middle school (6-8)	10,342	2,818	3,276	4,248	8,806	2,441	2,748	3,617	85.15	86.62	83.88	85.15
		High school (9-12)	11,491	3,197	3,515	4,779	9,964	2,828	3,035	4,101	86.71	88.46	86.34	85.81
2013-14	2014-15	Elementary school (0-5)	18,280	5,603	6,035	6,642	15,653	4,753	5,175	5,725	85.63	84.83 (85.05)	85.75	86.19
		Middle school (6-8)	10,317	2,776	3,293	4,248	8,777	2,363	2,780	3,634	85.07	85.12 (84.65)	84.42	85.55
		High school (9-12)	11,455	3,212	3,522	4,721	9,943	2,825	3,067	4,051	86.80	87.95 (87.22)	87.08	85.81
2014-15	2015-16	Elementary school (0-5)	18,429	5,664	6,118	6,647	15,848	4,816	5,233	5,799	85.99	85.03 (85.46)	85.53 (85.34)	87.24
		Middle school (6-8)	10,424	2,868	3,277	4,279	8,880	2,497	2,757	3,626	85.19	87.06 (86.22)	84.13 (84.11)	84.74
		High school (9-12)	11,515	3,268	3,570	4,677	10,062	2,920	3,091	4,051	87.38	89.35 (87.99)	86.58 (86.28)	86.62
2015-16	2016-17	Elementary school (0-5)	18,473	5,658	6,211	6,604	15,830	4,792	5,361	5,677	85.69	84.69 (85.34)	86.31 (85.94)	85.96 (85.99)

Year Retained From	Year Retained To	Grade Band	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
		Middle school (6-8)	10,461	2,911	3,307	4,243	8,926	2,488	2,853	3,585	85.33	85.47 (84.06)	86.27 (86.23)	84.49 (84.31)
		High school (9-12)	11,557	3,300	3,642	4,615	10,022	2,903	3,128	3,991	86.72	87.97 (85.66)	85.89 (85.27)	86.48 (86.09)

Note. Predicted post-TLC implementation teacher retention rates are included in parentheses. Cells with gray text indicate years prior to TLC implementation for each cohort.

**Table D6. District-Level Teacher Retention Rates by Grade Band**

Year Retained From	Year Retained To	Grade Band	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2005-06	2006-07	Elementary school (0-5)	16,602	5,205	5,254	6,143	15,158	4,782	4,829	5,547	91.30	91.87	91.91	90.30
		Middle school (6-8)	8,983	2,543	2,771	3,669	7,880	2,228	2,473	3,179	87.72	87.61	89.25	86.64
		High school (9-12)	8,910	2,486	2,702	3,722	7,608	2,095	2,375	3,138	85.39	84.27	87.90	84.31
2006-07	2007-08	Elementary school (0-5)	16,715	5,225	5,336	6,154	15,300	4,815	4,876	5,609	91.53	92.15	91.38	91.14
		Middle school (6-8)	8,957	2,541	2,783	3,633	7,976	2,302	2,511	3,163	89.05	90.59	90.23	87.06
		High school (9-12)	8,951	2,490	2,733	3,728	7,811	2,186	2,431	3,194	87.26	87.79	88.95	85.68
2007-08	2008-09	Elementary school (0-5)	17,762	5,468	5,662	6,632	16,316	5,121	5,207	5,988	91.86	93.65	91.96	90.29
		Middle school (6-8)	11,033	2,964	3,318	4,751	9,626	2,659	2,902	4,065	87.25	89.71	87.46	85.56
		High school (9-12)	12,032	3,215	3,553	5,264	10,285	2,815	3,065	4,405	85.48	87.56	86.27	83.68

