INSTABILITY IN CHILD CARE SETTINGS: INSIGHTS FROM THREE STATE CONTEXTS

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APPROVAL OF THE DISSERTATION

This dissertation, ("Instability in Child Care Settings: Insights from Three State Contexts"), has been approved by the Graduate Faculty of the School of Education and Human Development in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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DEDICATION

This dissertation is for my parents, my brother, my grandparents, and the mentors in my life who believed in me and pushed me to be my very best.
Thank you for your unwavering support.

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DISSERTATION OVERVIEW

A vast body of evidence demonstrates the importance of stability for child development and family functioning (Gassman-Pines et al., 2015; Sandstrom & Huerta, 2013; Yoshikawa et al., 2013). In the early care and education (ECE) context, stability offers children consistency in their educational experiences and in the interactions with their teachers (Markowitz et al., 2017; Mashburn et al., 2008; Yoshikawa et al., 2013), and it provides families with reliable child care that allows them to support their household and pursue education and employment opportunities (Forry et al., 2013; Sandstrom & Chaudry, 2012; Speirs et al., 2015). Put simply, a stable and well-supported ECE system helps young children and their families thrive.

In the United States, the majority of children ages 0-5 receive these ECE experiences through independently operated child care businesses (NSECE Project Team, 2013; Office of Child Care, n.d.). Unfortunately, the child care sector is characterized as a struggling and volatile industry, where many programs face difficulties keeping their teachers and even just staying open (Gould, 2015; Haynie, 2019; Mongeau, 2020; National Center on Early Childhood Quality Assurance, 2019; Petersen, 2021; Walton, 2017). The arrival of the coronavirus pandemic in 2020 exposed the fragility of the child care system (Mongeau, 2020), yet these issues have long pervaded child care businesses

and stinted their ability to function effectively (Institute of Medicine & National Research Council, 2015; Whitebook et al., 2014).

There are many hypothesized drivers and consequences of this instability. The high operational costs and low profit margins child care programs face may be one reason (Gould, 2015; Mongeau, 2020; Walton, 2017). Another related contributor is the challenging work conditions early educators face, including low wages and limited benefits, limited training and on-the-job resources, and a high prevalence of depressive symptoms and other mental health concerns (Bassok et al., 2019; IOM & NRC, 2015; Phillips et al., 2019; Roberts et al., 2019). These patterns are nonetheless problematic, as policy efforts to improve quality in child care settings will likely be undermined when there are high levels of churn among the programs and teachers that are primarily responsible for teaching and caring for young children. It is especially concerning that, within the ECE system, this instability is more salient among child care businesses (Bassok, Markowitz, et al., 2021; Phillips et al., 2019; Whitebook, McLean, Austin, et al., 2018), given that they are the primary provider of subsidized child care and care for younger-aged children (Office of Child Care, n.d.), who may especially benefit from stable ECE environments.

Encouragingly, in the months following the pandemic, there has been increasing interest toward addressing the systemic conditions facing child care providers. Notably, the American Rescue Plan and American Families Plan, both introduced under the Biden Administration in spring 2021, called for unprecedented levels of public investment toward child care (Bipartisan Policy Center, 2021). At the very least, these funds are likely to help providers return to pre-pandemic operations, and to the extent these

initiatives continue to build momentum, show promise for policymakers' ability to building a thriving and better-supported child care system over the long run.

Still, addressing the instability that characterizes child care settings will require a fuller understanding of the prevalence and correlates of instability in child care settings. Unfortunately, these efforts require data that have, for the most part, been unavailable. Unlike in K-12 settings where for decades stakeholders have invested in longitudinal data systems that track schools, their enrollments, and their teachers, there are no such data systems for child care (Whitebook, McLean, & Austin, 2018). This is especially true at the teacher level, where there are no datasets that track individual child care teachers' employment in licensed centers for even a single point in time, let alone longitudinally. This has substantially limited researchers' ability to study the instability pervasive in child care settings. Lack of data that track child care closures and teacher turnover, longitudinally or even at a single point of time, means that until recently, researchers' and policymakers' understanding of the instability facing child care programs has leaned heavily on journalistic accounts, outdated information, or small, primary data collection from researchers.

This dissertation leverages novel data from three states to document the scope and nature of the instability experienced by child care programs. The first paper focuses on child care closures using data from North Carolina, and the second and third papers examine teacher turnover in publicly-funded child care centers using data from Louisiana and Virginia, respectively. The set of papers, described below, aim to provide researchers and policymakers new insights on the prevalence, implications, and correlates of instability in child care settings. This information is especially timely and critical as

policymakers prepare for rebuilding and strengthening the child care system, both in response to the pandemic and toward longer-term solutions.

Chapter 1 (joint with Daphna Bassok) documents the churn among child care programs (i.e., the likelihood that programs close, and the extent that new programs continue to enter the system over time) and explores how these patterns concurrently relate to statewide quality improvements. Research on quality improvements across a state system is relatively nascent (Bassok, Magouirk, et al., 2021), but generally focuses on individual programs' ability to improve over time without noting which programs are able to stay open and demonstrate these improvements. Understanding these program-level improvements is clearly essential, yet there are other channels through which quality across a system can improve – for instance, through closures or through supporting the growth of new programs. To date, no study has examined how these closures or openings relate to efforts in expanding the availability of high-quality programs, particularly within the child care sectors.

To answer this, we use five years of data (2009-2013) on *all* licensed child care in North Carolina (including over 4,000 center-based and over 4,800 home-based programs) to provide the first detailed look at the prevalence of program closures, separately for center- and home-based child care. Because North Carolina requires all operational ECE programs to be licensed and observed, our panel is well-equipped to track how many programs as well as whether the quality of closing programs systematically varied in ways that drive overall quality.

We find that closures are frequent in our data, especially among home-based programs, where just over half of all programs that were open in 2009 were no longer

operational by 2013. Among center-based child care programs open in 2009, about one quarter closed by 2013. Over this period, average quality among both home- and center-based programs increased by about half a point on a five-point scale. We find that the higher rates of closure, particularly among lower-quality programs, explained a substantial portion of this improvement. For home-based programs, closures explained about half of the total observed improvement, while among center-based programs closures explained just under one-third of overall improvement.

These findings do not imply that high rates of closure are beneficial in ECE. As discussed above, closures are disruptive and can be problematic for children, families and teachers. Further research on the effects of these closures is needed, as well as the effects on efforts to reduce closures and stabilize programs. What our findings do demonstrate is that disregarding the high rates of closure in this sector when designing improvement initiatives misses a major potential driver of quality. Program closures are an often understudied portion of instability in ECE (Kershaw et al., 2005; Lam et al., 2013) and it remains important for policymakers to understand just how many programs they lose from year to year and how much of their investment stays with the ECE system over time.

Notably, programs that close down are not the only ones to experience instability. The remainder of this dissertation focuses on another form of instability facing operational child care centers: staffing issues resulting from teacher turnover.

Existing research suggests that teacher turnover is high in ECE, particularly among child care centers (Bassok, Markowitz, et al., 2021; Phillips et al., 2019; Whitebook et al., 2014). Most of this work, however, focuses on the prevalence and

predictors of turnover for individual teachers. Far less research has examined whether some centers experience higher or more frequent turnover than others, or whether there are key center-level features that can help centers reduce turnover among their teachers. Chapters 2 and 3 aim to fill this gap.

Chapter 2 (joint with Daphna Bassok, Laura Bellows, and Anna Markowitz) uses administrative data on all publicly-funded child care centers operating in Louisiana from the 2015-16 academic year to 2018-19 (n=575 centers). These data include all lead teachers of all classrooms observed through the state's ECE accountability system. Under Louisiana policy, every classroom must be observed twice each year. Though compiled to track classroom quality, an unintended benefit of these data is that they offer a unique opportunity to document teacher turnover across all publicly-funded centers throughout all of Louisiana, both within a single year and over repeated years.

We find that, overall, turnover is high in child care, with the average center losing about 40% of its lead teachers in a year. However, there is considerable variation throughout the state in centers' turnover rates. Just under one third of centers each year lost more than half their teachers, while about 20% of centers did not lose any of their teachers. We also find that some centers appeared to experience high turnover—or even the absence of high turnover—persistently across years in our panel. For instance, 27% of centers lost more than half their teachers for two or more years, whereas 44% of centers did not exceed this turnover rate even once. Finally, we show that centers with multiple years of high turnover are rated lower quality than both centers with a single year of high turnover and centers without high turnover.

Our findings underscore concerns that persistent staffing challenges may hinder efforts to improve children's experiences in child care. Some of this instability is likely to be addressed via system reform, particularly through addressing historically low levels of funding in the child care system. At the same time, if some of the variation in teacher turnover is explained by centers themselves, then there may be center-level strategies or supports that can be leveraged by center directors and other child care leaders to help stabilize their teaching staff.

Chapter 3 (joint with Anna Markowitz) builds on this idea, focusing on one promising lever—support from leadership at child care programs. Organizational theory as well as research from K-12 education contexts suggest that education leaders may be an important driver of teacher retention in ECE settings. Although interest in the role of child care leaders in supporting teachers is growing, existing evidence on the link between leader support and teacher retention is very limited, due to small samples and a focus on intentions to turnover rather than observed turnover.

This paper examines the link between leader support and teacher retention using survey data I collected through a research-policy partnership with the Virginia Department of Education as well as administrative data on teachers' employment roughly eight months following teacher surveys. It improves on earlier work by using a large sample (1,114 teachers at 152 child care centers) and by using directly observed measures of teacher retention. We find that leader support, measured either by an individual teacher's perception and through the aggregate ratings of teachers' peers, is positively linked to both intentions to stay and teacher retention.

ECE researchers, practitioners, and policymakers have long recognized the importance of stability in programs' ability to foster the teacher-child relationships critical for shaping young children's learning, and provide families with reliable child care. While instability has long characterized the child care industry and has created challenges to sustaining quality improvements, these issues have been profoundly exacerbated due to the coronavirus pandemic, which made clear the importance of stable, high-quality ECE options for children, families, and the economy (Mongeau, 2020). This dissertation begins to shed light on some of these challenges, using data from three state contexts to examine the scope, nature, and correlates of program closures and teacher turnover in child care.

CHAPTER 1

Child Care Closures and their Role in Understanding Systemwide Quality Improvement

Justin B. Doromal, Daphna Bassok

Abstract

Many center- and home-based child care programs operate on thin margins that make it challenging to stay open and serve children and families. While there is substantial policy interest in increasing the quality of children's experiences throughout child care systems, research often does not consider how instability among programs in these systems might explain aggregate changes in quality. We use panel data from North Carolina (from 2009 to 2013) to explore the importance of examining program closures alongside systemwide quality improvement in child care. One quarter of center-based programs operating across the state in 2009, and over half of home-based programs, were closed by 2013. Over the same period, the quality of child care programs as measured by the state's quality rating and improvement system increased. We show that while many programs that stayed open improved their quality over time, a substantial portion of the improvement trends at the system level was explained by the churn from programs closing and opening during the same period.

Introduction

Many families with young children rely on stable child care, so that parents can pursue employment or education opportunities and their children can have enriching early educational experiences (Institute of Medicine & National Research Council, 2015; Sandstrom & Huerta, 2013; Speirs et al., 2015; Yoshikawa et al., 2013). In fact, following the coronavirus pandemic in 2021, there has been substantial policy interest in investments and initiatives focused on establishing child care as essential infrastructure for working families and their children (Hurley, 2021; Uhing, 2021). Unfortunately, the child care system in the United States—made up largely of small businesses that operate on slim margins—is too often described as "broken," with conditions likely unable to support programs' basic needs to stay open, let alone support policy efforts to build and sustain high-quality environments and experiences (Gould, 2015; IOM & NRC, 2015; Mongeau, 2020; Petersen, 2021). In fact, a number of states have reported declines in child care in the last decade (Haynie, 2019), particularly among smaller, home-based child care providers (National Center on Early Childhood Quality Assurance, 2019).

There is growing recognition of the importance of high quality ECE for young children (IOM & NRC, 2015), and large policy investments have aimed to support higher quality ECE (Congressional Research Service, 2016). These quality improvement efforts may be compromised if providers struggle to stay open and continue serving children and families. To date, however, research has not examined just how this churn among child care providers relates to quality improvements at the system level. This is because longitudinal data about child care programs, their operational status, and their quality are not typically available (Whitebook, McLean, & Austin, 2018). Because we are seldom

able to identify which programs stay open or when programs close, it is challenging to assess how much of large-scale quality improvement efforts are about individual programs staying open and improving over time, versus changes in the quality composition of operational programs.

This paper uses program-year panel data from North Carolina as a case study to highlight the potential importance of documenting child care program closures and considering them alongside investigations of systemwide quality improvement. Our panel (2009-2013) comes from the state's Quality Rating and Improvement System (QRIS), which includes annual information on all licensed center- and home-based child care programs. These data allow us to provide a statewide look at the prevalence of child care closures and the opening of new programs over time. We then use these data to explore the role of closures and openings in explaining statewide quality improvements that occurred in child care settings throughout the state during this period. While North Carolina in the years under study may or may not necessarily capture how the dynamics between instability and quality might look in other states or time periods, our results demonstrate the need, more broadly, to connect discussions of instability in the child care system with those concerning quality improvements at scale.

Program Closures in Child Care

An extensive literature documents the importance of stability for young children and their families (Morrissey, 2009; Pilarz & Hill, 2017; Sandstrom & Huerta, 2013; Speirs et al., 2015). With respect to instability in child care and other early learning contexts, studies typically focus on disruptions resulting either from teacher turnover (Choi et al., 2019; Markowitz, 2019; Tran & Winsler, 2011) or from families' use of

multiple child care arrangements (Davis et al., 2017; Morrissey, 2009; Pilarz & Hill, 2014, 2017). These literature strands make clear that instability has negative consequences both for children's learning and for families' routines, particularly when these disruptions are frequent or unexpected (Speirs et al., 2015).

Child care program closures present a related yet separate form of instability. Like teacher turnover, closures can disrupt the relationships young children form with teachers and their peers. Program closures are also challenging for working families, who rely on stable child care to pursue employment and educational opportunities to support their household (Forry et al., 2013; Sandstrom & Chaudry, 2012). In fact, families report high parenting stress when reengaging in ECE search processes (A. D. Johnson & Padilla, 2018; Pilarz & Hill, 2017), and frequent (and forced) changes in child care arrangements have been linked to poorer child outcomes (Morrissey, 2009; Pilarz & Hill, 2014; Speirs et al., 2015).

Beyond these reasons for strengthening programs that serve children and their families, policymakers may also be interested in addressing instability to ensure the effectiveness of quality improvement investments. Indeed, many program-level interventions and levers for improving quality, such as professional development for leaders and teachers (Hamre et al., 2017) and investments in high-quality curricula and classroom materials (Duncan et al., 2015), can be challenging to sustain if the programs that would otherwise benefit from these investments are at risk of closing.

It is increasingly becoming more widely acknowledged that many center- and home-based child care programs are small businesses that operate with slim profit margins and struggle to stay open (Gould, 2015; Sanders, 2017; White, 2015; Whitebook

et al., 1998, 2014). However, the rates at which child care programs are likely to close is not well documented. A number of reports have pointed to considerable declines over time in the overall number of operational ECE programs (Haynie, 2019; National Center on Early Childhood Quality Assurance, 2019). These aggregate declines are most pronounced for home-based child care, where nationwide the number of programs decreased by an estimated 24.7 percent from 2008 to 2014 (National Center on Early Childhood Quality Assurance, 2019). In surveys of individuals working in state agencies, factors such as the economy, increased regulation, and low enrollment commonly emerge as hypothesized contributors to the decrease in licensed ECE programs (Alexander & Stoll, 2003; National Center on Early Childhood Quality Assurance, 2019).

Yet, aggregate trends can mask much of the volatility facing the child care sector. Even if the number of operating programs were to remain fixed over a period of time, there may be significant numbers of programs closing and new ones taking their place. As one example, Kershaw et al. (2005) use data from British Columbia to document that although the number of child care programs expanded by 5 percent between 1997 and 2001, 34% of the 1,867 center-based programs and 48% of the home-based programs that were open in 1997 had closed down by 2001, suggesting considerable instability of programs within the province's child care system. Though both overall availability of programs *and* the closure of programs may have important implications for families, we know much less about closure rates relative to aggregate supply changes. In part, this is because calculating closure rates requires program-level data that can capture which programs are observed in each year and track which programs stay open. Our paper takes a similar approach to Kershaw et al. (2005) to document child care closures across a state

system, but we extend this work by describing not only how closures relate to program availability but also program quality.

Relating Child Care Closures to Quality Improvement Efforts

Over the last several decades, policymakers have made substantial investments in strengthening the quality of existing ECE programs and expanding high-quality ECE opportunities for children. For instance, through two large federal programs (i.e., Race to the Top–Early Learning Challenge and Preschool Development Grants), the federal government competitively allocated a combined $1.75 billion to states between 2011 and 2016 and tied those resources to explicit investments in quality improvement infrastructures (Congressional Research Service, 2016). Increasingly, there have been calls to reach beyond programs typically managed and operated by government agencies (e.g., Head Start or state pre-k) and incorporate existing child care businesses into state ECE systems and quality improvement efforts.

Despite these sizable investments, we generally know little about the extent to which quality has improved over time, both in child care and ECE more broadly. Most studies about ECE quality improvement focus on evaluating the impact of specific quality improvement interventions, such as a professional development program for early educators (e.g., Hamre, Partee, & Mulcahy, 2017) or the use of developmentally appropriate curricula (e.g., Duncan et al., 2015). This research is critical for identifying promising levers for improvement. However, these studies typically include only a selected set of teachers within programs and do not speak to systemwide improvement "at scale," beyond the scope of an intervention.

In the same way that available data are often not well-suited to track closures and openings, researchers have also lacked the data needed to assess these system-level improvements and explore how they might occur. Indeed, not only do data not typically track which programs stay open over time, they do not often track multiple measures of quality across an ever-changing system of providers over time (some of whom stay open for longer than others). This data paucity in ECE is unlike the case in K-12 settings, where states track which schools are open and provide yearly information on metrics like programs' enrollment, children's academic achievement, and accountability ratings. This body of research has increased in recent years (Aikens et al., 2016; Bassok, Magouirk, et al., 2021; Friedman-Krauss et al., 2019; Sirinides, 2010); however, the majority of these papers focus on aggregate trends or rely on repeated cross-sections of data that do not necessarily capture information on the same programs over time.

