



Effective Teacher-Child Interactions and Child Outcomes:

*A Summary of Research on the Classroom Assessment
Scoring System (CLASS) Pre-K–3rd Grade*

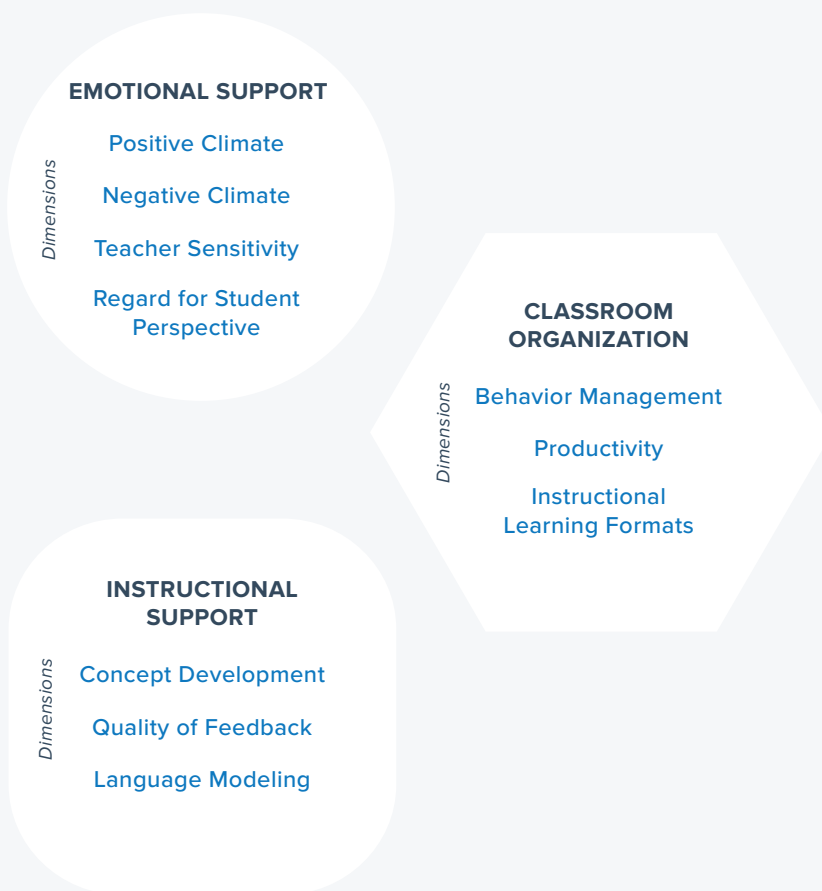
INTRODUCTION

The Classroom Assessment Scoring System¹ is an observational tool that measures the quality of teacher-student interactions. It is based on developmental theory and research that demonstrates that interactions between teachers and students are the primary mechanism through which children learn. The CLASS is predicated on the premise that effective teachers are better at drawing children into learning and keeping them engaged, which in turn leads to better academic outcomes.² Effective interactions also support the development of children's learning-to-learn skills, including attention, persistence, and frustration tolerance—skills that are linked to better early learning outcomes.³

The CLASS objectively identifies and assesses different dimensions of classroom interactions that make a difference in children's learning. The Pre-K and K-3 versions of the CLASS identify key behavioral interactions that reflect high and low quality of interactions on ten dimensions across three broad domains (Emotional Support, Classroom Organization, and Instructional Support).

The CLASS also serves as a roadmap for improving interactions by defining in detail the kinds of teacher-student interactions that matter most for children.⁴ The CLASS is curriculum and content-neutral, giving it broad utility, as the focus is exclusively on the quality of teaching interactions.

The efficacy of the CLASS as a measure of instructional quality has been supported by studies involving thousands of classrooms and tens of thousands of students across age levels, from infancy through secondary school. This paper provides a summary of over 150 peer-reviewed, published studies conducted in Pre-K and K-3 classrooms in the United States. This



body of research examines both small-scale and large-scale projects involving thousands of classrooms that were diverse in classroom makeup, instructional delivery model, setting, and geographic region.