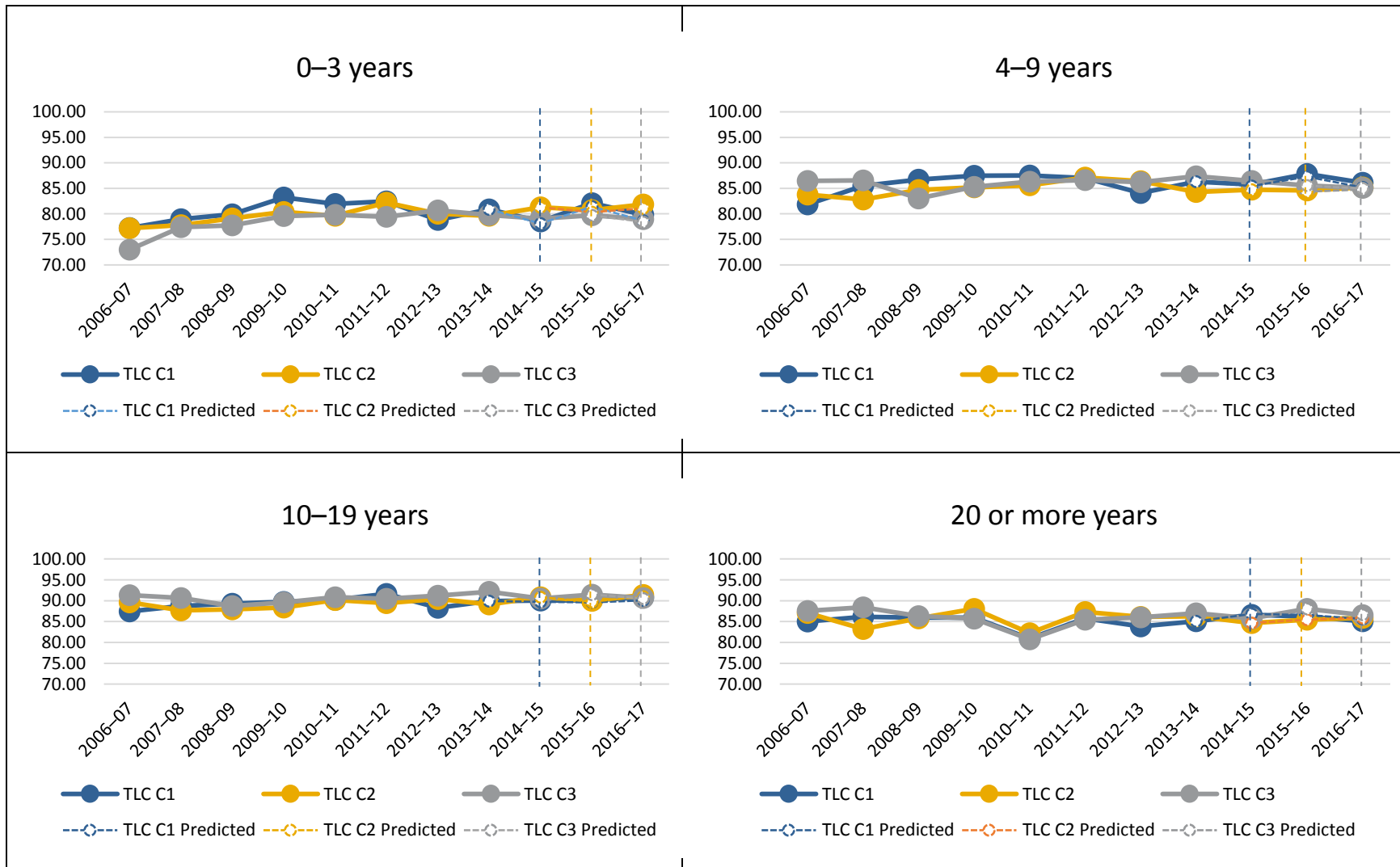


Year Retained From	Year Retained To	Grade Band	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
2008-09	2009-10	Elementary school (0-5)	17,756	5,454	5,693	6,609	16,448	5,118	5,304	6,026	92.63	93.84	93.17	91.18
		Middle school (6-8)	10,795	2,910	3,251	4,634	9,474	2,605	2,876	3,993	87.76	89.52	88.47	86.17
		High school (9-12)	11,946	3,218	3,549	5,179	10,265	2,815	3,077	4,373	85.93	87.48	86.70	84.44
2009-10	2010-11	Elementary school (0-5)	14,493	4,483	4,627	5,383	13,201	4,113	4,229	4,859	91.09	91.75	91.40	90.27
		Middle school (6-8)	10,770	2,836	3,237	4,697	9,664	2,597	2,934	4,133	89.73	91.57	90.64	87.99
		High school (9-12)	12,004	3,253	3,543	5,208	10,628	2,941	3,161	4,526	88.54	90.41	89.22	86.90
2010-11	2011-12	Elementary school (0-5)	18,037	5,597	5,795	6,645	16,580	5,220	5,376	5,984	91.92	93.26	92.77	90.05
		Middle school (6-8)	10,446	2,768	3,218	4,460	9,396	2,548	2,917	3,931	89.95	92.05	90.65	88.14
		High school (9-12)	11,566	3,202	3,435	4,929	10,396	2,931	3,148	4,317	89.88	91.54	91.64	87.58
2011-12	2012-13	Elementary school (0-5)	18,134	5,561	5,863	6,710	16,611	5,117	5,416	6,078	91.60	92.02	92.38	90.58
		Middle school (6-8)	10,542	2,824	3,283	4,435	9,470	2,564	2,983	3,923	89.83	90.79	90.86	88.46
		High school (9-12)	11,620	3,220	3,519	4,881	10,363	2,922	3,176	4,265	89.18	90.75	90.25	87.38
2012-13	2013-14	Elementary school (0-5)	18,424	5,616	6,018	6,790	16,816	5,187	5,483	6,146	91.27	92.36	91.11	90.52
		Middle school (6-8)	10,689	2,881	3,381	4,427	9,597	2,628	3,050	3,919	89.78	91.22	90.21	88.52
		High school (9-12)	11,689	3,250	3,562	4,877	10,503	2,959	3,236	4,308	89.85	91.05	90.85	88.33
2013-14	2014-15	Elementary school (0-5)	18,754	5,691	6,191	6,872	17,060	5,285	5,660	6,115	90.97	92.87 (92.88)	91.42	88.98
		Middle school (6-8)	10,730	2,840	3,439	4,451	9,570	2,567	3,106	3,897	89.19	90.39 (89.96)	90.32	87.55