The lack of data on programs over time means we often fail to understand the key mechanisms underlying system-level improvement, that is, we have not disentangled to what extent individual programs are improving over time (e.g., how quality improvement in ECE is typically defined and studied) relative to changes in quality due to closures and changes to the composition of open programs. If a substantial portion of programs close down, or if the programs that close down or newly open differ in quality relative to the programs that stay open, this compositional change may be an important part of systemwide improvement. Understanding how much of statewide increases to quality is driven by individual programs' improvements versus low-quality programs closing is important, as each has different implications both for the children and families using a given program, and for policymakers' responses. To date, because of data limitations, no

paper has identified the closure of individual programs and described the quality characteristics of programs facing imminent closure, which is the gap that this paper builds upon.

Present Study

To date no studies have examined which programs shut down, how closures are related to program quality, and whether instability is a driver of aggregate quality improvement. This is problematic as researchers and policymakers may be missing a key piece of the quality improvement picture. The present study aims to fill these gaps and to highlight the need to examine instability in child care systems alongside systemwide quality improvement.

To do this, we use data on licensed child care, including providers operating in both center- and home-based settings, from North Carolina's QRIS. QRIS are accountability systems that aim to define benchmarks for quality, standardize the measurement and evaluation of program quality, and incentivize improvements on these quality benchmarks. To date, more than 40 states implement a statewide QRIS (QRIS Compendium, n.d.). North Carolina's QRIS is the second oldest in the country, operating in its current form since 2005. A unique feature of their QRIS is that all licensed programs are required to participate, which differs from most states where QRIS participation is not required (i.e., programs opt in to being rated). For our purposes, this allows us to both have a quality rating for *all* programs at each time point, as well as identify and track which programs close and when.

We analyze data on licensed child care programs from 2009 to 2013. During this period, mean quality across the state increased, yet the number of programs declined over

time. In other words, it is unclear how much of this quality increase is explained by individual programs improving over time, versus closures and openings systematically differing in program quality. Our paper investigates this by answering the following research questions:

1. How much churn was there among child care providers in our data? That is, what proportion of center- and home-based child care programs closed each year, and how many new programs opened over time?
2. To what extent did quality and quality improvements vary across programs that stayed open, programs that ultimately closed, and programs that opened over time?
3. How much of the quality improvement we observe across a system was explained by the improvements of programs that stayed open, versus the churn in programs over time?

Method

Our data come from North Carolina's QRIS, which was established in 1999 and has operated in its current form since 2005. All licensed ECE programs are required to be rated through the state's QRIS. Programs are rated on a 5-point scale. Programs receiving a "One Star" license have met minimum licensing requirements, and they are auto-enrolled at this level. The "Five Star" license is designated to programs demonstrating the highest level of quality, as operationalized by the state.

Our study focuses on licensed center- and home-based child care programs in North Carolina.[1] State law requires that programs serving three to eight non-relative children be licensed by the state as "Family Child Care Homes" (hereafter, home-based

programs), while any program serving more than eight children must apply to be a "Child Care Center" (hereafter, center-based programs). From 2009 to 2013, we observe just under 4,000 unique center-based programs and just over 4,800 unique home-based programs.

Program Closures and Openings

Every program is assigned a license number by the state agency overseeing child care licensing. We use this as a unique identifier to track programs over time. We define a program's closure at the last year the program is observed in our data, if and only if the program exits prior to the last year of the panel (i.e., a program closes before 2013). This is because we cannot identify which programs in 2013 stayed open the following year, versus those that closed down. Similarly, we define a program's opening at the first year the program is observed, but only if this occurs after the panel begins (i.e., 2010 or later). Again, this is because for programs we observe in 2009, we cannot identify which have newly opened and which were already operational.

Stayers, Leavers, and Entrants

For the second and third research questions, we compare quality improvements across programs by whether we observe their closure or opening. We primarily focus on three groups of programs. "Stayers" are programs that were open for the entire period under study, that is, we observe neither their opening nor their closure. "Leavers" are programs that were open in 2009 but experienced a closure prior to 2013. "Entrants" are programs operating in 2013 but had opened sometime after 2009.[2]

Program Quality

Our quality measure is a program's quality rating through North Carolina's QRIS, which ranges from one to five stars. This rating is a summary index that describes quality along two equally weighted dimensions: program quality standards, which represent programmatic aspects such as having teacher-parent meetings and detailed operational policies; and educational quality standards, which represent aspects related to staffing, teacher education, and credentialing.[3] Quality ratings are widely publicized, impact levels of per-child funding, and are a useful metric in that all child care programs throughout the state receive a rating based on the same criteria.

Analysis

To answer the first question, we compute yearly rates of closure and opening for each sector. Yearly closure rates are the ratio of the number of programs in year *t* that closed by year *t*+1 to the number of operational programs in year *t*. Yearly rates of program openings are computed as the ratio of the number of new programs in year *t*+1 to the total operational programs that same year. By construction, we cannot compute an opening rate for the first year of the panel, nor can we compute a closure rate for the last year of the panel. Additionally, we examine cumulative closure throughout the panel by examining the percentage of programs in 2009 that were no longer open in 2013. We do this by classifying programs as either a stayer, leaver, or entrant.

Our analysis for the second research question comprises two components. First, we assess differences in quality – as measured in 2009 – between stayers and leavers. The goal is to understand whether the programs that ultimately close were those that were initially rated lower quality relative to the ones that stay in the system. We estimate the following regression model:

$$Q_{ij} = \alpha_0 + \alpha_1 Stayer_i + \Lambda_j + \epsilon_{ij} \quad (if\ Year = 2009) \qquad \text{(Eqn. 1)}$$

In the equation above, Q_{ij} represents quality for program *i* in county *j*. We are interested in the coefficient α_1, which tells us how stayers differed in baseline quality (i.e., in 2009) relative to the leavers. We fit two models. Model 1 controls only for a program's licensed capacity (i.e., the extent of the program-level covariates in our data), while Model 2 includes county-level fixed effects (Λ_j) to address potential regional variation in both programs' closure risk and their quality.[4] Comparing estimates across these different models allows us to explore whether differences in mean quality between stayers and leavers might be explained by community characteristics. In Equation 1, standard errors are clustered at the county level.

We then turn to the question of *improvements* to quality. We estimate these improvements using program fixed effects to focus on changes over time within individual programs. Moreover, we examine improvements not only for the stayers, but also for the leavers and entrants in our data. Specifically, we estimate the following regression model:

$$Q_{it} = \beta_0 + \beta_1 time_{it} + \beta_2 time_{it}^2 + \Gamma_i + \epsilon_{it} \qquad \text{(Eqn. 2)}$$

In the equation above, $time_{it}$ measures years centered to a program's first year of the panel; for stayers and leavers, this variable takes on a value of 0 in 2009, while for entrants it is their first year of operation. Note that we include a quadratic term to allow the possibility for non-linear growth. The coefficient we are interested in is β_1, which is the expected change in quality from one year to the next. In Equation 2, Γ_i represents our program fixed effects, and ϵ_{it} are standard errors clustered at the program level.

Finally, our third question is how much of the quality improvement we observe across a system is explained by the improvements of programs that stay open, versus the churn in programs over time. To answer this question, we consider a hypothetical scenario in which stayers did not improve at all (i.e., we fix stayers' quality in 2013 to their quality in 2009). If we still observe increases in systemwide quality under this scenario, then the remaining change is due to differences in the characteristics of programs closing and opening. To facilitate interpretation, we take the ratio between system improvements observed under this hypothetical scenario, and the real system improvements observed in the data. Values closer to 0 suggest that compositional changes have little influence on systemwide quality improvement, whereas values closer to 1 suggest closures and openings explain nearly the entirety of this system-level change.

Results

Table 1.1 summarizes how the availability and quality of child care programs changed during this period. Our data suggest that these variables moved in opposite directions. In both center- and home-based programs, the aggregate number of open programs dropped – roughly a 9 percent decline for centers and a 32 percent decline for home-based programs. At the same time, the mean quality among center-based programs increased by 0.45 points, and for home-based programs this increase was 0.48 points. Our goal is to understand the extent that program closures and openings explained the changes in quality measured across the system.

Yearly and Cumulative Churn Among Center- and Home-Based Programs

Figure 1.1 plots program closure and opening rates for each year of the panel. Each year, about 9% of operational center-based programs closed down. For this sector,

the number of new programs constituted about 7% of total programs each year. In other words, the rate programs closed was higher than the rate programs were opening, though only modestly.

This pattern was far more pronounced among home-based programs. About 18% of home-based programs closed down each year. Not only were opening rates far lower relative to closure rates, they also appear to be declining substantially over time. For instance, in 2010, new programs made up 12% of the sector while 19% of total programs closed; yet by 2013, opening rates were only 8%. The higher annual rates of closure, relative to new programs opening, explain the substantial decline in the total availability of programs over time for this sector, particularly relative to the extent of total declines observed among centers.

Figure 1.2 summarizes the churn accumulating throughout the panel by categorizing programs as stayers, leavers, or entrants. In 2009, there were a little over 3,100 center-based programs operating throughout the state. About 69% of these programs were stayers, or programs that remained operational through 2013. In other words, nearly one third (31%) of programs in 2009 had closed down. However, as we discussed above, the overall number of center-based programs decreased only slightly, since the number of entrants were comparable to the number of leavers for this sector. For home-based programs, a much lower percentage of programs in 2009 were stayers (49%) and there were far fewer entrants relative to the number of leavers, both of which contributed to the substantial decline in home-based programs throughout the state.[5]

Differences in Quality and Improvements among Stayers, Leavers, and Entrants

We begin by examining whether stayers and leavers had different levels of quality in 2009. The results in Table 1.2 suggest programs that ultimately stayed open had higher initial quality than those that were driven to closure. For instance, estimates from the county fixed effects models indicate the differential between stayers and leavers was about three-fourths of a point among center-based programs, and 0.60 points among home-based programs. Notably, the inclusion of county fixed effects seems to significantly attenuate the estimate for center-based programs (joint test of significance: χ^2=6.42, p<.01) but not home-based programs (χ^2=2.40, p=.12).

Next, we examine changes over time in programs' quality. Table 1.3 presents results for center-based programs, while Table 1.4 presents results for home-based programs. We focus first on stayers, as the improvements of these programs stay in the system and directly contribute to the changes that we might observe at the system level. Stayers in our panel demonstrated small and incremental improvements over time: Relative to the distribution of quality for programs in 2009 in each sector, the mean yearly improvement translates to about 0.09 of a standard deviation for center-based programs and 0.07 of a standard deviation for home-based programs.

Because we observe quality for all programs for the duration that they are open, we can also estimate the improvements of leavers and entrants for the duration they were operational. Again, for both sectors, leavers demonstrated positive changes in quality – about 0.11 of a standard deviation among center-based programs, and about 0.12 of a standard deviation for home-based programs. Finally, entrants in both sectors experienced the greatest growth – in part, because many programs entered the panel with lower average quality (both relative to the state-defined quality scale and the mean

overall quality in the sector in any given year) but demonstrated considerable gains in quality in their first several years of being open.[6]

Contributions of Closures and Openings to System-Level Quality Improvement

Our results indicate considerable churn among programs (particularly among home-based programs) and notable differences in quality across stayers, leavers, and entrants. Next, we examine how much of the improvements in quality observed at the system level was explained by the improvements of stayers, and how much was explained by differences in quality between the stayers and the programs that closed and opened during this period. To do this, we examine a hypothetical scenario in which we set stayers' improvements to zero. If program improvements fully explained the change in quality observed across the state (i.e., if program closures and openings did not contribute to statewide quality changes at all), then fixing stayers' improvements to zero would eliminate any system-level change in mean quality.

Table 1.5 compares the results of this hypothetical scenario to patterns observed in our data. The first row suggests that about 25% of the change (or about 0.11 points) for center-based programs remained, even when artificially setting stayers' improvements to zero. This means that for this sector, stayers' improvements over time explained most of the change in quality observed systemwide (i.e., three-fourths of the total mean improvement).

The second row presents the same set of results for home-based programs. Even when setting stayers' improvements to zero, we continue to observe a total mean improvement of 0.24 points. This represents just under half of what is actually observed in our data. In other words, while stayers' improvements are still an important contributor

to system-level improvement for this sector, closures and openings played a far larger role, explaining about half of the total system-level change among home-based programs in our data.

Discussion

Children and families rely on stable child care programs. In the United States, however, there are concerns both about inadequate child care supply (Malik & Hamm, 2017) and about the existing programs being highly unstable and not sufficiently high-quality to support these benefits (IOM & NRC, 2015; Petersen, 2021). Policymakers are keenly interested in addressing these fronts—stabilizing the child care system and increasing the availability of high-quality providers—yet due to data limitations, limited research has examined the likelihood that programs close down, or the role that closures and openings play in driving changes at the system level.

Understanding this churn is important for several reasons. First, identifying the prevalence of program closures helps us understand the extent to which families may be experiencing disruption as a result of programs closing down. Even if program quality is high, we might be concerned if programs serving families close down at considerable rates. Second, documenting heightened program closure and a declining number of program openings may provide policymakers with important insights for supporting the overall availability of ECE opportunities and ensuring children's likelihood of receiving consistent early educational experiences. Finally, policymakers should be aware of the extent to which investments in an unstable system are likely to build upon prior improvement efforts, or instead be lost over time due to high closure rates.

This study provided the first description of how often child care programs close down, whether programs that close differ than those that remain open with respect to quality, and the extent to which closures might drive the observed growth in quality across a state system. More broadly, it aimed to demonstrate the importance of examining program closures and openings alongside quality changes occurring throughout the system. We achieved this using unique program-year data from North Carolina, a state context where all programs were required to be licensed and thus included in the dataset. In particular, the years included in our study—2009 and 2013—were characterized by both increases in the overall quality of programs and declines in the availability of these programs throughout the state.

We have three primary findings. First, there was far greater instability among home-based programs: each year nearly 20% of programs closed down, and cumulatively only half of the programs open in 2009 remained open by 2013. In contrast, only 7% of center-based programs closed each year, and one quarter of these programs open in 2009 were closed by 2013. Second, there were substantial differences in quality between stayers and leavers. For both sectors, all programs demonstrated improvements from year to year, regardless of whether programs ultimately closed down. Finally, we show that closures and openings contribute substantially to overall changes in quality, with closures and openings explaining just one third of the overall growth among center-based programs but nearly half the growth among home-based programs.

Whether or not the rates of closure observed in our data are "too high" is a normative question. That some businesses shut down is to be expected, and certainly we may hope that centers that are of the lowest quality close down. These rates are

comparable to data from the Bureau of Labor Statistics, which reports that 20% of small businesses close after their first year and about half stay open for at least five years. At the same time, they contrast with survey results that suggest many providers do not intend to exit at such high rates. Data from the National Survey of Early Care and Education (2016), for example, show that 63% of licensed home-based child care programs expect to continue serving their families for at least another four years; only 5% of respondents expected to stop serving families within a year. We also see greater declines in our data than those reported by the NCECQA (2019), who reported a decline among licensed home-based programs of about 25% between 2008 and 2014 (compared to our 32% decline from 2009 to 2013). Because all the years in our study occur following the Great Recession, it is also possible that the instability observed in this study, across both sectors, is higher than what might be observed in other years (e.g., pre-recession), even in the same state. Although seldom discussed in the empirical literature, heightened risks in closure as a "consequence" of the Great Recession have been hypothesized in recent media accounts (e.g., Collier, 2015; Johnson, 2009; Raskin-Zrihen, 2011). Understanding how closures drive overall quality before after a period of economic stress could be a fruitful direction of future research.

That said, it is worth noting again that the patterns we documented are specific to North Carolina over a particular period of time, and may not extend to other states or time periods. It is plausible that in other contexts, there might be different levels of churn, differences in how states operationalize quality, or differences in how programs that stay open versus close fare on these quality measures. While discussion of our findings is helpful for contextualizing how our study may be different or similar to other contexts,

we stress that the primary goal of this paper was not to say that North Carolina provides a generalizable perspective of these issue, but rather to offer a case study showing that closures and openings represent a sizeable portion of systemwide quality improvement efforts.

Without program-level longitudinal data, we not only miss the extent of churn within a child care system over time, but also miss just how much the types of programs that remain operational relate to quality across a system. Such insights may be even more critical for researchers and policymakers following the COVID-19 coronavirus pandemic, where public health concerns alongside economic uncertainty drove many programs, even high-quality ones, to closure (NAEYC, 2020) and may have made it challenging for stayers to sustain quality. Particularly given recent proposals for substantial investments into the child care sector (Bipartisan Policy Center, 2021), it is worth understanding how instability during and following the pandemic can influence policymakers' efforts to address the availability of high-quality child care options for families in upcoming years.

Finally, policymakers should continue to consider in their own work the ways that changes over time in which programs are open and serving families are driving the availability of high-quality programs, particularly given that the solutions available to policymakers may depend in part on how these composition changes are occurring. This includes the continued investments in collecting extensive data and building data systems to track and better understand both program closures and program quality across a system. Our paper offered just one example of how instability can matter a lot for how we think of increasing quality across a state ECE system. Better data systems can help

policymakers, alongside researchers, be thoughtful moving forward about how instability and quality relate to each other in their own contexts.

[1] Government sponsored/operated programs such as Head Start and ECE programs located in public school buildings *are* included in North Carolina's licensing system and QRIS, though we do not include them in this study.

[2] There were 178 center-based programs and 484 home-based programs that both opened after 2009 and closed before 2013. These make up about 4% and 10% of center- and home-based programs, respectively, in our data.

[3] Underlying the state's QRIS is a 15-point integer scale, and 14 of these points are distributed equally between program quality standards and educational quality standards. For instance, a home-based child care program may receive one point if they only meet minimum licensing and education training requirements, but could receive the full seven program quality points if they adhere to stricter teacher-child ratios for young children and have more formalized operational policies (among other requirements). The 15th point is awarded for meeting additional criteria in either of these dimensions (e.g., using a developmentally appropriate curriculum, having 75% of teachers with at least 10 years of ECE experience). The allocation of points is the same to both center- and home-based programs, though what standards constitute the full set of points may differ across program types.

[4] Note that there is no universal method in the literature for defining local child care markets, with past research using existing administrative boundaries (e.g., counties, which we use in the current paper) or imposing a tessellated grid of equally sized geometric shapes (e.g., hexagons) (J. H. Brown, 2018).