Collectively, these studies confirm earlier studies indicating that classroom quality, as measured by the CLASS, predicts positive developmental and academic outcomes for children (predictive validity). Furthermore, the studies show that targeted professional development helps teachers improve the manner in which they interact with children, leading to better child outcomes and supporting the policy choice to adopt CLASS in quality improvement efforts.

Early Research on Effective Teacher-Child Interactions.

The NICHD Study of Early Child Care and Youth Development (SECCYD) (1991–2007) was a landmark study that examined children’s experiences in early education settings and elementary schools across the United States. One of the goals of the study was to determine what aspects of early environments and classroom processes were most important for children’s development. The study enrolled a cohort of more than 1,300 children who were followed from birth through their ninth grade⁵ academic year. A major component of this research focused on the delivery of quality, or the how of quality: how teachers interact with children. Observers used the Observation Record of the Caregiving Environment (ORCE), a precursor to the CLASS, to determine what aspects of early environments and classroom processes were most important for children’s development.

ORCE demonstrated the role of responsive caregiving and language stimulation from teachers and caregivers in promoting young children’s development, serving as a catalyst to further develop an instrument for assessing interactions. This instrument, the Classroom Observation System (COS), a precursor to the CLASS, was used to assess older students enrolled in the NICHD study and was validated through the NCEDL studies. Later research found that children establish trust and expectations with their caregivers through consistency of emotional support over time, setting the stage for productive learning indicated by academic and social-emotional outcomes.^{6, 7}

In 1996 the U.S. Department of Education’s Office of Educational Research and Improvement (OERI) funded the National Center for Early Development and Learning

(NCEDL), a multi-university partnership tasked with providing national leadership and evidence to better understand and serve early childhood professionals. NCEDL studied state-funded preschool programs in 11-states, involving 671 classrooms with more than 2,400 children who were followed into kindergarten. The Pre-K and K-3 CLASS were validated in this large-scale, nationally representative sample of ethnically and linguistically diverse children enrolled in state-funded preschool programs. The NCEDL studies found that (1) effective Instructional Support was associated with greater preschool gains in receptive vocabulary, expressive vocabulary, rhyming skills, letter naming, and mathematics skills, and (2) effective Emotional Support was associated with gains in social competence and fewer problem behaviors.⁸ Findings also indicated that the CLASS predicts student outcomes equally well in classrooms with high enrollments of Hispanic and Latino children and with high enrollments of dual language learners (DLLs), illustrating the validity of the CLASS in these settings.⁹ These early, large-scale studies demonstrated the importance of effective teacher-child interactions to student academic and social development in early childhood. Additional studies have extended this work into toddler and infant classrooms. Development and validation of the Toddler CLASS found that scores on the Toddler CLASS were positively associated with state quality ratings, smaller group sizes, and better teacher qualifications.¹⁰ In a separate large-scale study of nearly 500 Early Head Start classrooms, higher CLASS scores were found to be associated with increases in early language skills and decreases in behavior problems,¹¹ and a subsequent study found associations between Emotional and Behavioral Support scores and lower

levels of child behavior problems.¹² Studies on the Infant CLASS found that CLASS scores were correlated with scores on the ITERS-R, another measure of quality, and that CLASS scores were correlated with lower teacher-child ratios and more years of infant-teaching experience.¹³ In pilot testing across six sites, Infant CLASS scores showed high stability across the school day. Analyses also confirmed that the four dimensions of the tool were best represented by a single domain rather than multiple separate domains.¹⁴ However, the number of published studies at the Infant and Toddler level is small and therefore not reviewed in detail in this paper.

Outcome-Driven Systems in Early Learning.

The 2007 reauthorization of the Head Start Act authorized the use of a Designated Renewal System (DRS) in order to improve the assessment of quality in Head Start programs. The DRS requires the federal government to evaluate grantees in a new way, shifting the structure from grants funded in perpetuity to a five-year grant program, through which grantees receive an additional five-year contract by demonstrating competence as measured by the DRS. The federal Office of Head Start (OHS) implemented the DRS in five cohorts beginning in 2011, with the full transition of all grantees to five-year grants occurring by 2017. Under the DRS, programs that do not meet the quality requirements of the system must re-compete for a five-year award. CLASS scores that fall below the thresholds identified by the OHS or fall within the bottom 10% of national average CLASS score are one of seven triggers that result in a program having to compete for continued funding.