Year Retained From	Year Retained To	Grade Band	Number of Teachers in the Prior School Year				Number of Teachers Retained as School Staff Into the Following School Year				Percentage of Teachers Retained in a School Staff Position			
			Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3	Overall	TLC C1	TLC C2	TLC C3
		High school (9-12)	11,730	3,267	3,604	4,859	10,409	2,974	3,209	4,226	88.74	91.03 (90.24)	89.04	86.97
2014-15	2015-16	Elementary school (0-5)	18,922	5,740	6,249	6,933	17,319	5,276	5,789	6,254	91.53	91.92 (91.93)	92.64 (92.68)	90.21
		Middle school (6-8)	10,839	2,944	3,395	4,500	9,742	2,690	3,092	3,960	89.88	91.37 (90.57)	91.08 (90.88)	88.00
		High school (9-12)	11,795	3,338	3,618	4,839	10,545	3,053	3,250	4,242	89.40	91.46 (89.88)	89.83 (89.46)	87.66
2015-16	2016-17	Elementary school (0-5)	18,973	5,725	6,363	6,885	17,307	5,268	5,814	6,225	91.22	92.02 (92.04)	91.37 (91.45)	90.41 (90.51)
		Middle school (6-8)	10,877	2,965	3,434	4,478	9,807	2,726	3,101	3,980	90.16	91.94 (90.79)	90.30 (89.87)	88.88 (88.67)
		High school (9-12)	11,808	3,350	3,685	4,773	10,591	3,066	3,304	4,221	89.69	91.52 (89.07)	89.66 (88.91)	88.43 (88.05)

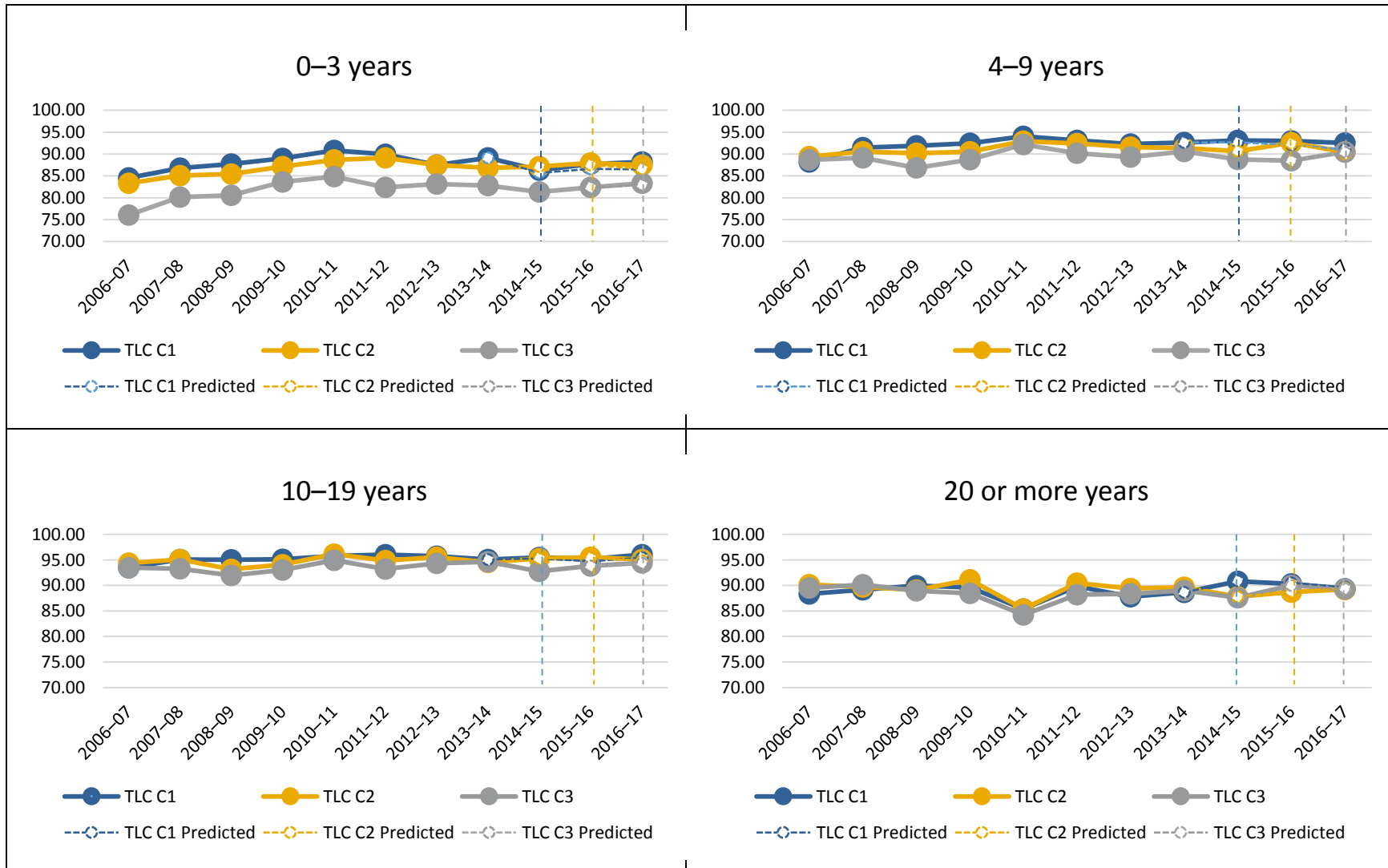
Note. Predicted post-Teacher Leadership and Compensation (TLC) program implementation teacher retention rates are included in parentheses. Cells with gray text indicate years prior to TLC implementation for each cohort.

