Understanding links between work climate and early care and education classroom quality

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Introduction

Work climate is a broad term that encompasses all facets of the work environment, other than training and education, that support or detract from employees' ability to succeed (Whitebook, McLean, Austin, & Edwards, 2018). In this brief, we use a sample of center-based child care classrooms in Georgia to examine how different aspects that affect work climate (e.g., wages, employee benefits, teacher turnover, children per teacher, and educator stress and commitment) are related to classroom quality. More fully understanding this relationship could help states collect information about work climate as part of their own quality improvement efforts.

Past research has identified multiple avenues by which work climate may intersect with classroom quality and children's development. Teachers' workplace demands and resources shape the environment in which teacher-child relationships are developed and learning occurs. For instance, teacher stress has been linked to their negative interactions with children (Buettner, Jeon, Hur, & Garcia, 2016), greater conflict in teacher-child associations (Whitaker, Dearth-Wesley, & Gooze, 2015), and spending less time teaching literacy and numeracy (Fantuzzo et al., 2012). Teacher turnover may have a detrimental effect on quality and children's development (Howes & Hamilton, 1995).

On the positive side, a low rate of staff turnover has been linked to greater rates of quality improvement over time (Whitebook, Sakai, & Howes, 2004). Teachers' ability to interact positively with children may be affected by their financial well-being. For example, King and colleagues (2016) found that teachers' compensation—including wages and ability to pay for basic expenses—was related to children's positive behaviors, after controlling for other classroom factors. Likewise, Phillips et al. (2000) found that teacher wages, among various other financial and structural factors, were the strongest predictor of children's quality of care.

There is also some evidence regarding the importance of teachers working with smaller numbers of children (i.e., child-to-teacher ratios). In a study by Vandell (1996), teacher-child interactions in infant classrooms were more positive when there were fewer children per adult and group sizes were smaller. In a study of Swedish preschools, in classrooms with fewer children per adult, there tended to be more verbal interactions (Palmerus, 1995). However, in a recent review of research linking teacher:child ratios and children's development, Perlman et al., (2017) concluded that the results were mixed.

In addition to aspects of work climate, teacher characteristics such as education level and college major may affect the quality of care and child outcomes. A 2003 review of research concluded that higher education and specialized training in early childhood education (ECE) were associated with higher-quality

June 2020

teacher behaviors that in turn contribute to positive developmental outcomes for children in their care (Whitebook, 2003).

An analysis combining data from seven studies, however, found few links between a bachelor's degree and higher-quality classrooms or children's academic skills (Early et al., 2007). Other researchers found no association between education level or child development coursework and quality of care, but found that level of education predicted compensation, which in turn predicted quality (Torquati, Raikes, & Huddleston-Cases, 2007). In this brief, these teacher characteristics are included to account for their possible contribution to the observed quality.

Research questions

In this brief, we address the following research questions in center-based child care classrooms for preschoolers and toddlers.

- **Research Question 1 (RQ1):** How are various aspects of the work climate (e.g., wages, benefits, teacher stress, teacher commitment, children per teacher) and teacher characteristics related to one another?
- **Research Question 2 (RQ2):** How are work climate and teacher characteristics related to observed teacher-child interactions?

Methodology and Data

This brief draws from data collected as part of Georgia's Quality Rated Validation Study.[1] Quality Rated, Georgia's Quality Rating and Improvement System (QRIS), is Georgia's systematic approach to assessing, improving, and communicating the level of quality in early care and education programs. In Quality Rated, center-based programs[2] and family child care learning homes (FCCLHs) apply to receive a star rating based on a combination of an online portfolio and classroom observations of global quality using standardized tools called the Environment Rating Scales (ERS). As part of Georgia's Race to the Top–Early Learning Challenge grant, Georgia's Department of Early Care and Learning (DECAL) invested in evaluating Quality Rated. Child Trends, in partnership with Georgia State University, led the Quality Rated Validation Study.

Participants

The sample for the current analysis included 173 center-based preschool teachers and 143 center-based toddler teachers.[3] Participation in both the QRIS and the study was voluntary and all programs in the sample were engaged in quality improvement efforts, so the sample is not representative of all center-based child care in Georgia. However, the findings can give us some idea of how these important facets are related to one another in a relatively large sample.

Within each participating center, up to two classrooms (one serving preschoolers and one serving toddlers) were recruited to participate. The target age range for preschool classrooms was 3- and 4-year-old

[1] More information about the Quality Rated Validation Study can be found here: http://decal.ga.gov/BftS/QRValidation.aspx

[2] We use the term center-based programs to refer to both Child Care Learning Centers (CCLCs) and unlicensed programs that are subject to different government oversight, which are called Others in previous work from this project.