The shift in measuring and monitoring Head Start grantees with quality metrics influenced other accountability systems in early childhood education across the nation. Shortly after the OHS announced the CLASS would be used in DRS, Quality Rating Improvement Systems (QRIS) gained traction in early childhood programs across the U.S., with the goal of incentivizing programs to improve quality through technical support, financial incentives, and publically available quality ratings. Statewide QRIS models grew rapidly with the 2012 Race to the Top – Early Learning Challenge (RTT-ELC), which called for the development and validation of QRIS models. Today, more than 20 states include the CLASS in their QRIS.



Continuity from Birth through Third Grade.

Until recently, federal education systems operated independently from one other. State and local programs have, however, looked for ways to layer, braid, and blend funding in order to maximize both the quality and the accessibility of quality services. Learning from the success of local implementations,¹⁵ federal program administrators began exploring ways to collaborate across administrative organizations, using a child-centered, holistic approach to increase quality for higher numbers of children without increasing the size of federal programs. The first initiative focusing on this collaboration was the Early Head Start-Child Care Partnership (EHS-CCP) in 2012 that blended Early Head Start and Child Care Development Block Grant (CCDBG) services to children from birth to age three in center-based programs and in family child care homes (FCC). This program emphasizes increasing quality, access, and alignment across two federal programs: Head Start and CCDBG. In 2014, the federal Department of Education awarded Preschool Development Grants to fund the development and expansion of state prekindergarten programs and better align early childhood education programs with state public education systems. The Elementary Secondary Education Act (ESEA) was reauthorized in late 2015 as the Every Student Succeeds Act (ESSA), which embedded the Preschool Development Grants into the Act, and also called for scientific examination of effective practices across preschool to kindergarten. In early 2016, the Institute of Education Sciences (IES) launched the Research Network, a five-year initiative to develop information and tools to inform policymakers and practitioners in supporting successful transitions from preschool to elementary school. Each of these efforts moves research, policy, and practice toward a comprehensive system of high-quality programming from birth through third grade to ensure long-term student success.

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A Review of Research Examining the Connection Between CLASS Scores and Child Outcomes

The studies summarized in this paper have a common aim: to detect the links between teacher behavior and the development of children in their classrooms, as measured by a variety of outcomes (i.e., specific social, emotional, or academic gains). This review confirms earlier research demonstrating that CLASS scores show significant and positive associations with children's social and academic growth. Findings are presented by CLASS domain. However, this format is not meant to suggest that CLASS domains function independently; in fact, the three CLASS domains tend to be highly correlated with one another, and therefore the distinct findings should not be interpreted as domain-specific associations.

Emotional Support

Emotional Support refers to the ways teachers help children develop warm and supportive relationships, experience enjoyment and excitement about learning, feel comfortable in the classroom, and experience appropriate levels of autonomy. There is an abundance of research indicating that children in classrooms with high levels of Emotional Support have more favorable social-emotional and academic outcomes than do children who attend classrooms with lower levels of Emotional Support.

Children in classrooms with higher Emotional Support display higher social competence^{16, 17, 18, 19} and positive engagement with teachers.²⁰ They also tend to experience fewer conflicts with teachers²¹ and display fewer behavior problems.^{22, 23, 24} Similar associations have been found at the dimension level. Children in classrooms rated higher on Positive Climate also displayed fewer problem behaviors.²⁵

Emotional Support positively predicts domain-general skills, such as executive functioning (cognitive processes that include working memory, inhibitory control, and cognitive flexibility). Specifically, when classrooms provide higher levels of Emotional Support, children show higher cognitive inhibitory control, an important aspect of executive functioning.²⁶

The benefit of Emotional Support is linked to preschool children's mathematics achievement. Children in classroom with high Emotional Support are better able to solve early applied math problems.^{27, 28} Children in classrooms with higher Positive Climate exhibit a higher ability to solve early applied math problems.²⁹

In addition to the robust direct associations, the Emotional Support children experience in preschool serves as a moderator. For example, Emotional Support has been found to buffer the typically negative association between problem behavior in structured learning contexts (i.e., involvement in class activities, taking part in games, sitting during teacher-directed activities) and approaches to learning³⁰—how children engage in learning and their enthusiasm for learning³¹ (i.e., cooperation, persistence, attention, and willingness to try new and challenging tasks). In classrooms with low levels of Emotional Support, problem behavior in structured learning activities is negatively associated with approaches to learning. However, the negative association is attenuated in classrooms with high Emotional Support; the association between problem behavior in structured learning and approaches to learning is not significant when Emotional Support was high.