**Figure D1. Percentage of Teachers Retained at the School Level in a School Staff Position by Years of Teaching Experience and Year**



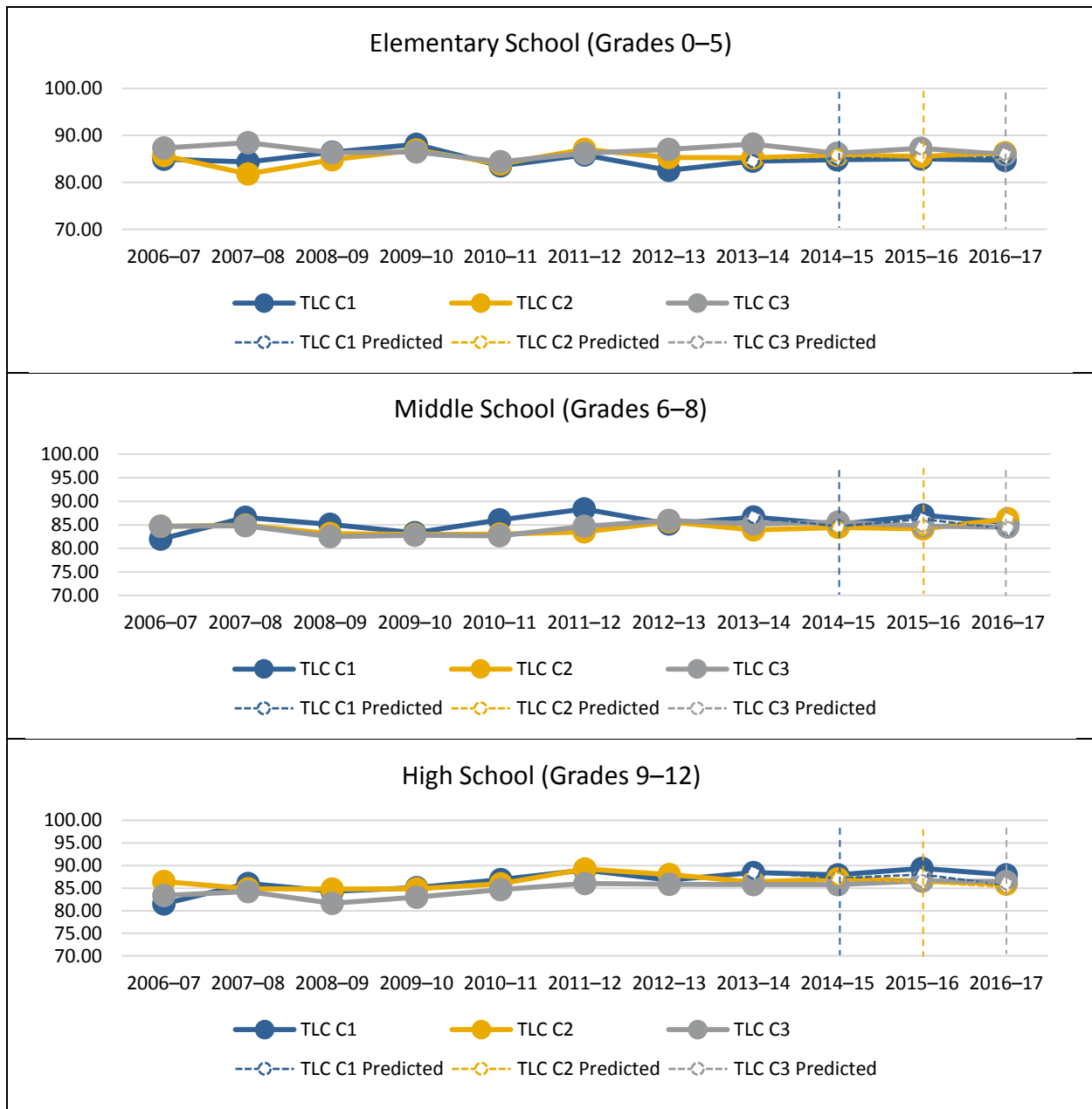
Note. Figure D1 presents the percentage of teachers retained at the school level in a school staff position from the prior school year to the school year indicated in the plot for differing years of experience. The solid trend lines represent the observed teacher retention rates calculated from the Iowa Department of Education’s administrative data. The dotted trend lines represent the predicted probabilities of teacher retention after Teacher Leadership and Compensation (TLC) program implementation based on the observed retention rates prior to TLC implementation for each cohort. The vertical lines indicate the year in which each cohort started implementing TLC.

