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Educators' Perceptions of Administrators' Support for Cognitively-Challenging Instruction

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Educators' Perceptions of Administrators' Support for Cognitively-Challenging Instruction

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by

Patricia Cabral

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ABSTRACT OF THE THESIS

Educators' Perceptions of Administrators' Support

for Cognitively-Challenging Instruction

by

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Master of Arts in Education

University of California, Los Angeles, 2022

Professor Carola E. Suárez-Orozco, Chair

Opportunities to learn (OTL) in the classroom have implications for academic comprehension, performance, and outcomes for diverse learners. OTL is defined as the set of conditions in schools that promote learning. This research study explored two conditions that have been theorized as influential for students' OTL by: (1) capturing the nuances of students' learning through cognitively-challenging instruction, and (2) educators' perceptions of administrators' support. The purpose of this research study was to explore the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction, and the role of classroom SES. Five public school districts, 151 schools, and 369 fourth to ninth grade classrooms were sampled. A simple moderation model was tested using multiple linear regression analysis. Results revealed that there is no relationship between educators' perceptions

of administrators' support and cognitively-challenging instruction nor that classroom SES, as measured here, moderated the relationship. Arguably, these findings are likely a result of the secondary data available for these analyses rather than of the conceptual underpinnings of this form of OTL. In practice, an OTL framing can still help administrators and educators reflect on key demographic compositions when developing and implementing instruction and curriculum in classrooms. Additionally, by using this cognitively-challenging instruction scale researchers could reflect on the "process" rather than just the "outcomes" for students' cognitive development for learning.

The thesis of Patricia Cabral is approved.

Sandra H. Graham

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University of California, Los Angeles

2022

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

Opportunities to learn (OTL) in the classroom is an important framework in educational research with implications for academic comprehension, performance, and outcomes for diverse learners (Cooper & Liou, 2007; Covay Minor, 2015; Darling-Hammond & Cook-Harvey, 2018; McDonnell, 1995). OTL is generally defined as the set of conditions within schools that promote learning (Boykin & Noguera, 2011; Cooper & Liou, 2007), and is used for understanding variability in classroom conditions provided to support students learning (Clotfelter et al., 2006; Quay, 2011). It is not simply a framework but also a research concept and policy instrument in education (McDonnell, 1995).

Studies that catalog, examine, and evaluate OTL have spanned from pedagogical practice and curriculum (Cooper & Liou, 2007; McDonnell, 1995; Travers, 1993; Walshaw, 2012; Ye, 2016) to learning processes (Cooper & Liou, 2007; McDonnell, 1995). In both research and policy, the concept of OTL has been used to assess differences in conditions for students, classrooms, and/or schools, to help understand and reduce disparities in comprehension, performance, and outcomes (Clotfelter et al., 2006; Quay, 2011).

For this study, my contribution to this body of work is to highlight two aspects of ‘conditions’ that have been theorized as influential for students’ opportunities to learn: (1) capturing the nuances of students’ learning through cognitively-challenging instruction (Vygotsky, 1978), and (2) educators’ perceptions of administrators’ support. In so doing, this study addresses a current gap in the field—a consideration of the relationship between the role of administrators’ support for educators and its influence on cognitively-challenging instruction in classrooms. This contribution to this body of research is important because we know OTL offered in instruction are influenced by many factors including school leadership (Giles, 2019;

Ross & Cozens, 2016), which can have implications for historically marginalized students of low socio-economic status (SES) backgrounds (Boykin & Noguera, 2011).

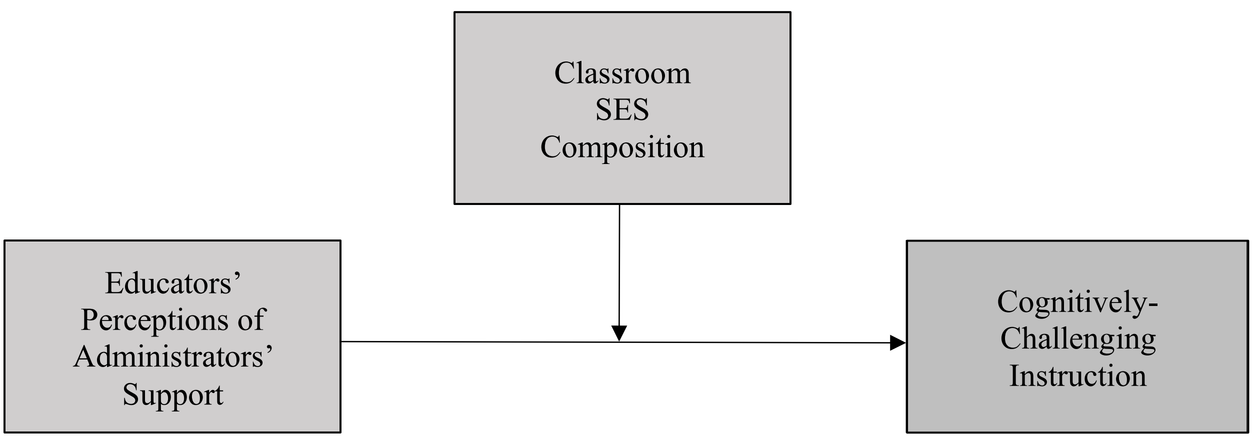
Literature Review

Opportunities to Learn

OTL generally considers numerous aspects of supports for educator instruction and student learning, which includes but is not limited to, "… curricula, learning materials, facilities, teachers, and instructional experiences" (Cooper & Liou, 2007, p. 44). In general, the definition of OTL has evolved overtime, and depends on the local context; for example, conceptualizations of OTL research in the United States vary between states (McDonnell, 1995). Nonetheless, OTL has been widely used as a research concept and subsequently a guiding framework in policy to provide a more equitable education for marginalized students (Cooper & Liou, 2007; McDonnell, 1995).

OTL originated as a research concept that was used to compare math achievement across students, classrooms, and schools within a state, state-by-state, and internationally. These comparisons were conducted to account for the differences of exposure to math curriculum before understanding academic disparities (McDonnell, 1995). OTL soon captured the attention of policy-makers in education and generally remained grounded in the idea that academic outcomes could not be measured without considering and also assessing OTL (i.e., the conditions offered in schools, classrooms, etc.; Cooper & Liou, 2007; McDonnell, 1995).