[3] These totals represent the number of teachers who returned questionnaires. The samples for each analysis presented in this brief varied based on available data.

children and the target age range for toddler classrooms was 18–36 months. If there was only one preschool or toddler classroom at the center, that was the classroom we selected. If there were multiple classrooms, one was selected at random. Some of the preschool classrooms were part of Georgia's Pre-K program and others were not; we did not distinguish between those two types of preschool classrooms in these analyses.

For more information about how programs were selected and recruited for participation, characteristics of study participants, and data collection procedures, please see Quality Rated Validation Study Report #4 (Early et al., 2019).

Measures

Below we describe the measures used in this brief.

Work climate and teacher characteristics

The center director, preschool teacher, and toddler teacher were given a questionnaire mid-way through the study year. Using those questionnaires, we created the following eight variables.

- **Turnover:** Center directors reported (1) how many lead teachers they currently employed, and (2) how many lead teachers had left their program and had to be replaced in the past 12 months. We divided the number of teachers who needed to be replaced by the number currently employed to capture percent turnover for lead teachers.
- **Years of Education:** Teachers selected their highest level of education, ranging from less than High School to PhD/EdD, which were converted to years of education using a standard scale.
- **Majored in ECE:** Teachers who had at least some college education selected a major from a list or selected "Other" and wrote in a major. The majors were classified by whether they related to early childhood education. If teachers did not have any college education, they were classified as not having majored in ECE.
- **Hourly wages:** Teachers reported their salary in dollars per hour, week, month, or year. All reported salaries were converted to dollars per hour, assuming that teachers worked 40-hour weeks year-round.[4]
- **Employee benefits:** Teachers reported which employee benefits they received from a list of eight, which were: health insurance, dental insurance, paid vacation time, paid sick time, paid maternity leave, raises,[5] free/reduced price child care at their center, and retirement benefits. The variable used in this brief is the sum of the number of employee benefits they reported out of eight.
- **Stress:** The four-item version of the Perceived Stress Scale (Cohen & Williamson, 1988) includes questions such as: "In the last month, how often have you felt that difficulties were piling up so high that you could not overcome them?" Participants responded using a Likert scale from *never* (0) to *very often* (4). For this brief, stress is the average of the four items, with higher values indicating more stress.

[4] Most teachers (70 percent of preschool teachers and 82 percent of toddler teachers) reported their wages in hours. For those who used another metric, we assumed 40 hours per week rather than basing it on their reported hours because many of the reported hours appeared inaccurate (e.g., zero hours per week).
[5] Teachers indicated whether they earned an annual merit raise, annual cost-of-living raise, occasional merit raise, occasional cost-of-living raise, or an occasional bonus.

- **Commitment:** The How Committed Am I? scale (Jorde-Bloom, 1988) includes 10 items such as: "I often think of quitting," and "I put a lot of extra effort into my work." Participants rated each item on a scale from *strongly disagree* (1) to *strongly agree* (5). For this brief, commitment is the average of the 10 items, with higher values indicating more commitment.
- **Children per teacher:** Classroom observers counted the number of children and adults (i.e., lead teachers, assistant teachers, administrators) present several times throughout a morning. To calculate children per teacher, the average number of children observed was divided by the average number of adults observed.

Observed quality

Trained data collectors observed center-based preschool classrooms using the Classroom Assessment Scoring System Pre-K (CLASS Pre-K; Pianta, La Paro, & Hamre, 2008) and toddler classrooms using the Classroom Assessment Scoring System Toddler (CLASS Toddler; La Paro, Hamre, & Pianta, 2012). Each of these tools is designed to assess the quality of the interactions between teachers and children.

The CLASS Pre-K results in scores in three domains: (1) Emotional Support, (2) Classroom Organization, and (3) Instructional Support. The CLASS Toddler provides scores in two domains: (1) Engaged Support for Learning and (2) Emotional and Behavioral Support. For both tools, domain scores can range from 1 to 7 with scores of 1 to less than 3 considered low-quality, 3 to less than 6 considered mid-range quality, and 6 to 7 considered high-quality.

