

The **Research Alliance** for
New York City Schools

Who Stays and Who Leaves?

Findings from a Three-Part Study of Teacher Turnover in NYC Middle Schools



William H. Marinell
Vanessa M. Coca
WITH THE MIDDLE SCHOOL
TEACHER TURNOVER PROJECT

March 2013

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Steinhardt School of Culture, Education, and Human Development



NEW YORK UNIVERSITY

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William H. Marinell

Vanessa M. Coca

With the Middle School Teacher Turnover Project

Richard Arum

Jennifer Goldstein

James Kemple

Aaron Pallas

Travis Bristol

Clare Buckley

Amy Scallon

Barbara Tanner

March 2013

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EXECUTIVE SUMMARY

There is growing evidence that the middle school years are critical to students' long-term success.ⁱ In New York City, middle schools have been the target of several high-profile improvement initiatives. One factor that has the potential to facilitate or complicate these efforts is the stability of the middle school teaching force. Yet there have been few studies of the rates and patterns of teacher turnover in the City's middle schools.

The Research Alliance for New York City Schools has recently completed a three-year investigation of teacher turnover that addresses this gap. The study represents the most current, comprehensive look at middle school teacher turnover to date, illuminating how long middle school teachers have historically remained in their schools, how long they intend to stay, what predicts whether or not they leave their school, where they go when they leave, and how their perceptions of their work environment influence these decisions. This summary presents highlights from the report, *Who Stays and Who Leaves? Findings from a Three-Part Study of Teacher Turnover in NYC Middle Schools*. It focuses on aspects of the study's results that are likely to be most useful for policymakers and school leaders as they strive to maintain and manage an effective teacher workforce.

Data Sources

This study draws on:

1. An analysis of the NYC Department of Education's human resource records from the past decade;
2. Surveys of more than 4,000 full-time middle school teachers; and
3. In-depth case studies in four NYC public middle schools.

What Are the Rates and Patterns of Teacher Turnover Across NYC Middle Schools?

While some amount of teacher turnover is generally thought to be constructive (as it brings new ideas, energy, and skills to schools), too much turnover may have a host of instructional, financial, and organizational costs.ⁱⁱ Our analyses of New York City Department of Education human resource records revealed that:

Among middle school teachers who entered their school during the past decade, more than half left that school within three years.

As shown in Figure ES-1 on page vi, 27 percent of middle school teachers left their school within one year of having entered; 55 percent left within three years; and 66

percent left within five years. On average, teachers remained in their school for slightly less than three years.

Turnover of this magnitude presents a number of challenges. It may make it difficult for principals, and for the teachers who do not leave their school, to establish organizational norms and a shared vision for their school's teaching and learning environment. Furthermore, this turnover may compromise the continuity of the relationships between middle school teachers and administrators, students, parents, and the staff of organizations that partner with middle schools. Turnover of this magnitude likely has an instructional cost as well. Indeed, recent research on New York City schools suggests that teacher turnover has a negative impact on student achievement.ⁱⁱⁱ

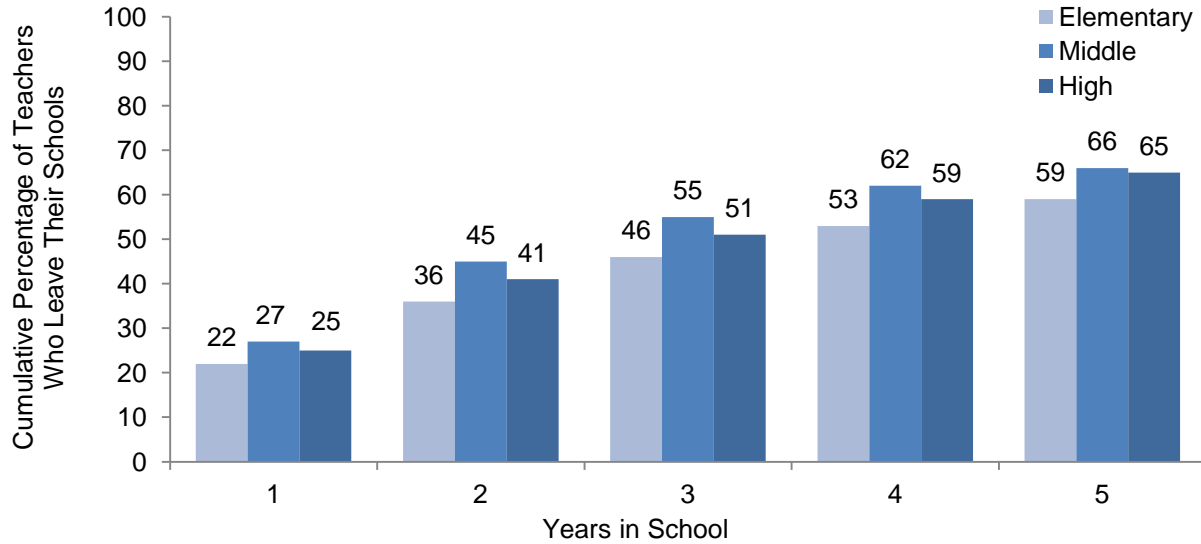
Middle school teachers leave their schools at higher rates than elementary and high school teachers.

As Figure ES-1 on the next page shows, rates of turnover in middle schools were generally higher than rates of turnover in elementary and high schools. Additional research will be needed to determine whether the high rate of middle school teacher turnover is a structural issue (such that these stand-alone schools serving only grades 6 through 8 are prone to higher rates of departure in comparison to schools with other grade configurations), a grade-specific issue (such that teaching grades 6 through 8, regardless of school type, is particularly difficult), or an external issue (such that teacher training programs or licensure routes rarely focus on the middle grades). It will also be necessary to examine whether the difference between middle schools and other schools is unique to New York City or is found in other cities as well. Certainly, it is possible that there is something distinctly challenging about teaching in New York City middle schools.

Only about one in ten departing middle school teachers transitions to another New York City middle school. The majority exit the City's public school system, with most of the remainder moving to elementary or high schools.

Among middle school teachers who entered and left their schools between 2002 and 2009, 59 percent left the system altogether, and 41 percent changed schools within the system. Only 12 percent transitioned to a traditional 6-8 middle school. These numbers highlight the challenge of building teaching capacity and continuity in the critical middle school years.

Figure ES-1: More Than Half of Middle School Teachers Leave Their Schools Within Three Years



Source: Marinell, W. (2011). *The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City's Middle Schools*. New York: Research Alliance for New York City Schools.

Note: The figure presents the cumulative percentage of teachers who left their school, among teachers who entered a NYC public school between 2002 and 2009.

Taken together, our findings suggest that teacher turnover may be creating chronic instability in many of the City's middle schools. A constant churning of teachers through schools requires administrators to direct already scarce resources toward hiring and supporting teachers who are new to the middle grades, and it makes establishing a consistent, constructive school culture more challenging. If middle schools are unstable and impersonal, students may find it even more difficult to manage the transitions into, through, and out of the critical middle grades.

While the high levels of turnover in New York City middle schools are disconcerting, it is worth noting that the City's annual rates of teacher turnover have been in decline since 2003. In 2003, 27 percent of teachers left their school within one year, compared with 17 percent in 2010. This decline may be related both to changes in working conditions and pay increases as well as the larger economy. Whatever the root causes, the observed decline presents a possible foundation on which a more stable middle school teaching core may be developed.

What Can Be Done to Address Turnover in NYC Middle Schools?

We examined the association between teacher turnover and various characteristics of teachers and schools, in hopes of providing direction for future policy and practice. Some of our findings underscore the inherent difficulty in “moving the needle” on teacher turnover in New York City’s middle schools:

NYC middle school teacher turnover is predominantly a system-wide phenomenon.

Our analyses suggest that New York City middle schools are more alike than different with regard to the turnover of teachers. While we identified some school characteristics that are associated with higher turnover—middle schools that are small, located in Manhattan, or have high concentrations of underperforming students, for example—there was little variation across schools as a whole. The majority of New York City middle schools are losing similarly high numbers of teachers, on average, over time. For this reason, a strategy to identify and focus on particular schools would likely do little to curb overall rates of teacher turnover across the system; turnover appears to be largely driven by individual teachers’ characteristics and choices.

If middle schools are unstable and impersonal, students may find it even more difficult to manage the transitions into, through, and out of the critical middle grades.

Despite this, many of the individual teacher characteristics that we were able to measure were not strong predictors of turnover. For example, we found that the average length of stay was similar for teachers regardless of their racial/ethnic background, gender, or subject taught. There were some exceptions to this general pattern, however:

Teachers with less experience are more likely to leave their schools.

Among the most experienced teachers, 44 percent left their school within three years, compared with 55 percent of the least experienced teachers. This finding is consistent with prior research on teacher career paths, which has shown the highest exit rates occur early in teachers’ careers. This suggests that new teachers may require additional supports in their transition into the profession. But, as noted above, even when departing middle school teachers remain in the New York City teaching corps, most of them do not continue teaching the middle grades. Thus, it

may be important to couple professional development for early-career teachers with incentives and other supports aimed at building longer-term commitments to middle grade education.

While the Department of Education's human resource records yielded only a few teacher characteristics that were associated with turnover, our survey elicited some interesting additional information about teachers who had *considered* leaving their school in the previous year:

Teachers are more likely to consider leaving their school if they entered teaching through alternative routes or are teaching a new subject for the first time.

Teachers from alternative certification routes like the New York City Teaching Fellows program and Teach For America were more likely to have considered leaving their school in the previous year, as were those teaching a new subject. Like the findings on early-career teachers, this highlights the importance of supporting newly minted teachers and those who are taking on new assignments and incentivizing them to continue working with this age group.

Our surveys also asked teachers about various aspects of their work environment. We were then able to assess how turnover rates correlated with teachers' perceptions of their schools. Our analysis showed that:

Teachers are more likely to stay in schools that are perceived to have strong principal leadership and high levels of order and teacher collegiality.

Turnover was lower in schools where teachers reported that the principal was trusting and supportive of the teaching staff, a knowledgeable instructional leader, an efficient manager, and adept at forming partnerships with external organizations. Teachers were also more likely to stay in schools that had high levels of order—that is, fewer incidents of violence, theft, disrespect toward teachers, and student absenteeism. The association between turnover and school order was quite similar to the association between turnover and principal leadership, suggesting the inter-relatedness of these two characteristics. While principals cannot maintain school order on their own, they play a critical role in establishing and reinforcing norms for student behavior. Interviews at our four case study schools also pointed to the importance of principal leadership in setting the tone for a school building and in cultivating a stable, committed core of teachers.

The level of collegiality among teachers also had a modest influence on the likelihood that teachers remained in their schools. In middle schools where teachers reported average or high levels of support, rapport, trust and respect among their colleagues, rates of turnover were lower. Likewise, our case study interviews indicated that strong relationships among teachers can promote stability (perhaps even where principals are perceived as ineffective, which was true at one of our case study sites).

Our survey asked teachers who reported that they had considered leaving their school to rate the importance of 14 different factors in influencing that decision. For the most part, their responses echo findings from our analysis of actual turnover rates. The three most important factors were: 1) lack of student discipline, 2) lack of support from administrators, and 3) wanting to have more influence over school policies. Notably, teachers in our case study schools identified these very same factors as being the frustrations that might compel them to leave.

Thus, there are several aspects of the school environment that are associated with turnover—and, importantly, that principals can influence. By exerting strong leadership, fostering high levels of order and teacher collegiality, and providing teachers with some professional control, principals may be able to retain more of their teachers over time. At the system level, these findings suggest that training and professional development focusing on the areas described above for principals may be important strategies to improve teacher retention.

Conclusion

More than half of the teachers who entered a middle school in the last decade left within three years. Only 12 percent of those teachers transitioned to another 6-8 middle school in the system. This exodus from middle schools presents serious challenges to the system's capacity for addressing the unique academic and developmental needs of students during these critical years.

Turnover and School Climate: A Vicious Cycle

Findings from our case study and survey analyses suggest that teacher turnover may be self-reinforcing, producing circumstances that in fact lead to more turnover. For example, high rates of turnover may contribute to a lack of effective and consistent school discipline, which may in turn make teachers less likely to stay.

The consequences of this cycle are severe. As a veteran teacher explained, "It's hard to turn around a bad school when you constantly have to improve new staff. It's very difficult."

While this is primarily a system-wide problem, our study does point to several characteristics of teachers and schools that are associated with increased turnover. Teachers who are less experienced, including those entering teaching through alternative routes and those transitioning to a new subject, are more likely to leave or consider leaving their middle school. These findings provide hints for district and school administrators about teachers who are likely to be targets for additional supports and incentives to continue teaching in the middle grades. Further investigation is needed to understand these factors more fully and develop appropriate policy responses.

By exerting strong leadership, fostering high levels of order and teacher collegiality, and providing teachers with some professional control, principals may be able to retain more of their teachers over time.

The results of our study also suggest that the working conditions at schools influence turnover. Teachers report that student behavior, school leadership, professional control, and teacher collegiality are all important to their employment decisions. Although it is difficult to pinpoint the direction of this relationship (school climate affects teacher turnover, but teacher turnover also likely affects school climate), our findings support the broader literature that points to strong and inclusive leadership, supportive and collaborative rapport among teachers, and safe and orderly student environments as factors that contribute to a positive climate and overall school improvement. Strategic initiatives that focus on these aspects of schools could potentially have a meaningful impact on reducing teacher turnover in middle schools.

This study of teacher turnover in middle schools is timely, given the Department of Education's recent reform efforts focused on the middle grades. The findings suggest that efforts to create and maintain strong middle schools in NYC may be hampered by a lack of continuity among the teachers who need to implement these reforms. Schools with high turnover face considerable instructional and organizational costs associated with losing and replacing staff. Supply-side solutions, such as recruiting and supporting new teachers, are important, but may be insufficient given the sheer number of teachers leaving the middle grades and the fact that most who leave do not continue teaching in a middle school, even if they stay in the system. Addressing middle school personnel issues will likely require a separate policy initiative to support and incentivize teachers

who specialize in working with early adolescents and commit to doing so for extended periods of time.

Although our research suggests that increasing teachers' lengths of stay in their schools is not simple or easily achievable, it is difficult to believe that stable and effective middle schools will be widely prevalent in the district without directly addressing this issue. Research shows that the transition from middle school to high school is distinctively challenging for students, especially in urban areas. Creating and maintaining strong middle schools—with stable teaching staffs—is essential to helping students navigate that transition and to supporting wider efforts to improve outcomes across the New York City system.

Executive Summary Notes

ⁱ Balfanz, 2009; Balfanz, Herzog, and Mac Iver, 2007; Murdock, Anderman, and Hodge, 2000; Neild and Balfanz, 2006; Roderick, 1994.

ⁱⁱ Johnson, Berg, and Donaldson, 2005; Milanowski and Odden, 2007; National Commission on Teaching and America's Future [NCTAF], 2007.

ⁱⁱⁱ Ronfeldt, Loeb, and Wyckoff, 2012.

INTRODUCTION

Strengthening New York City's (NYC) public middle schools has been a local priority for years. Over the past decade, practitioners, policymakers and researchers have repeatedly highlighted the shortcomings of NYC's public middle schools and launched various efforts to strengthen them. Continuing this focus, NYC Schools' Chancellor Dennis Walcott has made middle school improvement an explicit cornerstone of his administration.

Given the consensus that NYC middle schools were both important and ailing, the Research Alliance for New York City Schools identified the middle grades as a topic of critical importance and launched a series of studies related to them (see textbox on page 2 for more information about the Research Alliance's studies of middle schools and the middle grades). The first of these studies is a three-year, mixed-methods investigation of teacher turnover in NYC's traditional grade 6-8 middle schools. The findings from this study are presented in the following pages.

The study represents the most current, comprehensive look at middle school teacher turnover to date, illuminating how long middle school teachers have historically remained in their schools, how long they intend to stay, what predicts whether or not they leave their school, where they go when they leave, and how they feel about the working environment their school provides. All of this information is important for policymakers and school leaders as they strive to maintain and manage an effective teacher workforce both within and across NYC schools.