[5] These findings are similar when using cumulative licensed capacity, though seats at center-based programs in 2009 were slightly more likely to come from the stayers (75%), despite stayers making up only 69% of total operating programs. See Figure A1.1 in the appendix.

[6] For this group in particular, it seems important to model time nonlinearly. Indeed, while the direction of our results does not change if instead modeling time linearly, the magnitude of the coefficient for the linear term is somewhat understated for the entrants.

Table 1.1
Descriptive statistics for center- and home-based child care programs in sample

	2009	2010	2011	2012	2013
Center-based programs					
Number of programs	3,107	3,075	2,969	2,927	2,823
Cumulative capacity	242,951	243,125	238,210	236,987	231,850
Quality rating (mean [std. dev.])	3.31	3.36	3.53	3.67	3.76
	[1.25]	[1.27]	[1.25]	[1.21]	[1.18]
Home-based programs					
Number of programs	3,624	3,387	3,056	2,769	2,484
Cumulative capacity	27,026	25,378	23,011	20,903	18,810
Quality rating (mean [std. dev.])	2.63	2.68	2.77	3.00	3.11
	[1.39]	[1.36]	[1.35]	[1.29]	[1.25]

Table 1.2
OLS regressions comparing quality in 2009 between stayers and leavers, by sector

	Center-based programs		Home-based programs	
	Model 1	Model 2	Model 1	Model 2
Difference between stayers and leavers	0.823***	0.756***	0.621***	0.600***
	(0.045)	(0.051)	(0.041)	(0.040)
Constant	2.558***	2.627***	1.422***	1.506***
	(0.084)	(0.035)	(0.187)	(0.367)
County fixed effects	No	Yes	No	Yes
Number of obs.	3,107	3,107	3,624	3,624

Notes: Regression models estimate differences in 2009 quality between stayers and leavers. Model 1 controls only for programs' licensed capacity, and Model 2 introduces county fixed effects. Standard errors clustered at the county level are presented in parentheses. For center-based programs, the coefficients across models ("Difference between stayers and leavers") are statistically significant from each other (χ^2=6.42, p<.01); for home-based programs, the coefficients are not statistically significant from each other (χ^2=2.40, p=.12).
Sig: * p<.05, ** p<.01, *** p<.001

Table 1.3
Fixed effects models estimating quality improvements among center-based programs

	All programs	Stayers	Leavers	Entrants
Time (centered)	0.297***	0.143***	0.116***	1.555***
	(0.013)	(0.010)	(0.033)	(0.078)
Time (quadratic term)	-0.040***	-0.007**	0.007	-0.354***
	(0.003)	(0.002)	(0.011)	(0.022)
Intercept	3.209***	3.573***	2.822***	1.847***
	(0.010)	(0.011)	(0.016)	(0.038)
Program fixed effects	Yes	Yes	Yes	Yes
Number of obs.	14,901	10,730	2,245	1,654
Number of progs.	3,962	2,146	961	677

Notes: Clustered standard errors are presented in parentheses. All models include program fixed effects. Stayers are defined as programs open in both 2009 and 2013; leavers are defined as programs open in 2009 but not 2013; and entrants are programs that were open in 2013 but not 2009. Note that there are 178 programs that opened after 2009 and also closed before 2013.
Sig: * p<.05, ** p<.01, *** p<.001

Table 1.4
Fixed effects models estimating quality improvements among home-based programs

	All programs	Stayers	Leavers	Entrants
Time (centered)	0.277***	0.094***	0.160***	1.248***
	(0.014)	(0.013)	(0.026)	(0.068)
Time*Time	-0.040***	-0.002	-0.010	-0.245***
	(0.003)	(0.003)	(0.010)	(0.022)
Intercept	2.562***	2.952***	2.371***	1.641***
	(0.010)	(0.014)	(0.013)	(0.031)
Program fixed effects	Yes	Yes	Yes	Yes
Number of obs.	15,320	8,890	4,039	1,689
Number of progs.	4,814	1,778	1,846	706

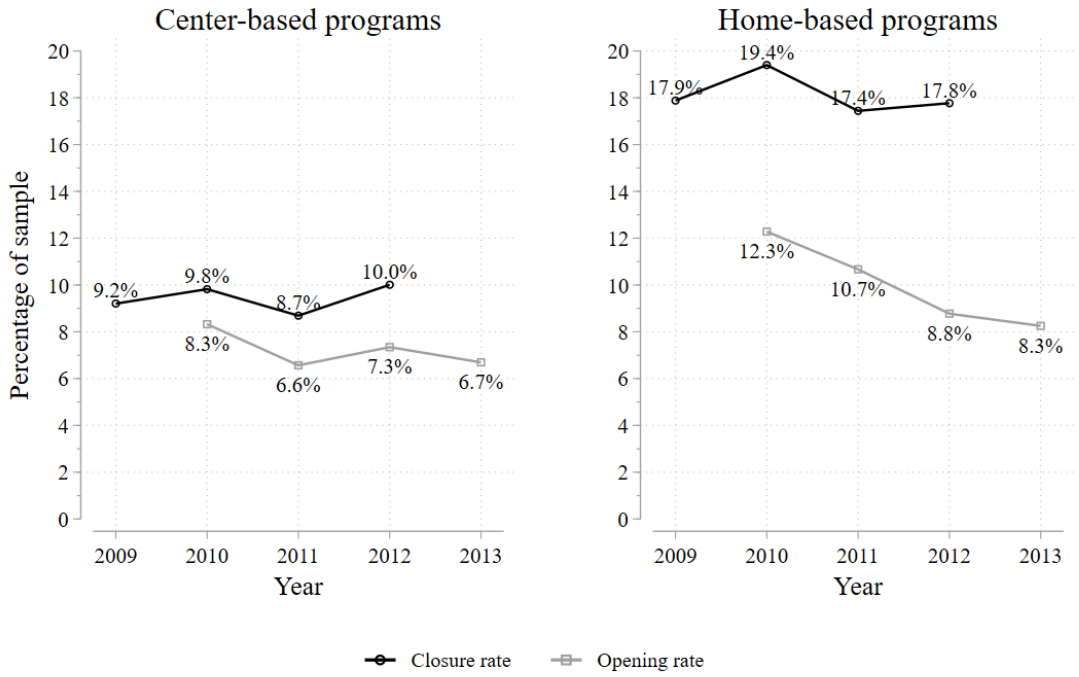
Notes: Clustered standard errors are presented in parentheses. All models include program fixed effects. Stayers are defined as programs open in both 2009 and 2013; leavers are defined as programs open in 2009 but not 2013; and entrants are programs that were open in 2013 but not 2009. Note that there are 484 programs that opened after 2009 and also closed before 2013.
Sig: * p<.05, ** p<.01, *** p<.001

Table 1.5
Hypothetical scenarios examining systemwide mean total change in quality under no program improvements

Sector	Observed systemwide mean total change	Hypothetical systemwide mean total change under no program improvements	% of systemwide mean total change attributable to leavers and entrants
Center-based programs	0.447 95% CI: [0.398, 0.496]	0.111 95% CI: [0.070, 0.152]	24.8%
Home-based programs	0.486 95% CI: [0.436, 0.537]	0.240 95% CI: [0.196, 0.285]	49.4%

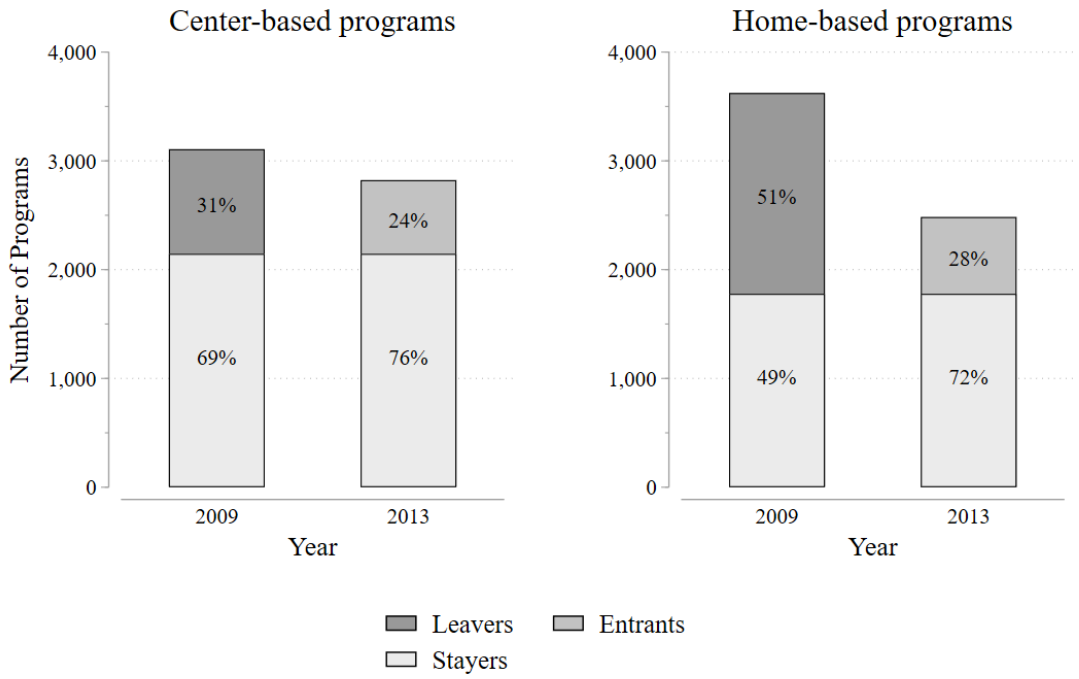
Notes: Results in column 1 estimate the overall improvement in quality across programs in our sample, as observed in our data. For column 2, we assume a hypothetical scenario in which stayers do not improve (that is, the quality of stayers in 2013 is artificially set to their quality in 2009), and again estimate the statewide change in quality over time. Column 2 describes the change under this simulation, and column 3 is the ratio of column 2 to column 1. In a scenario where the statewide average is driven entirely by the improvements of stayers, column 2 would display a value of 0, and column 3 would display 0%.

Figure 1.1
Rates of program closure and program opening, by sector and year



Notes: Closure rates are defined as the ratio of programs that close to the total operational programs in that year (see Table 1.1 for number of operational programs by sector and year). Entry rates are defined as the ratio of programs that open to the total operational programs in that year.

Figure 1.2
Composition of stayers, leavers, and entrants in 2009 and 2013



Notes: There were 3,107 center-based programs operating in 2009 and 2,823 programs in 2013. For home-based child care, there were 3,624 programs operating in 2009, and 2,484 programs in 2013. We define stayers as programs that remained open between 2009 and 2013; leavers as programs that were open in 2009 but closed by 2013; and entrants as programs that opened after 2009 and were observed in 2013.

CHAPTER 2

"Hard-to-Staff" Centers: Exploring Center-Level Variation in the Persistence of Child Care Teacher Turnover

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Abstract

High rates of teacher turnover in child care settings have negative implications for young children's learning experiences and for efforts to improve child care quality. Prior research has explored the prevalence and predictors of turnover at the individual level, but less is known about turnover at the center level—specifically, how turnover varies across child care centers or whether staffing challenges persist over time for some centers. This study tracks annual turnover rates for all publicly funded child care centers operating in Louisiana between the 2015-16 and 2018-19 school years (n=575 centers). We document high and variable turnover rates across centers throughout the state. Each year, nearly one-third of centers experienced high turnover, that is, lost more than half of their teachers. About 27% of centers experienced high turnover for multiple years in our panel, while 44% of centers did not experience high turnover in any year under study. Finally, we show that centers with multiple years of high turnover were rated as lower quality, relative to both centers with a single year of high turnover and centers without high turnover. Our findings underscore concerns that sustained staffing challenges may hinder efforts to provide high-quality child care.

Introduction

Early childhood education (ECE) programs have the potential to shape children's school readiness and long-term developmental outcomes (Institute of Medicine & National Research Council, 2015; Yoshikawa et al., 2013). These benefits occur primarily as a result of the consistent and responsive interactions children have with teachers in these settings (Markowitz et al., 2017; Yoshikawa et al., 2013). For many children in the United States, early educational experiences occur in center-based child care settings, many of which operate as small, independently owned or franchised businesses (NSECE Research Team, 2014).

Unfortunately, child care centers often face challenges retaining their teachers (Bassok, Markowitz, et al., 2021; Whitebook et al., 2014). Teacher turnover rates in child care far exceed annual turnover in other types of ECE programs like school-based pre-kindergarten (pre-k) (Bassok, Markowitz, et al., 2021; Phillips et al., 2019) and K-12 schools (Redding & Henry, 2019).[7] In Louisiana, the context for the current study, slightly under half of child care teachers observed one year were no longer at their center by the following fall (Bassok, Markowitz, et al., 2021).

These very high rates of turnover likely reflect, at least in part, systemic challenges faced by the child care sector. Centers primarily rely on parent fees and tuitions to sustain themselves financially (NSECE Research Team, 2014), with many operating on slim profit margins. Even when child care centers access public funds, such as through child care subsidy programs, the relatively low public investment in these programs compared even to Head Start and state pre-k leaves many child care centers resource-constrained. (Isaacs et al., 2019). Given that staffing is a major yet mandatory

expense for child care centers, the limited public investment in child care systems likely strains centers' efforts to effectively recruit and retain teachers (Gould et al., 2019). Indeed, child care teachers are not typically paid a living wage, have limited or no access to benefits, and have sparse opportunities for professional development (Gould, 2015; Whitebook, McLean, Austin, et al., 2018). Moreover, multiple studies suggest that low pay and challenging work conditions contribute to teachers' turnover decisions (Manlove & Guzell, 1997; McDonald et al., 2018).

Although most centers face these financing challenges, individual centers may differ in their ability to successfully retain teachers, depending on strategies leveraged by center leaders to navigate and address staffing challenges. Current research on turnover in ECE, however, remains largely focused on the teacher level (Bassok, Markowitz, et al., 2021; Doromal & Markowitz, 2021; Grant et al., 2019; Manlove & Guzell, 1997; Schaack et al., 2020; Wells, 2015), and there have been fewer explorations of center-level variability in teacher turnover. Recent teacher-level turnover estimates indicate that 40-50% of child care teachers leave each year (Bassok, Markowitz, et al., 2021) but has not identified to what extent turnover rates are similar or vary considerably across centers. Similarly, no studies demonstrate whether centers' turnover patterns are consistent over time—that is, whether there are centers that repeatedly lose their teachers year after year. Policymakers could use this information to learn from the centers that better retain their teachers and also target supports to centers facing deeper staffing instability issues.

The present study fills this gap. We use administrative data on the universe of publicly funded child care centers in Louisiana over a four-year period to describe how centers differ in levels of teacher turnover. We first document variation in turnover rates

within a single year. We then explore the extent to which centers persistently demonstrated high turnover across multiple years or, conversely, did not experience any years of high turnover at all. Finally, we examine whether center-level turnover rates correlate with the state's measure of center quality. This study is the first to both examine the distribution of center-level turnover using administrative data on *all* publicly funded child care centers in one state and describe year-to-year trends in centers' turnover rates. By estimating the variability in and the persistence of center level turnover, this study helps identify whether some centers are better able to navigate staffing challenges and offers new insights as to whether persistent staffing challenges are likely to hinder ongoing policy efforts to improve children's educational experiences

Teacher Turnover in Child Care Settings

High levels of teacher turnover pose a major challenge for the early childhood field (Totenhagen et al., 2016). One reason for this is a body of evidence showing the importance of stability for young children, particularly in their day-to-day interactions with the adults who teach and care for them (Bratsch-Hines et al., 2020; Howes et al., 1998; Moss et al., 1996). Sudden or frequent disruptions to these relationships resulting from teacher turnover have been linked to negative social and behavioral outcomes for children (Markowitz, 2019; Tran & Winsler, 2011). A second reason is that turnover creates challenges for policymakers seeking to strengthen the ECE workforce (IOM & NRC, 2015). For instance, many quality improvement efforts involve investments in teachers' professional development through coaching or coursework (Early et al., 2017; Hamre et al., 2017). Under high turnover, teachers likely depart before policymakers are able to see returns on their investments.

From an organizational standpoint, teacher turnover may also impede centers' ability to provide high-quality services to children and families. Qualitative research has explored how parents, child care center directors, and teachers perceive the relationship between teacher turnover and the dysfunction or instability of a center (Cassidy et al., 2011; Whitebook & Sakai, 2004). Parents reported they were concerned that frequent turnover meant that no one at their center knew their child or their developmental progress; teachers who remained reported feeling overwhelmed when other teachers left the center; and directors described frequent teacher departures straining their ability to maintain a highly qualified teaching staff and improve the center's quality (Cassidy et al., 2011). These child care findings echo a more robust literature from K-12 schools, which has found that teacher turnover places burdens on the schools from which teachers depart, particularly when schools face high levels of teacher instability year after year (Grissom et al., 2016; Holme et al., 2017; Sorensen & Ladd, 2020).

As is true in most industries, some teacher turnover is to be expected: individuals leave jobs for many reasons (e.g., fit with the profession broadly, issues with their specific employer, or personal reasons). If teachers leave because their fit with the profession was poor, that departure may be good for the individual teacher, and not particularly harmful to the center or for the profession (Dess & Shaw, 2001). That said, too much turnover – either experienced in one year or sustained across years – could negatively impact centers' functioning and, as a result, the care and education children receive. There is considerable debate in the broader organization management literature about the relationship between an organization's employee turnover rate and performance (e.g., Park & Shaw, 2013). While theories differ on whether low to moderate levels of

turnover should be considered good or bad, they concur that high levels of turnover are linked with negative organization-level outcomes. These theoretical models, however, typically do not quantify how much turnover is enough to be viewed as high or problematic for organizations.

In the child care context in particular, where children's experiences with their teachers are essential for their development, frequent turnover could be a barrier to centers effectively serving young children. Child care centers are the main provider of subsidized care for infants and toddlers (Office of Child Care, n.d.), meaning that high turnover in child care is especially likely to impact the youngest children. The child care sector also serves a high proportion of families who depend on financial assistance to access and afford ECE for their children (Office of Child Care, n.d.). For this reason, the particularly high rates of turnover in child care, even compared to Head Start and pre-k (Bassok, Markowitz, et al., 2021; Phillips et al., 2019), are problematic for efforts to build a system that equitably supports child development.