Analysis

RQ1: To assess the extent to which work climate and teacher characteristics were interrelated, we calculated correlation coefficients (Pearson's *r*) among the work climate and teacher characteristic variables for preschool teachers and toddler teachers separately. A correlation coefficient is a measure of the extent to which variables tend to go up or down together. They can range from -1.0 to +1.0; where -1.0 indicates a perfect, negative link, 0 indicates no link at all, and 1.0 indicates a perfect positive link. According to Cohen (1988), a correlation with an absolute value between 0.10 to 0.29 is small, 0.30 to 0.49 is moderate, and 0.50 or above is large.

RQ2: To assess the extent to which the work climate and teacher characteristic variables were associated with classroom quality, we conducted five separate regression analyses: one analysis for each of the three CLASS Pre-K domains, and one analysis for each of the two CLASS Toddler domains. In each regression model, the eight work climate[6] and teacher characteristic variables were used to predict one CLASS domain score. These analyses tell us the extent to which each of the work climate and teacher characteristics is associated with each of the CLASS domains, after accounting for the association between each of the other variables and that CLASS domain. [7]

[6] Teacher turnover was collected from the directors and we did not differentiate between preschool and toddler teacher turnover. For that reason, the same teacher turnover variable is included in both the preschool and toddler analyses.

[7] One risk of including multiple predictors in the same regression analysis is that the predictors may be highly correlated with one another (multicollinearity) and, as a result, their coefficients may be unstable. The variance inflation factor (VIF) is a statistic to determine the severity of multicollinearity in a model; the VIF is the ratio of the variance in the model with multiple terms divided by the variance of the model with the term alone. Prior to estimating models with correlated predictor variables entered, we calculated the VIF. The VIF indicated that the shared variance was small enough to include all eight variables in the same regression model.

Findings

The results of the two research questions are presented below. In this brief, we describe all *p*-values of 0.05 or smaller as *statistically significant*.

RQ1: Correlations among work climate and teacher characteristics

Among preschool teachers, some, but not all, measures of work climate were significantly related to one another (see Table 1). Teachers with higher levels of education reported higher hourly wages, and teachers with higher levels of education and higher hourly wages had more benefits. Preschool teachers who reported more stress reported less job commitment, and centers where preschool teachers reported more stress also tended to have higher lead teacher turnover. In addition, when preschool teachers' wages were higher, the number of children per teacher was also higher.

Table 1. Preschool classrooms: Correlations among work climate and teacher characteristics

There were small-to-medium correlations among some of the measures in preschool classrooms.

Preschool teacher characteristic	Lead teacher turnover	Hourly wages	Number of benefits	Stress	Commitment	Children per teacher	Years of education
Turnover	1						
Hourly wages	-0.13	1					
Benefits	-0.12	0.38***	1				
Stress	0.19*	0.02	-0.04	1			
Commitment	-0.08	0.04	0.07	-0.22**	1		
Children per teacher	-0.02	0.21*	-0.12	0.08	-0.06	1	
Years of education	-0.11	0.66***	0.33***	0.00	-0.05	0.01	1

Note: * = p < 0.5, ** = p < .01, and *** = p < .001. Source: Validation study team data collection in center-based programs, 2017–2018 school year

Similar to preschool teachers, toddler teachers with higher levels of education reported higher wages and more benefits, and teachers who received higher hourly wages also received more benefits. Teachers who reported more stress reported less job commitment (see Table 2). When there were fewer children per teacher, toddler teachers reported more benefits, and greater levels of commitment. Unlike preschool teachers, when toddler teachers reported higher wages, they also tended to have fewer children per teacher.

Table 2. Toddler classrooms: Correlations among work climate and teacher characteristics

There were small-to-medium correlations among some of the measures in toddler classrooms.

Toddler teacher characteristic	Lead teacher turnover	Hourly wages	Number of benefits	Stress	Commitment	Children per teacher	Years of education
Turnover	1						
Hourly wages	-0.19	1					
Benefits	-0.05	0.50***	1				
Stress	0.11	-0.04	0	1			
Commitment	-0.16	-0.02	0.11	-0.32***	1		
Children per teacher	0.03	-0.18*	-0.25**	0.06	-0.19*	1	
Years of education	-0.14	0.40***	0.29**	-0.03	-0.14	-0.13	1

Note: * = p < 0.5, ** = p < .01, and *** = p < .001. Source: Validation study team data collection in center-based programs, 2017–2018 school year