The study investigates three overarching questions:

1. What are the rates and patterns of teacher turnover across NYC middle schools?
2. What predicts middle school teacher turnover?
3. How do middle school teachers describe their work environment and its relationship to teacher turnover?

In the remainder of this introduction, we summarize previous research on teacher turnover and local policies related to NYC middle schools and outline the design of

this study. The subsequent three sections of the report each address one of the study's three broad questions, highlighting key findings from our analyses. The report concludes with a discussion of the findings and their implications for policy, practice, and research.

Research Alliance Studies on Middle School

Since 2009, the Research Alliance for New York City Schools has engaged in a number of studies that focus on the City's middle grades, including:

Identifying Successful Turnaround Strategies for New York City Middle Schools

This in-depth qualitative study was designed to identify and explore factors that contribute to middle school success, and more specifically, school turnaround in the middle grades. The study focused on two sets of initially low-performing NYC middle schools—one that exhibited significant growth in academic performance between 2006 and 2010, and another that remained basically stagnant during the same period. Our report, *Learning from "Turnaround" Middle Schools*, presents a rich picture of the conditions and strategies that enabled the turnaround schools to boost student achievement.

Assessing the Transition Into and Through the Middle Grades

There is increasing evidence that the middle school years represent a critical turning point for many students but little concrete information about when and under what circumstances students face the greatest challenges—information that is vital for educators trying to keep young people on track toward graduation. This study investigates NYC students' trajectories as they transition into and through middle school, specifically, whether and how their achievement and attendance fluctuate between their fourth and ninth grade years, moments when they tend to fall off or get back on track in their progress toward graduation, and how achievement and attendance trajectories vary across different types of students and schools.

Developing Measures of Effective Learning Environments

Since 2007, parents, students, and teachers from over 1,600 NYC schools have shared their perceptions about their schools in the City's annual School Survey. The goal of this Research Alliance study is to develop more valid and reliable measures of strong learning environments, using existing School Survey data (and informed by the Consortium for Chicago Schools Research's five essential supports framework, which identified factors that were associated with improved achievement in Chicago schools).

Evaluating the Early Impact of School of One

In the 2010-2011 academic year, three NYC middle schools began piloting School of One (SO1), an innovative, technology-enhanced math program that seeks to "meet students where they are," by creating individual learning plans, offering multiple teaching strategies, and using daily assessments to monitor progress and adapt lessons as needed. The Research Alliance designed a quasi-experimental study to assess SO1's initial impact on students' math achievement during this first year of school-wide implementation. The resulting report, *Assessing the Early Impact of School of One: Evidence from Three School-Wide Pilots*, offers recommendations for the program's ongoing development and for future research.

Why Does Turnover Matter?

Most experts agree that some amount of turnover of teachers is constructive, in that it helps bring new ideas to organizations that might otherwise become stagnant and enables schools to recruit effective, committed staff members and replace those who historically underperform.¹ In a recent study of teacher turnover in Chicago, researchers estimated that, even in schools where teachers are highly committed, about 10 percent of them leave annually.²

When rates of turnover are too high, however, schools face considerable instructional, financial, and organizational costs associated with losing and replacing staff.³ A constant churning of teachers through schools requires administrators to direct already scarce resources toward hiring and supporting new teachers, and it makes establishing a consistent, constructive school culture more challenging.⁴ Perhaps the greatest obstacle presented by turnover pertains to teacher supply—most often, exiting teachers are replaced by inexperienced beginning teachers, who are relatively less effective in their early years on the job.⁵ Rates of turnover are often highest in schools that serve large percentages of minority students and students who perform poorly on standardized tests,⁶ the very same schools that struggle to fill vacancies and attract qualified applicants.⁷

Few studies focus specifically on middle school teacher turnover, much less on middle school teacher turnover within one school system. The minimal evidence that does exist suggests that rates of turnover in middle schools may be particularly high, compared to other types of schools.⁸ There are a number of compelling reasons why we might expect turnover to be higher among middle school teachers. First, teachers often consider assignments in middle schools to be stepping stones to more competitive positions in elementary schools or to assignments in high schools, which some teachers find appealing due to their deeper emphasis on a particular subject area.⁹ As a result, middle school teachers have historically accepted, and been assigned to, teaching assignments for which they are only partially qualified; rates of turnover are higher among teachers with such out-of-field assignments.¹⁰ Second, middle school teaching may be particularly challenging, given the social, physical, and emotional developments that occur for students during the middle grade years.¹¹

Strengthening middle schools has taken on increased urgency, as it has become clear that students' development and performance during the middle grades plays a critical role in their subsequent success in and after high school.¹² Many NYC middle schools possess characteristics that have historically been associated with elevated levels of teacher turnover, such as high concentrations of underperforming students and substantial turnover among school leaders.¹³ However, prior to this study, there had not been a comprehensive investigation of the rates and patterns of teacher turnover in NYC's middle schools or the factors associated with turnover in these schools.

The New York City Context

Perhaps the apex of the recent attention to and criticism of NYC's middle schools came in 2007, when City Council Speaker Christine C. Quinn convened the Middle School Task Force. After extensive inquiry and investigation, the group issued a

Middle School Initiatives of the NYC Department of Education

The NYC Department of Education (DOE) is implementing a number of initiatives that have implications for human resource efforts in the City's middle schools.*

- The DOE has plans to open at least 28 new middle schools (14 traditional and 14 charter) in Fall 2013.
- The DOE is expanding initiatives to recruit and prepare new middle school teachers. In Spring 2012, it enrolled 150 new educators in a 10-week apprenticeship program, based in 35 middle schools across the district. Drawn mostly from the corps of New York City Teaching Fellows who started teaching in Fall 2012, these recruits worked with small groups of middle school students to learn strategies for boosting literacy and assisting students who need remediation.
- The DOE expanded the *Middle School Quality Initiative*, which provides intensive training and professional development for teachers (also focused on literacy), to more middle schools.
- The DOE is launching a new program called the *Middle School Leadership Internship*, in partnership with Teach for America, to attract and prepare new middle school principals. For four weeks, teachers who are thinking about making the jump to a school leadership position will be matched with a mentor principal, whom they will shadow. The DOE is also working with several partner organizations that focus on school leadership—e.g., LEAP, New Leaders for New Schools, and the Leadership Academy—to direct more of their graduates to middle schools.

* Source: "In Our Schools Today: Chancellor Walcott at NYU's Middle School Colloquium." Retrieved on April 16, 2012 from: http://schools.nyc.gov/Home/InOurSchoolsToday/2011-2012/NYU_MS_Colloquium.htm

sobering report on the state of NYC's middle schools. That same year, the NYC Coalition for Educational Justice published an equally critical report on the same topic. In response to the seemingly unanimous condemnation of the City's middle schools, the Department of Education (DOE) launched the Campaign for Middle School Success in 2008 and secured \$13 million from the General Electric Foundation to improve the academic performance of middle school students.

In the fall of 2011, the current New York City Schools Chancellor, Dennis Walcott, announced that his administration's signature initiative would be to strengthen NYC's middle schools, remarking that "for decades, cities including this one have struggled to address the lagging achievement among middle school students."¹⁴ Central to Walcott's initiative is the notion that teachers are of vital importance for improving middle school students' academic performance. The DOE has implemented a mix of "supply-side" policies and programs aimed at preparing additional middle school teachers and encouraging them to work in subjects where there are shortages and in hard-to-staff schools. While these supply-side policies are potentially important first steps, strengthening middle schools over the long-term may also require strategies to retain existing teachers (see textbox on page 4 for more information about current DOE middle school initiatives).

Given the DOE's interest in improving NYC's public middle schools, it is essential to learn more about the middle school teacher workforce: the rates at which they leave their schools, where they go when they depart, and how long those currently in schools intend to remain. In addition, it is critical to investigate whether particular teachers, or teachers in particular types of schools, are more inclined to leave their schools and, if so, why.

The Study

The study on which this report is based is comprised of three distinct parts that attempted to measure teacher turnover in a variety of ways (see textbox on page 8 for a description of how we measured teacher turnover). First, we used the DOE's human resources records from the past decade to identify rates and patterns of teacher turnover across NYC's grade 6-8 middle schools.¹⁵ We also examined the relationship between teacher turnover and various characteristics of middle school teachers and of the schools where they work. Second, via a survey of over 4,000 full-time middle school teachers administered in the spring of 2010, we sought to

identify factors associated with teachers' reported plans to leave their school and/or teaching.¹⁶ The survey asked teachers how long they intended to stay in their school, whether they were currently considering leaving their school or teaching, and how they experienced various aspects of their school that research has identified as related to turnover. Finally, we used in-depth case studies in four middle schools to gain a deeper understanding of teachers' impressions of their work environment and of the relationship between turnover and various aspects of middle schools. This report highlights and synthesizes the major findings across each of these components. Appendix A contains details on the data and samples for each of the study's three distinct parts, Appendix B contains details on the methods used to analyze the data, and Appendix C describes the characteristics of NYC middle school teachers.

The previous papers based on the Research Alliance's middle school teacher turnover study are [*Thoughts of Leaving: An Exploration of Why New York City Middle School Teachers Consider Leaving Their Classrooms*](#) (Pallas and Buckley, 2012) and [*The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City's Middle Schools*](#) (Marinell, 2011). Both are cited in the references section of this report.

WHAT ARE THE RATES AND PATTERNS OF TEACHER TURNOVER ACROSS NYC MIDDLE SCHOOLS?

This section of the paper describes the rates and patterns of NYC middle school teacher turnover during the past decade, starting with middle school teachers' typical length of stay in their school. We then consider how these rates of cumulative turnover compare with NYC elementary and high school teachers. Next, we examine where middle school teachers go when they leave their schools (to other NYC middle schools, to elementary or high schools, outside the system, etc.). To begin to explore how various system-wide factors (such as the DOE's previous reforms) and external conditions (such as the recent economic recession) might be influencing turnover, we look at annual turnover rates and how they changed between 2000 and 2010. We conclude this section by examining the percentage of teachers who reported that they considered leaving their school during the 2009-2010 school year, as well as the number of years they anticipate remaining in their school, which provides insight into current middle school teachers' general satisfaction with, and commitment to, their schools and the teaching profession.

Among middle school teachers who entered a school during the past decade, 55 percent left that school within three years.

Understanding the length of time that NYC middle school teachers stay in their schools is vital to help system administrators and local policymakers create long-term staffing plans. This information can help them assess whether supply-side approaches that increase the number of new teachers entering the school system will be adequate for resolving staffing challenges, such as filling vacancies in hard-to-staff subjects and schools. Moreover, it provides a sense of the difficulties that individual schools will face in recruiting, developing, and retaining teachers and in working to maintain the coherence of school-wide initiatives, like establishing a consistent approach to student discipline.

We used the NYC DOE's human resources records from the past decade to: 1) identify teachers who entered NYC middle schools, and then 2) examine how long these teachers remained in their same school. We found that, on average, teachers remained in their school for slightly less than three years. More specifically, 27 percent of middle school teachers left their school within one year of having first

entered; 55 percent left within three years, and 66 percent left within five years (see Figure 1 on the next page).^{17, 18} Rates of cumulative turnover of this magnitude present a number of challenges. They may make it difficult for principals, and for the teachers who do not leave their schools, to establish organizational norms and a shared vision for their schools' teaching and learning environment. Furthermore, this turnover may compromise the continuity of the relationships between middle school teachers and administrators, students, parents, and the staff at organizations that partner with middle schools. If middle schools are unstable and impersonal,

How We Measure Teacher Turnover

In this report, we approach the issue of teacher turnover from the perspective of the school. Thus, for us, “teacher turnover” occurs whenever a teacher leaves his or her school, which includes attrition (i.e., when a teacher leaves the school system and/or the teaching profession*) and mobility (i.e., when a teacher moves to another school within the system); this definition does not distinguish between voluntary or involuntary (i.e., employer termination) turnover.

Throughout this report, we reference a number of different metrics, each telling us something slightly different, but equally important, about teacher turnover. Our reliance on multiple data sources required us to use different outcomes to examine turnover from multiple perspectives. This was, in fact, useful, as no one metric presents a complete portrait of teacher turnover. The metrics we used are:

- **Length of stay in a school (or “cumulative turnover”):** This identifies the percentage of teachers who leave their school after various lengths of time. Based on the DOE’s employment records, we were able to observe teachers entering a school and then examine how long they remained in that same school. For instance, using this metric, we found that, over the last decade, middle school teachers’ median length of stay in their school was slightly less than three years. Another way of looking at this finding is to say that 55 percent of teachers left their schools within three years of having entered.
- **Percentage of teachers who *consider* leaving their schools:** We generated this metric from a question on our teacher survey, which asked whether teachers had considered leaving their schools and/or leaving teaching during the current school year. This outcome may gauge teachers’ general satisfaction with and commitment to their school (and to the teaching profession).**
- **Percentage of teachers who are not in their schools from one year to the next (or “annual turnover”):** This outcome also uses the DOE’s employment records—this time to calculate the percentage of teachers who are in a given school in one year but not in that same school a year later. This statistic is useful for identifying the percentage of a school’s entire staff that must be replaced from one year to the next. We use this same metric, but over a slightly longer period of time (one-and-a-half school years, as opposed to one) when examining the relationship between turnover and various school features.

* We did not distinguish between the two types of attrition (leaving the NYC system and leaving the teaching profession) because we did not have information on whether the former NYC teachers left to teach elsewhere.

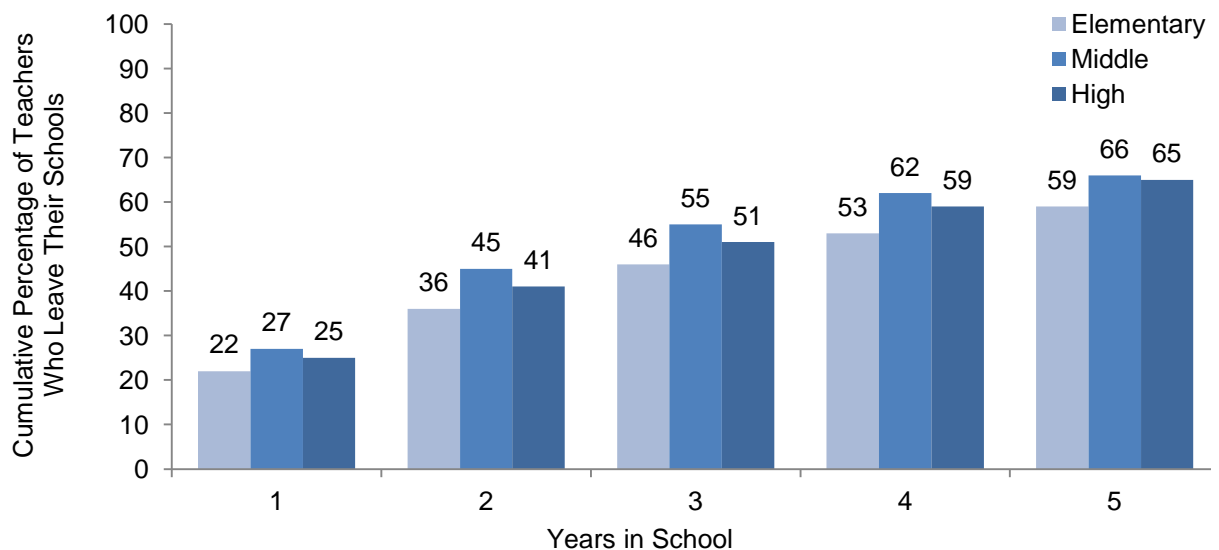
** While considering leaving one’s school and actually leaving are different outcomes, evidence suggests that the former can help predict the latter (Ladd, 2011).

students may find it even more challenging to manage the transitions into, through, and out of the middle grades—a time period that is already defined by profound, often difficult social and emotional changes.¹⁹ Lastly, there is likely an instructional cost to students of turnover of this magnitude. Indeed, recent research on NYC schools suggests that teacher turnover has a negative impact on student achievement.²⁰

Middle school teachers leave their schools at higher rates than elementary and high school teachers.