**Figure D2. Percentage of Teachers Retained at the District Level in a School Staff Position by Years of Teaching Experience and Year**



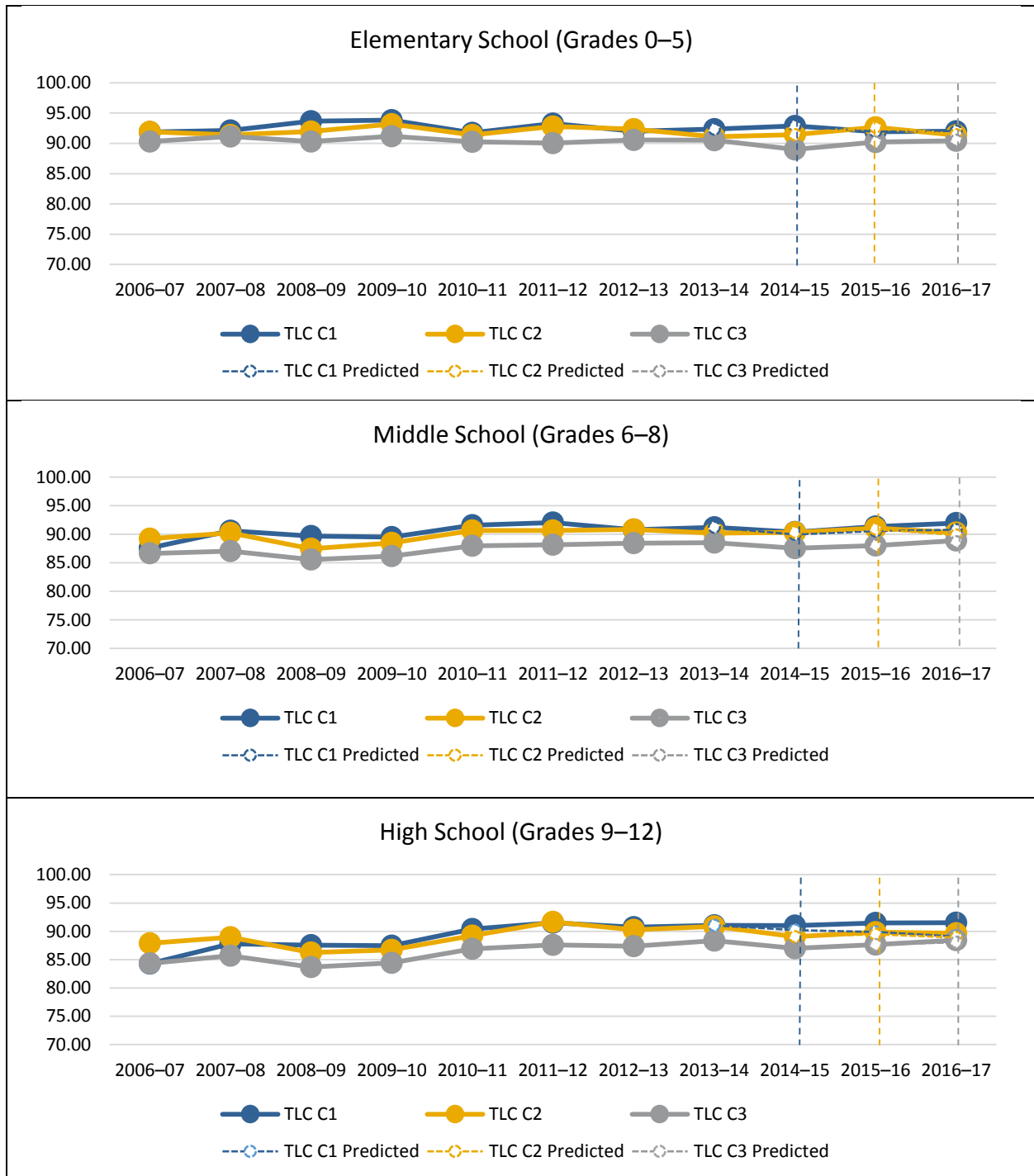
Note. Figure D2 presents the percentage of teachers retained at the district level in a school staff position from the prior school year to the school year indicated in the plot for differing years of experience. The solid trend lines represent the observed teacher retention rates calculated from the Iowa Department of Education’s administrative data. The dotted trend lines represent the predicted probabilities of teacher retention after Teacher Leadership and Compensation (TLC) program implementation based on the observed retention rates prior to TLC implementation for each cohort. The vertical lines indicate the year in which each cohort started implementing TLC.