Emotional Support may also moderate the relationship between temperament and language and literacy skills.³² For instance, resilient children in classrooms with higher Emotional Support made greater language and literacy

gains across the school year than did children in less warm and responsive classrooms.

Results from a study focused on children from Latino backgrounds and DLLs found similar associations. In classrooms where teachers were more emotionally supportive, Latino children and DLLs displayed higher social competence.³³

Children also benefit academically in classrooms with higher Emotional Support by demonstrating higher achievement in language and literacy, including early reading outcomes,³⁴ vocabulary knowledge and print awareness,³⁵ and expressive language.³⁶ Children in classrooms with higher Positive Climate exhibit higher receptive and expressive vocabulary, and perform better on rhyming tasks.³⁷ Finally, research has revealed the adverse effects of low levels of Emotional Support. For example, children in lower-quality preschool classrooms have lower receptive vocabularies.³⁸

These associations have been replicated in national samples that include Hispanic preschool children.³⁹ For example, one study found that a classroom's observed emotional climate positively related to children's receptive language skills and letter naming ability.⁴⁰ Another study examined the associations for Latino and DLLs separately.⁴¹ Within the Latino sample, Emotional Support was positively associated with language and literacy skills.⁴² For both the Latino and DLL samples, Emotional Support positively predicted letter naming ability.⁴³

For Spanish-speaking DLLs, Emotional Support also moderated the relationships between Spanish language use in the classroom and both early reading and mathematics outcomes (assessed in Spanish).⁴⁴ In classrooms with high Emotional Support, more frequent use of Spanish was positively associated with children's ability to identify letters and words, as well as their ability to solve applied math problems. In other words, when teachers were emotionally responsive and supportive in their interactions with children, the amount of Spanish instruction used in the classroom was a positive predictor of early literacy and math achievement in Spanish. In contrast, in classrooms with low Emotional Support, more frequent use of



Spanish was negatively associated with early literacy and mathematics outcomes.

Research also confirms the benefits of high Emotional Support in early elementary classrooms. For example, Emotional Support in first grade was positively associated with faster rates of growth in phonological awareness, regardless of children's achievement at kindergarten entry.⁴⁵ In addition, Emotional Support was found to moderate the relationship between behavior problems and later teacher-child conflict and closeness in kindergarten classrooms.⁴⁶ Children who demonstrated behavior problems who were in emotionally supportive classrooms were no longer at risk for developing conflictual teacher-child relationships and less close relationships with teachers.

Beyond mean levels of Emotional Support, consistency in the emotional teacher-child interactions children experience plays an important role in their development. Children in classrooms with teachers who maintained consistent Emotional Support across the day exhibit higher levels of student-teacher closeness and less student-teacher conflict,⁴⁷ as well as higher social competence and better academic outcomes in oral and written language, rhyming, and letter naming.⁴⁸ Consistency in Emotional Support moderates the association between children's behavior and mean levels of quality.⁴⁹ Children in classrooms with teachers who were, on average, highly emotionally supportive displayed more negative emotion and aggression if their teacher was also highly variable in Emotional Support. This finding underscores the importance of predictability and consistency in the emotional climate of the classroom.

Classroom Organization

Classroom Organization refers to the ways teachers help children develop skills to regulate their own behavior, get the most learning out of each school day, and maintain interest in learning activities. When children adhere to rules, follow classroom routines, and are



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consistently engaged in learning activities, there are more opportunities for teachers to support learning. Research findings consistently indicate that children in classrooms with high levels of Classroom Organization benefit in terms of their social-emotional and academic outcomes.