While the literature on child care teacher turnover is steadily growing, much of this research is at the teacher level (e.g., predicting individual teachers' likelihood of turnover and identifying correlates of turnover), rather than center level. Teacher-level analyses are important for understanding the drivers of individual decision-making and can help inform how to best target and personalize supports. Still, for the reasons described above, the consequences of turnover may depend on how much turnover individual centers experience. From a policy perspective, understanding center-level variability will likely reveal new ways to target funding and new strategies for addressing turnover issues.

Variation in Centers' Turnover Rates

There are several reasons why centers might experience different levels of teacher turnover. First, child care centers are small businesses that largely operate independently from each other. Center directors and other child care leaders oversee many different aspects of center operations, including hiring new staff, ensuring teachers are adequately trained and compensated, creating staffing schedules and managing teachers' hours, and establishing a positive professional environment for teaching and learning (LeeKeenan & Chin Ponte, 2018) – all of which may be related to teacher turnover. Additionally, center-level turnover rates might vary due to local circumstances. For example, centers face different local labor markets that are likely to influence both their ability to retain teachers and who they are able to hire. For at least these reasons, it seems plausible that turnover rates might vary across centers.

Despite growing interest in stabilizing the child care workforce, there is limited research on center-level turnover, especially relative to research in K-12 schools, in part because of data scarcity (Whitebook, McLean, & Austin, 2018). Over the last several decades there has been a rise in state data systems that track teachers' entries, exits, and transfers throughout the K-12 public school system, which has facilitated a deep understanding of turnover in those contexts. Unfortunately, most states have no comparable dataset tracking child care centers or the teachers employed there, severely limiting research on turnover among early educators. Some studies examining workforce trends have used national census data (e.g., Bassok et al., 2013; Brown & Herbst, 2021), which can capture teachers' exits out of the child care sector altogether; but, because

those data cannot link teacher departures to specific centers, they are less suited for understanding variability in how centers experience teacher turnover.

Given the absence of administrative data, many researchers have collected their own. Some studies have administered local teacher workforce surveys to understand potential drivers of turnover (e.g., Manlove & Guzell, 1997; Russell et al., 2010; Schaack et al., 2020); however, these studies typically sample too few teachers within a center to estimate center-level turnover rates. Similarly, a smaller set of studies aim to track teachers over time using a sample of teachers recruited from a small number of centers (e.g., Whitebook & Sakai, 2003), but it is unclear whether child care centers included in these studies generalize to the larger population of centers, limiting these studies' ability to capture variability in center-level turnover rates.

Perhaps the best estimates of center-level turnover rates come from studies using the National Study of Early Care and Education (NSECE), which provides a nationally representative snapshot of ECE providers. In 2012, directors of subsidized child care centers reported that 21% of their staff left in the 12 months prior to being surveyed (Phillips et al., 2019). Using the same data, Caven et al. (2021) find that most ECE directors reported turnover rates that were less than 20%. However, these estimates are not limited to child care centers; they include school-based pre-k programs and Head Start centers, in which turnover is considerably lower than in child care centers (Bassok, Markowitz, et al., 2021; Whitebook et al., 2014). Further, the NSECE relies on directors' retrospective recollection of turnover. These data may be difficult to interpret due to individual differences in how directors respond (e.g., differences in directors'

interpretation of who counts as a lead teacher or in recordkeeping practices that allow them to accurately recount departures).

Persistence in Centers' Turnover Rates

The cross-sectional nature of most ECE workforce data (including the NSECE) also limits our understanding of *center*-level turnover because these data provide only a snapshot of turnover rates at a single point in time. The lack of longitudinal data has made it challenging to distinguish centers with persistently high turnover rates from those for which high turnover is atypical: To date, no study has used multiple years of data to track child care centers' turnover rates over time.

Though not well understood in child care – or in ECE more broadly – persistent teacher staffing challenges have received attention in recent K-12 research (Holme et al., 2017; Sorensen & Ladd, 2020). For example, Holme et al. (2017) use a ten-year panel of administrative data on Texas public schools to classify schools according to a set of school-level, longitudinal measures of teacher instability. These authors argue that longitudinal, school-level turnover measures can "help illuminate different ways in which staff instability can affect schools and identify schools that suffer from particularly severe staff shortages" (Holme et al., 2017, p. 63). They define high turnover as schools with a turnover rate of at least 30% and find that 60% of schools had high turnover for at least one year in the panel. However, only 4% of schools persistently had this level of turnover, which they define as having high turnover for at least seven years (i.e., about two-thirds of the years in the panel). Moreover, research leveraging panel data has found that persistent teacher instability has prolonged consequences on school staffing and student achievement outcomes (Holme et al., 2017; Sorensen & Ladd, 2020).

Despite differences between K-12 and child care contexts, persistent turnover is likely to be a concern in the latter as well. In the present study, we lean on insights from these K-12 studies to characterize child care centers by their observed turnover rates across multiple years, in order to better understand the extent to which some centers face more severe staffing issues than others.

Present Study

We examine center-level turnover rates using a panel dataset tracking all lead teachers working in classrooms with toddlers and preschool-aged children in all publicly funded child care centers operating in Louisiana between the 2015-16 and 2018-19 academic years. Specifically, we ask:

1. On average, what proportion of teachers at publicly funded child care centers left their center each year, and to what extent did this turnover rate vary across centers?
2. To what extent were centers' turnover rates consistent from one year to the next? That is, were there centers that experienced (or did not experience) persistently high turnover?
3. To what extent did centers with high or persistently high turnover differ from centers without high turnover on state-defined, center-level measures of quality?

This paper is the first to look at center-level turnover in a large state sample and to examine the issue of persistently high turnover in child care settings. Further, by exploring the link between turnover rates and center quality, as measured using an observational measure collected by the state, the study provides suggestive evidence

about the importance of addressing persistent teacher turnover for broader ECE quality improvement efforts.

Method

We use data from Louisiana's Quality Rating and Improvement System (QRIS). Beginning in the 2015-16 academic year, all publicly funded ECE programs – including child care, Head Start, and school-based pre-k – were required to participate in Louisiana's statewide QRIS.[8] As part of the QRIS, all classrooms at these centers were observed at least twice per year by a local observer who recorded the name of the lead teacher in the classroom as part of the observation.

Although these data were collected to track observational measures of classroom quality, an unintended benefit of these data is that they provide an opportunity to identify the lead teacher in every classroom in all publicly funded child care programs in Louisiana at multiple time points.[9] Linking these data over time allows us to track which teachers remained at their center and which turned over. We can then aggregate these data on individual teachers' departures to the center level to measure the amount of turnover each program experienced annually and examine variation in these rates across centers.

For this study, we limited the analytic sample to child care centers that were operating in every year between the 2015-16 and the 2018-19 academic years (n=575 centers). This allowed us to study teacher departures from each center over three years (i.e., the turnover from 2015-16 to 2016-17 through that from 2017-18 to 2018-19). This sample definition ensured each center had the same number of years for which we can estimate annual turnover rates, which was important for understanding the persistence of

turnover at centers over time. However, as this decision meant we excluded centers that closed down altogether, we may be underestimating the prevalence of staffing instability among child care centers throughout the state. We assessed differences in the centers we included versus excluded for this study (see Table A2.1 in the appendix), and we discuss potential implications for the generalizability of our findings in the discussion.

Defining Center-Level Turnover Rates

To compute center turnover rates, we first took teachers observed in the 2015-16 academic year and created an indicator variable equal to 1 if the teacher was not observed in a teaching role at the center in 2016-17, and 0 if the teacher stayed as a teacher at the same center (the matching of teachers over time is described in greater detail in Appendix B). Next, we computed the average of this variable across all teachers at each center; this represents the proportion of a center's teaching staff lost in the first year of our panel (e.g., the turnover rate for 2015-16). We then calculated this same statistic for each of the next two years (e.g., a center's turnover rate of 2016-17 is the percentage of teachers observed in 2016-17 who are no longer teaching by 2017-18, irrespective of whether teachers were also observed at that center in prior years). We used these continuous measures in assessing the variability of turnover across centers.

Identifying Centers with High and Persistently High Turnover

Both indicators of interest (high turnover and persistently high turnover) were derived from centers' annual turnover rates. There is no theoretical or empirical guidance from the literature on how "high turnover" should be operationalized in early childhood contexts. In the K-12 context, Holme et al. (2017) used 30% as a threshold for classifying schools with high turnover (with the average school in their data having roughly 20%

turnover in any given year); however, these authors also note the absence of clear guidance for defining high turnover. In the present study, we defined a child care center as having high turnover if it lost more than half of its lead teachers in a year. We selected this threshold for its ease in interpretation and because it represents an "above average" threshold relative to turnover rates observed in our data. We also examined how sensitive our results are to both less and more restrictive definitions (see Table A2.2 in the appendix).

Center Quality

High or persistently high turnover may be seen as a metric for center functioning, i.e., their capacity to provide high-quality services for children and families. One advantage of the data is that we can compare this center-level turnover to another measure of center quality – specifically, the quality rating assigned by Louisiana's QRIS. Under this QRIS, all publicly funded ECE centers receive an annual score which ranges from 1 to 7. This center-level score is calculated by aggregating the quality scores for every classroom within that center, which are derived from the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008), a widely used and validated scored classroom observation tool that captures different dimensions of the quality of teachers' interactions with children on a 1 to 7 scale. We provide more detail on how Louisiana calculates an overall score for each center in Appendix C.

Analysis

This paper had three aims: (a) to document center-level variability in annual turnover rates; (b) to understand the persistence of high turnover at centers over time; and

(c) to determine whether center quality varied across programs that did or did not experience high or persistently high turnover.

Describing Variability in Centers' Teacher Turnover Rates

To address the first aim, we computed each center's turnover rate and summarized these rates for our statewide sample of centers in each year of our panel. In addition, we divided centers in our data into two subsamples based on the median number of lead teachers observed in 2015-16, and explored the distribution of turnover rates across both subsamples. Specifically, we defined "smaller centers" as those with 3 or fewer lead teachers, and "larger centers" as those with 4 or more lead teachers in 2015-16. We stratified the sample for two reasons. First, the extent to which high turnover is a problem for centers may depend in part on how many teachers that center relies on to sustain the day-to-day operations of teaching with kids. Larger centers may have more organizational resources to respond to staffing difficulties, whereas in smaller centers the burden of teacher departures is potentially borne (and therefore felt more acutely) by fewer teachers. Second, turnover rates may fluctuate more considerably for smaller centers relative to those with a larger pool of teachers simply due to the small denominator. Thus, it may be important to separately assess the stability of this measure by center size.

Describing the Prevalence of High and Persistently High Teacher Turnover

We addressed the second research aim by documenting the pairwise correlations between centers' turnover rates from one year to the next. Correlations that are not statistically different from zero would indicate that centers' turnover rates are not consistent from one year to the next. Moderate to high correlations, however, would

suggest that some centers face persistently high turnover, or inversely, that some centers consistently experience relatively little turnover.

We formalized this by describing the percentage of centers that have high turnover never, once, twice, or in all three years of the panel. A single year of high turnover may be anomalous, whereas three years of high turnover may reflect more persistent center-level challenges. Similarly, centers without high turnover in any year may indicate centers that are particularly successful in maintaining a stable teaching staff. Again, we calculated this both for the overall sample and the for smaller and larger center subsamples.

Our analysis plan raised two questions. First, it was unclear whether the patterns of persistently high turnover in our sample should warrant concern. To assess this, we compared both the overall rates of high-turnover centers and the prevalence of persistently high turnover across child care centers to those observed in other ECE sectors in Louisiana (specifically, Head Start and school-based pre-k programs). This comparison was a useful benchmark for understanding the extent to which persistent staffing challenges are an especially pronounced issue for programs in the child care sector, relative to other ECE providers.

A second question in interpreting our estimates was whether the prevalence of high or persistently high turnover we observed is ultimately about what we would expect to see due to the work conditions facing the sector, even if turnover were not systematically clustered at specific centers. That is, given systemic issues facing the child care sector and the baseline high levels of teacher turnover (Bassok, Markowitz, et al., 2021; Whitebook, McLean, Austin, et al., 2018), we might expect some centers to

experience high levels of turnover for multiple years during the period, even in the absence of center-specific staffing challenges.

To get at this concern, we conducted a set of simulations. First, in each year, we determined the average turnover among teachers across the state (i.e., statewide turnover, rather than center-level turnover). Based on these rates, and for each year of the panel, we randomly allocated "turnover" status to teachers in our sample, and computed turnover rates for each center. In other words, the prevalence of teacher-level turnover throughout the state was the same in both the observed data and in our simulations, but in the simulated data the turnover was randomly distributed across all teachers irrespective of where they work, whereas in our data it might have been systematically clustered at certain centers. In the simulated data some centers might still have had multiple years of high turnover, but in this case, we could attribute this to chance. We compared the rates of this "persistent turnover" across the simulated data and our data to see if the clustering of high turnover observed in our data was higher than what we would expect to see if teachers were randomly assigned to centers.

Exploring Associations Between Patterns in Turnover Rates and Center Quality

Our goal for the third research aim was to understand whether patterns in centers' turnover rates over time corresponded with another measure of center-level quality. To this end, we examined overall quality scores assigned by the state to centers in 2017-18 and explored mean differences across several groups: (a) centers that did not experience high levels of teacher turnover over the course of that same year, i.e., from 2017-18 to 2018-19; (b) centers that had high turnover that year, but not in any of the prior two years; and (c) centers that both experienced a high rate of teachers leaving from 2017-18

to 2018-19 *and* had experienced high turnover for at least one of the prior two years. These comparisons allowed us to understand if centers that have sustained high turnover over multiple years differ, on average, from those centers experiencing relatively less teacher turnover on another measure of center quality.

Results

Overall, about 45% of child care teachers in any one year were no longer teaching at their center the following year. Our results explored how this turnover was distributed across centers.

Variation in Centers' Turnover Rates

As shown in Table 2.1, on average, child care centers in our sample lost 39% to 42% of their lead teachers annually. Within each year, there was considerable variability in turnover rates. The average center lost 40% of its lead teachers from 2017-18 to 2018-19, but 22% of centers did not experience any teacher turnover, and 30% of centers experienced high turnover (i.e., they lost more than half their teachers). Center size explained some of this variability, particularly at the extremes. Relative to smaller centers with three or fewer lead teachers, larger centers had slightly higher mean turnover rates, were less likely to retain all teachers, and were more likely to experience high turnover.

Identifying Centers with Persistently High Teacher Turnover

Although average turnover rates were relatively similar across the years included in our panel, it was not clear whether the same centers persistently experienced high turnover. The rightmost columns of Table 2.1 show pairwise correlations between centers' turnover rates for each year of the study period. They provide evidence that

turnover rates were modestly correlated from one year to the next (*r* ranges from .31 to .36).

Table 2.2 shows the number of years centers experienced high turnover. The majority of centers (56%) experienced high turnover for at least one of the three years, and 27% demonstrated persistently high levels of turnover (i.e., high turnover for at least two of the three years observed). Larger centers were more likely to demonstrate persistently high turnover, with 33% of centers meeting this definition, and 12% doing so for all years under study; in contrast, 22% of smaller centers lost more than half their teachers for two or more years, and only 6% did so for all three years. That said, many centers (44% of the full sample) did not experience high turnover in any of the years under study.

Benchmarking Estimates of Persistently High Turnover

In our data, 9% of centers experienced high turnover in all three years. However, given the high prevalence of turnover across the child care sector in Louisiana, some centers might show persistently high levels of turnover even if the likelihood of teacher turnover was independent of center characteristics.

We used two benchmarks to better understand if these patterns were anomalous or indicated something systematic about centers. First, we compared our findings to the prevalence of high turnover and persistently high turnover in other ECE sectors in Louisiana (Table 2.3). Not only were child care centers far more likely in any given year to experience high teacher turnover relative to Head Start and school-based pre-k programs, they were also more likely to experience persistently high turnover. Only 11% of Head Start programs and 6% of pre-k programs had high turnover for two or more

years, and just 2% had this level of turnover for all three years. Similarly, 58% of Head Start programs and 71% of pre-k programs did not have high turnover in any year. These patterns suggested high and persistently high turnover were particularly pronounced in the child care sector.

Second, in Figure 2.1, we plotted the proportions observed in our data (dashed vertical lines) against results from 1,000 simulations under a scenario in which turnover was randomly assigned to teachers, irrespective of where they were employed. Relative to our simulations, centers in our data were both more likely to have no years of high turnover *and* to have three years of high turnover. For instance, if turnover was randomly distributed across centers, our simulation suggests 3% of programs would have had three years of high turnover. The rate we observed is three times higher. This comparison offers suggestive evidence that both persistently high turnover centers and centers without any high turnover appear more than would have been expected had turnover been distributed randomly across teachers. We show in Table A2.2 in the appendix that the overrepresentation in our data holds even across alternate threshold definitions, particularly for the "no high turnover" category.

Associations Between High Turnover Rates and Center Quality

Last, we examined differences in center quality between centers that did not have high turnover in 2017-18, centers that lost a high proportion of teachers only from 2017-18 to 2018-19, and centers with high turnover in 2017-18 and at least one of the prior two years. This comparison allowed us to understand whether the persistence of teacher turnover corresponded with Louisiana's assigned quality scores. Of the 172 centers with high turnover rates in 2017-18, 35% of centers did not experience high turnover in any of

the prior years, while the remaining 65% experienced high turnover for at least one of the prior years.

Table 2.4 that centers that experienced high rates of turnover both from 2017-18 to 2018-19 and at least one prior year had lower quality scores in 2017-2018, on average, compared to centers that did not experiencing high turnover at all (a difference of 0.40 points; $p<.001$); this difference reflects about two-thirds of a standard deviation. This result was true both for the full sample and within subsamples. Table 2.4 also shows that, in the overall sample, centers with a prior history of high turnover rates had lower quality than the centers for which high turnover was experienced only in 2017-18 (a difference of 0.21 points, or about one-third of a standard deviation; $p<.05$). Notably, this difference was especially pronounced among centers with three lead teachers or fewer, whereas for larger centers the difference between these groups of centers was not statistically significant. However, we note the small number of centers with high turnover from 2017-18 to 2018-19 only.