**Figure D3. Percentage of Teachers Retained at the School Level in a School Staff Position by Grade Band and Year**



Note. Figure D3 presents the percentage of teachers retained at the school level in a school staff position from the prior school year to the school year indicated in the plot for various grade bands. The solid trend lines represent the observed teacher retention rates calculated from the Iowa Department of Education's administrative data. The dotted trend lines represent the predicted probabilities of teacher retention after Teacher Leadership and Compensation (TLC) program implementation based on the observed retention rates prior to TLC implementation for each cohort. The vertical lines indicate the year in which each cohort started implementing TLC.

**Figure D4. Percentage of Teachers Retained at the District Level in a School Staff Position by Grade Band and Year**



Note. Figure D4 presents the percentage of teachers retained at the district level in a school staff position from the prior school year to the school year indicated in the plot for various grade bands. The solid trend lines represent the observed teacher retention rates calculated from the Iowa Department of Education's administrative data. The dotted trend lines represent the predicted probabilities of teacher retention after Teacher Leadership and Compensation (TLC) program implementation based on the observed retention rates prior to TLC implementation for each cohort. The vertical lines indicate the year in which each cohort started implementing TLC.

# Appendix E. Teacher Leadership and Compensation Program Student Achievement Impacts Analytical Approach

American Institutes for Research (AIR) conducted analyses using an interrupted time-series (ITS) design to estimate the impact of Teacher Leadership Compensation (TLC) on student achievement. This appendix describes these analyses.

## Interrupted Time-Series Analysis

To estimate student achievement outcomes in the first, second, and third years of TLC program implementation, we compared trends in outcomes from students in 39 TLC Cohort 1 districts, 76 TLC Cohort 2 districts, and 218 TLC Cohort 3 districts using a multiple baseline multilevel ITS model that accounts for nesting by means of random and fixed effects. The analysis examines changes in the outcomes of students across all three TLC cohorts in the first (2014–15), second (2015–16), and third (2016–17) years of program implementation. Because the ITS design uses the historical, or preintervention, performance of all students to predict post-TLC implementation outcomes, the design does not require that students across the three TLC cohorts be identical to one another. In addition, with all years and districts included in the analyses, we have a large amount of statistical power to detect small changes in performance.

The ITS model is represented by the following equation:

$$Y_{itjk} = \beta_0 + \beta_1 Post1_t + \beta_2 Post2_t + \beta_3 Post3_t + \beta_4 PY1_{tk} + \beta_5 PY2_{tk} + \beta_6 PY3_{tk} + \beta_7 Time_t + Grade_{itjk} + AEA_k + X_{itjk} + z_k + v_{jk} + u_{tjk} + e_{itjk}$$

where  $Y_{itjk}$  is the outcome measure (i.e., standardized scaled achievement score for reading or mathematics) for a student  $i$  at time  $t$  in school  $j$  in district  $k$ ;  $Time_t$  is the linear outcome trend across time (school years 2005–06 to 2016–17 are coded –9 through 2, respectively);  $Post1_t$ ,  $Post2_t$ , and  $Post3_t$  are indicators for whether the TLC program was in its first (2014–15), second (2015–16), or third (2016–17) years of implementation, respectively; and  $PY1_{tk}$ ,  $PY2_{tk}$ , and  $PY3_{tk}$  are interaction indicators for whether, at time  $t$ , a district started implementing TLC in the first (2014–15), second (2015–16), or third (2016–17) years of implementation, respectively (i.e., the post  $x$  intervention interaction terms of interest that represent the first, second, and third year treatment effects, respectively). In this model, each indicator for a student is coded as 1 if it applies to a student and 0 otherwise. For example, a student who has an outcome observed in a TLC Cohort 1 district in 2014–15 would be coded 1 for  $Post1_t$  and 1 for  $PY1_{tk}$  (because 2014–15 is the first year in the postprogram implementation time period for districts in Cohort 1). Area Education Agency (AEA) fixed effects ( $AEA_k$ ) and grade fixed effects ( $Grade_{itjk}$ ) are included to only allow for comparisons of students within the same AEA and grade. The model also includes a set of student-level characteristics  $X_{itjk}$  (i.e., gender, race, English language learner [ELL] status, individualized education program [IEP] status, and free or reduced-price lunch [FRPL] status) to account for differences in

student characteristics. Random effects were included to account for the residual effects of each district ( $z_k$ ), school ( $v_{jk}$ ), time ( $u_{tjk}$ ), and student ( $e_{itjk}$ ).