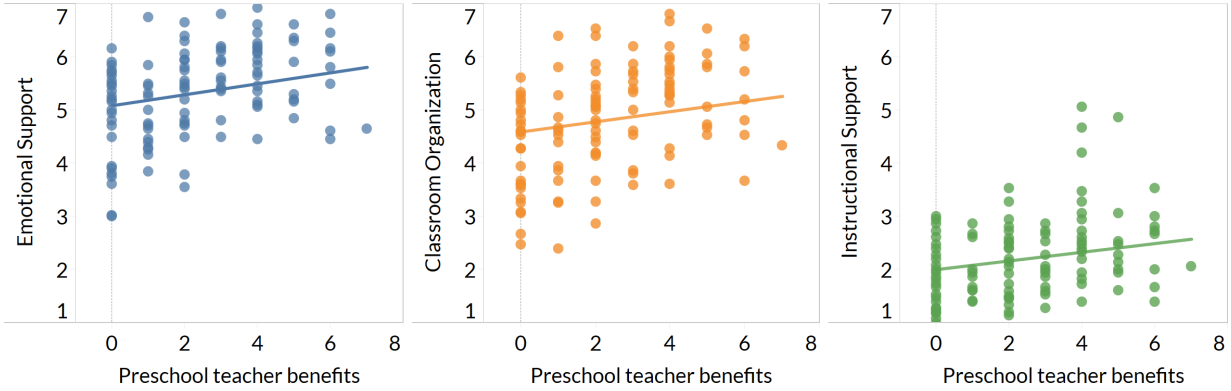
RQ2: Work climate and teacher characteristics: Associations with classroom quality

We used regression analysis to investigate which aspects of work climate and teacher characteristics were associated with each CLASS domain. Because we added all eight variables into the same models, each significant result we describe indicates that that facet is associated with the CLASS domain *above and beyond* the other variables.

As seen in Figure 1, teachers who reported more employee benefits had higher Emotional Support, Classroom Organization, and Instructional Support domain scores, after accounting for the other seven indices of work climate and education. Additionally, teachers who reported higher hourly wages, fewer children per teacher, and who majored in early childhood education had significantly higher scores on Emotional Support and Classroom Organization above the other work climate indices (not illustrated). Lead teacher turnover, years of education, stress, and commitment were not predictive of quality in preschool classrooms.

Figure 1. Association between number of employee benefits and CLASS Pre-K domain scores

For every additional employee benefit reported by preschool teachers, Emotional Support increased by 0.10 points, Classroom Organization increased by 0.10 points, and Instructional Support increased by 0.08 points, after accounting for other variables.

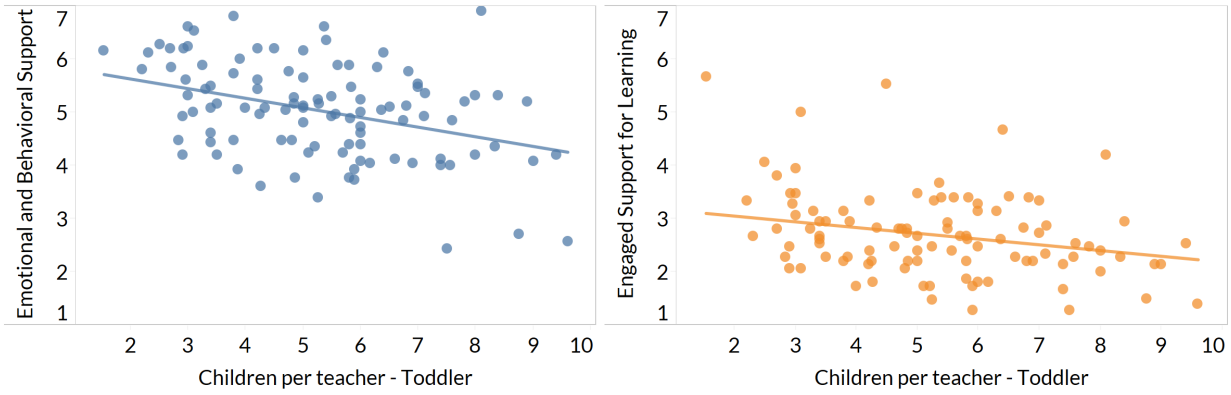


Note: The line displayed represents the regression equation after controlling for all other variables. Source: Validation study team data collection in center-based programs, 2017–2018 school year

We repeated the same analyses to consider associations between work climate, teacher characteristics, and the two CLASS Toddler domains in toddler classrooms. In classrooms where there were fewer children per teacher, both Engaged Support for Learning and Emotional and Behavioral Support scores were higher (see Figure 2). Toddler teachers who received more employee benefits had higher Emotional and Behavioral Support scores (not illustrated). Lead teacher turnover, years of education, hourly wages, child development major, stress, and commitment were not associated with CLASS Toddler scores.