As noted earlier, OTL is a multi-faceted concept (Covay Minor, 2015). In this research study, it is defined as the conditions that encourage learning (Cooper & Liou, 2007)—specifically, conditions for cognitively-challenging instruction, which is one aspect of OTL, also known as a type of implemented curriculum (Cooper & Liou, 2007; McDonnell, 1995; Travers, 1993). The first observed condition of OTL is to understand the nuances of students' learning experiences through their teachers' use of cognitively-challenging instruction. The second condition of observation for OTL is educators' perceptions of administrators' support and its relationship with cognitively-challenging instruction. In my analysis, the role of multiple actors within the school environment are conceptualized as contributors (e.g., administrators and educators) to students learning experiences (Bottia et al., 2016; Keene, 2017; Shavelson, 1989 *as cited in* McDonnell, 1995). By considering these conditions, this work can contribute to improving strategies for effectively implementing change at the school with implications in the classroom (see Figure below for conceptual diagram, and see Appendix A, Figure 1 for more details).



Note. Conceptual diagram of OTL to be assessed.

Cognitively-Challenging Instruction

Challenge and support in curriculum and instruction is encouraged for teaching and learning (Stefanou et al., 2004). Cognitively-challenging instruction is the implementation of challenging curriculum in instruction for students through academic rigor, classroom discussion, and question elicitation as provided and facilitated by educators (Karras-Jean Gilles et al., 2020). Cognitively-challenging instruction is grounded in Vygotsky's (1978) Social Development

Theory, which posits the importance of classroom interactions as facilitated by educators to stimulate students' learning for cognitive development (Pianta & Allen, 2008)—in particular, an individual's interactions with whom they perceive to be the expert (e.g., educator[s] or peer[s]) to help reach their learning aims, like, learning a new concept (Smierciak-Lueders, 2015; Vygotsky, 1978).

Social Development Theory helps us reflect on the following particularities regarding cognitively-challenging instruction: how is learning effectively negotiated by students, educators, and administrators for cognitively-challenging instruction? Do educators' perceptions of administrators' support for teachers influence cognitively-challenging instruction for students?

Previous research has primarily examined one aspect of OTL related to outcomes associated with attained curriculum–teacher effectiveness (McDonnell, 1995), which is usually measured by academic outcomes (e.g., students' standardized exam scores and grade point averages) or performance outcomes (e.g., evaluation scores; Ye, 2016). Teacher effectiveness is tangential but nonetheless related to cognitively-challenging instruction. In the current study, however, OTL will be measured through cognitively-challenging instruction of implemented curriculum, to capture the communal learning environment while accounting for potentially influential conditions (e.g., educators' perceptions of administrators' support). Before understanding the attained curriculum through academic outcomes, it is necessary to assess the quality of implemented curriculum through cognitively-challenging instruction.

Additionally, Social Development Theory emphasizes that curriculum implemented and taught by educators should include challenge (and support) in instructional practice, to maximize OTL offered by educators in classrooms (Stefanou et al., 2004). While educators certainly play a crucial role in optimizing OTL, administrators and their instructional support are also important for students' learning (Hallinger, 2005). Previous literature states that for educators to be optimally effective for their students, they also need to receive adequate and quality administrator support (Hallinger & Murphy, 1985; Hallinger, 2005; Johnson et al., 2012).

Educators' Perceptions of Administrators' Support

A functional and supportive environment for educators can also support instruction for students' learning (Hallinger, 2005). Administrators' instructional support for educators is a complementary component to their leadership role yet critical for transformative practice in education (Barth, 1990; Hallinger, 2005). For instance, administrators managing of curriculum (as a form of instructional support), should also be fully immersed in the classroom to provide useful evaluations for educators (Hallinger & Murphy, 1985; Hallinger, 2005; Johnson et al., 2012).

Another important contribution would be administrators' participation in teacher training workshops to support educators to translate training into classroom practice (Campbell, 2017). Administrators immersed in instruction can help provide context specific teacher training workshops to improve areas like cognitively-challenging instruction (Kindall et al., 2018). For example, administrators developing a teacher training workshop that incorporates a theoretical framework relevant to their subject(s) of teaching before targeting all-encompassing classroom practices (Johnson, 2006). Purposeful teacher training that encapsulates relevant theory would be more likely result in concrete implementation of strategies in classrooms (Ye, 2016). Therefore, administrators' instructional support can lead to an effective use of educator evaluations for subsequent teacher training workshops.

Ross and Cozens (2016) found that one of the core skills for instructional leadership was educators' perceptions of administrators' knowledge of curriculum and instruction. For public school educators, perceptions of administrators' leadership influence school climate, as well as other core skills (e.g., professionalism, professional development, and diversity). Research also suggests that there is a positive relationship between all school climate dimensions (e.g., order, leadership, environment, involvement, instruction, expectations, and collaboration) and the perception of the leader's intellectual stimulation (e.g., problem solving). Administrators in addition to maintaining core skills (Ross & Cozens, 2016), also serve to foster problem solving and creative thinking skills (Allen et al., 2015).

Results from a large-scale questionnaire reported that if an educator perceives the principal to have instructional knowledge, educators are more likely to implement instructional practices learned in teacher preparation programs and professional development (Kindall et al., 2018). Allen et al. (2015) also found that if educators have a higher satisfaction with their superiors, colleagues, and students, they are more likely to feel like they are capable of teaching and in-turn provide quality instruction for students. Educators' perceptions of administrators illustrate the in-direct relationship of administrators in students' learning and academic outcomes (Giles, 2019; Ross & Cozens, 2016).

Leadership preparation programs teach administrators helpful strategies for effective school leadership. For example, one strategy is 'communication', which is a method to strategize and act (e.g., presenting data to educators [strategy] for practice [act]). Given this, communication between administrators and educators makes its way into classroom practice, which has implications for students' academic outcomes (Marzano et al., 2005 *as cited in* Baxter et al., 2012). Moreover, such leadership preparation programs are grounded in the value of communitarian leaderships, where a school leader (e.g., principal, assistant principal, or central office leader) engages in a process of reflexivity—an active awareness of oneself and their relationship with others (e.g., interactions to understand values, foster mutual respect, etc.) for effective school leadership for instructional support (Baxter et al., 2012).