In classrooms with higher Classroom Organization, children show more positive social-emotional development. For example, findings suggest that children display higher social skills when teachers provide children with clear expectations, organized activities, and interesting materials.⁵⁰ Other studies have shown that Classroom Organization is positively associated with behavioral competence⁵¹ and negatively associated with behavior problems.^{52, 53}

Higher levels of Classroom Organization lead to improved academic outcomes. Classroom Organization is positively associated with language and literacy skills, such as receptive vocabulary,^{54, 55} early writing skills,⁵⁶ print knowledge,⁵⁷ phonological awareness,⁵⁸ listening comprehension,⁵⁹ gains in letter-naming skills (specifically among Latino and DLLs),⁶⁰ alphabet knowledge,⁶¹ and letter-word identification.⁶² Classroom Organization also predicts growth in language and literacy, including phonological awareness, book knowledge, listening comprehension, alphabet knowledge, and early writing skills.⁶³ In addition, Productivity, a dimension of Classroom Organization, is associated with both expressive and receptive language.⁶⁴

Classroom Organization has also been linked to early mathematics outcomes. Children whose teachers provide clear expectations, organized activities, and interesting materials perform better on tests of early numeracy skills than do children in classrooms with low Classroom Organization.⁶⁵ Additionally, Productivity has been found to be positively associated with applied problems.⁶⁶

In addition to these robust direct associations, Behavior Management moderates the associations between

academic outcomes. In one study, Behavior Management moderated the association between task orientation and vocabulary gains.⁶⁷ Children with above-average task orientation, who were in classrooms with more effective Behavior Management, exhibited greater gains in vocabulary than did children in classrooms with ineffective interactions in Behavior Management. In another study, Behavior Management moderated the relationship between peer expressive language (defined as the average expressive language of the children in the classroom) and receptive language skills.⁶⁸ In other words, the positive influence of peer expressive skills on children's receptive language was strengthened in well-managed classrooms.

In addition to social-emotional outcomes, Classroom Organization is associated with more domain-general skills, such as executive functioning,^{69, 70} and approaches to learning.^{71, 72} Specifically, higher-quality Classroom Organization correlates with children exhibiting higher working memory⁷³ and better inhibitory control.^{74, 75} This finding suggests that high levels of Classroom Organization may help children stop automatic responses and negative behaviors in favor of more appropriate ones. Further, children in highly organized classrooms may display more frequent learning behaviors such as persistence, attention, flexibility, and eagerness to learn.⁷⁶

Research conducted in early elementary classrooms reveals similar findings to those found in preschool classrooms. For example, Classroom Organization in kindergarten classrooms is positively associated with teacher reports of children's cognitive self-control and positive work habits, as well as observed engagement⁷⁷ and better behavioral self-control.⁷⁸ Furthermore, children in classrooms with higher Classroom Organization exhibit less time off-task and more engagement in learning.

Results from a study conducted with first grade children reveal a connection between Classroom Organization and gains in reading skills. In addition, an examination of the separate Classroom Organization dimensions showed that each dimension—Behavior Management,

Productivity, and Instructional Learning Formats— independently predicted gains in reading skills.⁷⁹

The positive association between Classroom Organization and children’s social-emotional development has been replicated within samples of Latino and DLL children; results demonstrate a positive association between Classroom Organization and children’s social competence.⁸⁰

Instructional Support Domain

Instructional Support refers to the ways in which teachers effectively support student cognitive development and language growth. The Instructional Support domain does not focus on the content of the curriculum or learning activities, but rather on how the teacher effectively supports metacognitive and language development. Research findings consistently indicate that children in classrooms with high Instructional Support benefit in terms of their social-emotional functioning and academic development. For example, children in classrooms with higher levels of Instructional Support display increased behavior competence⁸¹ and teacher-child closeness.⁸² ⁸³ Higher levels of Instructional Support are negatively associated with behavior problems.⁸⁴