To situate these rates of cumulative turnover within the larger NYC public school context, we examined comparable rates of turnover among elementary and high school teachers who entered their schools during the same time period. Figure 1 illustrates the cumulative percentages of teachers who left NYC’s middle, elementary and high schools after various lengths of time. As the figure depicts, the cumulative rates of middle school turnover were generally higher than rates of turnover in elementary and high schools. For example, 55 percent of middle school teachers left their schools within three years, compared with 46 percent of

Figure 1: More than Half of Middle School Teachers Leave Their Schools Within Three Years



Source: Marinell, W. (2011). *The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City’s Middle Schools*. New York: Research Alliance for New York City Schools.

Note: The figure presents the cumulative percentage of teachers who left their school, among teachers who entered a NYC public school between 2002 and 2009.

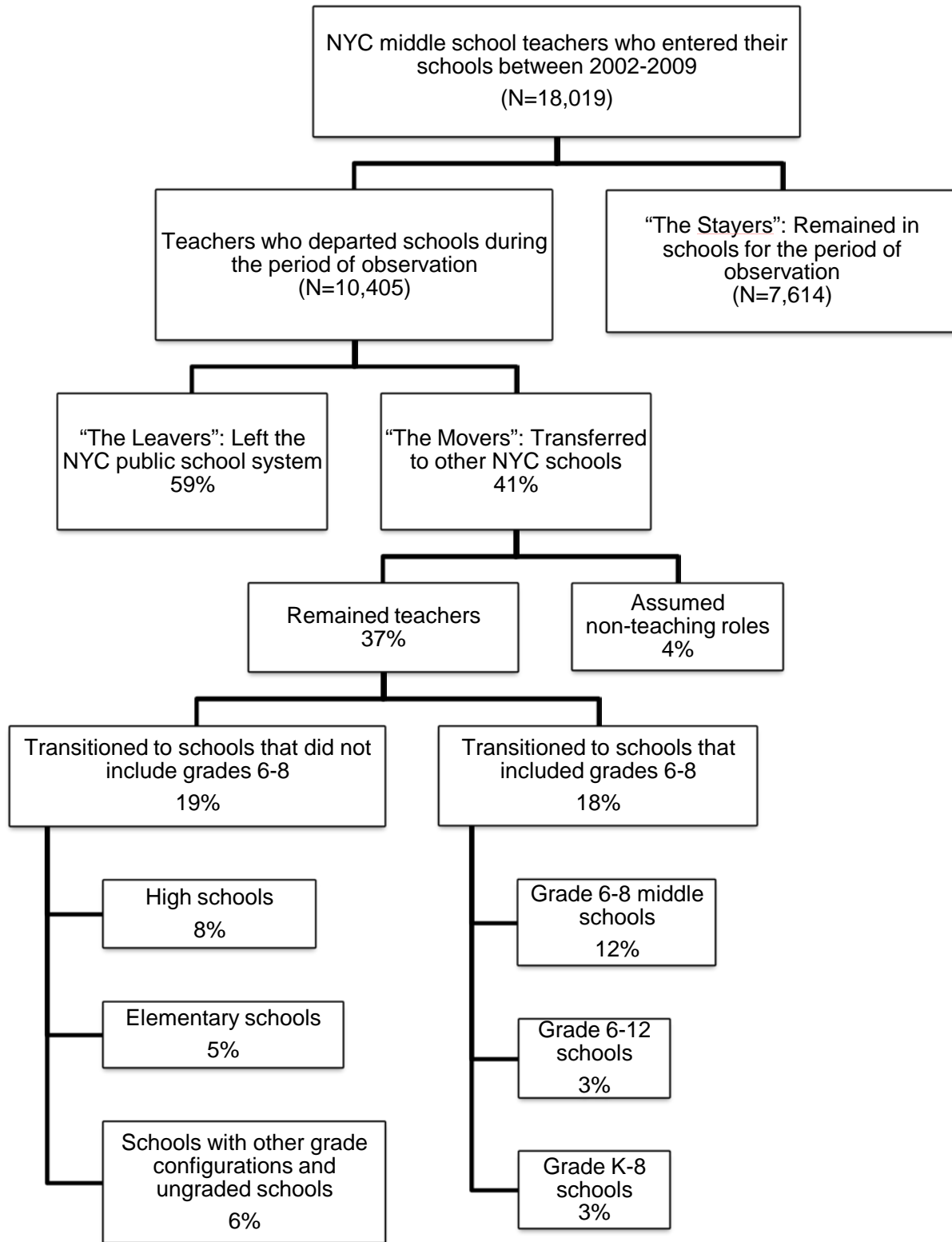
elementary school teachers and 51 percent of high school teachers. Over time, middle and high school teachers' cumulative rates of turnover converge. Within five years of having begun in a school, 66 percent of middle school teachers and 65 percent of high school teachers left their schools. Seven years out, the percentage of teachers who left their schools is the same for teachers in both middle and high schools, at 73 percent.²¹ Despite this convergence over time, the data clearly indicate that turnover poses particular challenges for NYC's public middle schools.

Figure 1 also demonstrates that, across all school levels, the greatest percentage of teachers left their schools within the first few years; the longer a teacher remains in her school, the less likely she is to leave it in a given year. These rates of cumulative turnover are comparable to those seen in a recent study of the Los Angeles school system.²² As with our analysis, the Los Angeles research team found that teachers' risk of school departure was greatest during their first year in a school. From this finding, the research team concluded that school administrators and local policymakers should pay particular attention to supporting teachers during their early years in a building, regardless of whether these entering teachers are new to the profession or just new to their schools. Our findings also support this recommendation.

When NYC middle school teachers leave their schools, 59 percent leave the system altogether; 41 percent change schools within the system, often transitioning to schools that do not contain the middle grades.

To educators within a given school, it may make little difference whether a teacher transitions to another school or pursues a career outside of teaching. However, to the NYC public school system as a whole, the question of where teachers go when they leave is critically important. Teacher attrition represents a net loss to the system in a way that mobility between schools does not. Certainly, this calculus depends on the effectiveness of the outgoing teachers relative to those entering the system (i.e., losing ineffective teachers may not be a bad thing). However, training novice, new-to-school and new-to-system teachers requires substantial resources. Any system that loses a sizable percentage of teachers, even if some have yet to demonstrate their effectiveness, loses the initial investment it made in preparing those teachers.

Figure 2: Among Teachers Who Entered NYC Middle Schools Between 2002 and 2009, More Than One Third Left the NYC System



Source: Marinell, W. (2011). *The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City's Middle Schools*. New York: Research Alliance for New York City Schools.

Our analyses reveal that both mobility (transferring between NYC schools) and attrition (leaving the NYC public school system altogether) contribute to the rates of cumulative teacher turnover described above, but that the latter plays a more substantial role. Figure 2 on the previous page illustrates the patterns of mobility and attrition among teachers who were new to their middle schools between 2002 and 2009. As the figure reveals, 59 percent of departing middle school teachers were not employed in the NYC public school system in the year after their departure (referred to as *Leavers*). By comparison, 41 percent of departing middle school teachers transitioned to other NYC public schools (referred to as *Movers*).

A closer inspection of these data reveals that many of the teachers who transitioned to other NYC public schools did not remain in middle schools. Among *Movers*, a small percentage, 4 percent, assumed non-teaching roles, such as assistant principals or librarians. Of the other *Movers*, roughly equal percentages secured assignments in schools that do and do not include the middle grades (grades 6-8). It is notable that of all the teachers in our sample who left their middle schools (including both *Movers* and *Leavers*), only 12 percent transitioned to another middle school (i.e., a school with a traditional grade 6-8 configuration).

These findings raise a number of questions that future research should explore. First, it will be important to learn more about the circumstances and motivations for teachers' mobility and attrition. Our data do not allow us to determine whether teachers who transition from middle schools to elementary or high schools do so because they are frustrated with teaching the middle grades, because they were not adequately prepared to be successful middle school teachers, or for some other reason. In addition, we need to examine where teachers who exit the NYC public school system altogether go when they leave and the reasons for their departure. Do they remain teachers and, if so, what types of schools do they enter, how long do they remain in these schools, and are they any more effective (and do they perceive themselves to be more effective) in their new school context?

Annual turnover rates have declined over time.

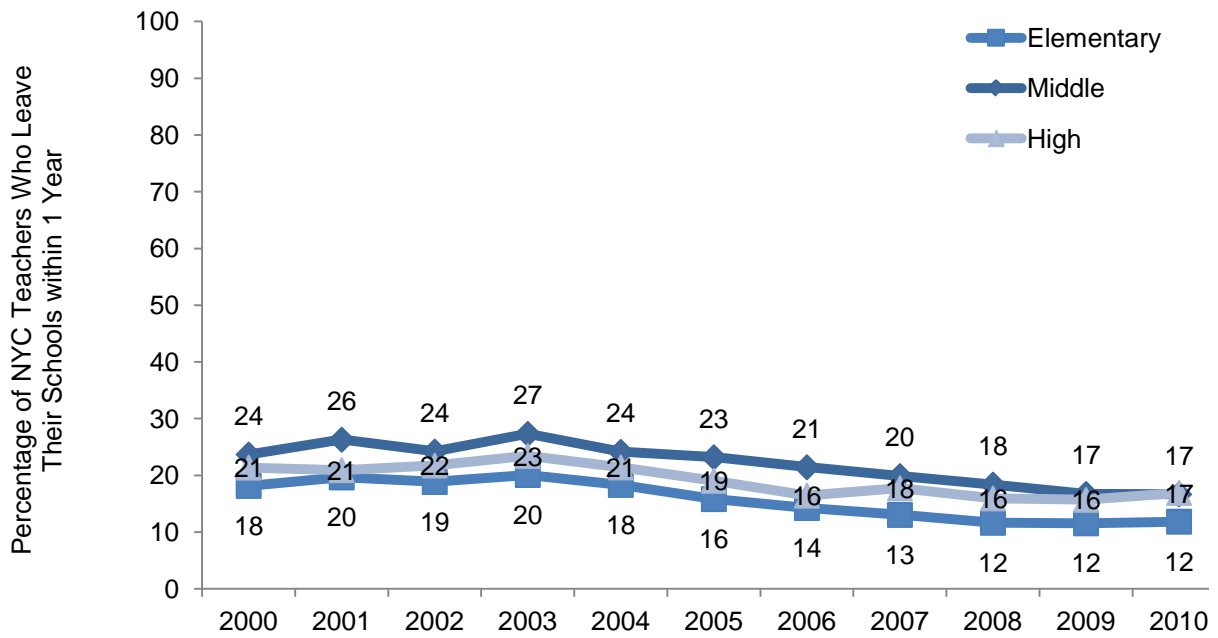
While the analyses outlined above establish historic rates of middle school teachers' cumulative turnover, which can help policymakers consider long-term strategies for retaining teachers, recent annual turnover rates may be more useful for anticipating current and near-future staffing needs and for shaping instructional practices moving

forward. Thus, we examined the percentage of teachers leaving their schools each year over the last decade, to discern whether there are any notable trends or patterns in how annual teacher turnover rates have changed over time.

We hypothesized that annual turnover rates would be lower in recent years due, in part, to the effects of the economic downturn. We reasoned that with fewer employment prospects teachers might be more inclined to remain in their schools and in a profession that is generally regarded as being relatively secure and stable. While this seems sensible, there are a number of other, less obvious factors that might influence middle school teachers' annual turnover rates, such as an increasing percentage of entering teachers who intend to have only brief stints in the profession (such as those from Teach for America) or the increasing number of newly created charter schools and small high schools in NYC, which might present middle school teachers with additional employment opportunities that prompt them to leave their current schools from one year to the next.

Analyses confirmed our hypothesis: rates of annual teacher turnover were lower in recent years than they had been in previous years—in middle schools, as well as in elementary and high schools, across the NYC public school system. Yet this cannot be attributed solely to the recession. As shown in Figure 3 on the next page, annual turnover rates have generally been declining over the last decade, particularly since 2003, well before the economic downturn. (The proper way to interpret a point in this figure is as follows: 24 percent of teachers who were in a NYC public middle school in the spring of 2000—i.e., the 1999-2000 school year—were not in the same school one year later.)

It is beyond the scope of this study to rigorously examine the factors responsible for the observed changes in annual teacher turnover rates. Furthermore, it seems important to note that while the declines in annual turnover could be interpreted as an indicator of progress—which they may well be—rates of middle school teacher turnover may be higher than optimal even at their lowest points. As noted above, a recent study in Chicago suggests that schools where teachers are highly committed lose roughly 10 percent of their teachers each year. The annual turnover of 17 percent of middle school teachers in 2009 and 2010 are higher than this minimum threshold. Still, our analyses suggest that a substantial proportion of NYC middle schools have a more stable base of teachers than they did earlier in the decade.

Figure 3: Annual Turnover Rates Have Gone Down Since 2003

Note: See Appendix A for information on the number of teachers in each year for each school type.

Over a third of middle school teachers reported that they considered leaving their school, the teaching profession or both during the 2009-2010 school year.

To get a sense of current middle school teachers' impressions of their schools and of the teaching profession, we surveyed 4,214 full-time middle school teachers in 116 grade 6-8 middle schools in the spring of 2010. We asked them about various aspects of their schools, such as the level of collegiality among teachers and school safety, as well as a series of questions about their future plans, including whether they had considered leaving their schools and/or the teaching profession during the current school year. This "considering leaving" metric has been linked to actual rates of teacher turnover. For example, recent evidence from North Carolina demonstrates that schools with higher numbers of teachers who are considering leaving also have higher rates of turnover, suggesting that considering leaving is more than just a flight of fancy or a reaction to a bad day in the classroom.²³

Our survey analysis revealed that 39 percent of middle grade teachers had considered leaving their school or teaching during the 2009-2010 school year. Of

the teachers who reported that they considered leaving their school, one quarter expected to leave at the end of the 2009-2010 school year, and another 45 percent expected to stay for, at most, another year or two. Thus, 70 percent of the teachers who reported that they had considered leaving their school expected to be gone within two years. Only 12 percent of these teachers expected to stay in their current school for more than six years.

Interestingly, teachers who reported that they had *not* considered leaving their school during the 2009-2010 school year seemed split between those who anticipated spending a substantial amount of time in their school and those who envisioned far shorter commitments. Nearly 40 percent of the teachers who had not considered leaving expected to remain in their current school for more than ten years. Another 40 percent anticipated remaining in their current school for less than five years.

WHAT PREDICTS MIDDLE SCHOOL TEACHER TURNOVER?

The rates and patterns of turnover described in the preceding section shed light on the prevalence of turnover in NYC middle schools and provide a window into middle school teachers' transitions in and out of the school system. In this section, we attempt to understand some of the characteristics of teachers and schools that may underlie the trends and patterns that we described above.

Our research design does not allow us to pinpoint clear causes or consequences of turnover; however, identifying associations between turnover and different types of teachers and schools can help us form preliminary hypotheses about how policymakers can influence teacher turnover, which schools and teachers may need additional support, and what questions researchers should explore in greater depth. Of primary interest to us are the associations between turnover and characteristics of teachers and schools that policymakers may be able to influence, such as the adequacy of a school's resources or the professional credentials of teachers.

Our analytical strategy for this part of the study consisted of a number of interrelated steps. First, to get a general sense of whether middle school teacher turnover is concentrated in particular schools or is a system-wide phenomenon, we examined the extent to which rates of turnover differed across our sample of grade 6-8 middle schools. In the second phase of our analysis, we looked at various characteristics of teachers (such as their professional degrees) to determine whether these characteristics were associated with turnover. We also used data from the teacher survey to examine associations between other characteristics of teachers—including characteristics that are not in the DOE's human resources database, such as the length of a teacher's commute—and their consideration of leaving their school during the 2009-2010 year. Finally, we examined various characteristics of middle schools (such as their size, location and student demographics) to determine whether they were also associated with turnover. The survey data also allowed us to assess whether teacher's ratings of the school environment (principals' leadership, school safety, etc.) are correlated with varying rates of turnover.