Discussion

Teachers are critical for early childhood programs' efforts to support children's development, yet the child care sector has continued to struggle with finding and retaining teachers (Bassok, Markowitz, et al., 2021; Whitebook, McLean, Austin, et al., 2018). These staffing challenges likely have implications for both children (Markowitz, 2019; Tran & Winsler, 2011) and the teachers and leaders left behind (Cassidy et al., 2011; Whitebook & Sakai, 2004). To better identify solutions for promoting workforce stability, it is essential to know the extent to which centers vary in their experiences with teacher turnover. The present study addressed this need by using statewide panel data

from Louisiana to estimate the variability in centers' turnover rates over a four-year period. To our knowledge, this study was the first to quantify how different centers experienced teacher departures, and the first to explore whether high turnover levels persisted across multiple years for some centers.

Mean turnover rates in our data were quite high: In any given year, the average center lost about 40% of its lead teachers from one year to the next. The high levels of turnover are generally consistent with prior research examining teacher turnover (Totenhagen et al., 2016; Whitebook & Sakai, 2003). However, there was substantial variability in these turnover rates. For instance, about 25% of centers experienced no turnover in a given year, and about one-third of the sample experienced at least 50% turnover.

Our results further showed that instances of high turnover occurred consistently over time for some centers in our data. This finding is particularly noteworthy given the absence of statewide longitudinal data systems in ECE (Whitebook, McLean, & Austin, 2018) that make it difficult to assess whether the same centers continue to struggle with teacher turnover issues. In our data, about 25% of centers lost more than half of their teachers for multiple years of the panel, and 9% of the sample had this level of turnover in all three years for which we could estimate annual turnover rates. To put in perspective, the prevalence of persistently high-turnover child care centers in our data was far higher than that observed even in other ECE sectors in the same state and during the same period – more than twice as high as in Head Start and more than four times the prevalence in state pre-k (Table 2.3). At the same time, 44% of the sample did not

experience any years of high turnover, which was further evidence for systematic clustering of teacher turnover by centers.

Prior research on the drivers of individual teachers' turnover decisions generally categorizes these factors into three levels: personal factors, such as teachers' motivation and professional commitment, or obligations unrelated to teachers' current position; center-specific factors, including positive social exchanges in the workplace, feelings of autonomy, and a sense of recognition; and institutional or systemic factors, including issues of teacher compensation (Bridges et al., 2011; Cassidy et al., 2011; Doromal & Markowitz, 2021; Grant et al., 2019; Manlove & Guzell, 1997; McDonald et al., 2018; Schaack et al., 2020; Totenhagen et al., 2016; Whitebook & Sakai, 2004). The variability in teacher turnover across centers (rather than, for instance, all centers uniformly experiencing high levels of turnover) lends support to at least the latter two factors as salient drivers of turnover from centers. Child care directors and other center leadership, in particular, may play an important role in addressing these factors, such as through creating supportive and collaborative workplaces, fostering mentoring relationships, and providing feedback for their teachers (Doromal & Markowitz, 2021; Douglass, 2017; Jeon & Wells, 2018; McDonald et al., 2018). Understanding the potential magnitude of these associations, as well as evaluating the impacts of interventions that explicitly target center-level factors to influence teacher retention, is a key area for future research.

While these center-level factors are important and are salient in how teachers describe their reasons for staying or leaving, it remains difficult to disentangle them from external factors that may also be driving turnover at a center. Local labor markets likely influence both who directors are able to hire and directors' ability to retain these teachers.

Compensation issues are commonly cited in teachers' intentions to leave their center, and in many cases they prevail over positive attitudes of either early childhood work or their center (McDonald et al., 2018; Schaack et al., 2020; Whitebook & Sakai, 2004). Qualitative research (McDonald et al., 2018; Whitebook & Sakai, 2004) and popular press articles (Petersen, 2021) have suggested that low wage rates, given education and training requirements, often pose challenges for both hiring qualified staff and keeping them from exiting the workforce altogether (e.g., to find jobs in comparable-paying fields). In Louisiana, where this study was conducted, the average child care lead teacher earned about $9.50 per hour in 2018 (Bassok et al., 2019), about half of the wage rate of lead teachers in school-based pre-k classrooms. These issues are widespread across child care centers, yet likely also contribute to center-level variability, as some leaders are more or less able to navigate staffing challenges, or to find new sources of revenue to support teacher compensation. While recent research has suggested the potential of wage incentives for addressing teacher retention (Bassok, Doromal, et al., 2020; Bridges et al., 2011; Gable et al., 2007), more research exploring how compensation strategies interact with either center-level factors or the local labor markets centers face may be warranted.

One primary reason policymakers, center directors, and other practitioners are concerned about teacher turnover is because of its implications for the types of experiences a center can provide for young children. Louisiana's early childhood reforms over the past decade have focused on improving the quality of teacher-child interactions through professional development investments, credentialing efforts, tax credits, and other initiatives (Bassok, Magouirk, et al., 2021). The state has recognized that turnover in child care is a problem it needs to address (LDOE, n.d.-b). This study documents that

center-level teacher turnover mirrors their key metric of a center capacity to provide high-quality services: Centers with more sustained teacher instability were the least likely to be assigned higher quality scores from the state. These patterns were especially pronounced among the smaller centers in our sample, perhaps because each teacher departure represented a greater share of the center's overall teaching staff, and potentially because these centers had fewer personnel to distribute the burdens of high teacher turnover. This finding echoes prior research exploring how teacher turnover is related to the day-to-day operations of child care centers (Cassidy et al., 2011) and suggests that data on center-level turnover rates may be a useful measure to collect in administrative data. That said, our data cannot confirm these potential explanations, and cannot speak to just how much past turnover complicates current efforts related to staffing a center and improving center quality. Better understanding how persistent staffing challenges relate to center functioning and, ultimately, the teachers and children at those centers is a key area for future research.

Limitations and Future Directions

While the present study advances the literature in a number of key ways, we note several limitations. First, we did not observe the characteristics of individual teachers or leaders in our study, nor did we observe the practices or policies implemented at centers. Our data allowed us to document the scope of turnover across centers in one state context; but, with more detailed data, future research can investigate whether there are key center- and community-level factors that correlate with centers' turnover rates. It may be especially important to know if there are specific leadership styles or practices that support centers' staffing stability, or similarly if there are market factors that might

help lead some centers to have greater staffing difficulties. This research would help clarify how directors contend with teacher turnover and the extent to which high turnover impedes on their ability to lead and manage a high-quality child care center.

Second, we did not observe information about who is served by each center. Although it was not within the scope of the present study, it is important to identify the characteristics of children, families, and communities that are more likely to be served by these high and persistently high turnover centers, particularly given concerns that persistent staffing challenges could negatively influence center operations and children's experiences. In light of these consequences, researchers should be attentive to equity implications when examining community-level correlates, especially given that other research documents structural inequities along socioeconomic status and by race and ethnicity in who has access to safe and high-quality ECE programs (Latham et al., 2020; Valentino, 2018).

Third, we acknowledge that our findings may *understate* the overall prevalence of high turnover among the universe of child care centers serving children in Louisiana during this period. Our decision to focus on only the centers that remained operational allowed us to better understand the longitudinal nature of centers' turnover issues; yet, as Table A2.1 in the appendix shows, the centers that were open in 2015-16 that closed before 2018-19 were considerably more likely to demonstrate high levels of turnover relative to the centers that remained open. As teachers are a vital component of the operations of child care centers, it seems plausible that high turnover could contribute to difficulties in keeping a center open. These centers may be even more likely to benefit

from targeted supports to help their business to stay staffed and, in turn, function at a level that helps ensure quality services for children and families.

Finally, although our use of a statewide, four-year panel of data is a strength of this study, it is important to replicate this work in other states and other periods of time. This is particularly true give the potential of larger economic conditions, including availability of higher wages and benefits, to impact turnover patterns. The impact of COVID-19 on centers' ability to hire and retain staff has received increased attention but is not yet well understood, and understanding pre-pandemic staffing challenges across a range of contexts could help guide policy spending the unprecedented investments in child care stemming from COVID-19 recovery funds (Bipartisan Policy Center, 2021). Research on the impact of these efforts will also be important moving forward.

Policy Implications and Conclusion

In a statewide sample of publicly funded child care centers in Louisiana, we found that one-third of centers each year lost more than 50% of their lead teachers from one year to the next, and that one-quarter of all centers open from 2015-16 to 2018-19 experienced this level of teacher turnover for multiple years. The findings underscore Using statewide data on publicly funded child care centers in Louisiana, we found high rates of teacher turnover that systematically varied across centers and persisted for some centers across multiple years. These measures of high and persistently high teacher turnover corresponded with Louisiana's measure of center quality, thus underscoring concerns that the teacher staffing challenges pervasive in child care are likely to impede on policymakers' efforts to improve ECE quality in this sector.

Policymakers should recognize there are many factors likely driving the clustering of turnover at specific centers, including features of centers themselves (e.g., work environments or how those centers are managed) and community- or system-level factors that influence how centers are able to staff (e.g., navigating resource constraints in an underfunded child care system). These factors translate into a number of short- and long-term solutions that could show promise for stabilizing the workforce. Some of these strategies involve directly targeting centers that seem to persistently struggle with teacher turnover, including providing center directors with training on how to manage an effective center and lead a collaborative team of teachers. While these investments are appealing in tackling retention issues over the short-term, these targeted approaches may require more long-term commitments that address many of the system-level constraints that limit centers' ability to support and invest in their teachers, including offering higher pay, more benefits and access to professional development opportunities.

The calls for heightened public investment in child care following COVID-19 present a novel opportunity for policymakers to innovate and invest in these strategies for supporting the child care workforce. This period is thus also an important opportunity to learn how to support this sector over the long-term by studying current policy actions. Ensuring the availability of data, and potentially collecting new information as part of these policy rollouts, will be essential for helping policymakers understand the impact of their investments and ensuring the returns for teachers, centers, and child development.

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[7] Throughout the paper, we use the term *turnover* to describe teachers' departure from a center. We focus on this type of turnover because we are primarily interested in the organization-level instability resulting from teacher departures—regardless of whether they stay in child care or in another ECE profession.
[8] In Louisiana, some child care centers do not accept public dollars and thus are not included in QRIS. Our data include about two-thirds of all licensed child care centers across the state.
[9] One notable limitation of the data is that we only observe lead teachers (i.e., we do not observe instructional aides or other paraprofessionals), and we only observe toddler and preschool-age classrooms

(i.e., we do not have infant classrooms). Louisiana's administrative data started to include infant teachers beginning in 2018-19. However, as we do not observe infant teachers in prior years, we excluded these observations for comparability.

Table 2.1
Teacher turnover rates for centers in study sample

	Summary statistics			Year-to-year correlations		
	Mean center-level turnover rate	% of sample with no turnover	% of sample with high turnover	2015-16	2016-17	2017-18
All centers						
2015-16	42%	22%	33%	1.00		
2016-17	39%	26%	29%	0.31	1.00	
2017-18	40%	22%	30%	0.21	0.36	1.00
Smaller centers						
2015-16	37%	37%	27%	1.00		
2016-17	35%	39%	27%	0.27	1.00	
2017-18	36%	33%	26%	0.15	0.36	1.00
Larger centers						
2015-16	48%	6%	39%	1.00		
2016-17	43%	11%	32%	0.36	1.00	
2017-18	44%	10%	34%	0.28	0.34	1.00

Notes: All centers based on 575 centers in study sample. We define smaller centers as those with 3 lead teachers or fewer; 305 centers met this definition. We define larger centers as those with 4 or more lead teachers; 270 centers met this definition. High turnover is defined as a center losing more than 50% of its lead teachers from one year to the next.

Table 2.2
Prevalence of persistently high teacher turnover among centers in study sample

		% of sample by number of years with high turnover			
	n	0 years	1 year	2 years	3 years
All centers	575	44%	29%	18%	9%
Smaller centers	305	48%	30%	16%	6%
Larger centers	270	39%	29%	21%	12%

Notes: We define smaller centers as those with 3 lead teachers or fewer; we define larger centers as those with 4 or more lead teachers. High turnover is defined as a center losing more than 50% of its lead teachers from one year to the next. Recall that we limit the sample to centers operating for the entire duration of the panel, so that center closures do not drive any of these patterns. See Table A2.1 in the appendix for more information.

Table 2.3
Prevalence of high and persistently high turnover centers, by ECE sector

		% of sample with high turnover, by year			% of sample by number of years with high turnover			
	n	2015-16	2016-17	2017-18	0 years	1 year	2 years	3 years
Child Care	575	33%	29%	30%	44%	29%	18%	9%
Head Start	184	14%	16%	24%	58%	31%	9%	2%
Pre-K	630	11%	11%	13%	71%	23%	5%	1%

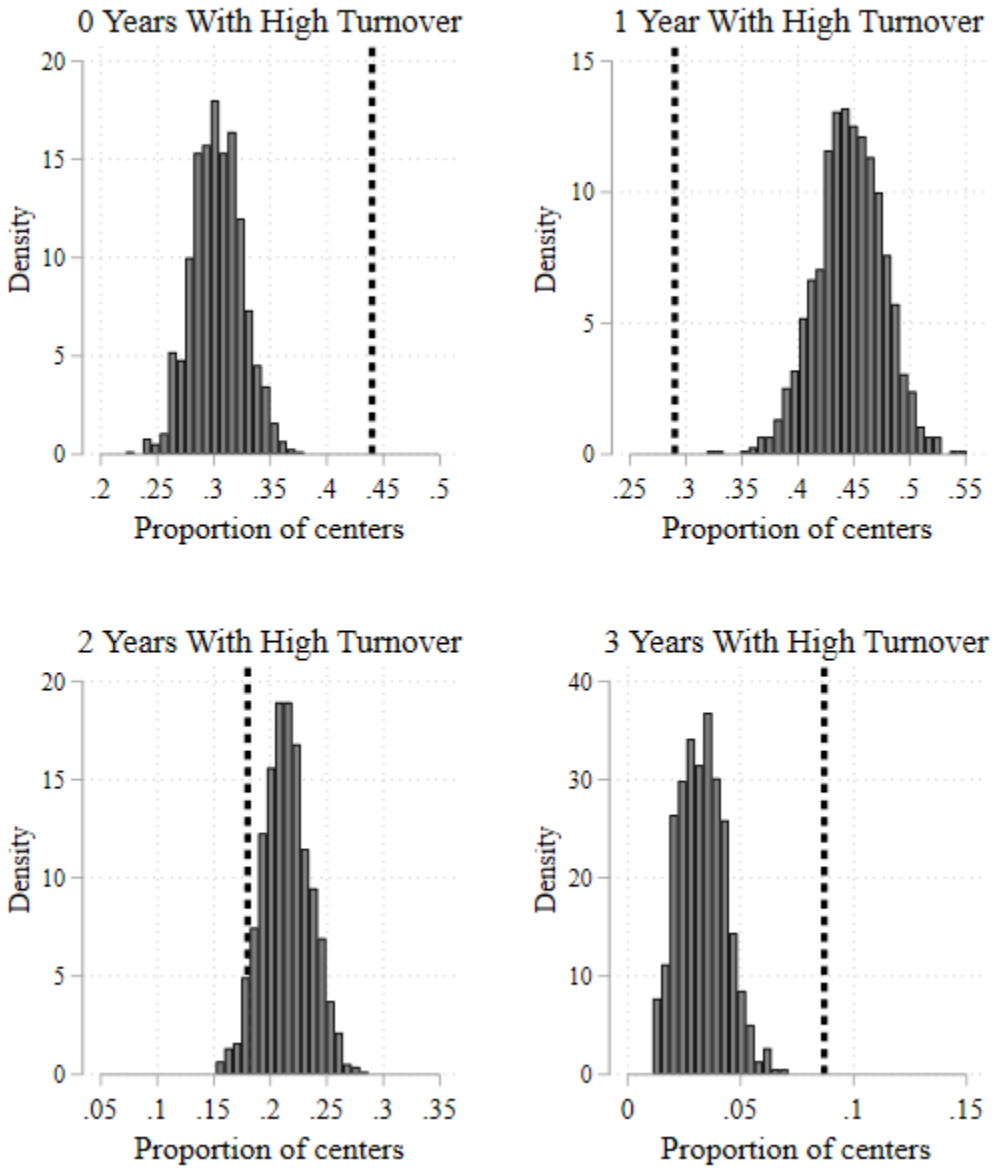
Notes: All programs were operational in Louisiana between the 2015-16 and 2018-19 school years. High turnover is defined as a center losing more than 50% of its lead teachers from one year to the next. Persistently high turnover centers are those with at least two years with high teacher turnover.

Table 2.4
Center quality scores in 2017-18, by high teacher turnover in current and prior years

Sample	(1) No high turnover from 2017-18 to 2018-19	(2) High turnover from 2017-18 to 2018-19 only	(3) High turnover from 2017-18 to 2018-19 and at least one prior year	Difference between (3) and (1)	Difference between (3) and (2)
All centers	4.78 [0.62]	4.59 [0.58]	4.38 [0.56]	-0.40***	-0.21*
Smaller centers	4.68 [0.65]	4.64 [0.62]	4.25 [0.55]	-0.43***	-0.39**
Larger centers	4.91 [0.56]	4.54 [0.55]	4.48 [0.55]	-0.43***	-0.06

Notes: All centers based on 575 centers in study sample. We define smaller centers as those with 3 lead teachers or fewer; 305 centers met this definition. We define larger centers as those with 4 or more lead teachers; 270 centers met this definition. High turnover is defined as a center losing more than 50% of its lead teachers from one year to the next. Center quality is measured on a 7-point scale; more information is provided in Appendix C. Standard deviations are presented in bracket parentheses.
Significance: * p<.05; ** p <.01; *** p<.001

Figure 2.1
Comparison of observed proportions and simulation distributions of persistently high teacher turnover



Notes: The figure above summarizes 1,000 simulations, where we fix the likelihood of individual teachers' turnover but randomly assign turnover to teachers such that turnover is uncorrelated with center characteristics. The vertical dashed line represents the observed proportion in our data; this allows us to examine whether the prevalence of centers with persistently high turnover in our data (or even the lack of high turnover) is different from what we might expect to observe were teacher turnover distributed randomly across centers.

CHAPTER 3

Following the Leader: Associations Between Leader Support and Teacher Retention in Child Care Settings

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Abstract

There is high turnover among child care teachers in the United States. Center directors may play an important role in reducing this turnover, but to date, research on how leaders in child care support workforce stability has not been sufficiently examined beyond small, selected samples. This study links survey responses from 1,114 child care teachers working in 152 publicly-funded child care centers to examine how leader support (as reported by teachers) is associated with teacher retention outcomes. Results suggest leader support is positively associated with both teachers' intent to stay and their observed retention at their center eight months later, above and beyond a set of teacher, leader, and center characteristics. Our findings suggest leaders in child care may be important in promoting workforce stability and quality improvement.