In short, instructional leadership is important in schools (Giles, 2019; Wise & Wright, 2012), and cannot be considered in isolation of the context of the individuals and the communities to which they cater. Transformational leadership by administrators and educators is necessary to develop and implement quality instructional practices that genuinely cater to the needs of diverse learners (Fenn & Mixton, 2011). Given the importance of administrators' support to educators' use of quality instruction for students' learning (Giles, 2019; Ross & Cozens, 2016), it is especially important to consider the role of characteristics known to be related to infrastructural support and educators' instructional practice (e.g., the SES background of students; Aikens & Barbarin, 2008; Luyten et al., 2009; Reid & Ready, 2013).

Classroom Socio-Economic Status Composition

Classroom SES composition is associated with cognitive development for students' learning (Luyten et al., 2009; Reid & Ready, 2013). Reid and Ready (2013) found that SES composition is an important predictor of instructional quality. In addition, other research states that SES composition is more likely to predict students' academic outcomes than students' individual SES background (Borman & Dowling, 2010).

In terms of administrator support, there is longstanding research that supports the linkage between SES composition and administrators' leadership, which in turn influences academic outcomes (Hallinger & Murphy, 1985; Hallinger, 1998). There is a significant relationship between low levels of administrators' quality leadership and low academic outcomes for schools primarily composed of students from low SES backgrounds (Andrews & Soder, 1987). Equally important, in schools composed of majorly low SES students, administrators who provide quality leadership through instructional support serve as a buffer for outside influences (e.g., home, neighborhood, etc.) that may influence school effectiveness (Hallinger, 1998).

Santibañez and Fagioli (2016) found that academic performance and outcomes can be mediated by OTL despite SES, however, OTL is still more salient in affluent and advantaged schools (and societies) in general. Therefore, it is critical to consider the intersection of SES of students in classrooms across schools, to provide quality OTL (Santibañez & Fagioli, 2016). This theorization of classroom SES composition as an important factor in learning and OTL may help us demographically contextualize the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction.

Socio-Economic Status and Other Key Factors

Across classroom grades and subjects, SES status at a young age also has implications for OTL. For instance, Cueto et al. (2014) found that low SES children at age one were exposed to lower levels of OTL in their fourth grade math classrooms, when compared to high SES children. OTL was measured through the educators' level of cognitive demand, which included the novel application of math procedures, reasoning, and so on (Cueto et al., 2014). Relatedly, Covay Minor et al. (2015) found that first grade students from low SES backgrounds are more likely to be taught math in a procedural form when compared to students from other SES backgrounds. SES at multiple time points has implications for OTL.

In English Language Arts (ELA) classrooms we see that OTL in reading are more likely to be present in schools composed of more high SES students and less in low SES schools. In other words, students in schools with more low SES students were taught material with low cognitive demand (Lafontaine et al., 2015). Other researchers have observed and documented the variability in reading achievement scores across classrooms, specifically that OTL available in classroom environments predicted reading achievement more often than the school itself (Martínez, 2012). It is also important to examine OTL in classrooms and schools to gain a comprehensive understanding of academic outcomes.

The increased focus of OTL in ELA classrooms has magnified systemic inequities that affect low SES students, especially for students that belong to racial/ethnic minority backgrounds (Lafontaine et al., 2015; Scherff & Piazza, 2008). For example, in a study that measured OTL through literacy content and observed curriculum, the researchers found that across schools and grades it is not only important to assess the quality of OTL but to also situate it within systems (e.g., a systemic issue like tracking), offerings (e.g., quality teaching practices and resources), and acknowledgements (e.g., student perspective and choice) (Scherff & Piazza, 2008). This work highlights the importance of SES by grade and subject when researchers examine OTL, while also situating their observations in systems of oppression.

One systemic issue of particular interest is curricular and differentiated instruction, which is commonly referred to as ‘tracking’ and ‘grouping’ (Dougherty, 1996; Scherff & Piazza, 2008). Tracking and grouping is defined as "… the separation of students into different classes or different groups within the same class that vary either in the content and difficulty of the material taught or in the speed at which it is covered" (Dougherty, 1996, p. 43). Dougherty (1996) critiques the usefulness of OTL standards as they do not explicitly include how students' racial/ethnic and SES background is rooted in segregation, tracking, and grouping in education. Some researchers claim that tracking and grouping reproduces inequities in OTL, which contributes to the educational achievement and attainment gap by race/ethnicity, SES, and gender (Dougherty, 1996). Some of the disparities documented between racial/ethnic minorities from lower SES backgrounds and white students from higher SES backgrounds include the difficulty and amount of material covered during class time and access to quality teachers (Brewer et al., 1995; Catsambis, 1994; Dreeben & Gamoran, 1986; Finley, 1984; Gamoran, 1986; Grant & Rothenberg, 1986; Hallinan, 1987; Metz, 1978; Oakes, 1985, 1990, 1992; Oakes & Guiton, 1995; Persell, 1977; Rosenbaum, 1976; Rowan & Miracle, 1983; Schwartz, 1981 *as cited in* Dougherty, 1996). Segregation, tracking, and grouping is typically captured through classroom and school demographic compositions, therefore, these too, were key analytical factors considered when I statistically observed my conceptual model.

Race/ethnicity and SES background composition are two factors that play a key role in academic outcomes. For example, in eighth and tenth grade math classrooms, located within racially segregated schools (e.g., high minority schools), found that Black students are less likely to have exposure to high level math courses before their eighth grade year and low engagement levels (Lleras, 2008). Reid and Ready (2013) found that in comparison to high SES white students, low SES racial/ethnic minorities learned less, and also found that classrooms primarily composed of high SES students reduced the OTL gap. Researchers also suggest that students' race/ethnicity and SES background determined instructional differences. For instance, in fifth grade, Black middle class students spend more time on math topics than white middle class students, and Black low and middle SES students are expected to spend more time on math homework when compared to white students (Covay Minor et al., 2015).

By gender, Farkas el al. (1990) stated that boys tend to perform lower in coursework grade through cognitive performance than girls and found that there was a negative association between gender and coursework grade. This generally meant that boys performed lower than girls. This research highlighted teacher biases based on student gender, SES and racial/ethnic background. Therefore, in addition to student demographic information researchers should continue to collect educator background characteristics to observe patterns in biases. Especially since teachers tend be female, middle class, and white (Gregory et al., 2010). In sum, SES and other key factors should be accounted for as they have been empirically deemed as influential to the OTL.