NYC middle school teacher turnover is predominantly a system-wide phenomenon.

Policymakers need to know whether high rates of cumulative teacher turnover are prevalent across all (or most) NYC middle schools or are in fact concentrated in a smaller subgroup of schools. If the latter is true, then policymakers might respond by targeting particular resources, supports or interventions toward the schools in question. By contrast, turnover that is system-wide would require more comprehensive, system-wide response.

Our analyses suggest that NYC middle schools are more alike than different with regard to cumulative turnover of middle school teachers.²⁴ While there are certainly some schools that typically lose more teachers than others, there is little variation across schools as a whole. On average, the majority of NYC middle schools are losing similarly high numbers of teachers over time.

This fact provides important context for the other findings reported below. The lack of across-school variation suggests that manipulating the characteristics of schools—such as the level of collegiality between teachers or the extent of student misbehavior—is not likely to have a dramatic effect on teachers’ cumulative turnover (given that large numbers of teachers leave schools even where these aspects of their schools are desirable). On the other hand, our decision to conduct research on cumulative turnover at one level of schooling (i.e., middle schools) and in one system (i.e., New York City public schools) may constrain the amount variation across schools, by design. Regardless, policymakers and practitioners have more control over the internal workings of schools than they do over many larger, external forces that might affect cumulative turnover, such as regional or national economic conditions. Thus, examining associations between cumulative turnover and features of schools remains an important objective, in spite of there being limited variation across schools.

Rates of cumulative turnover are generally similar across many different types of teachers; however, teachers with less experience are more likely to leave their schools, as are those with the most and least advanced credentials.

Associations between predicted rates of cumulative turnover and teachers’ background characteristics can help identify types of teachers who may be at the greatest risk for departure (see Appendix C for more information on the

background of middle school teachers in NYC). In addition, analyses of this nature can help policymakers anticipate system- or district-wide staffing needs.

In general, rates of cumulative turnover were similar for the different types of teachers that we were able to identify with existing data. Roughly half of middle school teachers left their school within three years, regardless of whether they were male or female, from various racial/ethnic backgrounds, or whether they were math and science teachers or teachers of some other subject area. Thus, the characteristics of teachers that are reflected in the DOE's human resources data are not particularly strong predictors of cumulative turnover.

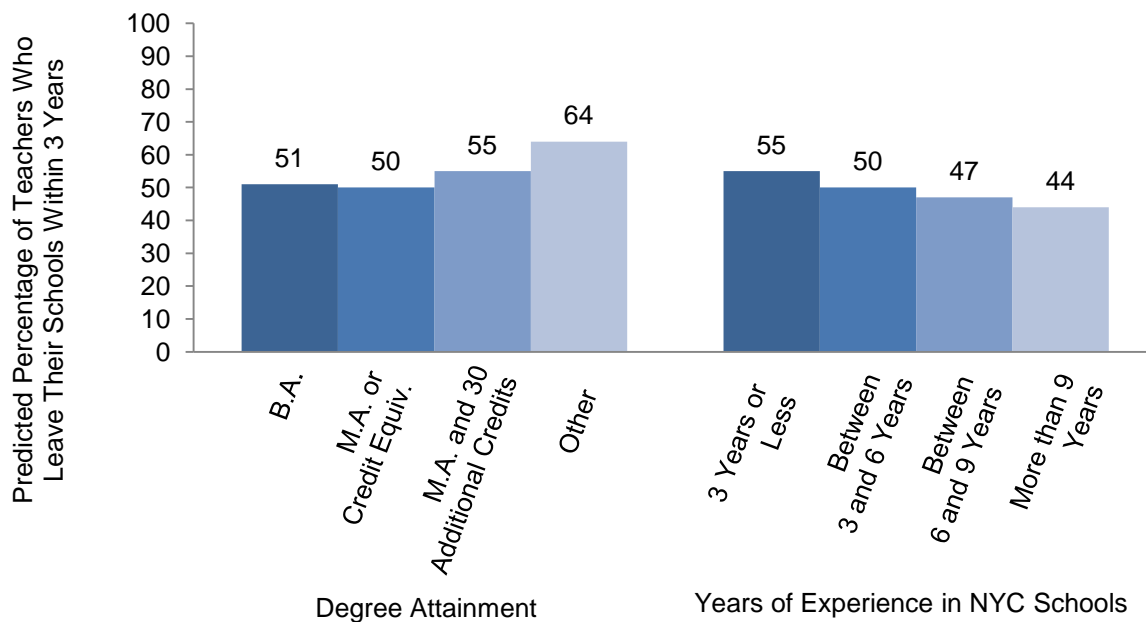
There are a few notable exceptions to this general pattern of similarity. Figure 4 on the next page depicts the percentage of teachers who left their middle school within three years by level of education and experience, which were both statistically significant predictors of turnover. High levels of experience in NYC schools were associated with the lowest rates of cumulative turnover: 44 percent of the most experienced teachers left their school within three years, compared with 55 percent of the least experienced teachers (those who had worked in NYC schools for three years or less). In addition, the strongest and weakest education credentials were associated with higher rates of turnover. Specifically, 55 percent of middle school teachers who possessed a Masters degree and at least 30 additional credits left their school within three years. An even higher percentage, 64 percent, left within this time frame, among teachers who fell into the "other" degree category, which includes teachers with the least or most advanced credentials (e.g., associates' degrees and doctorates). By comparison, among middle school teachers with Bachelor's and Master's degrees, the percentages of teachers who left their school within three years were 51 and 50 percent, respectively.

Arguably, the teachers who stand the best chance of being effective and making long-term contributions to students' learning are those with Master's degrees (indicating that they have fulfilled the "high quality" provision of No Child Left Behind) plus additional credits (indicating that they have pursued some formal training beyond a Master's degree). Thus, our finding that teachers with these credentials may leave their schools at higher rates than teachers with Bachelors' degrees does not seem encouraging. This finding may suggest a tension between teachers' lengths of stay and efforts to professionalize teaching by increasing the credentials required for obtaining and maintaining certification. While additional

training—if it is properly designed—can increase teachers’ effectiveness, it may also increase their opportunities in careers outside of education or in employment outside of large urban districts. This may suggest that professional development opportunities for middle school teachers should be coupled with deliberate retention efforts.

The more general finding—that many teachers are leaving, regardless of their background—suggests that middle school teacher turnover is pervasive and cannot be tackled simply by attracting or supporting any particular type of teacher, at least not as defined by the characteristics available in the DOE’s human resource database. In fact, the lack of strong individual-level predictors of cumulative turnover also suggests the need for more comprehensive human resources databases, as well as exit interviews/surveys that may help identify teachers’ reasons for leaving their schools and the NYC school system.

Figure 4: Inexperienced Teachers and Teachers with “Other” Levels of Degree Attainment Are More Likely to Leave Their Schools Within Three Years



Source: Marinell, W. (2011). *The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City’s Middle Schools*. New York: Research Alliance for New York City Schools, Table 8.

Note: The “Other category” includes teachers with the least or most advanced credentials (e.g., associates’ degrees and doctorates).

Teachers are more likely to consider leaving their school if they have a long commute, are teaching a new subject for the first time, or pursued an alternative route of entry into the profession.

The survey that we administered in the spring of the 2009-2010 school year elicited information about teachers' professional backgrounds and assignments that is not available in the DOE's human resource data. Because the survey responses were anonymous, we were not able to link them with individual teachers' employment records, so we could not explore the direct relationship between characteristics reported in the survey and teachers' actual departures from their school. However, we were able to see whether teachers who reported different characteristics were also more likely to report that they had considered leaving their school (and, as noted above, "considering leaving" has been linked to actual rates of teacher turnover in past research). Thus, we examined whether teachers were more or less likely to consider leaving their schools on the basis of several characteristics, including their routes of entry into the profession, the length of their commutes, and whether they taught a new subject or grade during the 2009-2010 school year.

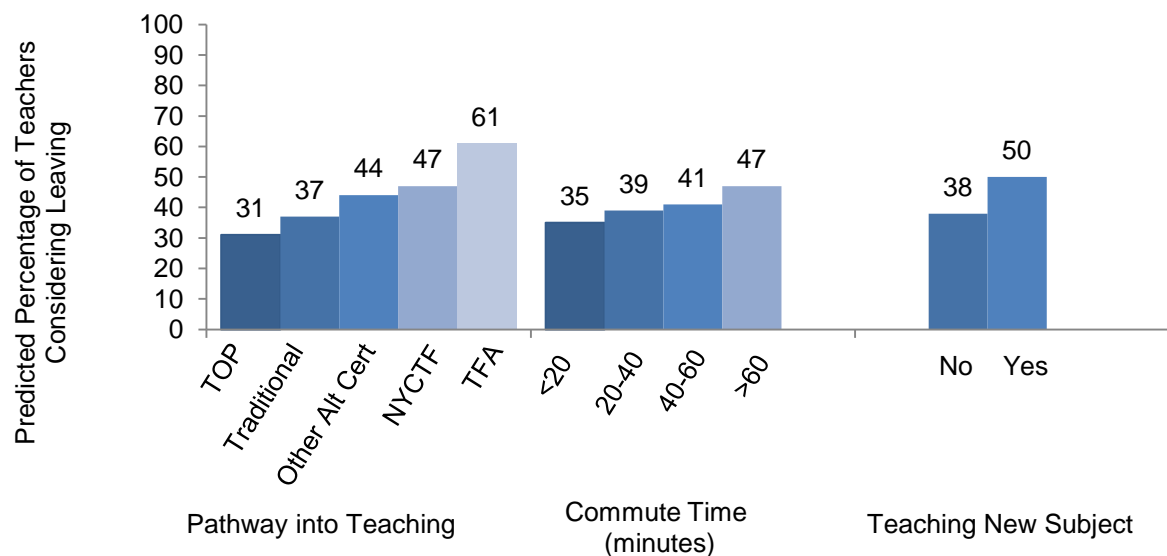
Indeed, we found that each of these characteristics was related to teachers' consideration of whether to leave their schools. Figure 5 on the next page depicts the percentage of teachers who considered leaving their schools during the 2009-2012 school years. As we can see, all else being equal, teachers with longer commutes were much more likely to consider leaving their schools than teachers with shorter commutes. The starkest difference was between teachers with a commute of 20 minutes or less and those with a commute of one hour or more: 35 percent of teachers in former category considered leaving their school, as compared with 47 percent of teachers in the latter category.

Interestingly, our survey analysis revealed that 20 percent of respondents with one or more years of teaching experience were teaching students in a grade level they had not taught before, and 11 percent were teaching a subject that they had not taught before.²⁵ (We cannot tell whether the teacher or school initiated these assignments). A small percentage was teaching both a new subject *and* a new grade. Overall, 26 percent of survey respondents reported teaching assignments that might have posed challenges due to changes in curriculum and/or the student population. Although teachers who were teaching a new grade level were no more likely to consider leaving their schools, about 50 percent of those teaching a new subject

considered leaving, as compared with approximately 38 percent of their peers, after controlling for other factors.

Finally, middle school teachers who entered teaching via alternate pathways were much more likely to consider leaving their current classrooms than those who entered via traditional pathways. We found that 61 percent of teachers who entered the profession via Teach for America (TFA) and 47 percent of teachers from the NYC Teaching Fellows Program considered leaving their school, controlling for other factors. By comparison, just 37 percent of teachers who entered the profession by way of traditional, university-based preparation programs considered leaving their schools. As reported in a recent Research Alliance publication, our survey suggests that traditionally prepared teachers comprise the vast majority of NYC middle school teachers.²⁶ Therefore, it might be beneficial to provide targeted mentoring and professional development for teachers who enter through alternative pathways, in an effort to keep them engaged in their schools.

Figure 5: Teachers Are More Likely to Consider Leaving if They Are Alternatively Certified, Have a Long Commute, or Are Teaching a New Subject



Source: Pallas, A. & C. Buckley. (2012) *Thoughts of Leaving: An Exploration of Why New York City Middle School Teachers Consider Leaving Their Classrooms*. New York: Research Alliance for New York City Schools, Figures 2b, 2g, and 2f.

Note: These analyses controlled for other teacher and school characteristics

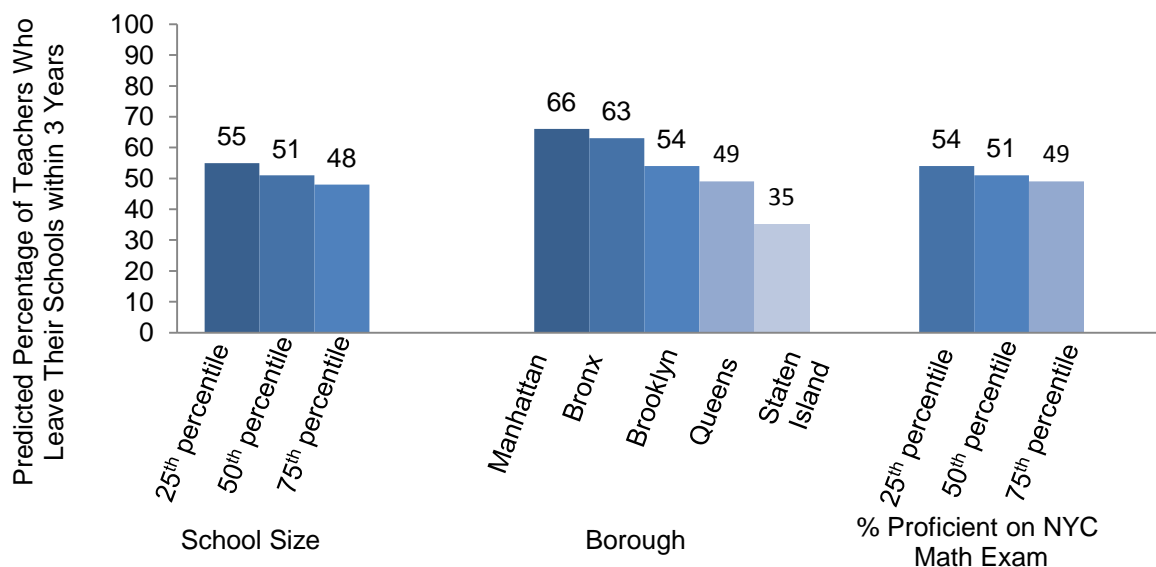
Teachers' lengths of stay are shorter in middle schools that are small, located in Manhattan, have high concentrations of underperforming students, and where teachers do not share the same racial/ethnic profile as their students.

In addition to examining whether specific teacher characteristics were associated with higher turnover, we also wanted to know if cumulative turnover rates differed across various types of middle schools, controlling for other factors (i.e., characteristics of teachers and larger, system-wide contextual factors that might affect teacher turnover²⁷). Given the limited amount of variation in cumulative turnover across middle schools, we anticipated finding that rates of turnover would be similar for many different types of middle schools. This is, indeed, what we found, with the following exceptions: Rates of turnover were higher in small middle schools, those located in Manhattan, and those with high concentrations of students who did not perform well on New York State's standardized math assessment. Further, teachers were more likely to leave their school when their racial and ethnic characteristics did not match those of a substantial proportion of the school's students.