Introduction

Teachers play a major role in creating consistent and responsive learning experiences for young children in early childhood education (ECE) settings (Institute of Medicine & National Research Council, 2015), yet studies suggest that about one third of ECE teachers in the United States leave their program each year (Bassok, Markowitz, et al., 2021). Teacher turnover is particularly prevalent among independently operated child care centers (Bassok, Markowitz, et al., 2021; Phillips et al., 2019; Whitebook et al., 2014), which serve just over half of children ages 0 to 5 (NSECE Research Team, 2014) and are a major ECE provider for families relying on child care subsidies (Office of Child Care, n.d.). Instability in the child care workforce can hinder children's developmental progress (Choi et al., 2019; Tran & Winsler, 2011) and undermine investments in teachers' professional development (Gould, 2015; Whitebook et al., 2014).

Researchers and policymakers have long considered challenging working conditions as a likely driver of high turnover rates throughout the child care system (Barnett, 2003; IOM & NRC, 2015; Whitebook et al., 2014). At the same time, studies have begun to document how turnover rates vary considerably across centers (Caven et al., 2021; Doromal et al., 2021; Whitebook et al., 2014), suggesting that there may be center-specific factors likely to help support teacher retention. This paper examines one candidate explanation: access to supportive leaders.

In child care, center directors primarily play this leadership role. They support the functioning of their center through both managerial duties (e.g., hire teachers, manage payroll, recruit and enroll families) and instructional duties (e.g., train and provide feedback for teachers), and, recently, policymakers have taken early steps to potentially

support directors in their leadership capacity, for example, by developing and standardizing core competencies for ECE leaders (McCormick Center, n.d.). As directors shape the day-to-day experiences of teachers (Zinsser et al., 2016), they are likely to influence teachers' job attitudes and their likelihood of staying in a position, potentially even in the absence of costlier intervention. While the broader literature on leaders in child care is steadily growing (e.g., Heikka et al., 2013; McDonald et al., 2018; Russell et al., 2010), research linking leader support to teacher retention remains limited in key ways, including its focus on teachers' turnover intentions (rather than actualized turnover) and the prevalence of small samples, which may not provide sufficient variability in both center leadership and teacher retention. This limits their ability to speak to the ultimate goal of workforce stabilization (Grissom et al., 2016).

This study links survey data from 1,114 teachers working at 152 center-based child care settings with administrative data measuring teachers' retention status at the end of the calendar year to estimate the relationship between leader support and teacher retention. There are two key features of our analysis that allow us to strengthen the existing literature. First, our data include teachers' observed employment, in addition to intentions to stay (or leave) measures that many prior studies have used. By analyzing both, we are able to make comparisons in our estimated associations across outcomes. Second, we leverage ratings of leader support across multiple teachers in the same center (i.e., not relying solely on ratings from a single teacher), offering important information on how leader support should be measured for research. Our study provides new insights for policymakers seeking strategies for supporting child care and for researchers aiming to clarify how child care leaders can support teachers.

Teacher Turnover in Child Care Settings

Child care centers have long faced challenges in retaining teachers, though estimates of turnover rates vary substantially. Studies relying on directors' retrospective reports on staff departures find that about 20% to 25% of child care teachers leave their center each year (Phillips et al., 2019; Whitebook et al., 2014). However, other studies, particularly those that track teachers longitudinally, estimate turnover rates reaching as high as 45% (Bassok, Markowitz, et al., 2021). Turnover rates in child care are often higher than in other ECE settings such as Head Start and state pre-k programs (Bassok, Markowitz, et al., 2021; Phillips et al., 2019) and are substantially higher than turnover rates in K-12 settings (Holme et al., 2017; Redding & Henry, 2019).

There are several ways high teacher turnover can inhibit centers' ability to provide young children with high-quality educational experiences. First, children's learning hinges on warm, scaffolded interactions, particularly for infants and toddlers whose development relies on relationships with caregivers (Bowlby, 2008). Teacher turnover disrupts the stable teacher-child relationships needed to support children's growth, and has been negatively linked to child outcomes (Choi et al., 2019; Howes et al., 1998; Markowitz, 2019; Tran & Winsler, 2011). Second, teacher turnover can contribute to the already high levels of work-related stress for the remaining teachers, which can reduce the quality of their classroom interactions (Cassidy et al., 2011; Totenhagen et al., 2016). Third, investments in teachers' professional development are lost when teachers leave their jobs, making turnover costly for centers. Finally, high turnover leaves ECE leaders scrambling to find new hires, which can detract from other leadership duties (Cassidy et al., 2011).

Poor work conditions – such as long hours, low wages, and limited supports and resources to handle job stressors – are a key challenge in centers' efforts to retain teachers. Policymakers have long discussed compensation strategies such as increasing wages and benefits to early educators (Bridges et al., 2011; Gable et al., 2007; Whitebook et al., 2014; Whitebook & Sakai, 2003). Yet, support from ECE leaders may be an important on-the-job resource for teachers, especially those who may be seeking more immediate support in their roles. This paper explores this possibility by examining whether directors and other leaders in child care, and specifically the support leaders provide teachers, are one potential factor in supporting retention.

Child Care Directors as Multidimensional Leaders

Leaders play a major role in building high-quality ECE environments (LeeKeenan & Chin Ponte, 2018). In child care, center directors typically assume this leadership role, taking on a diverse set of responsibilities at their center. Most centers operate as small, independently operated businesses, and as such, leaders perform a number of managerial tasks to keep their center running—for example, scheduling staff, managing payroll and billing systems, and advertising in order to maintain enrollment and revenue. Alongside these essential duties, leaders also serve as an instructional resource at their center, helping to develop and support teachers' classroom instruction by observing teachers and providing instructional feedback and resources (LeeKeenan & Chin Ponte, 2018).

In order to both manage their center and serve as instructional leaders, directors need to build strong, supportive relationships with their teachers (Douglass, 2017; LeeKeenan & Chin Ponte, 2018; Luther, 2020). Leaders are said to support teachers when they are able to articulate a clear improvement-oriented vision, motivate and unify

teachers under a shared goal, and recognize and show appreciation for teachers' efforts and contributions in promoting children's learning in the classroom (McCormick Center, n.d.). These principles undergird a number of commonly applied center practices, such as holding regular staff meetings and setting expectations for clear and honest two-way communication (LeeKeenan & Chin Ponte, 2018).

Leaders as an On-the-Job Support for Teachers

For child care leaders to meaningfully influence teacher behaviors, teachers must experience their leader's efforts as support, and in turn value those actions in how they perceive their work and their role. This support can come in many forms, such as receiving mentoring and advice from experienced individuals, being coached on organizational expectations, having close relationships with others at work with whom to share work or personal challenges, and receiving support directly related to tasks and job performance (Harris et al., 2007). In broader educational contexts, leaders have been shown to play a critical role in structuring these supports, either directly through their interactions, or indirectly through setting norms and creating a positive work climate (Grissom & Loeb, 2011; LeeKeenan & Chin Ponte, 2018; Maertz Jr. et al., 2007; Wells, 2017; Zinsser et al., 2016).

These job supports may be related to teacher retention. Theoretical models (e.g., Demerouti et al., 2001; Sun & Wang, 2017) suggest that resources and supports in the workplace can help mitigate feelings of job-related exhaustion and burnout, which in turn relate to teachers' motivations for leaving their job. Support from leaders, in particular, may shape teachers' retention decisions by counterbalancing the job demands of working

in child care, such as low wages and the day-to-day challenges of working with young children.

Research findings from K-12 also strengthens this idea: Principals and the support they provide are among the most important influences on whether a teacher chooses to remain at their school (Boyd et al., 2011; K. M. Brown & Wynn, 2009; Grissom, 2011; Grissom et al., 2021; Ladd, 2011; Tickle et al., 2011). Though child care directors are likely to play a similar role at their centers, the child care and K-12 school contexts are distinct on several critical dimensions. First, their job responsibilities differ. While both principals and child care directors serve as instructional leaders, child care directors are also responsible for their center's financial solvency. Moreover, the teachers across these settings also vary substantially: even compared to kindergarten and elementary grade teachers, child care teachers earn far lower wages and have limited pathways to continued education, are more likely to fall below the poverty line, and are more likely to turn over (Phillips et al., 2019; Whitebook, McLean, Austin, et al., 2018). These differences may imply varying capacities of leaders to offer support to teachers, and varied expectations from teachers for how leaders should support them. As a result, it remains important to understand the role of leaders in supporting teacher retention in child care specifically.

Leader Support and Teacher Retention in Child Care

There is a small though growing literature examining how leaders might support teacher retention in child care settings. Qualitative research demonstrates how child care teachers value the support they receive from leaders, and how this support, in turn, informs their motivations to stay at their center (McDonald et al., 2018; Wells, 2017). In one study, McDonald and colleagues (2018) interviewed 80 teachers across nine child

care centers to determine reasons for staying at their center. They identified leadership and management practices as one of three potential influences. Participants in the study described leaders as playing a key role in facilitating positive and effective social exchanges in the workplace, and in helping teachers feel recognized for their work. Teachers also cited relying on leaders to lead an effective team of teachers at their center, and to motivate and support the teaching staff (McDonald et al., 2018, p. 659).

Researchers using survey data have uncovered similar associations (Grant et al., 2019; Russell et al., 2010; Wells, 2015). Teachers' views on how a center is managed and organized (Russell et al., 2010) and on whether a shared instructional vision has been established at a center (Schaack et al., 2020) emerge as particularly important for teachers' motivations to stay or leave. Some studies using Head Start samples have found a positive association between teacher retention an their views of relationships with leaders at their center (Wells, 2015), though this does not always emerge as a main predictor in other studies (Russell et al., 2010; Schaack et al., 2020).

In general, the relatively small and homogeneous samples these studies employ make it challenging to understand whether these preliminary associations are influenced by either the limited variability of turnover among teachers under the same center leadership, or the generalizability issues about the teachers or center who elected to participate in the study.

Another limitation is that many of these studies do not consider whether teachers' reports of their jobs are correlated with underlying turnover decision-making processes in ways other than the constructs under study (in our case, leader support). This may lead to common source bias, that is, there may be person characteristics—for example,

personality or mental health factors—driving any observed associations, or distort existing true relationships between leader support and retention. Teacher-specific measures are insightful for understanding job-related experiences, yet it is important to assess the extent to which associations are driven by leaders themselves, rather than individuals' perceptions. This is especially an issue given that much of the turnover literature uses turnover intentions—another teacher-reported measure that is often measured concurrently with job perceptions. While these constructs are modestly correlated (Grissom et al., 2016; Manlove & Guzell, 1997), it is actualized turnover, not the intention to turnover, that is most salient for policy and practice.

Research from the K-12 context offers useful methodological tools for addressing some of these issues. For example, Boyd and colleagues (2011) analyzed a working conditions survey of first-year teachers in New York City Public Schools, and used the average ratings of administrative support from first-year teachers within a school to predict not only those teachers' turnover risk, but also the risk of turnover for *other* teachers at the same school. The authors argue that this approach removes the linkage between how an individual teacher responds to a survey and their future behavior. This approach, which is increasingly used in the K-12 literature (Kraft et al., 2020), is especially promising if an individual's rating of leadership proxies something about the leader and their capacities to support the center.

To date, however, such approaches have not been applied to the child care context, in part because they require data that are not typically available for child care. Unlike in K-12 education settings, there is no centralized source of data for child care teachers' current or past employment at a specific center (Whitebook, McLean, & Austin,

2018). In the absence of these data, researchers must rely on primary data collection methods, often yielding small sample sizes. Moreover, response rates for ECE workforce surveys tend to range from 25-30% of their intended sample, and seldom do response rates exceed 50% (Boyd-Swan & Herbst, 2019; Roberts et al., 2019; Schaack et al., 2020). These challenges make it particularly difficult for researchers to sample across a sufficiently large number of sites to observe meaningful variation in leader practices and work environments, or survey multiple teachers within each of those sites to avoid relying on a single teacher's perspective of their leader. Our study builds on the literature by leveraging data sources that overcome these issues.

Present Study

This paper examines associations between leader support and teacher retention by combining baseline surveys with novel administrative data on child care teachers' employment, for a sample of over 1,100 teachers at 152 child care centers. Specifically, it addresses the following questions:

1. To what extent do child care teachers perceive support from leaders at their center?
2. Is leader support related to teachers' intention to stay and their observed retention? Do these associations differ by whether we use individual or aggregated ratings of leader support?

Method

This study uses data collected as part of an ongoing research-policy partnership between university researchers and the Virginia Department of Education (VDOE). In 2019, with support from a federal Preschool Development Grant Birth through Five

award, Virginia began a set of efforts to improve ECE across the state. This initiative aimed to increase access to stable, affordable, and high-quality ECE for families across the state.

In its first year, the initiative included 26 cities and counties, covering about a third of Virginia's total population. The participating communities are geographically diverse and include urban, suburban, and rural settings. The population in these communities are comparable to Virginia's population as a whole with respect to racial and ethnic composition, though they have a slightly lower median household income compared to the state average. The initiative included not only center-based child care programs accepting subsidy, who we focus on in this study, but also ECE programs operating in public schools, Head Start programs, and home-based child care providers accepting subsidies. We estimate that about 40% of all subsidy-participating child care centers in these 26 communities were included in the first year of the initiative.

Data and Sample

This study uses information from two sources. First, we use data from a spring 2019 survey that was fielded to all teachers working at least 30 hours per week in programs participating in the larger state initiative. The survey, which was a component of the larger partnership, asked detailed questions about teachers' lives and work, including perceptions of their leaders. All eligible teachers employed at these programs were invited to complete the survey. With support from state and local partners, the survey achieved responses from 72% of the sampling frame. The teacher surveys provide our measure of leader support, our intentions to stay measure, and a comprehensive set of teacher and classroom characteristics as covariates. Because center leaders were also

invited to take a separate survey, we were able to link demographic information on leaders of centers in our study, including their race and ethnicity, educational attainment, and experience working in ECE.

Second, we use administrative data collected by our state partners to track teacher retention. Teachers registered for the state initiative in spring 2019; eight months later our state partners contacted center directors to ascertain whether each registered teacher was still employed and working for at least 30 hours per week at their initial center. We link these employment data to teachers' baseline survey responses.

Our study focuses on teachers working at a center-based child care program participating in the initiative (i.e., it does not include any home-based programs or programs located in a public school building that were participating in the initiative).[10] Our analytic sample includes centers where at least three teachers provided valid reports of leader support (defined below), and is restricted to teachers with complete information on our retention outcomes. The resulting analytic sample is 1,114 teachers from 152 child care centers, with a median of six teachers surveyed per center.

Measures

Leader Support. Teachers' ratings of their leaders were assessed using an adapted version of the "School Leadership" subscale of the *VA Working Conditions Survey – Teacher* (VDOE, 2019). The original survey, which is widely used in K-12 settings throughout the state, asks respondents to rate their level of agreement with nine statements related to leadership at their school. We minimally modified the items to be more relevant for our context (e.g., changing "school" to "program"). Sample items included "I feel respected by the program leader," "I feel comfortable raising issues and

concerns that are important to me with the program leader," and "The program leader appreciates the hard work of teachers." Table 3.1 presents the full list of items as well as item-level descriptive statistics for the sample. Items were measured on a four-point agreement scale (*strongly disagree* to *strongly agree*) and demonstrated strong internal consistency for our sample ($\alpha = .96$).

We operationalize leader support in two ways. First, we create a composite score for each individual teacher by averaging the teacher's responses to the nine items. Teachers must have a valid response for at least 7 of the 9 items to be included. The resulting measure provides a summary of how individual teachers perceive leader support at their center.

Second, we compute an aggregate measure of leader support that is specific to each teacher. This measure is made by averaging the scores from all teachers working at a given center *except* the focal teacher. By excluding the focal teacher's report in the aggregated score, we reduce the possibility of unobserved, person-specific factors biasing estimated links between leader support and retention outcomes. Hereafter, we use "peer-average" to refer to these aggregated scores that exclude an individual's own rating in the computation.

Teacher Retention. We operationalize teacher retention in two ways: (1) teacher-reported intentions to stay and (2) observed employment at the same child care center eight months after the baseline survey (i.e., observed retention).

To measure intentions to stay, teachers indicated their level of agreement on a five-point scale (*strongly disagree* to *strongly agree*) to the following statement: "I am very likely to still be working at this program in March 2020." March 2020 was about 10

months after most teachers took the survey (May and June 2019). We create a dichotomous outcome equal to 1 for teachers indicating agreement or strong agreement with the intentions to stay item, and 0 for other responses (neutral, disagree, or strongly disagree).

For observed retention, we used the administrative employment data to create a dichotomous variable coded as 1 for teachers who were still employed at their center by the end of the calendar year (about eight months following the start of the study), and 0 for teachers who have otherwise left their initial teaching position.

Covariates. We account for several teacher-reported factors that may be related to teacher retention outcomes and leader support. First, we control for a set of teacher-level factors. We include: teachers' age, race and ethnicity, coded as White (omitted category), Black, Hispanic, or multiracial and/or other race;[11] degree attainment (1=holds a Bachelor's Degree or higher); certification (1=holds a Child Development Associate's); experience in the ECE field, coded as a three-level variable (less than one year of experience (the omitted category), between one and three years of experience; and more than three years of experience).

Our center- and job-related covariates include the following: classroom role (1=lead teacher status), Head Start status (1=works at a center with at least one classroom funded through Head Start), racial/ethnic composition of classroom, age group teacher serves (1=infant/toddler teacher), self-reported annual wages, and availability of benefits (1=teacher receives partially or fully paid healthcare benefits from center).

Finally, we include several self-reported demographic characteristics of the leaders of the centers in our sample, including their race and ethnicity (same definition as

above), their degree attainment (less than a Bachelor's degree (the omitted category), Bachelor's degree, and Master's degree or higher), and a four-level variable for years of ECE experience (less than one year (the omitted category), 1-4.99 years, 5-19.99 years, and more than 20 years).