Aims

The purpose of my research study was to explore the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction, and the role of classroom SES composition. Expanding upon prior research, I aimed to answer the following research questions:

(1) What is the relationship between educators' perceptions of administrators' support and cognitive-challenging instruction offered to fourth to ninth grade students across ELA and Math subjects?

(2) Does the relationship between educators' perceptions of administrators' support and cognitive-challenging instruction depend on classroom SES composition?

Hypotheses Based on the research questions, I hypothesized the following: (1) Educators' perceptions of administrators' support will be positively associated with cognitively-challenging instruction, (2) the positive association between educators' perceptions of administrators' support and cognitively-challenging instruction will depend on the composition of students' SES background; I predict that the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction will be stronger for classrooms with a lower percentage of students enrolled in the Free and Reduced Priced Lunch (FRPL) Program.

Through the exploration of these research questions by testing the proposed hypotheses, the value of this research study was to explore the role of administrators in students' class instruction, especially for our most marginalized children and adolescents from low SES backgrounds.

Method

Study Design

Data Source The archival data used for this research study was derived from the Measures of Effective Teaching (MET) project, which was data collected from 2009 to 2011 from six public school districts and 317 schools across the United States. For recruitment, an opportunity sampling method was used, then, researchers gathered the participation of the following school districts: Charlotte-Mecklenburg (North Carolina), Dallas (Texas), Denver (Colorado), Hillsborough (Florida), Memphis (Tennessee), and New York City (New York) (Bill & Melinda Gates Foundation, 2018; White & Rowan, 2018). After recruitment, the opportunity to be a part of this research study was made available to each districts' respective schools which ranged from elementary to high school. In each school, teachers nominated classrooms, all the while researchers also considered an even representation of grades and subjects. Researchers subsequently observed select classrooms using a wide-angled camera to capture manifestations of teacher effectiveness. Other gathered data included district and school data (e.g., demographic data), rated scores of these classroom video observations, and survey data (Bill and Melinda Gates Foundation, 2018, p. 11). Overall, the MET study aimed to measure educators' quality of instruction in classrooms and its relation to students' academic achievement (White & Rowan, 2018, p. 10).

MET Study The MET was composed of two waves of data collection, from 2009 to 2010 (i.e., Year One) and 2010 to 2011 (i.e., Year Two). From Year One the data collected most relevant to my research study was the classroom level data, specifically, classroom SES composition, classroom racial/ethnic and gender composition, classroom grade, classroom subject, teacher racial/ethnic background, and teacher gender.

Lastly, two types of surveys were administered to teachers, the Teacher Working Conditions Survey was administered during Year One and the MET Teacher Survey was administered during Year Two (Bill and Melinda Gates Foundation, 2018; White & Rowan, 2018, p. 18). I used the Teacher Working Conditions Survey for this analysis. The Teacher Working Conditions Survey was administered to the teachers that were sampled for the classroom video observations as well as other teachers who also worked at those schools. These surveys were administered online (White & Rowan, 2018, p. 36-37). For a more comprehensive overview of information regarding the MET Study's original sample and the details of data collection by year, reference the User Guide to Measures of Effective Teaching Longitudinal Database (Flores, 2019; White & Rowan, 2018).

MIV Study In addition to the data used from the MET, I also used classroom video scores derived from the Making Invisible Visible (MIV) project, a multi-stage mixed-methods secondary data analysis of the MET (Principal Investigator: Dr. Carola Suárez-Orozco). The MIV project aimed to capture and understand the manifestations of teacher bias in classrooms composed of varying percentages of students of color, to explore its effects on students' academic outcomes. I drew upon classroom video scores from a scale called the *Cognitively-Challenging Instruction Scale*. This scale was derived from the qualitative phase and was further refined during the subsequent quantitative phase (Karras-Jean Gilles et al., 2020; Suárez-Orozco, 2017; Suárez-Orozco, 2018).

Sample

MIV Analytic Sample The MIV analytic sample included five public school districts, 223 schools, and 610 fourth to ninth grade classrooms across ELA and Math subjects (see Appendix B, Table 1; Flores, 2019; White & Rowan, 2018). The inclusion criteria for the MIV sample was based on quality of video and audio, complete MET data, a varied representation of classroom grades, subjects, and racial/ethnic compositions of students of color, and educators' race/ethnicity and gender (Karras-Jean Gilles et al., 2020).

Inclusion Criteria Inclusion criteria for the current study were: (1) At least 80% or more complete responses to items extracted from the Teacher Working Conditions Survey that measure school leadership, (2) complete classroom SES, racial/ethnic, and gender composition data, (3) complete educator racial/ethnic background and gender data, and (4) complete classroom grade and subject data. All educators that were missing more than 20% of responses for the survey were automatically excluded from this study's analytic sample, in addition to, classrooms that were missing compositional data (e.g., SES, racial/ethnic, and gender). After accounting for missing cases through listwise deletion (241 out of 610), the sample ultimately totaled to 369 cases. The reason behind execution of a listwise deletion was to use complete demographic data.

299 Analytic Sample After applying the inclusion criteria, a total of five public school districts, 151 schools, and 369 unique classrooms represent the analytic sample for this research study (see Appendix B, Table 1 and Table 2). Moreover, the 369 cases represent both unique educators and classrooms which means the cases can be linked at the classroom/educator level.

Measures

Cognitively-Challenging Instruction The MET classroom video data was coded for cognitively-challenging instruction on a five-point scale that ranged from -2 to +2, where -2 represents “no challenge” and +2 represents “high challenge” (see Appendix A, Figure 2 for conceptualization and Appendix C, Table 3 for variable details; Karras-Jean Gilles et al., 2020; Suárez-Orozco, 2018). The development of the scale was modeled after the work of Pianta et al. (2008; e.g., CLassroom Assessment Scoring System [CLASS]). An example of academic rigor, classroom talk, and question elicitation during class time (i.e., cognitively-challenging instruction) included, (a) incorporation of academic rigor into learning opportunities by encouraging students to provide evidence for their reasoning to solve a problem, (b) encouraging classroom talk by asking questions and actively listening to students reasoning, to discuss and help students make sense of content, and (c) engage students in learning through probing with questions (see Appendix A, Figure 2; Gibbons, 2015; Karras-Jean Gilles et al., 2020; Mariani, 1997; Suárez-Orozco, 2018; Vygotsky, 1978). To measure cognitively-challenging instruction (i.e., one aspect of OTL) I used the raw score provided.