## Cohort Analyses

To examine the varying achievement outcome trajectories of the TLC cohorts, we estimated TLC impacts for Cohorts 1, 2, and 3 separately. Specifically, instead of the comprehensive model defined above, we estimated the following ITS model for each cohort and year separately:

$$Y_{itjk} = \beta_0 + \beta_1 Post_t + \beta_2 TLC_k Post_t + \beta_3 Time_t + Grade_{itjk} + AEA_k + X_{itjk} + z_k + v_{jk} + u_{tjk} + e_{itjk}$$

where  $TLC_k Post_t$  represents the posttreatment effect of interest. The model was run separately for the following groups:

1. Cohort 1 in Year 1: 2014–15 effect for Cohort 1
2. Cohort 2 in Year 1: 2015–16 effect for Cohort 2
3. Cohort 3 in Year 1: 2016–17 effect for Cohort 3
4. Cohort 1 in Year 2: 2015–16 effect for Cohort 1
5. Cohort 2 in Year 2: 2016–17 effect for Cohort 2
6. Cohort 1 in Year 3: 2016–17 effect for Cohort 1

We also estimated pooled Year 1 and 2 effects using meta-analysis. We combined the postintervention treatment effects ( $TLC_k Post_t$ ) for Cohort 1 Year 1, Cohort 2 Year 1, and Cohort 3 Year 1 to estimate the pooled Year 1 effect. We combined the postintervention treatment effects ( $TLC_k Post_t$ ) for Cohort 1 Year 2 and Cohort 2 Year 2 to estimate the pooled Year 2 effect. Meta-analysis is a statistical technique that combines results from multiple effects by weighting the contribution of each estimate of the effect based on the statistical precision with which that effect was estimated. Thus, effects that are estimated from a larger sample (in this case, from Cohort 3) are weighted more heavily in the pooled effect, allowing the larger sample to contribute more information to calculating the overall pooled effect. The individual and pooled postintervention treatment effects then were plotted on a forest plot to show how much treatment effects varied between the cohorts and years.



## District Size Tier, Grade Band, and Special Populations Subgroup Analyses

We examined TLC impacts for students within Tier 1 thru Tier 6 size districts,<sup>39</sup> students within different grade bands (Grades 3–5, 6–8, and 10–11),<sup>40</sup> and special populations of students (specifically, ELLs, those eligible for FRPL, and those who have an IEP). For each subgroup analysis, the data were limited to the given subgroup and the main ITS model defined above was conducted to allow for the estimation of treatment effects *within* subgroups. The postintervention treatment effects ( $PY1_{tk}$ ,  $PY2_{tk}$ , and  $PY3_{tk}$ ) then were plotted on forest plots—separately for tier size and grade band subgroups—and heterogeneity statistics were calculated to examine how much treatment effects varied between the subgroups.

### New York City Leadership Academy Analysis

TLC Cohort 2 principals participating in the New York City Leadership Academy (NYCLA) started in the summer of 2016.<sup>41</sup> We examined whether achievement outcomes for students in 15 TLC Cohort 2 schools participating in NYCLA differed from other students in Cohort 1 and 3 districts, using postintervention data from 2016–17. The ITS model is represented by the following equation:

$$Y_{itjk} = \beta_0 + \beta_1 Post_t + \beta_2 NYCLA\_TLC_j Post_t + \beta_3 Time_t + Grade_{itjk} + AEA_k + X_{itjk} + z_k + v_{jk} + u_{tjk} + e_{itjk}$$

where  $NYCLA\_TLC_j Post_t$  represents two posttreatment effects of interest: a 2016–17 treatment effect for students in Cohort 2 districts and a 2016–17 treatment effect for students in Cohort 2 NYCLA schools.<sup>42</sup>

<sup>39</sup> Iowa Department of Education defined district tier sizes as follows:

- Tier 1: 9,000 or more students (10 districts)
- Tier 2: 2,500 students to 8,999 students (24 districts)
- Tier 3: 1,000 students to 2,499 students (85 districts)
- Tier 4: 600 students to 999 students (94 districts)
- Tier 5: 300 students to 599 students (86 districts)
- Tier 6: fewer than 300 students (37 districts)

<sup>40</sup> Grade fixed effects are excluded in the grade-level subgroup analyses.