Figures 6a and 6b present these results in more detail, displaying the percentage of teachers who left their school within three years for middle schools with different characteristics. As seen in Figure 6a on the next page, smaller middle schools (i.e., schools with roughly 700 students or less) lost roughly 55 percent of their teachers within three years of entering the school. By comparison, schools that enroll approximately twice as many students lost about 48 percent of teachers within that time period. Figure 6a also depicts the discrepancies in turnover rates across the five boroughs. Controlling for the characteristics of teachers, students and schools that influence turnover, rates of turnover are highest in Manhattan, where 66 percent left within three years. By contrast, within the same period of time, 63 percent of teachers left middle schools in the Bronx, 54 percent left schools in Brooklyn, 49 percent left schools in Queens, and 35 percent left schools in Staten Island. While cumulative turnover rates did not differ much across schools with different concentrations of poverty, teachers were more inclined to leave schools that have high proportions of students who did not meet proficiency standards on the state's standardized math assessment (see Figure 6a). In schools where 30 percent of students tested proficient on the math exam, 54 percent of teachers left within three years. By comparison, in schools where nearly 70 percent of students tested

proficient in math, just 49 percent of teachers left within the same timeframe. While this difference is statistically significant, rates of cumulative turnover were not more divergent across schools where students were succeeding to very different degrees—i.e., schools with students with very high or very low test scores did not have correspondingly extreme turnover rates.

Figure 6a: Teachers in Schools That Are Small, in Manhattan, or Have Relatively Low Proportions of Students Proficient in Math Were More Likely to Leave Their Schools Than Their Counterparts



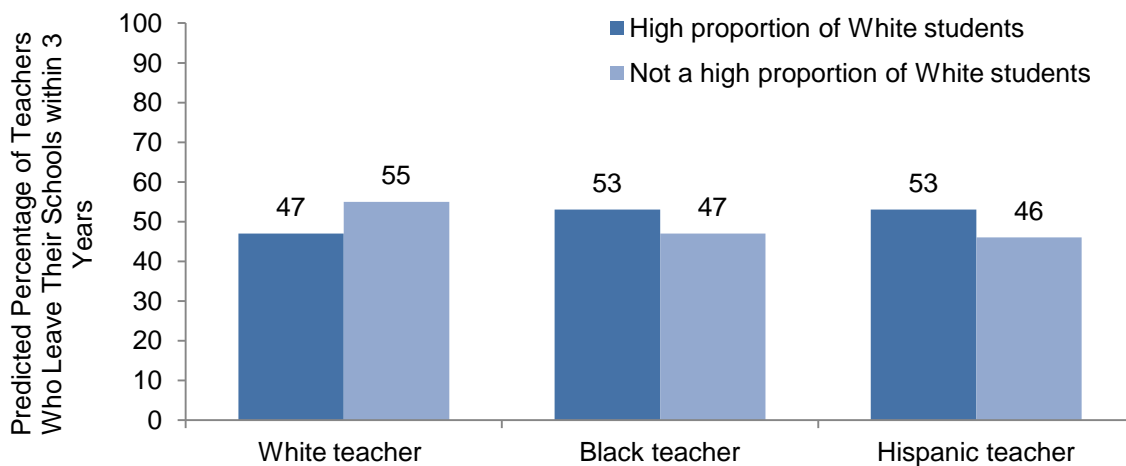
Source: Marinell, W. (2011). *The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City's Middle Schools*. New York: Research Alliance for New York City Schools, Tables 6 & 10.

Notes: The categories reported for the measures of school size and the percentage of a school's students who are proficient on the NY math exam represent prototypical schools at the 25th, 50th, and 75th percentiles in the distribution of each measure across all of the years in the person, spell, period dataset (2002-09).

Lastly, we examined the relationship between cumulative turnover and the match between teachers' and students' racial/ethnic backgrounds. These analyses revealed that middle school teachers remain in their schools longer when their racial and ethnic characteristics match those of a substantial proportion of the students in their schools. In the typical NYC middle school, roughly 16 percent of students are White and 84 percent are non-White. Thus, schools where more than 16 percent of students are White could be considered schools with a relatively high proportion of White students even though White students do not represent the predominant racial/ethnic category in the school.

As Figure 6b shows, controlling for other factors, White teachers who work in schools with a relatively large proportion of White students are less likely to leave their schools than are White teachers working in schools with fewer White students. Similarly, Black and Hispanic teachers who work in schools that have a relatively large proportion of non-White students are less likely to leave than are Black and Hispanic teachers who work in schools with fewer non-White students.

Figure 6b: Middle School Teachers Remain in Their School Longer When Their Racial/Ethnic Background Matches Those of the Students in Their School



Source: Marinell, W. (2011). *The Middle School Teacher Turnover Project—A Descriptive Analysis of Teacher Turnover in New York City's Middle Schools*. New York: Research Alliance for New York City Schools, Table 10.

It is important to report how teachers' lengths of stay vary across schools that serve students from different backgrounds, such as students' racial/ethnic characteristics, for many reasons, including to discern whether rates of school stability are equally distributed across the system's middle schools. However, it is also important to keep in mind that strong, positive associations between teachers' cumulative turnover and, for instance, the percentage of a school's non-White population does not necessarily indicate a causal relationship—that teachers leave their school because they are teaching students from a certain racial/ethnic background. Furthermore, many urban principals have a limited ability to alter the mix of students or teachers in their schools, so findings about the relationship between these kinds of school characteristics and turnover may do little to inform school administrators' day-to-day efforts. But these findings can give principals a sense of

where they stand against schools with similar populations, which may be helpful. Below, we examine associations between teachers' annual turnover and the more malleable characteristics of schools.

Teachers are more likely to stay in schools that are perceived to have strong principal leadership, high levels of order and teacher collegiality, and where teachers have some, but not too much, influence.

In the minds of principals, perhaps the question of greatest importance is whether teacher turnover is related to aspects of their school that they can control, such as the quality of school professional development, the level of safety and order within the buildings, and the adequacy of schools' physical resources. While the DOE human resource data do not contain nuanced information about these features of schools, we asked middle school teachers to evaluate these and other aspects of their schools in our survey (see textbox below for descriptions of the workplace characteristics we asked about). By aggregating the teacher survey responses for each middle school, we were able to examine the relationship between various school features (as they are perceived by teachers) and rates of turnover. Because the survey was administered in the spring of 2010, our analyses could only follow teachers' subsequent employment for

Workplace Measures

Our survey of middle school teachers incorporated the following measures of teachers' workplace environments:

Principal leadership indicates the extent to which the principal is perceived as successful in managing resources and supporting teachers' work. This measure is made up of seven questions. For example, teachers were asked about the extent to which their principal "solicits, and genuinely values, teachers' input when considering making substantial changes at the school." A high score indicates that teachers reported relatively strong principal leadership in their school.

Professional control indicates the extent to which teachers feel they have control over various aspects of their work. Ten different workplace responsibilities were considered including: skills and topics to be taught, determining standards for student behavior, and deciding teacher's classroom and grade-level assignments. A high score on this measure means that teachers report a great deal of control over their work.

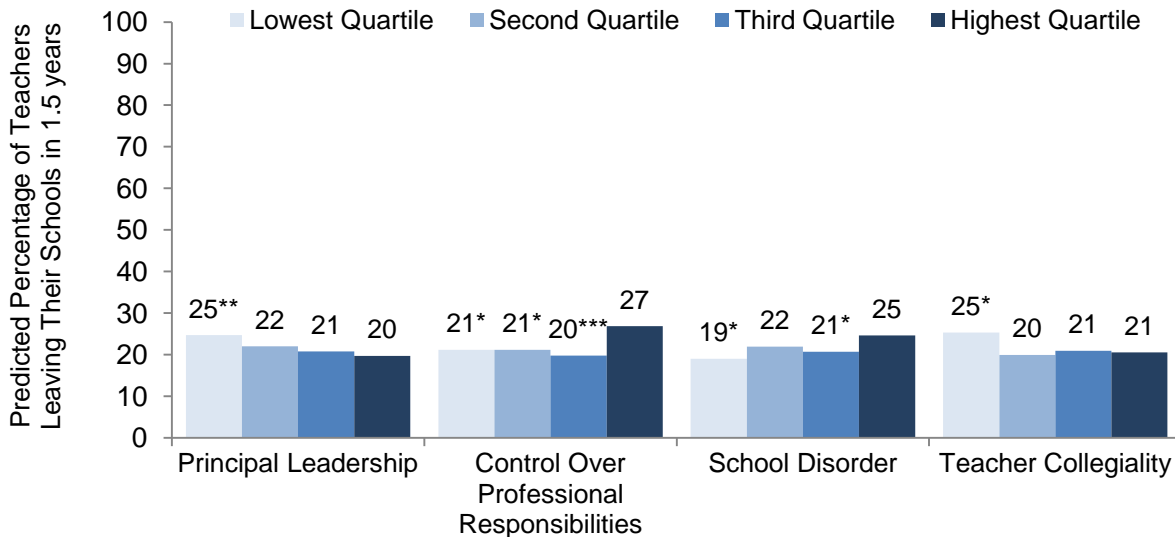
School disorder indicates the extent of perceived disrespect and criminal activity in the school. The school disorder measure is based on teachers' reports of 10 factors, such as student disrespect of teachers and gang activity, as problems at their school. Thus, a high value on this measure signifies a relatively high level of school disorder.

Teacher collegiality indicates the extent to which teachers respect and support one another. This measure is made up of four items, in which teachers were asked whether, for example, they recognize and respect colleagues who are the most skillful teachers. A high score indicates a relatively strong teacher collegiality in their school.

one-and-a-half years (i.e., through the fall of the 2011-2012 school year). Still, we were able to identify a number of school features that were related to higher or lower teacher turnover during that time period.

First, our analyses revealed that teachers were more likely to stay in schools that have strong principals—where teachers reported that the principal was trusting and supportive of the teaching staff, a knowledgeable instructional leader, an efficient manager, and adept at forming partnerships with external organizations that enhanced the school’s effectiveness. As shown in Figure 7 below, in schools where teachers rated principals highly, 20 percent of teachers left the school within one-and-a-half years after we administered the survey. By contrast, in schools where principal leadership was in the bottom quartile, 25 percent of the teachers left the school during the same length of time. These findings are consistent with the existing body of literature that suggests school leadership has a strong impact on teachers’ workplace experience.²⁸ While a difference of five percentage points may not seem particularly large, it is important to keep in mind that this difference was seen after only one-and-a-half years. The finding suggests that training and professional development for principals may be useful strategies to improve teacher retention.

Figure 7: Teachers Are More Likely to Stay in Schools with High Levels of Leadership, School Order, and Teacher Collegiality



Note: Statistical significance of estimated differences is indicated by: * = $p < .10$; ** = $p < .05$; *** = $p < .01$. Statistical significance indicates that a given quartile is significantly different from the reference quartile (Highest Quartile) controlling for teacher- and school-level characteristics. See Appendix B for more information on the methods used for this analysis.

Teachers were also more likely to stay in schools that had high levels of order (i.e., low levels of school “disorder”)—in other words, schools with fewer incidents of violence, theft, disrespect toward teachers, and student absenteeism. As Figure 7 depicts, in schools where teachers reported low levels of disorder, school departure rates were six percentage points lower (19 percent) than in schools where disorder is high (25 percent). The association between turnover and school disorder is quite similar to the association between turnover and principal leadership, suggesting the inter-relatedness of these two characteristics. While principals cannot maintain school order on their own, they play a critical role in establishing and reinforcing norms for student behavior.

The level of collegiality among teachers also had a modest influence on the likelihood that teachers remained in their schools. In middle schools where teachers reported average or high levels of support, rapport, trust and respect among their colleagues, rates of turnover after one-and-a-half years were about 20 percent. By contrast, in schools where teacher collegiality was in the bottom quartile, about 25 percent of teachers left their school within the same time period. Thus, as Figure 7 shows, a pronounced lack of collegiality in schools is associated with notably higher turnover rates (whereas schools with average and high collegiality look very similar to one another in terms of turnover).

Somewhat surprisingly, teachers in schools with the highest levels of control over professional responsibilities (i.e., the top quartile) were the most likely to leave their schools (see Figure 7). Although previous research indicates that teachers desire more control over their professional responsibilities, this finding suggests that too much control over professional responsibilities or control over too many professional responsibilities may discourage teachers from staying their schools. Perhaps having a great deal of control corresponds with a lack of involvement or support from administrators.

Together, these findings point to several aspects of the school environment that are associated with lower turnover—and, importantly, that principals can influence. By exerting strong leadership, fostering high levels of order and teacher collegiality, and providing teachers with some, but not too much, control, principals may be able to retain more of their teachers over time.

HOW DO MIDDLE SCHOOL TEACHERS DESCRIBE THEIR WORK ENVIRONMENT AND ITS RELATIONSHIP TO TEACHER TURNOVER?

To further examine how teacher turnover and school work environments influence one another, we relied on two sources of information: 1) data gleaned from our survey of middle school teachers and 2) information collected from case studies of four NYC middle schools—two high-turnover schools, and two low-turnover schools (See Appendices A and B for more information on data and methods used in the case study analysis). The case studies were designed to supplement the previous analysis with a deeper, finer-grained examination of various school environments and to help illuminate specific mechanisms of teacher turnover.

The three most important factors to teachers who are considering leaving their school are: 1) lack of student discipline, 2) lack of support from administrators, and 3) wanting to have more influence over school policies.

Our survey asked teachers who reported that they had considered leaving their school during the 2009-10 school year to rate the importance of 14 different factors in influencing that decision. Teachers' responses revealed that many different factors are important to some teachers, but a few factors are important to most. Figure 8 on the next page displays the percentage of teachers who indicated that a given factor was very important or important, with the factors listed in descending order of reported importance. Three quarters (75 percent) of the survey respondents who were considering leaving their school indicated student discipline problems and/or lack of student motivation as very important or important factors. Two thirds (66 percent) stated that lack of support from administrators was very important or important. And 56 percent said that having more influence over school policies and practices was a very important or important factor in their consideration of leaving their school. As we note in the concluding section, all of these are complex features of a school environment, but they may be appropriate targets for policies designed to improve student behavior and to enhance the capacity of a school's administration to support its teachers.

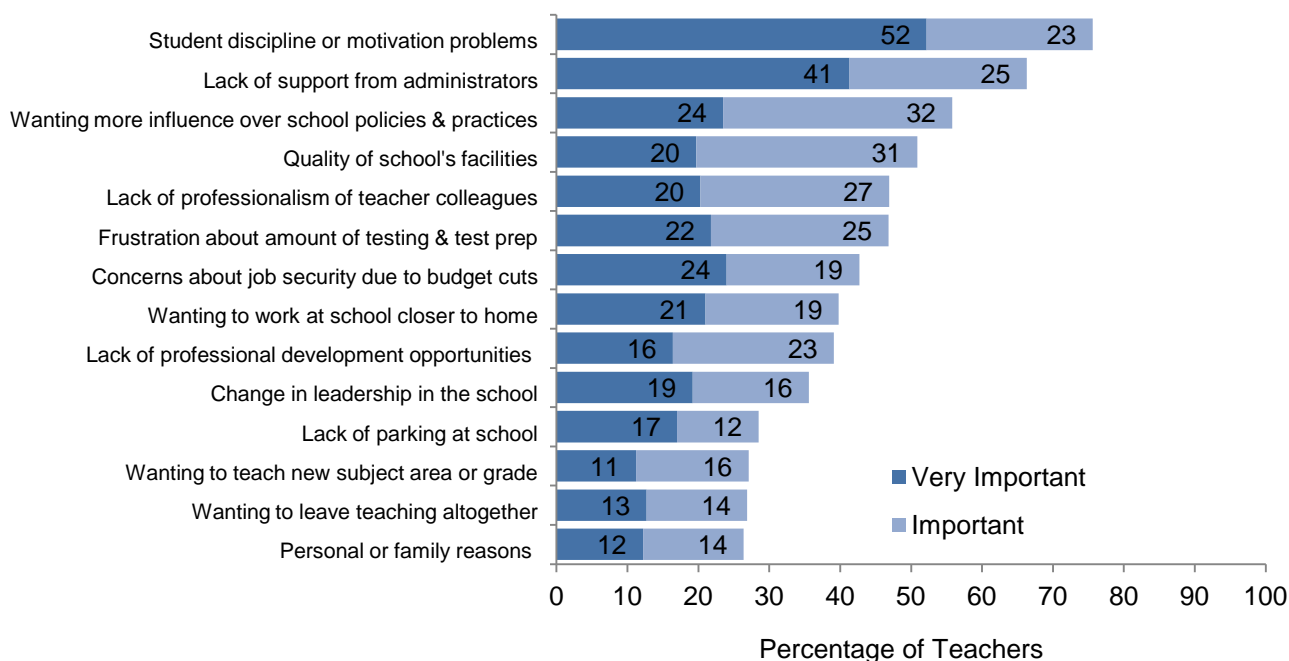
We examined whether the rank ordering of these factors was similar for different kinds of teachers, or whether some factors were more or less important for

particular categories of teachers. Regardless of background or assignment, teachers cited student discipline and administrative support as particularly important in their thinking about leaving their schools. Student discipline problems were especially important to teachers who do not view themselves as effective in the classroom; 92 percent of these teachers rated discipline as very important or important.²⁹

Discipline problems were also ranked highly by teachers in schools in the lowest achievement quartile, and in schools in the lowest quartile of principal leadership. (Not surprisingly, 83 percent of these teachers—i.e., those in schools in the lowest quartile of principal leadership—also rated poor administrative support as a very important or important factor.)