Figure 2. Association between number of children per teacher and CLASS Toddler domain scores

For every additional child per teacher, average Emotional and Behavioral Support decreased by 0.18 points and average Engaged Support for Learning decreased by 0.11 points, after accounting for other variables.



Note: The line displayed represents the regression equation with all other variables held at their average value. Source: Validation study team data collection in center-based programs, 2017–2018 school year

Discussion

This brief investigated the extent to which work climate and teacher characteristics were interrelated and associated with classroom quality. These analyses are strictly correlational, so we cannot use them to discern how changes in one aspect of work climate would lead to changes in others. Nonetheless, the patterns could be informative.

In both preschool and toddler classrooms, teachers who reported more stress tended to report lower commitment, which supports previous research involving the negative impact of stress on the level of job commitment in teachers (Jorde-Bloom, 1983). In addition, preschool teachers who reported more stress tended to work in centers with higher teacher turnover. These findings suggest the importance of supporting teachers' mental health to reduce stress and turnover in child care centers and increase commitment to their jobs (Gooze, 2014).

Neither teacher stress nor commitment, however, were related to observed classroom quality (see Table 3). One possible reason for this lack of association is the generally low levels of stress and high levels of commitment teachers reported. On a scale of zero to 4, the range for stress among preschool teachers was between zero and 3.3 (the average was 1.0) and the range among toddler teachers was zero to 2.5 (the average was 1.0). Commitment was measured on a scale of 1 to 5; the range for preschool teachers was 2.6 to 5.0 (the average was 4.4) and the range for toddler teachers was 1.9 to 5.0 (the average was 4.3). We cannot know if the limited range of scores had to do with the tools, this sample, or the generally positive attitude and high commitment among early childhood teachers.

Table 3. Summary of signficant assocations between work climate, teacher characteristics, and classroom quality

Major, wages, benefits, and the number of children per teacher were significant predictors of classroom quality for both preschool and toddler teachers.

Characteristic	Preschool classroom quality	Toddler classroom quality
Turnover		
Years of education		
Majored in child development or ECE	+	
Hourly wages	+	
Benefits	+	+
Stress		
Commitment		
Children per teacher	-	-

Note: (+) = any significant positive association, (-) = any significant negative association

The number of children per teacher had consistent associations with different domains of quality and for both preschool and toddler classrooms (see Table 3). These findings support other research (Vandell, 1996; Palmerus, 1995) indicating the need for individualized attention for children to foster high-quality teacher-child interactions in the classroom.

Likewise, teachers with more employee benefits had higher quality teacher-child interactions. These findings are in line with previous research findings of strong associations between extrinsic supports, such as higher compensation and teacher benefits, and classroom quality in child care settings (Torquati, Raikes, & Huddleston-Casas, 2007; Phillips et al., 2000). The present study used a unique approach of summing the number of benefits that a teacher received, rather than investigating the presence or absence of each

individual benefit (e.g., vacation time). The results suggest that workplace supports such as employee benefits may have a cumulative effect on work climate. After accounting for other factors, preschool teacher hourly wages were related to higher quality teacher-child interactions, but toddler teacher wages were not. A potential explanation for the lack of association between toddler teacher wages and quality is that on average, infant and toddler teachers receive extremely low wages, often lower than that of preschool teachers (Center for the Study of Child Care Employment, 2018). In this study, the median was only $9.00 per hour for toddler teachers, as compared with $11.82 for preschool teachers. It may be that wages need to reach a minimum level before we would expect them to be linked to improved quality or outcomes.

Limitations

As with all research studies, this study had some limitations. All results are correlational and, therefore, we cannot know the direction of causality in the associations. For instance, it may be that higher wages lead to better quality in classrooms by attracting and retaining better teachers; or, that better quality in classrooms leads to higher wages because centers award raises to their best teachers. Or, it may be that a third variable, such as regulations, is enhancing both wages and classroom quality. For instance, taking part in Georgia's Pre-K program requires higher wages and supports high-quality classrooms.

Another limitation is that the programs that participated in our study were all in Georgia's QRIS, Quality Rated, and, therefore, may be different from child care centers throughout Georgia and the United States. For example, average commitment from teachers was very high and average level of stress was very low, possibly explaining the lack of significant results using those variables. We cannot know if these values are typical of child care teachers who are not part of Quality Rated.