<sup>41</sup> TLC Cohort 1 principals participated in NYCLA in the summer of 2015. We did not examine the effects of NYCLA for TLC Cohort 1 in 2016 because they did not continue participating in NYCLA in 2016.

<sup>42</sup>  $NYCLA\_TLC_j$  is dummy coded in such a way as to allow for two separate comparisons (i.e., one for Cohort 2 vs. Cohorts 1 and 3 and one for Cohort 2 plus NYCLA vs. Cohorts 1 and 3).

## Appendix F. Teacher Leadership and Compensation Program Student Achievement Impact Results

The interrupted time-series (ITS) analysis impact estimates for the Teacher Leadership and Compensation (TLC) program and student, school, and district subgroups are presented in Table F1. The estimates represent the effects of TLC in the first, second, and third years of program implementation.<sup>43</sup>

**Table F1. TLC Impact Estimates and Subgroup Effects**

Subgroup	Reading			Mathematics		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
<b>All Students</b>						
Overall TLC impact	0.00 (0.01)	0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.04** (0.01)
<b>Cohorts</b>						
Cohort 1	-0.02* (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.02** (0.01)	-0.02* (0.01)	-0.02** (0.01)
Cohort 2	0.02** (0.01)	0.03** (0.01)	—	0.02 (0.01)	0.02* (0.01)	—
Cohort 3	-0.01 (0.01)	—	—	0.00 (0.01)	—	—
Cohorts 1, 2, 3 combined	0.00 (0.00)	—	—	0.00 (0.01)	—	—
Cohorts 1 and 2 combined	—	0.01 (0.01)	—	—	0.00 (0.01)	—
<b>Special Populations</b>						
English language learners	-0.02 (0.02)	-0.04* (0.02)	-0.09** (0.03)	0.00 (0.02)	-0.04 (0.03)	-0.08* (0.03)

<sup>43</sup> As noted in Appendix E, all models control for student-level demographics (i.e., gender, race, English language learner status, free or reduced-price lunch status, and individualized education program status), grade and Area Education Agency fixed effects, and linear outcome trends across time. Due to space constraints, we only present the postintervention treatment impact estimates.

Subgroup	Reading			Mathematics		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Students eligible for free or reduced-price lunch	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.03* (0.01)
Students with an individualized education program	-0.01 (0.01)	-0.01 (0.01)	-0.03 (0.02)	-0.02 (0.01)	-0.03* (0.01)	-0.08** (0.02)
<b>New York City Leadership Academy (NYCLA) (2016–17)</b>						
Cohort 2, controlling for NYCLA	–	0.03** (0.01)	–	–	0.02 (0.01)	–
Cohort 2 + NYCLA	–	0.01 (0.02)	–	–	0.04 (0.03)	–
<b>District Size Tiers</b>						
9,000 or more students	-0.07** (0.01)	-0.16** (0.02)	-0.22** (0.03)	-0.05** (0.02)	-0.12** (0.03)	-0.16** (0.03)
2,500 to 8,999 students	-0.01 (0.01)	-0.03 (0.02)	-0.06* (0.02)	-0.03 (0.02)	-0.06* (0.03)	-0.12** (0.03)
1,000 to 2,499 students	0.01 (0.01)	0.03* (0.02)	0.02 (0.03)	0.02 (0.01)	0.06** (0.02)	0.04 (0.03)
600 to 999 students	-0.02 (0.02)	-0.03 (0.02)	-0.05 (0.04)	0.00 (0.02)	-0.02 (0.03)	0.09* (0.04)
300 to 599 students	0.00 (0.02)	0.07* (0.03)	0.11 (0.07)	-0.01 (0.03)	0.01 (0.04)	0.15 (0.08)
Fewer than 300 students	0.04 (0.05)	0.11 (0.07)	-0.05 (0.13)	0.12* (0.05)	0.20** (0.08)	0.52** (0.15)
<b>Grade Bands</b>						
Grades 3–5	-0.01 (0.01)	-0.01 (0.01)	-0.03* (0.01)	-0.02** (0.01)	-0.04** (0.01)	-0.08** (0.02)
Grades 6–8	0.00 (0.01)	0.03* (0.01)	0.01 (0.02)	0.01 (0.01)	0.03* (0.01)	0.03 (0.02)
Grades 10 and 11	0.02 (0.01)	0.03 (0.02)	0.02 (0.03)	0.00 (0.01)	0.01 (0.02)	0.00 (0.03)

Note. Unless the TLC cohort is specified, Year 1 effects include Cohorts 1, 2, and 3; Year 2 effects include Cohorts 1 and 2; and Year 3 effects include Cohort 1. Standard errors are presented in parentheses.

\* $p \leq .05$ . \*\* $p \leq .01$ .