Analysis

We first conduct descriptive analyses for all study variables to assess their distributional properties and to ensure variables took on logical values. For the leader support items, we compute intraclass correlations (ICCs) to examine the proportion of variance shared at the center level. ICCs also help us determine whether teachers' ratings of leader support are idiosyncratic or if they would yield meaningful information if aggregated.

Second, we examine associations between leader support and retention outcomes. Both study outcomes are binary, so we use linear probability models[12] to estimate the increase in the probability of retention associated with more positive ratings of leader support:

$$Y_{ij} = \beta_0 + \beta_1 Leadership_{ij} + \Gamma \boldsymbol{X} + \epsilon_{ij} \quad \text{(Eqn. 1)}$$

where Y_{ij} is the dichotomous outcome, and $Leadership_{ij}$ is the predictor of interest. We estimate Equation 1 for both of our leader support measures (individual reports and peer-averaged ratings, both standardized to the sample mean) and for both retention outcomes (intentions to stay and eight-month retention). Because our leader support variables are standardized, we interpret β_1 as the average increase in the probability that a teacher expresses intentions to stay (or is observed to stay at their center) for a 1 standard-

deviation increase in the leader support variable, conditional on the teacher, center, and leader characteristics accounted for in $\boldsymbol{X}$.

Because survey data were collected as part of a larger statewide program evaluation, all models include center-level treatment indicators and geography-based randomization blocks. In effect, our estimates compare centers and teachers located in the same region of the state, which also helps account for unobserved regional differences in turnover rates. All models also include indicators for missing covariate information. Finally, we use clustered standard errors to account for teachers within the same center.

Results

Table 3.2 provides summary statistics for the primary variables included in the main results. At baseline, 73% of teachers agreed or strongly agreed with the statement that they would be very likely to still be working at their center. Ultimately, 75% of the sample remained at their center after eight months, meaning that one-quarter of teachers left their center. However, these teachers who expressed an intention to leave were not entirely overlapping with teachers who ultimately left. For instance, of the teachers who did not expect to stay at their center, only 41% actually turned over. Similarly, among teachers who ultimately left, 55% had expressed an earlier intention to stay. The zero-order tetrachoric correlation between staying intentions and actual retention was r=.39, suggesting a modest relationship, while the center-level intraclass correlations for intentions to stay and observed retention were .06 and .08, respectively.

The majority of teachers in this sample identified as female (98%). About half of the sample was White (52%); 25% of teachers identified as Black, 10% of teachers identified as Hispanic, and the remainder identified as either Asian or multiracial. A little

over one-quarter of teachers (27%) held a Bachelor's degree or higher, and about one-third held a CDA credential (31%). Many teachers in our sample demonstrated commitment to the ECE profession, with 70% having at least three years of experience working in ECE and just 14% having less than a year of experience.

More than half (56%) reported being the lead teacher of their classroom; the remaining 44% were instructional aides, assistant teachers, or floaters. The sample was about evenly split between those teaching in infant and/or toddler classrooms (47%) and those with preschool-aged children. Finally, the median self-reported hourly wages was $11.12, which is just slightly under the statewide median hourly wages for child care teachers as reported by the Bureau of Labor Statistics.

Teachers' Ratings of Leader Support

Overall, teachers responded very positively to each of the leader support items (see Table 3.1, as well as Table A3.1 in the appendix). All items included in this scale had more than 80% of respondents reporting *agree* or *strongly agree*. Some items demonstrated more universal support than others. For example, the items "The program leader truly respects the families and children we serve," and "The program leader treats people respectfully, regardless of their race, ethnicity, gender, or any other characteristics," had about 93% agreement from teachers in the study. Notably, both these items describe more global characteristics of leaders and do not ask teachers to reflect on interactions with specific individuals, such as themselves or other teachers at their center.

Four items demonstrated more variability. About 15-18% of teachers responded neutrally or negatively to two items related to teachers' individual trust of their leader: "I

feel comfortable raising issues and concerns that are important to me with the program leader," and "I trust the program leader to do what they say they will do." Two other items related to the leader's instructional leadership showed a similar pattern ("The program leader supports teachers' efforts to manage challenging behavior," and "The program leader communicates a clear vision for this program"). In sum, teachers' overall ratings are positive, and there were some aspects of leader support that show variability in ratings.

Associations Between Leader Support and Retention

Table 3.3 presents results from four linear probability models that include teacher, center, and leader characteristics We compare across these models to understand first how the use of intentions rather than observed retention and second how the use of an individual teacher's rating versus the average rating of that teacher's peers influences the associations we estimate.

The first two columns present results from models that use the teacher's own ratings of leaders to predict intentions to stay (column 1) and observed retention (column 2). We estimate that a 1 standard-deviation increase in a teacher's own rating increases that teacher's probability of demonstrating an intention to stay at their center by 13 percentage points (column 1; $p<.001$). Column 2 shows that, when we predict a teacher's observed retention status using their own rating of leader support, the coefficient derived from the same analysis model is substantially attenuated to a 4 percentage-point increase in retention ($p<.01$). Post-hoc analyses confirm that estimates from columns 1 and 2 are statistically different from each other ($\chi^2=26.08$, $p<.001$). In other words, an individual's

view of leader support is more strongly linked with whether they intend to stay or leave, and may be a weaker predictor of observed retention.

Column 3 presents results from models that predict intention to stay using the peer-average measure. Using this approach, the link between leader support and intentions to stay remains positive and statistically significant (column 3; b=0.08, p<.05). This coefficient is marginally significantly different from the coefficient produced in column 1 (χ^2=3.20, p=.07), but not statistically different from the result in column 2 (χ^2=0.84, p>.1).

Finally, column 4 shows the results from regressions using observed retention and peer-averaged leader support. This is our preferred model, as it both incorporates observed retention measures and uses a more holistic measure of center leadership as a predictor variable. We find that a 1 standard-deviation change in the peer-average measure increases a teacher's own retention probability at the end of the calendar year by 7 percentage points (p<.05). Again, this coefficient marginally statistically different from that produced in column 1 (χ^2=3.69, p=.05), but not from those obtained in other models.

Discussion

Early educators play an important role in supporting young children, yet they are rarely well supported or well compensated for their work in the classroom. Too often, teachers in child care settings report high levels of stress (Bassok et al., 2019; Roberts et al., 2019), receive low wages and limited benefits (Phillips et al., 2019; Whitebook et al., 2014), and leave their jobs at high rates (Bassok, Markowitz, et al., 2021; Phillips et al., 2019). These concerns may be disproportionately experienced by very young children and children from low-income households, who are especially likely to be served in these

publicly funded, child care settings (NSECE Research Team, 2014; Office of Child Care, n.d.).

One often-discussed solution to promote teacher retention is to increase the supports teachers receive at their job, particularly through their leader (IOM & NRC, 2015). However, the relationship between leader support at a center and teacher retention is not well understood. This study used survey and administrative data from over 1,100 teachers to provide new evidence on this issue while overcoming two common methodological limitations in the literature (the use of staying intentions instead of observed retention, and predicting teachers' retention using their own ratings of leadership).

The turnover rates documented in our sample highlight the challenge of teacher turnover in child care settings. After just eight months, one-quarter of our sample had left their center. This turnover rate is high, both relative to Head Start and state pre-k (Phillips et al., 2019) and relative to turnover among K-12 teachers (Grissom et al., 2016; Redding & Henry, 2019).

We also found that teachers' ratings of their leaders are by and large positive. Across all nine items assessing views on leader support, more than 80% agreed that they felt supported, respected, and appreciated (see Table A3.1). At the same time, however, the data pointed to areas where leaders might focus their future efforts. Items related to leaders' instructional support and teachers' trust of their leaders had the highest proportion of teachers who disagreed. We find that 7 to 13% of the variability in leaders' ratings was explained at the center level. This suggests that even though teachers spend

much of their time in their own classrooms, teachers within a center have similar views of their leaders.

A primary goal of this study was to examine whether teachers were more likely to stay in centers where directors were viewed as more supportive. Consistent with this possibility, we find that leader support was positively and meaningfully associated with teacher retention. This association holds even when controlling for a number of teacher-, center-, and center-level characteristics likely to influence both retention and how teachers view their leadership. In our preferred model (model 4), a one standard-deviation increase in leader support was associated with a 7 percentage-point increase in the probability of eight-month observed retention.

A secondary goal of our study was to better understand how the challenges researchers face in collecting data in child care centers may impact our understanding of the role of leaders in creating high-quality care. Often researchers are limited to teacher survey data, and estimate the relationship between teacher-reported measures of leadership and teacher-reported intentions to stay at their center. This method both fails to measure the true construct of interest—teacher retention—and introduces common source bias, or that teacher characteristics related to how they fill out surveys will inflate observed associations between leadership and outcomes. Our data allows us to test how using an observed measure of teacher retention and an aggregated, peer measure of leadership changes estimated associations, which has implications for the design of future research.

We find evidence that common source bias can meaningfully distort associations. For instance, the association between leadership and retention when using individual

teacher reports and intentions to stay (model 1) was substantially larger in magnitude relative to that of every other model we estimate (models 2, 3, 4). An individual teacher's ratings of leadership and their intentions to stay or leave provide valuable and important information about teachers' outlook on their present job and the supports they perceive at their center, yet may be influenced by other factors beyond the support a leader provides. Using peers' ratings, rather than an individual teacher's own rating, changes the magnitude of the association substantially. In other words, our findings suggest that measurement decisions are likely to matter, and that ECE researchers faced with data collection constraints should adjust their analyses appropriately when examining the influence of leadership on retention.

Our findings are consistent with previous literature. Teachers value the support from their leadership, not only in supporting their instruction in the classroom, but also as a key social and emotional resource to help manage the demands of directly working with children and supporting their growth (Luther, 2020; McDonald et al., 2018; Wells, 2017; Zinsser et al., 2016). Our data supports previous work asserting that having supportive leaders influences teachers' outlook on whether they see themselves still working at the same center (Buettner et al., 2016; Grant et al., 2019; Schaack et al., 2020; Wells, 2015). Not only were we able to demonstrate these relationships in a larger sample, we were also able to test our associations using state-collected data on observed retention, rather than only analyzing self-reported intentions to stay. The magnitude of our associations using observed retention is somewhat smaller relative to prior studies using turnover intentions; however, this finding generally aligns with K-12 literature suggesting that leadership is a

stronger predictor of turnover intentions and a significant but more modest predictor of actual turnover (Grissom et al., 2016; Ladd, 2011).

Implications for Research, Policy, and Practice

Researchers, practitioners, and policymakers looking to reduce turnover in child care and in ECE more broadly should consider strategies that support the leaders who work with teachers every day. They should continue to examine what specific director practices are especially effective in helping teachers to feel supported in their role. Some of this work has already begun—for example, through clarifying definitions of leadership and developing core competencies to guide leader development, and designing common training experiences and credentials to demonstrate these competencies (McCormick Center, n.d.). A continued focus on these efforts may be a promising pathway for not only supporting teachers in their profession but also reducing turnover.

To the extent feasible, practitioners and policymakers should consider collecting data on leadership—and work climate more broadly—as a tool for understanding working conditions both at specific centers and more broadly at scale. Leaders, for instance, can use aggregated responses to brief surveys as a diagnostic tool to assess their own weaknesses and strengths and to target their practices to better support their teachers. Analogously, state departments could collect such measures as a "pulse" to understand whether teachers are feeling supported in their teaching role, and use it to target resources to support workforce stability. In fact, many state education departments already administer similar surveys in K-12 schools. There are challenges to coordinating and administering such a survey at scale in centers that are located outside of public school settings; for instance, these centers are not centrally managed and may experience more

frequent and fluid movement in their employees. Nevertheless, these data collection efforts could prove useful both in understanding supports as perceived by these teachers and, eventually, in tangibly tracking policy efforts to improve teachers' work conditions.

Finally, policymakers should consider strategies for supporting the development of ECE leaders, both in child care and in all ECE settings, to more effectively support the teachers who work day-to-day with young children in their classrooms. The Louisiana Department of Education, for example, launched a leadership program designed to bring together cohorts of ECE leaders across the state and develop the skills to better support the teachers and children at their center (LDOE, n.d.-a). These initiatives could be enabled and funded using existing funding sources, for instance, through quality set-aside funds provided by the Child Care and Development Block Grant Reauthorization (Department of Health and Human Services, 2014). Partnerships with researchers to test these innovative strategies may be especially fruitful in tangibly tracking changes in how teachers report feeling supported in the workplace and, ultimately, changes in center stability and reduced turnover.

Although we found that supportive leaders may be a key on-the-job resource important for teachers' decisions to stay, we stress that changes to leadership alone will not be sufficient for stabilizing the child care workforce. Addressing systemic issues such as low wages and limited benefits is an important and needed course of action for improving the working conditions of child care teachers, and also emerge in qualitative research exploring teachers' motivations for staying at their center (McDonald et al., 2018). Changing the nature of compensation in child care is essential, but will also take time and political will, and may not immediately improve teachers' professional practice;

a focus on developing leaders may be especially effective and complementary to these longer-term strategies for supporting the workforce.

Study Limitations

Though we leverage unique data collection in a large sample of child care teachers, there are several limitations of this work that should be kept in mind. First, while data collection efforts as part of the larger state initiative were expansive, the resulting sample was limited to the teachers who worked at least 30 hours per week at these centers. We may be missing out on the perspectives of part-time teachers who may not work above this threshold yet are still essential teaching staff. Our sample was also limited to centers serving low-income children using public dollars (e.g., through the state child care subsidy program and/or using Head Start funds). Future research should assess whether our findings transfer to other contexts, including early educators with different teaching schedules, and in child care settings that may have less financial support than the centers we surveyed in this study.

Finally, there is a question of how centers in our study – and, thus, the leaders supporting teachers in those settings – are representative of child care centers at large. A novel aspect of the study was to be able to leverage a large number of centers across the state *and* have information on all full-time teachers at these centers. Still, future research should clarify just how these relationships play out in other state contexts or time periods. For instance, the coronavirus, or COVID-19 pandemic, has highlighted the essential nature of child care for supporting the economy, and raised several questions about how to best create stable, effective care for young children. Child care leaders have faced many new challenges and have found their roles expanding as they tackle pandemic-

linked changes to their business (Bassok, Markowitz, et al., 2020). Future research should consider how leaders' capacity for leadership activities has changed and specifically the extent to which leaders are able to support their teachers amidst increasing demands and rapidly changing job expectations.

Conclusion

In a sample of child care teachers where even short-term turnover rates were notably high, we found that teachers' ratings of leader support were positive overall, shared among their colleagues, and linked to teachers' intentions to stay and their later retention at the center above and beyond a host of other teacher, center, and leader characteristics. For policymakers interested in stabilizing the ECE workforce, investments in the leaders who support teachers in their work may prove fruitful. Future research should continue to examine these relationships to ensure that the early educators who are central in supporting young children's development are themselves supported in their work.

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[10] In the state's initiative, programs are classified by auspice, or their physical location (i.e., either home-, school-, or center-based programs). Head Start programs span all setting types, and as a result some centers in our sample serve children using Head Start funds. Teachers in Head Start centers made up 23% of our sample.

[11] Following VDOE conventions, the survey asked a set of two questions, where respondents first reported whether they identified as Hispanic and/or Latino, and then reported their race. Respondents could choose from one or more of the following categories: White, Black or African American, Asian, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, Other. Because of small cell sizes, we collapse some of the categories in the analysis.

[12] We prefer the linear probability model given its straightforwardness and ease of interpretation, and we use bootstrapped standard errors to address concerns for heteroscedasticity that may otherwise arise from using OLS regression for binary outcomes. Our findings are not sensitive to this choice, that is, they are similar to those obtained from other approaches such as logistic regression.

Table 3.1
Summary statistics for leader support items

Variable	% non-missing	ICC	Mean	SD
Individual-Level Leader Support Score	100	0.11	3.21	0.65
Leader Support Items				
I feel respected by the program leader.	100	0.07	3.25	0.75
I feel comfortable raising issues and concerns that are important to me with the program leader.	100	0.08	3.14	0.81
I trust the program leader to do what they say they will do.	99	0.11	3.08	0.81
The program leader supports the professional development of staff.	99	0.07	3.23	0.71
The program leader supports teachers' efforts to manage challenging behavior.	100	0.08	3.09	0.79
The program leader communicates a clear vision for this program.	100	0.13	3.15	0.77
The program leader truly respects the families and children we serve.	100	0.06	3.34	0.67
The program leader treats people respectfully, regardless of their race, ethnicity, gender, or any other characteristics.	100	0.08	3.35	0.70
The program leader appreciates the hard work of teachers.	99	0.09	3.22	0.76

Notes: Based on n=1,114 teachers. Each item was rated on a four-point agreement scale (strongly disagree, disagree, agree, strongly agree); Appendix Table A3.1 shows the distribution of responses across each category. ICC = center-level intraclass correlation; SD = standard deviation.

Table 3.2
Summary statistics for retention outcomes and teacher and center characteristics

	Full sample (n=1,114)	Stayed at center (n=840)	Left center (n=274)
Teacher Retention			
Intentions to stay at center	73%	79%	55%
Stayed at center	75%	---	---
Teacher Characteristics			
Age (in years)	38.12	39.54	33.85
[std. deviation]	[13.44]	[13.51]	[12.27]
Female	98%	98%	98%
Race and Ethnicity			
White, non-Hispanic	52%	52%	52%
Black, non-Hispanic	25%	23%	29%
Hispanic, any race	10%	10%	8%
Multiracial and/or race undisclosed	14%	14%	12%
Bachelor's degree or higher	27%	27%	26%
CDA certification	31%	33%	26%
Years of ECE Experience			
Less than one year	14%	12%	20%
1-2.99 years	17%	16%	20%
3 or more years	70%	73%	61%
Center and Job Characteristics			
Lead teacher of classroom	56%	58%	51%
Racial/ethnic composition of classroom (%)			
White, non-Hispanic	50.10	50.65	48.41
Black, non-Hispanic	20.33	18.50	25.94
Hispanic, any race	11.46	12.45	8.40
Multiracial and/or race not known	18.12	18.40	17.25
Teaches infants and/or toddlers	47%	46%	48%
Teaches children with special needs	46%	46%	47%
Works in Head Start center	23%	21%	29%
Self-reported hourly wages ($)	11.99	12.26	11.12
[std. deviation]	[3.93]	[4.10]	[3.18]
Receives health insurance from center	0.520	0.519	0.523

Notes: Based on n=1,114 teachers. Table displays means and standard deviations (in square brackets, where applicable) for the full sample and by retention status. The intentions to stay measure is coded as 1 = *agree* or *strongly agree* and 0 = other response options. CDA = Child Development Associate's; having a Bachelor's degree and having a CDA are not mutually exclusive. Non-missingness for variables in the sample ranged from 88.9% to 100%.