To further understand validity and reliability of this cognitively-challenging instruction measure it is useful to briefly review the rigorous coding strategy developed and used. Researchers thoroughly reviewed 10 classroom videos then met weekly to discuss observations, while also using relevant literature to formally operationalize cognitively-challenging instruction (and other themes). This process then informed the development of the observational protocol for coding that was to be used by the coding team. Next, researchers created detailed analytic memos for the first half hour of all 610 classroom videos. Lastly, researchers recruited and trained a coding team to apply the observational protocol where a percent observed agreement of at least 80% was required. The additional domains observed other than cognitively-challenging instruction included relationships and classroom management (Karras-Jean Gilles et al., 2020).

Educators' Perceptions of Administrators' Support The Teacher Working Conditions Survey measured multiple constructs, however, the construct most relevant to my study is school leadership (White & Rowan, 2018, p. 36). School leadership measures the forms in which school leaders create and foster an environment of trust and support ($\alpha = .93$; Bill and Melinda Gates Foundation, 2010; New Teacher Center, 2016). Three sample survey items on a Likert-type scale that measured school leadership included: (1) "*The faculty and leadership have a shared vision*", (2) "*The school leadership consistently supports teachers*", and (3) "*The school leadership makes a sustained effort to address teachers concerns about: Instructional practices and support*" (see Appendix C, Table 3 for details of survey items). In this study, I refer to "school leadership" as "administrators" (e.g., principal and/or assistant principal) for the sake of uniformity, as that is the term most often used in the gathered literature. I generated a composite score of selected items to measure for educators' perceptions of administrators' support. I modeled the development of a robust composite score for educators' perceptions of administrators' support drawing upon the work of Burkhauser (2017), Ware (2019), and Vause (2012).

Classroom SES Composition Classroom SES composition was measured using the classroom composition of students in a section (i.e., classroom) enrolled in FRPL. FRPL was used as a proxy for classroom SES composition (see Appendix C, Table 3; Day et al., 2016; Fan, 2012; Ilie et al., 2017).

Covariates Educator gender was measured by using the variable that provided an indicator for if the teacher was male. Educator racial/ethnic background was measured by using multiple dichotomous categorical variables, which included the race/ethnicity indicator for if the teacher was White, Black, Hispanic, and Other.

Classroom gender composition was measured by using the percent of students ever listed in the section who identified as male. Classroom racial/ethnic composition was measured by using multiple dichotomous categorical variables, which included, the percent of White, Black, Hispanic, Asian, and Other students in a section.

Classroom grade was measured by using several dichotomous categorical variables that indicated the grade of the MET section. Lastly, classroom subject was measured by using a dichotomous categorical variable that indicated the subject of the classroom was ELA (see Appendix C, Table 3 for all variables).

Analytic Plan

To test my hypotheses, I conducted a moderated multiple regression analysis (Baron & Kenny, 1986; Hayes, 2013; Mertens, 2015) to examine the conditional effect of educators' perceptions of administrators' support (i.e., focal independent variable, *X*, or TWC_SCHO) on cognitively challenging instruction (i.e., dependent variable, *Y*, or COG_STIM) defined by a function of classroom SES composition (i.e., moderation variable, *W*, or DAD_PERC; see Appendix A, Figure 1 for the simple moderation model tested; Field, 2013; Hayes, 2013; Lock et al., 2017).

In addition to the primary variables of interest in my simple moderation model, I inserted and controlled for the following covariates: (1) Educator race/ethnicity (i.e., DAD_BLAC, DAD_HISP, and DAD_RACE), (2) Educator gender (i.e., DAD_MALE), (3) Classroom race/ethnicity composition (i.e., BLACK_Se, HISPANIC, RACEOTHE, ASIAN_Se, and WHITE.y_), (4) Classroom gender composition (i.e., MALE_Sec), (5) Classroom grade (i.e., FOURTHGR, FIFTHGRA, SIXTHGRA, SEVENTHG, and EIGHTHGR), and (6) Classroom subject (i.e., SUBJECT.).

All covariate categorical variables were dummy coded except for the classroom racial/ethnic composition. The reference group for educator racial/ethnic background was White educators (i.e., DAD_WHIT), for educator gender it was female educators, for grades it was ninth grade (i.e., NINTHGRA), and lastly, for classroom subject it was math classrooms.

I tested my simple moderation model using PROCESS (Hayes, 2018) in SPSS (Version 26; IBM, 2019) to run a multiple linear regression with an interaction term. All additional analyses were done using SPSS (IBM, 2019).

I obtained an intraclass correlation coefficient (ICC) value of 0.01. An ICC value of 1% represents the proportion of the total variance in cognitively-challenging instruction attributable to group mean differences at the school level. If two schools were extracted from the sample, we would expect them to be correlated by 1%. I used a cut-off point of at least .05 (5%) as is typical in cross-sectional data in educational research (Raudenbush et al., 2006; Snijders & Bosker, 2012). Given that an ICC value of 1% is less than 5%, I determined that the degree of independence violation is not substantial enough to use multilevel methods (Raudenbush & Bryk, 2002; Snijders & Bosker, 2012). Therefore, a single level (or classroom level) multiple regression analysis was used to test the simple moderation model.

The simple moderation model adapted and estimated the following single level multiple linear regression equation (Saunders, 1956 *as cited in* Hayes, 2013):

$$\hat{Y} = i_Y + b_1X + b_2W + b_3XW + b_4U_1 + \ldots + b_{19}U_{16} + e_y$$

The $\hat{Y}$ term represents the observed cognitively-challenging instruction score. i_Y term represents the intercept in the model. b_1 is the regression coefficient of the effect of educators' perceptions of administrators' support (X), b_2 is the regression coefficient of the effect of classroom SES composition (W), and b_3 is the interaction term (XW). All remaining coefficients in the model represent the effect of the covariates in the model, which are educator racial/ethnic background (b_4 to b_6), educator gender (b_7), classroom racial/ethnic composition (b_8 to b_{12}), classroom gender composition (b_{13}), classroom grade (b_{14} to b_{18}), and classroom subject (b_{19}).