Research consistently shows that children in classrooms with higher Instructional Support have positive academic outcomes in areas such as language, literacy, and math skills. For instance, Instructional Support is positively associated with language and literacy skills including receptive^{85, 86, 87, 88, 89, 90, 91, 92} and expressive vocabulary,^{93, 94, 95, 96, 97, 98} vocabulary knowledge,^{99, 100} picture vocabulary,¹⁰¹ oral language skills,¹⁰² phonological sensitivity,¹⁰³ phonological awareness,¹⁰⁴ print knowledge,^{105, 106} letter-word knowledge,^{107, 108} lower-case recognition,¹⁰⁹ rhyming,¹¹⁰ early reading,¹¹¹ and teacher-rated global language and literacy skills.¹¹² Effective interactions in Language Modeling, in particular, are correlated with phonological and print awareness¹¹³ and receptive vocabulary,¹¹⁴ whereas Concept Development is positively associated with receptive^{115, 116} and expressive



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vocabulary.¹¹⁷ However, Language Modeling does not significantly predict gains in print knowledge when children's receptive vocabulary is low or average.¹¹⁸

In addition to academic outcomes, Instructional Support has been positively associated with executive functioning skills.¹¹⁹ Children in classrooms with high levels of Instructional Support perform better on cognitive inhibitory control tasks than those in classrooms with lower levels of instructional support. When teachers support higher-order thinking and problem-solving and model language use, children may be better able to inhibit impulsive behaviors and instead use language and reasoning skills to solve problems.

Studies also consistently reveal a positive association between Instructional Support and early mathematics skills.^{120, 121, 122, 123, 124} Both Concept Development and Language Modeling are positively associated with early mathematics achievement.^{125, 126, 127, 128}

Beyond these robust direct associations, Instructional Support has also been found to play a moderating role. For example, instructional quality moderates the association between attendance and expressive vocabulary.¹²⁹ Children with high rates of attendance in classrooms with high instructional quality exhibit significantly greater expressive language gains than children in lower quality classrooms. There is also a significant interaction between Instructional Support and children's early language ability at the beginning of the school year and their oral language skills at the end of the school year.¹³⁰ Children with high early language ability who attend classrooms with higher Instructional Support exhibit increased later oral language skills, when compared to children with lower early language ability.¹³¹

Other research also suggests that differential benefits of high-quality instruction are afforded to children who are at risk.¹³² For example, Instructional Support moderates the association between receptive vocabulary skills at the beginning of the school year and receptive skills at the end of the school year.¹³³ Children with the highest

initial risk (lowest initial vocabulary skills) demonstrate greater gains in vocabulary, as a function of classroom instructional quality, when compared to children with higher skills at the beginning of the school year.¹³⁴ This finding suggests that despite initial disadvantages, children are able to benefit from high-quality instruction, which may begin to close the gap with their more advantaged peers.

Instructional Support also moderates the relationship between having writing materials in the classroom and alphabet knowledge.¹³⁵ The relationship is significant in classrooms rated high on Instructional Support, whereas the relationship is not significant in classrooms in classrooms with low Instructional Support. In addition, Instructional Support moderates the relationship between positive peer play behaviors and early mathematics skills.¹³⁶ In classrooms with higher Instructional Support, peer play is positively associated with early mathematics skills; in classrooms with low Instructional Support, the association is not significant.

Additionally, research indicates that the effects of high-quality early classroom experiences extend beyond preschool. For example, Instructional Support in preschool is positively correlated with expressive and receptive vocabulary, as well as letter-word knowledge in kindergarten.¹³⁷

Research also suggests that Instructional Support scores have adequate levels of predictive validity among Spanish-speaking DLLs. For example, Instructional Support is positively correlated with children's Spanish and English vocabulary.¹³⁸ Language Modeling was also found to be positively associated with both expressive and receptive vocabulary (assessed in English) for DLL children.¹³⁹

SUMMARY

Research conducted over the past several decades confirms that the Pre-K and K-3 CLASS measure the types of social, behavioral, and instructional interactions that lead to student growth. The studies reviewed for this paper provide a preponderance of evidence of the impact of higher CLASS scores on student outcomes relative to the gains made by students in classrooms with lower CLASS scores. One of the most important findings from research on the CLASS is that CLASS-based interventions help teachers improve their interactions with students. Programs and resources that have proven effective at increasing CLASS scores include coaching, coursework, and facilitated access to a video library of effective teaching exemplars.

Ultimately, the value of the CLASS is not only to measure teacher interactions, but to use those measurements to enhance teacher practices through targeted feedback or coaching. Using the CLASS to define and improve teacher practices increases children's potential for learning.

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