Table 3.3
Linear probability models using leader support to predict teacher retention

	Teacher-Level Leadership Measure		Peer-Average Leadership Measure	
	Outcome: Intentions to Stay	Outcome: Retention	Outcome: Intentions to Stay	Outcome: Retention
Leader Support (standardized)	0.13***	0.04**	0.08*	0.07*
	(0.01)	(0.02)	(0.04)	(0.03)
Num. of obs.	1,114	1,114	1,114	1,114

Notes: Regression coefficients obtained from a set of linear probability models; each column represents a separate regression model. Cluster bootstrapped standard errors presented in parentheses. All models include a set of teacher, center, and leader characteristics as controls (see Table 3.2 Models also include study variable controls, a set of regional indicators, and missing value indicators for each variable where applicable. Appendix Table A3.2 provides the full regression output.
Sig: + p<.10, * p<.05, ** p<.01, *** p<.001

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APPENDICES

This dissertation has three appendices:

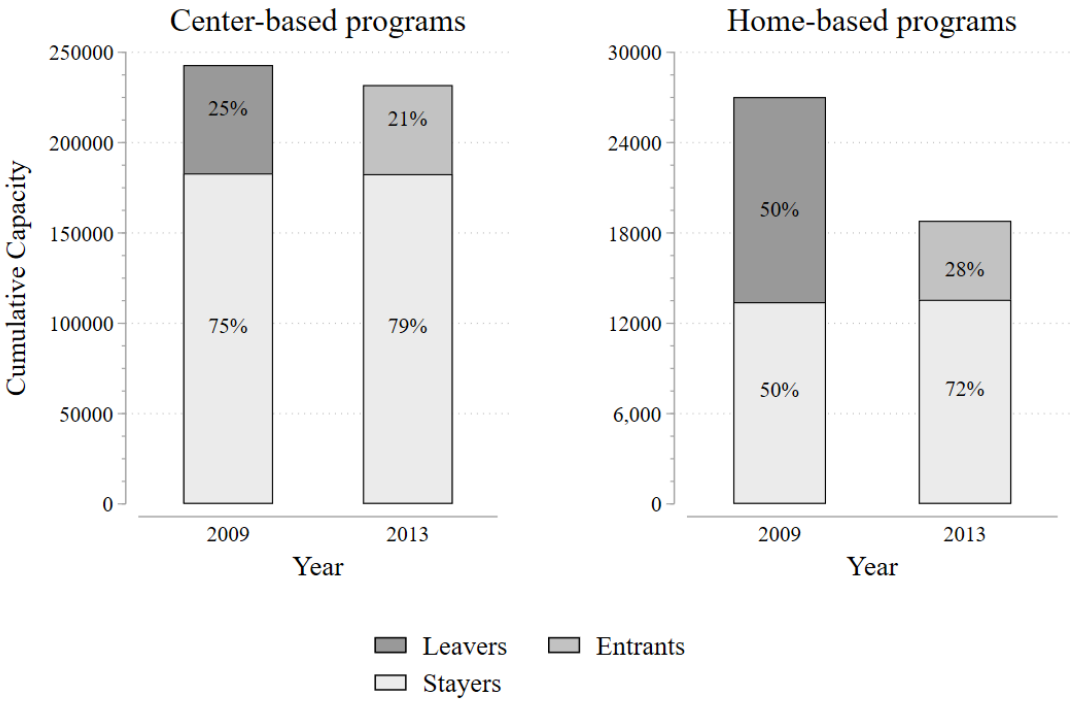
A. Supplemental tables and figures (All dissertation chapters)

B. Matching procedures (Chapter 2)

C. Detailed description of center quality in Louisiana (Chapter 2)

APPENDIX A. SUPPLEMENTAL TABLES AND FIGURES

Appendix Figure A.1
Cumulative capacity across stayers, leavers, and entrants in 2009 and 2013



Notes: There were 242,951 seats at center-based programs operating in 2009, and 231,850 seats in 2013. For home-based child care, there were 27,026 seats at operational programs in 2009, and 13,562 seats in 2013. We define stayers as programs that remained open between 2009 and 2013; leavers as programs that were open in 2009 but closed by 2013; and entrants as programs that opened after 2009 and were observed in 2013.

Appendix Table A2.1
Comparison of centers included in and excluded from the study, as observed in 2015-16

	Included in Study (n=575)	Excluded from Study (n=183)
Center size (% of sample)		
1-3 lead teachers	53%	73%
4 or more lead teachers	47%	27%
% of sample with high teacher turnover		
All centers	33%	74%
Centers with 1-3 lead teachers	27%	75%
Centers with 4 or more lead teachers	39%	71%
Center quality (Mean [SD])	4.36 [0.63]	4.07 [0.67]

Notes: Table describes the 758 centers observed in 2015-16 across key study variables. The first column describes centers included in our study sample, which we define as centers open in all years between the 2015-16 and 2018-19 school years. The second column describes centers that were open in 2015-16 but dropped out of the data prior to the last year of the panel (e.g., due to center closure). Note that in our four-year panel, there were an additional 138 centers that were not open in 2015-16 but observed in at least one subsequent year; these centers are not represented in the table above. In all, the 575 centers in the study represent 76% of all centers observed in 2015-16, 81% of all centers in 2016-17, 82% of centers in 2017-18, and 82% of centers in 2018-19. Center quality is measured on a 7-point scale; more information is provided in Appendix C. High turnover is defined as a center losing more than 50% of its lead teachers from one year to the next.

Table A2.2
Sensitivity of sample distributions to "high teacher turnover" definitions

	% of sample, by number of years meeting high turnover definition											
	All Centers (n=575)				Smaller Centers (n=305)				Larger Centers (n=270)			
	0 years	1 year	2 years	3 years	0 years	1 year	2 years	3 years	0 years	1 year	2 years	3 years
Definition 1: >30% turnover												
Observed distribution	10%	21%	32%	37%	11%	28%	29%	32%	9%	13%	35%	43%
Simulated distribution	3%	18%	42%	37%	5%	23%	43%	30%	2%	14%	41%	43%
Definition 2: >50% turnover												
Observed distribution	44%	29%	18%	9%	48%	30%	16%	6%	39%	29%	21%	12%
Simulated distribution	33%	44%	20%	3%	37%	43%	18%	3%	30%	45%	22%	3%
Definition 3: >66.7% turnover												
Observed distribution	51%	29%	14%	5%	61%	27%	9%	2%	54%	26%	15%	6%
Simulated distribution	44%	40%	15%	2%	39%	43%	16%	2%	52%	37%	10%	1%
Definition 4: 100% turnover												
Observed distribution	85%	13%	2%	0%	79%	17%	4%	1%	92%	8%	0%	0%
Simulated distribution	76%	19%	4%	1%	65%	28%	6%	1%	92%	8%	0%	0%

Notes: Table describes the sensitivity of our persistently high turnover findings to how high turnover is defined. Definition 1 is based on the threshold used in many K-12 studies; Definitions 2 and 4 are intended to describe intuitive quantities of teachers lost (i.e., half and all, respectively); and Definition 3 roughly defines the threshold for the uppermost quartile on the distribution of turnover rates in 2015-16. "Observed distribution" is the distribution of centers in our data, according to how many years they meet or exceed the given high turnover threshold definition. "Simulated distribution" averages the distribution of centers across 1,000 simulations, where we fix the likelihood of individual teachers' turnover but randomly assign turnover to teachers such that turnover is uncorrelated with center characteristics. In general, our data have a greater prevalence of persistently high turnover relative to the simulations, particularly when looking at centers with all three years with high turnover. The exception is Definition 4, though arguably, this may be an unrealistically high definition. We define smaller centers as those with 3 lead teachers or fewer; we define larger centers as those with 4 or more lead teachers.

Appendix Table A3.1
Item-level distribution of responses to leader support measure

	% Strongly disagree	% Disagree	% Agree	% Strongly agree
I feel respected by the program leader.	4%	6%	51%	39%
I feel comfortable raising issues and concerns that are important to me with the program leader.	5%	10%	49%	35%
I trust the program leader to do what they say they will do.	6%	12%	51%	31%
The program leader supports the professional development of staff.	3%	7%	54%	36%
The program leader supports teachers' efforts to manage challenging behavior.	5%	11%	52%	31%
The program leader communicates a clear vision for this program.	4%	10%	52%	34%
The program leader truly respects the families and children we serve.	3%	3%	51%	43%
The program leader treats people respectfully, regardless of their race, ethnicity, gender, or any other characteristics.	3%	4%	48%	45%
The program leader appreciates the hard work of teachers.	4%	8%	50%	38%

Notes: Based on n=1,114 teachers. Summary information (i.e., % non-missing, center-level intraclass correlations, means, and standard deviations) for each item and the composite score is provided in Table 3.1.

Appendix Table A3.2
Full regression results from linear probability models

	Individual-Level Measure		Peer-Average Measure	
	Outcome: Intentions to Stay	Outcome: Retention	Outcome: Intentions to Stay	Outcome: Retention
Leader Support (standardized)	0.13***	0.04**	0.08*	0.07*
	(0.01)	(0.02)	(0.04)	(0.03)
Teacher Characteristics				
Age (standardized)	0.07***	0.07***	0.07***	0.07***
	(0.01)	(0.02)	(0.02)	(0.02)
Race and Ethnicity (White is omitted)				
Black, non-Hispanic	-0.11*	-0.00	-0.12**	-0.01
	(0.04)	(0.04)	(0.04)	(0.04)
Hispanic	-0.01	0.03	-0.02	0.02
	(0.06)	(0.05)	(0.06)	(0.05)
Other race/multiracial/race undisclosed	0.01	-0.01	0.01	-0.02
	(0.04)	(0.05)	(0.04)	(0.04)
Bachelor's Degree or Higher	-0.02	-0.02	-0.01	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)
Child Development Associate's	0.03	0.05	0.04	0.05
	(0.03)	(0.03)	(0.03)	(0.03)
ECE Experience (Less than one year is omitted)				
Between 1-2.99 years	0.03	0.06	0.06	0.07
	(0.05)	(0.05)	(0.06)	(0.06)
3 or more years	0.09+	0.05	0.08+	0.05
	(0.05)	(0.04)	(0.05)	(0.05)
Job and Program Characteristics				
Lead Teacher	0.05	0.04	0.03	0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Children Served				
Racial/Ethnic Composition (standardized)				
Black	0.00	-0.05*	0.01	-0.05*
	(0.02)	(0.02)	(0.02)	(0.02)
Hispanic	0.01	0.00	0.02	0.00
	(0.02)	(0.02)	(0.02)	(0.02)
Other race/multiracial/race not known	0.03+	-0.01	0.03+	-0.01
	(0.01)	(0.01)	(0.02)	(0.01)
Teaches Infants and/or Toddlers	-0.05	0.01	-0.05+	0.00
	(0.03)	(0.03)	(0.03)	(0.03)
Teaches Children with Exceptionalities	-0.02	-0.03	-0.02	-0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Head Start Teacher	0.04	-0.06	0.01	-0.06
	(0.05)	(0.06)	(0.05)	(0.06)
Hourly wages	0.00	0.03+	0.01	0.03+
	(0.02)	(0.02)	(0.02)	(0.02)
Receives healthcare benefit from center	0.01	-0.01	0.02	-0.01
	(0.03)	(0.04)	(0.03)	(0.04)

Leader Characteristics				
Race and Ethnicity (White is omitted)				
Black	0.09+	0.02	0.10+	0.02
	(0.05)	(0.06)	(0.05)	(0.06)
Hispanic	0.09	-0.04	0.07	-0.04
	(0.07)	(0.09)	(0.07)	(0.09)
Other race/multiracial/race undisclosed	0.02	0.03	0.04	0.03
	(0.08)	(0.17)	(0.11)	(0.17)
Highest Degree Earned (Associate's degree is omitted)				
Bachelor's degree	-0.02	0.01	-0.02	0.00
	(0.05)	(0.04)	(0.05)	(0.04)
Master's degree or higher	0.00	0.01	-0.01	0.01
	(0.05)	(0.06)	(0.05)	(0.06)
ECE Experience (Less than 1 year is omitted)				
1-4.99 years	-0.00	0.19	-0.03	0.21
	(0.13)	(0.14)	(0.13)	(0.14)
5-19.99 years	-0.02	0.11	-0.05	0.12
	(0.10)	(0.13)	(0.10)	(0.13)
20+ years	0.04	0.17	0.02	0.18
	(0.10)	(0.13)	(0.10)	(0.12)
Num. of obs.	1,114	1,114	1,114	1,114

Notes: Regression coefficients obtained from linear probability models; each column represents a separate regression model. Cluster bootstrapped standard errors presented in parentheses. All models include a set of teacher, center, and leader characteristics as controls (see Table 3.2). Models also include study variable controls, a set of regional indicators, and missing value indicators for each variable where applicable. Original distributions for standardized variables: teacher-level measure (M=3.21, SD=0.65), peer-average measure (M=3.20, SD=0.33), age (M=38.12, SD=13.44), % of kids Black (M=20.33, SD=24.92), % of kids Hispanic (M=11.46, SD=20.95), % of kids other/multiracial/race not known (M=18.12, SD=25.71); hourly wages (M=11.99, SD=3.93). CDA=Child Development Associate's.
Sig: + p<.10, * p<.05, ** p<.01, *** p<.001

APPENDIX B: DATA AND MATCHING PROCESS

Administrative data include lead teachers observed at all classrooms in all publicly funded programs in Louisiana from the 2015-16 to the 2018-19 academic year. These data come from the state's QRIS, where lead teachers' names are recorded in semesterly observations. Notably, there are no teacher IDs in the source dataset, meaning that identifying and tracking teachers over time required name matching. This process is described below; for a full description of this process, see Bassok, Markowitz, Bellows, & Sadowski (2021).

We matched teachers across time points using their names, as reported by the observer conducting the observation. Teacher names sometimes had different spellings across time points. Additionally, teachers may also use slightly different first names from year-to-year or change last names (e.g., upon marriage). We used fuzzy matching algorithms to account for typos and different spellings. We used matching algorithms (`-matchit-` and `-reclink-` in Stata) and self-created commands to account for typos and different spellings (Bassok, Markowitz, et al., 2021).

We first matched names within a school year (i.e., fall and spring observations). If we observed a teacher within the same classroom and year that had the same first name but different last name (or the same last name but different first names), we considered this teacher a match. We then used *both* versions of the teacher's name when conducting the year-to-year match, which is the focus of the current analysis. These rules were designed to avoid overstating teacher turnover.

To create our main measures of turnover, we first matched teachers within programs. If we observed a teacher with the same name (or accepted variants as

described above) at a center from one academic year to the next (in either fall or spring), we defined that teacher as not leaving their program, even if the same name also appears outside of the program. A teacher is thus classified as having turned over if their name does not appear in any classroom observations the following academic year, even if that teacher later returns to the center in future years.

Limitations of Match Process

LDOE policy directs classroom observers to observe the classroom's lead teacher and observers are asked to enter the name of the lead teacher in the classroom. Occasionally they enter two names, which *may* represent two co-lead teachers in the same class but may also represent a lead and assistant teacher combination. We are unable to detect whether a name included in the dataset represents a lead or assistant teacher and assume all entered names are lead teachers. This assumption introduces some error to our turnover estimates because assistant teachers may be more mobile than lead teachers; however, we expect the magnitude of this error to be small.

Because the data focuses on lead teachers in the classroom, it is possible that some teachers we classified as turning over may not have left their program, if these teachers move into a non-teaching position (to assistant director, for example) or to an infant classroom. These teachers would inadvertently be classified as having turned over, because we would no longer see the teacher in the classroom observation records.

APPENDIX C: CENTER QUALITY RATINGS AND SCORES IN LOUISIANA

In Louisiana, CLASS observations are collected by local raters who have been trained and demonstrate reliability on the CLASS tools in alignment with the guidelines established by the developers of CLASS. Observers score classrooms using a protocol established by the CLASS developers. They observe teachers across four 20-minute cycles, in which they observe for a portion of time and then score the classrooms from 1 to 7 on several quality dimensions. These cycles are averaged together to create single dimension scores for each observation.

Table C2.1
Domains and dimensions for classrooms serving toddlers

Domain	**Dimensions**
Emotional and Behavioral Support	Positive Climate
	Negative Climate*
	Teacher Sensitivity
	Regard for Child Perspectives
	Behavior Guidance
Engaged Support for Learning	Facilitation of Learning Development
	Quality of Feedback
	Language Modeling

*Although negative climate is typically included in the emotional support domain for toddler classrooms, as well as in the overall score, Louisiana does not include negative climate in its ratings calculations.

Table C2.2
Domains and dimensions for classrooms serving preschoolers

Domain	Dimensions
Emotional Support	Positive Climate
	Negative Climate*
	Teacher Sensitivity
	Regard for Student Perspectives
Classroom Organization	Behavior Management
	Productivity
	Instructional Learning Formats
Instructional Support	Concept Development
	Quality of Feedback
	Language Modeling

*Although negative climate is typically included in the emotional support domain for preschool classrooms, as well as in the overall score, Louisiana does not include negative climate in its ratings calculations.

As shown in Tables C2.1 and C2.2 above, classrooms serving toddlers (children aged 15 to 36 months) are rated on eight dimensions, which are aggregated to two domains, and classrooms serving preschoolers (children aged 3 to 5 years) are rated on ten dimensions, which are aggregated to three domains.

Dimension Score Replacement

If a classroom has been rated by both a local and third-party observer during a semester, those ratings are compared. First, domain scores for local and third-party observers are calculated separately. If the local observation domain score is more than

one point different from the third-party domain score, the dimension scores of the third-party observation replace the dimension scores of the local observation for that domain. Then, the third-party dimension scores are considered the raw data, and the local dimension scores (for that particular domain) are no longer used. Otherwise, the third-party dimension scores are used only if there is no local observation of the classroom that semester.

Overall Score

To calculate the overall score, dimension scores (not domain scores) are averaged; thus, overall scores range from 1 to 7 points. Negative climate is not included in overall score calculations. If local dimension scores were replaced by third-party scores, those third-party scores are used instead in calculations.