Results

Preliminary Analyses

Power Analysis To determine the estimated sample size needed, I conducted an a-priori power analysis for multiple regression (Cohen, 1988; Faul et al., 2009; Faul et al., 2007). The a-priori analysis indicated that with an observed power (1-β) of .80, and an effect size (f^2) of at least .1 (which is small per Cohen's criteria [1992]), and an alpha threshold of .05, a sample of approximately 101 classrooms is needed. Therefore, a sample size of 369 classrooms is appropriate to test my hypotheses.

Descriptive Statistics Table 1 (Appendix B) details descriptive statistics for the demographic variables used for this analysis to help contextualize the 369 cases. 369 unique classrooms were sampled from 151 schools within 5 school districts. 38% of the 369 classrooms were in elementary school, 45% in middle school, and 17% in high school. A little over half (56%) of classrooms were ELA, and about less than half (44%) of classrooms were Math. There were no classrooms in the sub-sample of 369 that were combined ELA and Math. 369 unique educators broken down by race/ethnicity were majority White (64%), followed by Black (27%), Latinx (8%), and Other (2%). About 290 (79%) educators' identified as female and 79 (21%) identified as male. It is important to note that the descriptive statistics for the 299 analytic sample are reflective of the MIV analytic sample.

In terms of the compositional demographic variables used, in order to help visualize the data distribution further, I use their corresponding mean and standard deviation (i.e., mean [SD]).

Classroom male gender composition had an average of .50 (.12) and the distribution was not skewed (-.01) yet was substantially peaked (2.75). Classroom SES composition (i.e., proportion of students enrolled in FRPL) had an average of .54 (.30) and a distribution that was not skewed (-.03) but was considerably peaked (-1.30). Lastly, the average number of students per classroom were 23.48 (5.43) with a distribution that has a skewness and kurtosis of .62 (i.e., not substantially skewed) and 1.30 (i.e., slightly peaked), respectively.

Table 4 (Appendix B) provides all correlations for continuous variables in the regression model. Statistical significance was determined by using an alpha threshold value of .05. Among classrooms, there was a positive association between educators' perceptions of administrators' support and cognitively-challenging instruction $r(367) = .15$, $p = .01$. Cognitively-challenging instruction was also positively correlated with classroom proportion of students who are Asian $r(367) = .13$, $p = .01$. Educators' perceptions of administrators' support was positively associated with proportion of students who are White $r(367) = .23$, $p = .00$, and was negatively associated with proportion of students who are Latinx $r(367) = -.17$, $p = .00$, and classroom proportion of students enrolled in FRPL $r(367) = -.21$, $p = .00$.

There was a positive relationship between classroom proportion of students who were enrolled in FRPL and proportion of students identified as Latinx $r(367) = .64$, $p = .00$. Classroom proportion of students enrolled in FRPL was negatively correlated with proportion of students who identified as Other $r(367) = -.16$, $p = .00$ and White $r(367) = -.46$, $p = .00$. Classroom proportion of Latinx students was negatively associated with classroom proportion of Black students $r(367) = -.41$, $p = .00$, Other Race students $r(367) = -.14$, $p = .05$, and White students $r(367) = -.41$, $p = .00$. Proportion of male students in a classroom was positively associated with proportion of Latinx students in a classroom $r(367) = .10$, $p = .05$.

The proportion of students in a classroom who were categorized as Other were negatively correlated with classroom proportion of Black students $r(367) = -.32$, $p = .00$, and positively correlated with classroom proportion of White students $r(367) = .34$, $p = .00$. The proportion in classrooms of Asian students was negatively associated with classroom proportion of Black students $r(367) = -.24$, $p = .00$. Finally, classroom proportion of White students is negatively correlated with classroom proportion of Black students $r(367) = -.60$, $p = .00$.

Additional Tests. To determine the effect of the covariates in my model, I conducted additional chi-square tests, independent samples t-tests, and one-way ANOVAs for certain variables of interest, then generally compared results between analytic samples. It is important to note that missing cases were not removed nor was there data imputation performed for the MIV analytic sample ($n = 610$).

299 Analytic Sample. Table 5 (Appendix B) recounts multiple chi-square test results for all categorical variables in the regression model. Results indicated that there was a significant relationship between educators that identify as Black and classrooms identified as ELA. There is an association between Latinx teachers and sixth grade classrooms and between White educators and sixth grade classrooms. For classrooms taught by educators that identify as male for gender, there was a present association with fourth, fifth, seventh, and ninth grade classrooms.

I conducted additional independent samples t-tests to separately compare educator gender and classroom subject on classroom cognitively-challenging instruction scores. I concluded that there was no significant mean difference between educators that identified as males ($M = .41$, $SD = 1.61$) and females ($M = .34$, $SD = 1.48$) in classroom cognitively-challenging instruction scores $t(367) = -.31$, $p = .18$. On the other hand, there was a significant mean difference between ELA classrooms (*M* = .11, *SD* = 1.51) and Math classrooms (*M* = .58, *SD* = 1.48) in cognitively-challenging instruction scores $t(367) = 3.05$, $p = .00$.

I also conducted multiple one-way ANOVAs for all categorical variables composed of three or more groups on the continuous outcome variable. The two relevant categorical variables were educator race/ethnicity and classroom grade. Results indicated that there were no significant mean differences in cognitively-challenging instruction scores between educator racial/ethnic background groups (i.e., Black, Hispanic, Other, and White) $F(3, 365) = 1.27$, $p = .28$. However, there was significant difference in cognitively-challenging instruction scores amongst different grade levels (e.g., fourth to ninth grade) $F(5, 363) = 4.85$, $p = .00$. No additional post-hoc comparisons were conducted for significant results.

MIV Analytic Sample. After broadly comparing for discrepancies in both analytic sample results, several key differences were noted.

There was no longer a relationship between Black educators and ELA classrooms, but there was a relationship between Black educators and ninth grade classrooms. An association between Latinx educators and ELA classrooms was also noted, but no association between Latinx teachers and sixth grade classrooms. Educators that identified as Other Race were associated with sixth grade classrooms and White teachers are associated with ninth grade classrooms.