Certain pathways into teaching seemed to influence the importance ascribed to different factors among those considering leaving their school. Controlling for other teacher characteristics, Teach For America teachers and New York City Teaching Fellows were less likely than traditionally certified teachers to rate student discipline

Figure 8: Student Discipline and Lack of Supportive Leadership Are Important for Considering Leaving School



Source: Pallas, A. & C. Buckley. (2012) *Thoughts of Leaving: An Exploration of Why New York City Middle School Teachers Consider Leaving Their Classrooms*. New York: Research Alliance for New York City Schools, Figure 5.

as an important factor in considering leaving their schools. These alternate-route teachers were also less likely to name the quality of school facilities, concerns about job security, parking, or wanting to work closer to home as important factors in their decision, although these issues were not cited by substantial numbers of teachers overall.

The findings from our case studies corroborate and illuminate the findings from the survey analysis. Teachers in our four case study schools identified the very same factors (i.e., student misbehavior, lack of supportive leadership, and limited ability to influence their schools' policies and practices) as being the frustrations that might compel them to leave their schools, though the sites differed in the extent to which each of these issues was problematic and, hence, the extent to which teachers were planning to leave their schools as a result. In addition, the cases demonstrate the inter-relatedness of these aspects of schools and suggest some school and system-wide practices that might affect teacher turnover. We examine these findings in greater depth below.

Principals' leadership influences the school environment and teachers' intention to remain in their schools.

Two of our case sites—which we will call Southern Boulevard and Memorial—illustrate a standard leadership hypothesis: the low-turnover school (Southern Boulevard) had a strong, supportive leader whom the teachers widely respected; the high-turnover school (Memorial) had a principal of limited effectiveness, as described by teachers. The two other schools—we'll call them Roseville and Eastside—present more complicated cases. Despite Eastside's historically high rates of teacher turnover, the school had made a striking turn-around in recent years, an accomplishment that teachers attributed primarily to the former principal, whom they characterized as highly effective. By contrast, Roseville had low teacher turnover, despite having a principal that teachers uniformly rejected. Roseville's teachers attributed their school's low rates of turnover to the strong, supportive relationships that they had cultivated with one another, which we discuss in more depth below.

The Memorial case illustrates how teachers' perceptions of weak leadership can prompt them to leave their school or to strongly consider doing so. At Memorial, teachers felt undermined by, and untrusting of, their principal. An established teacher described how this climate was both the result of and a contributor to

turnover: “Because there’s such a high turnover rate in this particular building, nobody’s comfortable. Everybody’s looking over their shoulder. Some people are apprehensive to talk amongst teachers because they’re afraid you don’t know who’s the spy for administration.” Similarly, in describing factors that influence his decision about whether to remain at Memorial, another established teacher remarked, “At least two of the administrators I find very disheartening for a number of reasons: how they treat people, how they treat students, their inconsistencies, and their big mouths.” He knew he would be happier and more effective in another school, and he contemplated what that would look like when he mused, “Maybe I don’t have to be taking all this abuse.”

Eastside, by contrast, while a “high turnover” site, had undergone a dramatic reduction in teacher turnover just before our study. Teachers credited the former principal with initiating this turn-around by creating an environment where “students wanted to learn and teachers wanted to teach.” This former principal noted that, when he arrived, “the place looked like a dump,” so he set out to beautify the school. He bought couches, plants and wide screen televisions for hallways; he placed curtains in his office and on windows in the main office. Further, he created a voluntary teacher leadership team and an instructional team system, in which groups of teachers work together to manage the instruction of particular students.

It was too soon to tell whether Eastside would continue to make progress and whether these general environmental improvements, and the actions of the current principal, would reduce teacher turnover and strengthen student learning over the long term. However, preliminary evidence was encouraging. In explaining why he intended to remain at Eastside, a relatively new teacher explained, “After seeing the amount of progress—when a group of people and a community comes together—the amount of progress that we can make over the course of four years, I think it’s phenomenal.”

Strong relationships among teachers may also promote stability.

Interestingly, while our interviews and observations provide overwhelming evidence of the central role that the principal plays in influencing teacher turnover, interviews from the Roseville site suggest that collegiality among teachers may also

help sustain—and possibly, retain—teachers, perhaps even in spite of perceived ineffective leadership.

Like teachers at Memorial, teachers at Roseville were critical of their principal. From novices to veterans, *all* of the teachers we interviewed characterized the principal as an ineffective instructional leader. Yet teachers at Roseville described a supportive community of teachers, often using the word “family” to describe their relationships with one another. As one veteran said, “We’re a family and, in some cases, a very close-knit family. We share each other’s aches and pains, or we share joys and sorrows.” Another veteran concurred, adding that teachers had turned to each other for support because administrators were consistently unable to sympathize with the challenges teachers faced. A third experienced teacher corroborated this assertion, reporting that the administration’s ineffective leadership had brought teachers closer together: “We don’t have the support of the administration. Even if I don’t have a great relationship with the teacher across the hall, if there’s a problem, I know I have to help her or she has to help me, because the administration’s really not going to do anything.”

This finding shows how the case studies provide a level of nuance that our other sources of data could not produce. Recall that, for the most part, we found annual rates of school turnover to be a system-wide phenomenon, with very little variation between different types of schools. The case studies allowed us to “get inside” different measures of schools’ work environments, showing, for instance, that while schools with ineffective leaders may also tend to have less collegial school staff (and many other undesirable characteristics), sometimes that is not the case. As seems to have happened at Roseville, one highly functional aspect of a school may actually counterbalance a dysfunctional aspect, helping to sustain teachers in the process.

School climate may influence, and be influenced by, teacher turnover.

Not surprisingly, our findings suggest that a challenging school climate may increase teacher turnover and that a constant churning of teachers may, in turn, make the school climate all the more challenging. Perhaps this is most evident around the issue of school discipline. In both the case study and the survey, student misbehavior emerged as a universal concern for those working in NYC middle schools. Even in Southern Boulevard, the most functional of our four case study sites, some teachers reported that student behavior is an issue that frustrates them. The case study data

further suggest that student misbehavior may both influence, and be influenced by, teacher turnover.

This assertion is best illustrated by the situation at Memorial, where teachers reported that students neither respected nor trusted incoming teachers because there was such a history of turnover at the school. Students' lack of respect for teachers worsened students' behavior, or at least reinforced their poor behavior. This, in turn, likely prompted more new teachers to leave, creating a vicious cycle of high turnover and discipline problems. As one teacher summarized, "The kids see that the stronger teachers leave, and it does something to the overall tone of the building as far as the students' behavior, and that affects the teachers that stay." This same teacher reported that students ask her why their teachers do not remain at Memorial. She explained, "We can't tell them the truth, because the truth is teachers are miserable in this building." One teacher described how turnover contributed to student misbehavior, explaining, "We've lost a lot of quality teachers, and we're forced to bring in newer, not necessarily younger, but less experienced teachers, and it hurts your classroom management. When your classroom management is hurt, your building management is hurt."

Teachers at Memorial also identified other organizational costs of turnover. One teacher lamented, "We have a very large turnover, so faces come and go, and it's very difficult to establish relationships." This teacher expanded on this point, explaining:

Each year we have to, sort of, repeat everything that we said all over again to a new set of teachers that come in. It's like you're always giving PD over and over again. And, it's frustrating, and it's tiring. You just wish that once you put all that effort into a new teacher they would just stay and develop, but then they leave, and you start all over again... I don't have the actual data to show if [the teachers who left] were effective, but we lost teachers who had good classroom management, had rapport with the students, and helped the school environment with activities like dances.

A veteran teacher summed up the organizational costs of turnover when he stated succinctly, "It's hard to turn around a bad school when you constantly have to

improve new staff. It's very difficult." Teachers also described vacancies that remained unfilled all year long and teachers leaving the school mid-year, despite the stigma that this action likely carried with future employers. Both of these realities placed additional burdens on the teachers who remained and may have contributed to subsequent waves of departure or displeasure.

Indeed, three teachers at Roseville—an unusually high number—retired mid-year during our data collection, which left the teachers who remained scrambling and frustrated. With annoyance, one experienced teacher explained the school's approach to handling one of these departures:

So what [happened] was, the administration said: 'Oh, let's get a long-term sub, throw him in there [the first departing teacher's first class] until we get some other sub to put in there and then we can move [the first sub] to go do [the second class]. And we'll get another sub in there [the third class].' So now, those positions are covered by subs. Subs haven't necessarily been equipped to deal with the curriculum.

Other teachers at Roseville described the organizational costs of turnover more generally. Because of their school's unusually high rate of turnover, teachers had been left teaching classes that they felt unprepared to teach well, or that would require an inordinate amount of work. One new teacher spoke about the burden of having to teach larger classes and classes outside of her content area because of turnover: "So now everybody's doing so many things at the same time... everybody is tired... instead of working one day you feel like [you've worked] a day and a half."

This finding from our case study analysis, as well as the findings from our survey analysis (e.g., that teachers teaching a new subject are more likely to consider leaving their school), suggests that teacher turnover may be self-reinforcing—producing circumstances that in fact lead to more turnover.

Not having enough influence over their schools' policies and practices may prompt some middle school teachers to leave their schools.

Previous research has found that teachers' ability to influence certain policies and practices at their schools (such as hiring other teachers, determining the school schedule, setting school discipline policy and designing faculty in-service) are associated with high rates of teacher retention.³⁰ Thus, we noted with interest that 56 percent of our survey respondents who were considering leaving their schools reported wanting to have more influence over school-wide policies and practices. In our case study sites, we set out to explore this issue in greater depth.

Interestingly, we found that, across all four sites, teachers reported having little input into any school-wide decisions of this nature. Further, teachers struggled to answer interview questions that asked them to identify formal leadership responsibilities held by teachers at their school. The most functional school in our sample, Southern Boulevard, provided more leadership opportunities than the other three case sites; however, teachers' contributed primarily to instructional and curricular decisions, which previous research has found to be less related to retention than some of the organizational practices and policies described above.

Nonetheless, teachers at Southern Boulevard reported that their involvement in these aspects of their school environment contributed to their general satisfaction, which, in turn, may have contributed to their inclination to stay in the school. For instance, one teacher explained, "In the meeting, [the principal] will throw it out to us... that we need not sit as a body and have things done to us, but [we can] actually be a part of that voice. Then she enforces that, she tries to pull us in." Teachers reported appreciating their principal's efforts to ensure that teachers had a voice in what happened at the school. However, it is worth noting that, in our analysis of teachers' actual departures, we found that too much control over professional responsibilities was associated with higher rates of turnover compared to moderate amounts of control over one's professional responsibilities. Evidence from the case studies similarly demonstrates that while control over one's professional responsibilities was generally desirable, too much control was not constructive. For instance, Eastside provided teachers with total curricular autonomy, which meant that high turnover could be especially devastating to students, as teachers took their curriculum with them when they left.

SUMMARY AND CONCLUSIONS

A central finding from this study is that turnover in NYC’s public middle schools is consistently high—across teachers, schools and time. Middle school teachers’ lengths of stay are shorter relative to teachers in NYC elementary and high schools. And more than half of NYC middle school teachers leave their schools within three years of having first entered those schools. These high rates of cumulative turnover represent one of the major challenges that NYC middle schools face when attempting to build stable and effective learning communities.

Our finding that teachers in grade 6-8 middle schools have shorter stays in their schools than teachers in elementary or high schools suggests that there may be something distinctively challenging about teaching in NYC middle schools. Additional research is required to identify whether the high rate of middle school teacher turnover is a structural issue (such that these stand-alone schools serving only grades 6 through 8 are prone to higher rates of departure in comparison to schools with other grade configurations), a grade-specific issue (such that teaching grades 6 through 8, regardless of school type, is particularly difficult), or an external issue (such that teacher training programs or licensure routes rarely focus on the middle grades). It will also be necessary to examine whether the difference between middle schools and other schools is unique to NYC or is a phenomenon in evidence in other cities as well. Either way, the relatively elevated rates of cumulative turnover suggest that middle schools in NYC require special attention.

Some turnover, of course, could be advantageous to schools and the district. If teachers who leave their schools move to schools within the district that are a better fit, then principals, students, and the district might benefit in the long run from teachers finding more appropriate placements. However, the findings from our study suggest a more problematic aspect of turnover—that is, a large proportion of middle school teachers who leave their schools leave the NYC system altogether or move to schools that do not serve grades 6 through 8. In other words, the majority of departing middle school teachers either exit the NYC public school system or leave middle-grade classrooms.

This pattern may mean that middle school principals are obliged to hire teachers new to the NYC system or teachers who have not taught grades 6 to 8 to fill in personnel gaps. Hiring inexperienced teachers is not only costly in terms of

supporting their professional development needs; research has also found that new teachers are more likely than others to leave their schools. Thus, the pattern of turnover that we observed may be subjecting middle schools to chronic instability.

Somewhat surprisingly, our study found that few of the teacher characteristics we measured are strong predictors of teachers' cumulative turnover in middle schools. Where teacher characteristics were predictive of turnover, the differences in turnover rates were fairly small across groups. On average, we found no substantial difference in lengths of stay among teachers, based on racial/ethnic background, gender, or subject taught. In keeping with past studies, we found a difference of 11 percentage points between the school departure rates of the least experienced teachers (55 percent leave within three years) and the most experienced teachers (44 percent leave within three years). This finding suggests that new teachers may require additional supports in their transition into the teaching profession. Teachers with higher credentials (a Master's degree or more) also leave their schools at higher rates, perhaps suggesting that additional training for middle school teachers should be coupled with retention efforts. Apart from these insights, our analysis of the DOE's human resource data give little guidance to district and school administrators about which teachers they should target with their retention efforts.

The findings from our survey analysis do shed light on potential areas of focus for future efforts aimed at reducing turnover. The fact that teachers from alternative certification routes (i.e., NYC Teaching Fellows and TFA), teachers with long commutes, and those teaching a new subject or grade are more likely to consider leaving their school may inform decisions about training and placement. For instance, teachers entering via alternative pathways might be targeted with mentoring and professional development opportunities. The commute finding may speak to the need for more affordable housing and/or changes in job placement policies. Further investigation is needed to understand these factors more fully and develop appropriate policy responses.

Addressing teacher turnover in NYC middle schools is further complicated by the fact that high rates of teacher turnover are consistent across different types of middle schools. With few exceptions, the structural characteristics of schools are unrelated or only weakly related to patterns of cumulative turnover. The characteristics of schools that were related to cumulative turnover include school size, concentrations of students underperforming academically, and borough

location (i.e., schools in Manhattan). The findings about the size of the school and the concentration of underperforming students are consistent with previous literature. The study of the Chicago Public School district also found that teachers in small schools were less likely to stay in their schools. This finding was attributed to the heavy resource demands that are often placed on staff in small schools. Similarly, schools with high concentrations of underperforming students are often characterized as having inadequate resources and capacity to deal with student needs. Although a strategy to curb teacher turnover might involve identifying and focusing efforts on these problematic schools, our findings suggest that this strategy would do little to bring down the overall rates of teacher turnover across the system, because high rates of cumulative turnover are so pervasive.