In addition, we asked teachers to report their salary in the unit most comfortable for them (per hour, per week, per month, or per year). Although the most commonly used unit was hourly (70 percent of preschool teachers and 82 percent of toddler teachers reported their wages in this unit), when teachers reported wages in a different unit we had to convert them to hourly wages, by making assumptions about their work schedules. We did request information about their work schedules, but those responses seemed to contain more errors than typical questions, so we did not use that information. Instead, we assumed a 40-hour work week.

Further, although the full models included years of education and an indicator of a child development major, we did not account for other factors that might influence wages, such as years of experience, professional certifications other than education, and a major (e.g., Child Development Associate [CDA]), or center funding such as Georgia's Pre-K and Head Start.

Our main analyses did not attempt to separate programs with different funding sources because the sample sizes were small. In addition, although the funding source might affect average salaries, it is less clear that the funding source should affect associations between various aspects of the work climate. Nonetheless, the fact that our preschool analyses included both Georgia's Pre-K teachers and non-Georgia's Pre-K teachers is concerning because DECAL sets minimum salaries for Georgia's Pre-K teachers[8] and provides extensive quality supports.

To examine this possible confound, we repeated our regression analysis using only the sample of preschool teachers who did not report that their classroom was part of Georgia's Pre-K (n = 92). The

[8] See more information about the salary requirements here: http://decal.ga.gov/documents/attachments/Guidelines.pdf

results were consistent with the results reported earlier in the brief, except for the association between majoring in ECE and Emotional Support was no longer significant.

It is possible, however, that funding sources affect entire centers, even when a particular classroom does not receive that source of funds. To investigate this possibility, we limited the sample to only preschool teachers at centers where the director did not report receiving any funding from Georgia's Pre-K (n = 59) or Head Start (n = 85). When we limited the sample in this way, some results become nonsignificant (see Table 4). In centers without Georgia's Pre-K, there was no longer an association between wages and any of the preschool classroom quality domains. The pattern of associations was unchanged when we limited the sample to just preschool classroom in centers without Head Start. We cannot know if these changes are due to reduced power in the smaller sample, or because these associations are different when the program receives Georgia's Pre-K or Head Start funding.

Table 4. Summary of signficant associations between work climate, teacher characteristics, and classroom quality at center-based programs without Georgia's Pre-K or Head Start funding

In sites without Georgia's Pre-K and/or Head Start funding, major, wages, benefits, and the number of children per teacher mostly remained significant predictors of classroom quality for both preschool and toddler teachers.

Characteristic	Preschool classroom quality in centers without Georgia's Pre-K (n = 59)	Preschool classroom quality in centers without Head Start (n = 85)
Turnover		
Years of education		
Majored in child development or ECE	+	+
Hourly wages		+
Benefits	+	+
Stress		
Commitment		
Children per teacher	-	-

Note: (+) = any significant positive association, (-) = any significant negative association

Recommendations

1. **Continue efforts to decrease the number of children per teacher**. Having fewer children per teacher was consistently associated with higher-quality teacher-child interactions. Although these findings are correlational and must be interpreted with caution, they seem to indicate that lowering the number of children per teacher might be a worthwhile strategy for improving quality. The National Association for the Education of Young Children (NAEYC) recommends a ratio of six toddlers per teacher and 10 preschoolers per teacher. Georgia licensing standards for Child Care Learning Centers (CCLCs) allow up to 10 two-year-olds per teacher, 15 three-year-olds per teacher, and 18 four-year-olds per teacher. Georgia's QRIS includes standards designed to encourage programs to serve fewer children per teacher, and the present study's findings indicate those efforts are likely worthwhile. Additionally, there are efforts underway to use observed ratios in the QRIS, instead of a director-reported form. Such efforts are likely to increase the validity of the data collected and the robustness of the system.
2. **Continue to support improved teacher compensation packages**. There was some evidence that teachers' hourly wages and number of employee benefits were linked to classroom quality after accounting for other factors, such as teacher education and major. DECAL currently supports the INCENTIVES program, which provides bonuses to teachers who meet certain education and tenure

criteria. This program is funded through the federal Child Care and Development Fund.[9] A few studies have evaluated these types of bonus programs in other states, and the findings generally indicate an association between bonuses and lower turnover (e.g., Minnesota's R.E.E.T.A.I.N. program; Shaw et al., 2019). Improving teacher wages may be a valuable means of improving classroom quality. Therefore, we believe that using public funding to supplement teachers' salaries is a positive step.

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