The only chi-square test results that are similar to the 299 analytic sample chi-square results were that White educators are still associated with sixth grade classrooms and that male educators are associated with fourth, fifth, and ninth grade classrooms. However, unlike before, there is no association present for male educators and seventh grade classrooms, and an association was found between male educators and eighth grade classrooms.

Additional tests revealed that all conclusions for independent samples t-test and one-way ANOVA's remained consistent with the 299 analytic sample in terms of significance. Table 6 and 7 (Appendix B) provides the t-test results and Table 8-13 (Appendix B) shows the one-way ANOVA results for the 299 and MIV analytic samples.

In conclusion, the covariates considered are influential at some point in both analytic samples, therefore I included them in the final model tested. Researchers that work with this sub-sample (n = 610) in the future may find it in their best interests to conduct data imputation for more reliable and comparable results. Per the theoretical framing behind the main analyses and my lack of experience with data imputation procedures, all demographic variables remained as covariates in the model and all missing data was removed.

Main Analyses

To answer the research question of focal interest the best fitting regression model is as follows (see Appendix B, Table 14):

$$\hat{Y} = 3.6442 + .3527X - .3335W + .1152XW + .4557U_1 - .0154U_2 + .8102U_3 + .3383U_4 - 6.4545U_5 - 6.2434U_6 - 7.3917U_7 - 4.3066U_8 - 5.9348U_9 - .2966U_{10} + .6763U_{11} + .5785U_{12} + .5419U_{13} - .0030U_{14} - .2491U_{15} - .2775U_{16}$$

The moderation analysis using OLS regression yielded a coefficient value (i.e., b_1) of .35 for educators' perceptions of administrators' support, and this value is not statistically different from zero (p = .61). The regression coefficient value of .35 represents the effect of educators' perceptions of administrators' support on cognitively-challenging instruction when classroom SES composition equals zero (i.e., classrooms that have no students enrolled into the FRPL Program). Where two classrooms that differ by one unit on educators' perceptions of administrators' support, but are equal to zero in classroom SES composition, are estimated to differ by .35 on cognitively-challenging instruction, while controlling for classroom race/ethnicity composition, classroom gender composition, educator's race/ethnicity, educator's gender, classroom grade, and classroom subject.

Next, results also indicated that the regression coefficient value for classroom SES composition (i.e., b_2) is -.33, which was not statistically significant (p = .82). The regression coefficient value of -.33 is the effect of classroom SES composition when educators' perceptions of administrators' support is equal to zero (i.e., no support from administrators as perceived by educators). In detail, two classrooms that differ by one unit on classroom SES composition, but with a value of zero on educators' perceptions of administrators' support, are estimated to differ by -.33 on cognitively-challenging instruction, while controlling for classroom race/ethnicity composition, classroom gender composition, educator's race/ethnicity, educator's gender, classroom grade, and classroom subject. The regression coefficient is negative (b_1 = -.33), which indicates that amongst the classrooms sampled, in particular those that had a relatively higher percentage of students enrolled in FRPL (i.e., classroom SES composition), resulted in a relatively lower score for cognitively-challenging instruction.

The interaction term value (i.e., b_3) for educators' perceptions of administrators' support and classroom SES composition is .12 and is not statistically different from zero (p = .82). This interaction term value of .12 is interpreted as the quantity by which the effect of educators' perceptions of administrators' support on cognitively-challenging instruction changes, as classroom SES changes by one unit. Therefore, the relationship and effect of educators' perceptions of administrators' support on cognitively-challenging instruction is not dependent on classroom SES composition, while controlling for classroom race/ethnicity composition, classroom gender composition, educator's race/ethnicity, educator's gender, classroom grade, and classroom subject. Since the interaction term in our simple moderation model is not statistically different from zero, we can conclude that educators' perceptions of administrators' support has the same effect on cognitively-challenging instruction despite amount of students enrolled in FRPL (i.e., classroom SES composition). Therefore, we fail to reject the null hypothesis.

For the covariate effects in the regression model, I also obtained some insightful results. There was a significant effect ($b_4 = .46$) for Black educators ($p = .04$), where a value of .46 means that Black educators resulted in a .46-point increase in cognitively-challenging instruction when compared to White educators, while controlling for all other variables in the model. For grade, there was a significant effect for fourth ($b_{14} = .68$, $p = .02$), fifth ($b_{15} = .58$, $p = .04$), and sixth grade ($b_{16} = .54$, $p = .04$) when compared to ninth grade, independently. In other words, fourth, fifth, and sixth grades resulted in a .68-point, .58-point, and .54-point increase in cognitively-challenging instruction scores when compared to ninth grade individually, while holding all other variables in the model constant.

Hypothesis 1 In conclusion, as already stated, educators' perceptions of administrators' support was not significantly associated with cognitively-challenging instruction ($b_1 = .35$, $p = .61$).

Hypothesis 2 Results indicated that there was no evidence of a moderation effect present ($b_3 = .12$, $p = .82$). Hence, the association between educators' perceptions of administrators' support and cognitively-challenging instruction does not depend on composition of students' SES background. To visualize these results reference Appendix B, Figure 3.

Since the interaction term was not statistically significant, for exploratory purposes I re-estimated the model without the interaction term (Hayes, 2013). Alternatively, I inserted classroom SES composition as an additional covariate in the model and re-ran my revised model. Results are listed on Table 15 (Appendix B).

In brief, now that the effect of educators' perceptions of administrators' support is not variant on classroom SES composition, we obtained a statistically significant (p = .01) regression value of .41. The classroom SES composition effect resulted in a regression coefficient value of .00 and was non-significant (p = .99). In terms of the other covariate effects in the regression model, a significant effect was observed for Black educators (p =.04), fourth (p = .02), fifth (p = .04), and sixth grade (p = .04).

Discussion

The purpose of this research study was to explore a gap in the field, which was the association between educators' perceptions of administrators' support and cognitively-challenging instruction by classroom SES. I tested the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction, and classroom SES composition as a moderator.