While structural characteristics of schools are admittedly difficult to address—most schools in the district cannot choose which students to serve, for example—our findings suggest the critical importance of more malleable institutional practices at the school level. Teachers report that their decisions to remain in or leave their schools are influenced by their perceptions of the working conditions at the school. Student behavior, school leadership, professional control, and relationships among teachers are all cited as informing employment decisions. These findings are consistent with the Chicago study on teacher turnover and the more extensive work coming out of the Consortium on Chicago School Research that has highlighted the relationship between school climate and school improvement. Although our study cannot pinpoint the direction of this relationship (i.e., school climate affects teacher turnover, but teacher turnover also likely affects school climate), our findings support the broader literature that points to strong and inclusive leadership, supportive and collaborative rapport among teachers, and safe and orderly student environments as factors that contribute to a positive climate and overall school improvement. Thus, strategic initiatives that focus on these aspects of schools could potentially have a meaningful impact on reducing teacher turnover in middle schools, in addition to other potential benefits.

While the overall high rates of cumulative turnover in NYC middle schools are disconcerting, it is worth noting that the annual rates of teacher turnover in NYC have been in decline since 2003. This decline may be related to changes both in working conditions and in the larger economy. The observed declines present a foundation upon which more stable and effective learning environments may be developed.

Although most experts agree that some level of teacher turnover is constructive, part of that assumption rests on knowing both who is leaving the school and who is coming in to fill job openings. It is beyond the scope of this study to examine the qualities of the NYC middle school teachers who leave their schools and of those who replace them. However, a recent study examining turnover in NYC public school teachers (grades 4-8) found that first-year teachers who are less effective at improving student test scores had overall higher turnover rates, especially those who worked in low-performing schools.³¹ Moreover, the authors found that relatively less effective teachers were more likely to leave the school system altogether, whereas relatively more effective teachers were more likely to move within the NYC school system. While this seems like fairly good news for the district, it is worth noting that the authors also found that when relatively more effective teachers left their schools they were much more likely to leave a low-performing school than a high-performing one. Thus, it appears that less effective teachers are shuffling among low-performing schools, while more effective teachers are moving from low- to high-performing schools. This shuffling of low-performing teachers among low-performing schools may inhibit the schools' capacities to build coherent long-term instructional plans and enduring and collaborative relationships that help serve high-need student populations. This has major implications for equity of access to high-quality education across the district.

This study of teacher turnover in middle schools is particularly timely given NYCDOE's recent reform efforts focused on the middle grades. The findings suggest that, absent powerful intervention, efforts to create and maintain strong middle schools in NYC may be hampered by high rates of teacher turnover. Schools with high turnover rates face considerable instructional and organizational costs associated with losing and replacing staff. Furthermore, the findings from this study also suggest that efforts that focus simply on supply-side solutions, such as recruiting and supporting new teachers, may be insufficient given the "leaky bucket" of turnover. Thus, it appears that addressing middle school personnel issues will require a separate policy initiative designed to reduce turnover of effective teachers, which would supplement the existing efforts to increase the supply and better prepare teachers. Although our research suggests that increasing teachers' lengths of stay in their schools is not simple or easily achievable, it is difficult to believe that stable and effective middle schools will be widely prevalent in the district without directly addressing this issue. Research shows that the transition from middle school

to high school is distinctively challenging for students to manage, especially for students in urban areas. Creating and maintaining strong middle schools—with stable teaching staffs—is essential to helping students navigate that critical transition and to supporting wider efforts to improve long-term outcomes in the NYC system.

Notes

- ¹ Johnson, Berg, and Donaldson, 2005.
- ² Allensworth, Ponisciak, and Mazzeo, 2009.
- ³ Johnson, Berg, and Donaldson, 2005; Milanowski and Odden, 2007; National Commission on Teaching and America's Future [NCTAF], 2007.
- ⁴ Neild, Useem, Travers, and Lesnick, 2003.
- ⁵ Hanushek, Kain, and Rivkin, 2004; Kane, Rockoff, and Staiger, 2006; Murnane and Phillips, 1981; Rockoff, 2004.
- ⁶ e.g., Boyd, Lankford, Loeb, and Wyckoff, 2005; Goldhaber, Gross, and Player, 2009; Hanushek, Kain, and Rivkin, 2004.
- ⁷ Guin, 2004; Lankford, Loeb, and Wyckoff, 2002.
- ⁸ NCTAF, 2007.
- ⁹ Neild, Useem, and Farley, 2005.
- ¹⁰ Donaldson and Johnson, 2010; Ingersoll, 2003b; Neild, Farley-Ripple, and Byrnes, 2009; Young, 2002.
- ¹¹ Eccles, Midgley, and Adler, 1984; National Middle School Association, 1995.
- ¹² Balfanz, 2009; Balfanz, Herzog, and Mac Iver, 2007; Murdock, Anderman, and Hodge, 2000; Neild and Balfanz, 2006; Roderick, 1994.
- ¹³ New York City Council, 2007.
- ¹⁴ Wolcott, 2011.
- ¹⁵ Marinell, 2011.
- ¹⁶ Pallas and Buckley, 2012.
- ¹⁷ Readers should note that this does not mean that 27 percent of an entire school's staff left after one year in that school. Rather, it means that among teachers who entered their schools over the past decade, 27 percent left within one year of having entered.
- ¹⁸ Readers may be curious about the extent to which our findings are influenced by teachers' decision to retire. We cannot answer this question with complete certainty, though we do not believe that teachers' retirement had a profound effect on our findings. At the time we performed this analysis, we did not have the necessary information on reasons for leaving that would allow us to isolate retiring teachers, nor to distinguish between teachers who were departing on voluntary versus involuntary terms. However, because this analysis entails examining how long teachers remain in their schools *after having first entered a school*, we do not believe that our results are greatly influenced by teachers' retirement. As our own findings reveal, as teachers near retirement, they become less and less likely to change schools; hence, we suspect that very few of the teachers in our analytic sample were on the verge of retirement when they first entered their schools.
- ¹⁹ Seidman, Aber, and French, 2004; Eccles, Midgley, and Adler, 1984; National Middle School Association, 1995.
- ²⁰ Ronfeldt, Loeb, and Wyckoff, 2012.
- ²¹ Marinell, 2011.
- ²² Newton, Rivero, Fuller, and Dauter, 2011.
- ²³ Ladd, 2011.
- ²⁴ The metrics that researchers use to determine whether a given phenomenon—in this case, teacher turnover—is widespread or localized can be somewhat inaccessible to the lay reader, thus we do not discuss them at length in this report. However, readers with technical training may be interested to learn that approximately 5 percent of the variation in cumulative teacher turnover was across schools. In other words, the vast majority of variation in cumulative turnover is within, not across schools.
- ²⁵ We chose to report the percentage of survey respondents teaching a new subject or a new grade only for teachers who had been teaching for one year or more. Pallas and Buckley (2012), by contrast, report the percentage of respondents teaching new subjects/grades for all of the survey respondents, including those in their first year of teaching. We think both decisions are defensible, for different reasons. Our different approaches do not have major implications for the analysis, as the number

of new teachers in new subjects or grades is quite small.

²⁶ Pallas and Buckley, 2012.

²⁷ In the full report, Marinell (2011), our analyses of the relationship between turnover and the characteristics of teachers and schools controlled for four factors that we hypothesized might affect turnover: 1) the school year during which teachers first entered their NYC middle school; 2) whether a school experienced one or several episodes of principal turnover during the period of observation; 3) a time-varying measure of the annual change in a school's student enrollment; and 4) the school's NYC borough location. We refer

to these variables as our *baseline covariates*. Our methodology controls for their effects in order to examine the relationships between turnover and the relevant teacher and school characteristics in our datasets.

²⁸ See Boyd, Grossman, Ing, Lankford, Loeb, and Wyckoff, 2011; Grissom, 2011; Johnson, Kraft, and Papay. 2011. Ladd, 2011.

²⁹ Pallas and Buckley, 2012.

³⁰ Ingersoll, 2003a.

³¹ Boyd, Lankford, Loeb, and Wyckoff, 2009.

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The **Research Alliance** for
New York City Schools

Who Stays and Who Leaves?

Findings from a Three-Part Study of Teacher Turnover in NYC Middle Schools

Technical Appendices

William H. Marinell

Vanessa M. Coca

With the Middle School Teacher Turnover Project

Richard Arum

Jennifer Goldstein

James Kemple

Aaron Pallas

Travis Bristol

Clare Buckley

Amy Scallon

Barbara Tanner

March 2013

APPENDIX A: DESCRIPTION OF DATA SOURCES AND SAMPLES

Cumulative Turnover

For the longitudinal analyses, we chose to examine turnover in grade 6-8 middle schools—the most common type of middle grades school. For the purposes of this study, we selected schools that existed in 2009, served students in the traditional middle grades (6, 7 and 8), *did not* serve students in any other grades in that same year, and had opened and begun enrolling students by the 2005-06 school year.ⁱ

Between 2001 and 2010, 24,598 full-time teachersⁱⁱ were employed in at least one traditional grade 6-8 NYC middle school for at least one school year. Of these, 15,628 entered their schools between 2002 and 2009. We conducted analyses of turnover using both the larger, inclusive set of teachers and the smaller sample of teachers who were new to their schools between 2002 and 2009; we refer to this latter group as “new-to-school teachers.” New-to-school teachers constituted roughly 65 percent of all the teachers who were employed in traditional grade 6-8 middle schools between 2001 and 2010.ⁱⁱⁱ The bulk of the longitudinal analysis focused on the rates of turnover among the 15,628 new-to-school teachers, as we could only generate accurate estimates of how long middle school teachers remained in their schools if we knew when they began teaching in their schools. Since our dataset does not contain information that would allow us to identify how long teachers had been in their schools at the outset of the period of observation (2000-01), we had to focus our analysis on the subset of new-to-school teachers. *Please note, the cumulative turnover statistics in this report refer to those among new-to-school teachers.* For ease of reporting, we sometimes refer to these teachers simply as “middle school teachers,” rather than as “new-to-school teachers,” the latter of which is more accurate, but also more cumbersome.

Annual Turnover

When examining the annual rates of turnover (as seen in Figure 3 and shown in Table A1 below), we included all teachers who worked in the spring semester of each academic year. Teachers were then categorized by the school in which they were assigned. Unlike the samples from other components of this study, the middle school teachers included in this analysis were not limited to teachers who taught in schools with grade 6-8 configurations.

For the analysis in which we examined the percentage of teachers who were not in their schools from one year to the next (and one year to one-and-a-half years later), we used the population of teachers who worked in the spring of 2010 at the grade 6-8 schools we sampled for our survey, as reported by NYC DOE’s human resources database. We only kept teachers who had full information available in the HR data (i.e., age, race/ethnicity, number of years taught in the system, highest degree attained, and salary) and who were in schools where at least one teacher from the school had responded to our survey questions about school environment. Our analytic sample for this analysis included 5,765 teachers in 121 grade 6-8 middle schools. Our sample of teachers accounts for 54 percent of all teachers in middle schools that serve grades 6 through 8, representing 52 percent of all middle schools that serve grades 6 through 8.

The Survey

The survey analysis is based on a survey administered to teachers in May and June of 2010. In the spring of 2010, researchers contacted the principal at each of the 196 middle schools in New York City serving only grades 6 through 8. Of the 196 principals, 125 agreed to allow researchers to survey full-time teachers in their schools, a school-level response rate of 64 percent. In the vast majority of instances, teachers completed the paper-and-pencil survey in a group setting on a day in which students were not in the building, with a member of the research team distributing and collecting the surveys. In 116 schools, at least 10 teachers completed the survey. The total number of full-time New York City middle school teachers who responded to the survey is 4,214, representing 42 percent of the

estimated population of teachers in New York City's true middle schools at the time of the survey. Within schools that allowed us to administer surveys to teachers in a group administration, we surveyed 79 percent of the full-time teachers.

Case Study

From the population of 125 middle schools that completed surveys, we selected four high-need^{iv} case sites that had experienced different degrees of attrition^v over 10 years, in order to facilitate comparative case studies.^{vi} Specifically, we identified two high-turnover sites and two low-turnover sites, with one of each in Brooklyn and one of each in the Bronx.^{vii} We contacted the principals of our first-choice schools directly to seek their participation, and all agreed to join the study.

The case studies for each of the four schools were created using information coming from interviews with school faculty and staff as well as documented observations. Table A2 on the next page summarizes our data sources across the four case study sites (see Appendix B for more information about the qualitative methods).

Table A1
Number of Teachers Represented in Figure 3

	Elementary	Middle	High
2000	37,358	14,249	15,137
2001	38,513	14,788	14,850
2002	38,286	15,016	15,126
2003	38,374	15,335	15,530
2004	37,498	15,064	16,371
2005	36,654	15,037	17,018
2006	36,810	15,142	17,174
2007	37,161	15,359	17,314
2008	38,022	15,493	17,308
2009	37,894	15,308	17,058
2010	36,853	14,734	16,309
Total	413,423	165,525	179,195

Table A2
Data Sources for Case Study

	Southern Blvd	Roseville	Eastside	Memorial	Total
Beginning teachers (1-5 years)	2	2	3	3	10
Established teachers (6-10 years)	3	6	3	5	17
Veteran teachers (>10 years)	5	4	7	4	20
Teacher leaders	2	5	8	1	16
Administrators	2	2	2	2	8
English Language Arts teachers	4	4	2	0	10
Math teachers	1	7	2	2	12
Special education/ collaborative team teachers	2	3	6	4	15
Teachers of other subjects	3	5	9	5	22
Total interviewees	12	16	16	14	58
Total interviews	21	25	26	21	93
Documented observations	7	7	7	11	32

APPENDIX B: METHODS

Cumulative Turnover

To address our research questions on teacher mobility longitudinally (as shown in Figures 1, 2, 4, 6a and 6b), we used a discrete time survival analysis methodology (DTSA). DTSA is a specialized type of event-history logistic regression analysis designed to address research questions that ask whether and when events occur.^{viii} For this component of the study, we were interested in determining the extent to which middle school teachers leave their schools and, if so, how long they remain in their schools before leaving. Among the features that make DTSA superior for this type of analysis is its ability to account for the right-hand censoring of data that occurs as, in this case, teachers approached the end of the period of observation in 2010 where we have less information about whether or not these teachers stay in their school in the future. Alternative methodologies either exclude censored cases or impute estimates of when censored cases experience the “events” in question.^{ix}

The dichotomous outcome of our logistic regression model was called *MOVE*, though it refers both to teachers’ decision to move between schools and to exit schools. Further, because we were ultimately interested in investigating the extent to which turnover is disruptive to schools, we employed an expansive definition of turnover, identifying a teacher as having “moved” if she either: a) left her school (due to move or exit); or b) assumed a role other than as a full-time teacher (e.g., a principal or librarian), regardless of whether she remained in her school. Our rationale for considering role-changers as having “turned over” is that this transition ultimately leaves building administrators facing the same scenario: needing to fill a vacant teaching position.^x Thus, we coded *MOVE* “1” if teachers experienced the event of moving, exiting, or changing roles, and “0” otherwise. To examine the relationship between turnover and the characteristics of teachers, we sequentially added and removed each teacher-level predictor and its two-way interaction with the continuous specification of time to the baseline control model.

To examine the extent to which school characteristics predict the probability of teacher turnover, we embarked on a similar model building process that entailed adding and removing each school-level predictor to the full teacher model and examined the nature of the relationship between turnover and each of the school characteristics. In addition, we examined the nature and strength of these relationships in a full school-level model (see Marinell, 2011 for more information), which contained all of the school-level variables, as well as all of the previously described covariates and the teacher-level main effects and their interactions with the continuous specification of time.

Annual Turnover

To address our research question about the extent to which school characteristics are associated with the probability that a teacher leaves within one-and-a-half years (as seen in Figure 7), we used a multilevel logistic mixed model in which teachers were nested in their middle schools (see tables below for the output from these models). Our dependent variable was a dichotomous variable such that teachers who left their schools within one-and-a-half years were given a value of “1” and those who stayed were given a value of “0.”

In our two-level model, we included a number of control variables at the teacher level: gender, race/ethnicity (White, Black, Hispanic, other), years of experience as of June 2010 (less than 1 year, 1 to 6 years, 6 to 10 years, 10 or more years), highest degree attained (Bachelor’s degree, Master’s degree and/or the credit equivalent, Master’s degree and 30 additional credit hours, degree credential other than those identified), age (30 years old or younger, 31 to 54 years old, 55 or older), and a dummy for whether the teacher was licensed to teach math or science.

At the school level, we controlled for the school’s location (Bronx, Brooklyn, Manhattan, Queens, Staten Island); size; percentage of students scoring at or above the proficiency standard on the NY State standardized mathematics assessment, among all of the grades tested in a middle school; whether the school has a high percentage of White students (16 percent or more of a school’s student population is White); peer index measure, which is a measure developed by the NYC DOE indicating how well a school’s students score on the NY State standardized test relative to schools that serve similar student populations—the index ranges from 1-4 (lower values indicating lower performing schools that serve higher-need student populations); weighted environment score according to the NYC

DOE's 2008 *School Survey*; percentage of students in the school that are eligible for free or reduced-priced lunch; and average attendance rate for all students in the school.

The teacher- and school-level intercepts were allowed to vary while teacher- and school-level predictors were fixed at their respective levels.

The Survey

The bulk of this analysis was based on teachers' responses to a series of questions about their future plans (as seen in Figure 5).^{xi} More specifically, the majority of the survey analyses used teacher responses to the question about whether they had considered leaving their school during the current school year as the outcome variable. Teachers could respond 'yes' or 'no.' Because this variable is dichotomous, we use multinomial logistic regressions with teacher-level and school-level predictors and standard errors that take the clustering of teachers within schools into account. For ease of interpretation, we created adjusted percentages based on the predicted values from these models.

Unlike the objective measures of school demographics discussed in the previous section, the measures in this section reflect a teachers subjective experiences in a given school. We developed measures of the school as a workplace that reflect the aggregate views of all responding teachers in the school. These measures are thus school-level measures, rather than the perceptions of an individual teacher. Different teachers within a school may have differing perceptions and experiences, but those are best interpreted as attributes of the teacher, rather than as attributes of the school, which is the focus of the survey analysis.

For more information on methods used in this study, see the full report.^{xii}

Case Study

Case study methodology is particularly fitting to address questions of *how* and *why*, piecing together relationships between variables over time. The primary window of data collection occurred during the fall of 2010 through the spring of 2011. We conducted two waves of semi-structured interviews, one in the fall of 2010 and a second in the spring of 2011, with 93 interviews total (see Appendix A for more details on who we interviewed). Prior to beginning our data collection, we also piloted a draft interview protocol in the spring of 2010 with a few teachers in two of the sites (Southern Boulevard and Eastside), making adjustments based on those results.

For our fall interview protocols (teacher and administrator), we drew on prior literature on teacher retention.^{xiii} For our spring protocols, we drew on our preliminary analysis of the fall interviews—determining themes where we wanted to probe more deeply—as well as added themes that had not been addressed in the fall. We were also able to draw on our preliminary analysis of the survey research in the case schools for the spring protocol.

While researchers obviously observed the case sites informally all year long, gaining impressions and insights, we conducted 32 formal documented observations in the spring. Researchers followed an observation protocol in order to facilitate cross-site comparisons.

The qualitative data collection process and analysis of qualitative data informed one another in an ongoing way through a variety of tools. Researchers engaged in analytic memoing following site visits to summarize field notes and capture insights and held regular team meetings to discuss technical and analytical aspects of the work.

We developed a coding schema, relying heavily on our protocols-in-use and then our own progressive refinements, rather than data management software. We then created coding rules for the schema where needed, prior to coding the data.

We attempted to establish the reliability of the coding schema across the two field researchers and the project director. When this did not occur, we changed course and one of the field researchers who was tightly correlated to the project director coded all of the data. At this point all coded documents were entered into the software NVivo for qualitative data management purposes. The database was then queried to test the researchers' hypotheses and establish preliminary findings for the purpose of this report.

Table B1
Results from Annual Turnover Analyses
(Predicted Probability of Leaving One's School Within 18 Months)

	Principal leadership			Professional control			School disorder			Teacher collegiality		
	Coef.	SE	P-value	Coef.	SE	P-value	Coef.	SE	P-value	Coef.	SE	P-value
Intercept	-1.375	2.721	0.614	-2.011	2.673	0.454	-2.117	2.681	0.431	-1.039	2.713	0.702
Teacher Characteristics												
Male	0.098	0.072	0.169	0.102	0.072	0.153	0.098	0.072	0.170	0.101	0.072	0.157
Black	-0.396	0.108	0.000	-0.386	0.108	0.000	-0.394	0.108	0.000	-0.397	0.108	0.000
Hispanic	-0.329	0.090	0.000	-0.318	0.090	0.000	-0.335	0.090	0.000	-0.333	0.090	0.000
Other race/ethnicity	0.031	0.147	0.834	0.033	0.147	0.824	0.031	0.147	0.830	0.035	0.147	0.813
Experience as of June 2010												
Less than one year	0.478	0.124	0.000	0.489	0.124	<.0001	0.477	0.124	0.000	0.477	0.124	0.000
Six to ten years	-0.348	0.097	0.000	-0.349	0.097	0.000	-0.348	0.097	0.000	-0.359	0.097	0.000
Ten or more years	-0.400	0.101	<.0001	-0.391	0.101	0.000	-0.397	0.101	<.0001	-0.405	0.101	<.0001
Highest Degree Attained												
Bachelor's degree	0.318	0.110	0.004	0.319	0.110	0.004	0.318	0.109	0.004	0.328	0.110	0.003
Master's degree and/or the credit equivalent	-0.206	0.079	0.009	-0.210	0.079	0.008	-0.211	0.079	0.007	-0.205	0.079	0.010
Other degree credential	1.353	0.673	0.044	1.368	0.672	0.042	1.373	0.673	0.041	1.366	0.676	0.043
Age												
30 years old or younger	0.544	0.090	<.0001	0.545	0.090	<.0001	0.546	0.090	<.0001	0.552	0.090	<.0001
55 or older	0.798	0.091	<.0001	0.793	0.091	<.0001	0.792	0.091	<.0001	0.799	0.091	<.0001
Has math or science licensure	0.058	0.083	0.485	0.059	0.083	0.474	0.057	0.083	0.491	0.057	0.083	0.490

Table B1 Continued
Results from Annual Turnover Analyses
(Predicted Probability of Leaving One's School within 18 Months)

	Principal leadership			Professional control			School disorder			Teacher collegiality		
	Coef.	SE	P-value	Coef.	SE	P-value	Coef.	SE	P-value	Coef.	SE	P-value
Intercept	-1.375	2.721	0.614	-2.011	2.673	0.454	-2.117	2.681	0.431	-1.039	2.713	0.702
Borough												
Bronx	0.078	0.115	0.499	0.023	0.117	0.846	0.092	0.111	0.410	0.064	0.113	0.574
Queens	-0.157	0.127	0.220	-0.145	0.126	0.253	-0.149	0.125	0.238	-0.116	0.125	0.359
Manhattan	0.290	0.142	0.043	0.253	0.143	0.080	0.267	0.141	0.060	0.310	0.139	0.028
Staten Island	-0.134	0.207	0.521	-0.193	0.206	0.350	-0.190	0.210	0.367	-0.093	0.206	0.653
School Characteristics												
Size	-0.001	0.000	<.0001	-0.001	0.000	<.0001	-0.001	0.000	<.0001	-0.001	0.000	<.0001
NYDOE Peer Index Measure	-0.385	0.251	0.128	-0.534	0.246	0.032	-0.388	0.251	0.124	-0.477	0.251	0.059
NYDOE Environment Score	-0.076	0.030	0.014	-0.132	0.030	<.0001	-0.084	0.029	0.004	-0.077	0.031	0.015
Student Characteristics												
Students who qualify for free or reduced price lunch (%)	0.001	0.004	0.820	0.000	0.004	0.921	0.001	0.004	0.874	0.001	0.004	0.858
Average attendance	0.024	0.034	0.480	0.045	0.032	0.170	0.036	0.032	0.261	0.023	0.034	0.493
High percentage of white students	-0.049	0.151	0.746	-0.085	0.149	0.570	-0.028	0.149	0.853	-0.125	0.154	0.417
Workplace Measure												
Quartile_1 (lowest)	0.290	0.143	0.045	-0.310	0.169	0.070	-0.331	0.185	0.077	0.270	0.151	0.076
Quartile_2	0.139	0.126	0.270	-0.312	0.168	0.066	-0.151	0.133	0.258	-0.038	0.132	0.771
Quartile_3	0.069	0.125	0.581	-0.395	0.141	0.006	-0.225	0.119	0.062	0.023	0.129	0.861

APPENDIX C: WHO ARE MIDDLE SCHOOL TEACHERS IN NYC?

Describing teacher characteristics in any one year or across several years can obscure changes that occur over a larger period of time. Below, we briefly describe some key characteristics of the population of NYC middle school teachers and identify some of the notable differences across two cohorts—to illuminate broad changes that occurred during the years covered by this study.

As shown in Table C1 below, on average, 2009 middle school teachers were, on average, about 40 years old and had taught in NYC schools for approximately 9 years. Specifically, 33 percent of middle school teachers had more than nine years of experience in NYC schools. Yet middle schools also had a high percentage of inexperienced teachers: 21 percent of middle school teachers had been in NYC schools for three years or less. Not surprisingly, given their average age and years of experience, less than half (40 percent) of middle school teachers had the highest level of credentials recognized in the NYC salary step schedule.

Compared to the middle school teachers in 2009, those in 2001 were slightly older (42, as compared with 40) and more likely to be veterans (41 percent had more than nine years of experience teaching in NYC schools, compared with just 33 percent in 2009). A smaller percentage of middle school teachers were women in 2001 than in 2009 (62 and 69 percent, respectively), while a greater percentage were Black (26 percent, as compared with 23 in 2009).

These changes, especially those related to age and experience, are important to keep in mind when interpreting findings regarding middle school teachers' length of stay in schools, which, as described in the report, differ as a function of teachers' levels of experience.^{xiv}

**Table C1
Background Characteristics of Middle School Teachers
(2001 and 2009 Cohorts)**

Characteristic	2001 Middle School Teachers (N=10,909)	2009 Middle School Teachers (N=11,591)
Average age	42	40
Female	62%	69%
Race/ethnicity		
White	59%	58%
Black	26%	23%
Hispanic	12%	13%
Other	3%	6%
Years of teaching experience		
Average years of experience in NYC schools	10	9
Three years of NYC experience or less	30%	21%
More than nine years of NYC experience	41%	33%
Degree level		
Bachelor's degree	31%	19%
Master's degree and/or the credit equivalent	30%	41%
MA and additional credits	38%	40%

Appendix Notes

ⁱ There were additional criteria we considered in selecting the schools in our study sample. We only included schools that had not closed and re-opened at any point over the ten-year period of observation. Some of the schools in the sample served students in one or two of the middle school grades (e.g., only grade 6, grades 6 and 7, only grade 7) in prior years but served students in all three grades by 2009. Schools that added middle grades over time were included in the sample so long as they enrolled students in all three grades (and in no other grades) by 2009. We excluded schools that dropped one or more of the middle grades over the period of observation. In other words, if a school had served students in grades 6-8 from 2003-05 and then dropped grade 6 from 2006-08, the school *was excluded* from the sample regardless of whether it had returned to enrolling students in grades 6, 7, and 8 by 2009.

ⁱⁱ This includes general education, special education, and English as a Second Language teachers.

ⁱⁱⁱ Some middle school teachers, including those who were new to their schools between 2001 and 2010, appeared multiple times in our analysis because they transferred between traditional grade 6-8 middle schools. Thus, while we conduct our analysis of turnover with 15,628 unique new-to-school teachers, the total number of new-to-school teachers over the period of observation is actually 18,019 or 65 percent of the total number of all middle school teachers during the time period (27,636). Please see the technical documentation from the *The Middle School Teacher Turnover Project: A Descriptive Analysis of Teacher Turnover in New York City's Middle Schools* report (available on the Research Alliance website: <https://files.nyu.edu/RANYCS/public/media/2011001.pdf>) for additional descriptive information about the teachers in the study.

^{iv} Given the high correlation among existing measures of need (the percentage of students coming from poverty backgrounds, the amount of per pupil expenditures coming from federal Title I support, the percentage of students in a school scoring at or above the proficiency level on standardized state test scores, schools' DOE peer index value), we chose the DOE's peer index value for its ease of interpretation and because we had values on the measure across all middle schools in a recent year (2008). We considered any NYC middle school with a peer index value in the

bottom 25th percentile of the distribution to be a high-need school or a school that served high-need students.

^v Using the DOE's human resources datasets, we identified the observed rates of teacher turnover among new-to-school teachers in all of the high-need middle schools. From these observed values, we generated turnover statistics indicating the percentage of teachers who left within one, two, and three years after having first begun teaching in sample schools.

^{vi} Johnson, Berg, and Donaldson, 2005.

^{vii} After examining a variety of school-level characteristics (the previously described turnover statistics, the year the schools began enrolling students, the schools' borough location, peer index value, percent of students scoring at or above the proficiency on the state's English Language Arts and math exams, the number of students enrolled in a school, the percentage of those students from poverty backgrounds, the percentage of students from African American and Hispanic racial/ethnic backgrounds, the number of teachers, the percentage change in the number of regular education teachers between 2008 and 2009, the number of principals the school had between 2005-09, and when the school had a new principal), we attempted to find schools that were located in different NYC boroughs, and which had not experienced substantial principal turnover between 2005-09 and chose two high- and two low-teacher-turnover schools for the case study analysis.

^{viii} Singer and Willette, 1992; Singer and Willette, 2003;

^{ix} Singer and Willette, 1992.

^x Another scenario is that teachers who change roles do so because their assignment is made redundant due to declining enrollment in a school. We do not have an ideal way for dealing with this possibility, though we attempt to control for it in our statistical models by incorporating a time-varying change in enrollment variable as a baseline covariate in all of our models.

^{xi} Similar methods have been used in these studies: Buckley, J., M. Schneider, and Y. Shang. (2005). "Fix It and They Might Stay: School Facility Quality and Teacher Retention in Washington, DC." *Teachers College Record* 107(5), 1107-1123. Ladd, Helen F. (2011) "Teachers' Perceptions of Their Working Conditions: How Predictive of Planned and Actual Teacher Movement?" *Educational Evaluation and Policy Analysis*, 33(2), 235-261.

^{xii} Pallas and Buckley, 2012

^{xiii} Johnson, Berg, and Donaldson, 2005.

^{xiv} Because middle school teachers were fairly senior in terms of age and experience in 2001, it is possible that our estimates of turnover capture, in part, teachers' expected exit from schools at the end of their career. However, our methodology and sample selection should negate substantial bias in this regard. By focusing our analysis on a sample of new-to-school teachers, we necessarily identified greater percentages of starting and second-stage teachers and a smaller percentage of more experienced veterans. Veteran teachers are included in the sample if they were new to a sample school during the period of observation.

The **Research Alliance** for
New York City Schools

285 Mercer Street, 3rd Floor | New York, New York 10003-9502
212 992 7697 | 212 995 4910 fax
research.alliance@nyu.edu | www.steinhardt.nyu.edu/research_alliance

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