Preliminary analyses of this study revealed a positive association between educators' perceptions of administrators' support and cognitively-challenging instruction. However, the subsequent main multiple regression analysis did not demonstrate that educators' perceptions of administrators' support were positively associated with cognitively-challenging instruction. These results do not align with previous research that found that relationships between administrators and educators play a fundamental role in instruction and learning (Barth, 1990; Hallinger, 2005). Prior research findings have indicated that there is a significant positive association between principals' instructional support and classroom instruction (Goddard et al., 2010), which further aligns with other literature that states that principal's instructional support indeed has implications for instructional practice (May & Supovitz, 2011; Sebastian & Allensworth, 2012). Furthermore, prior research has shown that administrators' instructional support has both direct and in-direct implications for students' academic achievement and other outcomes (Hallinger, 2005; Sebastian & Allensworth, 2012).

It was also found that the effect between educators' perceptions of administrators' support on cognitively-challenging instruction was not moderated by or does not depend on classroom SES composition. This finding could be partially explained by the work of Ross and Cozens (2016), which details that the relationship between administrators' support and student instruction and learning is not direct. Instead, it is in-directly related through administrators' role in a multidimensional school climate. In other words, researchers found there was a relationship between leadership (e.g., administrators' instructional support), school climate, and student instruction and learning. However, on the other hand, Allen et al. (2015), found that this in-direct relationship does not exist, but rather that there was a positive association between leadership and school climate, but no association between school climate and student instruction and learning (Allen et al., 2015). Similar to what I found, these researchers also observed no relationship present between leadership and student instruction and learning (Allen et al., 2015). In general, we can conclude that the instructional support provided by administrators can sometimes impact student instruction but other times does not.

The inconsistency of findings could be attributed to what Sebastian et al. (2016) refer to as "multiple leadership roles" (p. 70), where leadership would also include instructional coaches and teacher leaders. Researchers believe this reconceptualization of formal school leadership is a more accurate representation of schools' organizational structures, which then could be used to appropriately assess its relationship with classroom instruction and student learning (Leithwood

& Mascall, 2008; Neumerski, 2013 *as cited in* Sebastian et al., 2016). However, like my own research study, research work today typically observes leadership in isolation (e.g., principals/assistant principals only; Sebastian et al., 2016).

There are multiple ways to define school leadership which partially explains dissimilar findings across studies, however a consistent finding found across research is the importance of school climate (Ross & Cozens, 2016; Sebastian et al., 2016). Thus, in addition to the reconceptualization of school leadership roles, another important point could be the inclusion of mediating factors like school learning climate (Sebastian et al., 2016). Sebastian and colleagues (2016) found that school learning climate connects the relationship between administrators' support and classroom instruction and learning, which coincides with the findings of Ross and Cozens (2016). All in all, it appears that the complex nature of this relationship requires an advanced model that tests both direct and in-direct relationships (Sebastian et al., 2016).

Empirical research shows that classroom SES composition is associated with administrators' support (Hallinger & Murphy, 1985; Hallinger, 1998) and cognitively-challenging instruction and learning (Luyten et al., 2009; Reid & Ready, 2013). In general, it has also been found that SES influences multiple (if not all) school characteristics such as leadership and classroom instruction (Sebastian et al., 2016). My findings, however, suggest that the relationship between administrators' support and cognitively-challenging instruction is not moderated by classroom SES. There are two additional explanations for this in the literature, 1) the measure for classroom SES only measures one aspect (or is one indicator) of SES (Diemer et al., 2013), which could also explain dissimilar results and conclusions across research, and 2) related research has found that depending on the SES measure used, that would determine whether or not there is a significant relationship between classroom SES and instruction. Hence, contributing to the argument that the SES indicator(s) matters and that a more comprehensive conceptual and analytical model is needed to holistically answer my research questions (Bachman et al., 2015).

As stated by the American Psychological Association (APA), one of the most effective ways to conceptualize and measure for SES is to consider multiple indicators, such as, income, educational attainment, and occupation, to then decide what measure or combination of measures is most appropriate to use (APA, 2015; Diemer et al., 2013). Diemer and colleagues (2013) highlight that indicators of SES measures are typically sorted into four categories, which includes prestige-, resource-, absolute poverty, and relative poverty based. For this study, under this criteria, I worked with one absolute poverty measure of SES—classroom SES. Furthermore, researchers added that there are times when using a variable composed of multiple SES indicators is not preferred, especially when researchers are looking to observe one indicator's unique effect (APA Task Force on SES; Duncan & Magunson, 2003 *as cited in* Diemer et al., 2013). On that account it could very well be that classroom SES (FRPL) does not moderate the relationship between administrators' support and instruction, but that there is another SES measure(s) that does.

Researchers have also found that there is no relationship between income (i.e., FRPL status) and conceptual instruction, but there is a relationship with maternal education (Bachman et al., 2015). Again, this finding contributes to the point that results will differ depending on the SES measure(s) used. Although in this research study I explicitly tested the interaction between educators' perceptions of administrators' support and classroom SES, it might be helpful to use a more complex model to test multiple relationships and interactions for a more comprehensive understanding of the relationship between administrators' support and instruction.

Interestingly, Black educators represented only 28% of the sample yet a significant effect in cognitively-challenging instruction when compared to white educators (represented 64% of the sample) was found. As stated, this proportion of Black educators reflects what is typically seen in the field of education (Gregory et al., 2010), the reasoning behind increased levels of cognitively-challenging instruction could be aligned with what Acosta (2015) refers to as a "sense of urgency" and an "insistent approach" often modeled by Black educators for educational liberation. Black educators usually take this approach when working with Black students from lower SES backgrounds as a way to help them academically succeed and to prepare them to effectively navigate western education spaces (pp. 983, 988). While there is no explicit research that explains why Black educators engage in more cognitively-challenging instruction, it could be that Black educators tend to teach in more urban schools predominately composed of marginalized students of lower SES backgrounds (Acosta, 2015), and may use more cognitively-challenging approaches to instruction in such contexts. The latter contradicts what has been previously found where students from higher SES backgrounds tend to have more exposure to cognitively-challenging instruction (Covay Minor et al., 2015; Cueto et al., 2014). It might be helpful for future researchers to consider teacher to student race/ethnicity ratio and relationships while analyzing key constructs of interest.

There was a significant effect between fourth, fifth, and sixth grade, and cognitively-challenging instruction when compared to ninth grade classrooms. Relevant research compares students and classrooms within the same grade or across grades in the same level (e.g., elementary, middle, or high school) (Covay Minor et al., 2015; Cueto et al., 2014). Bachman et al. (2015) looked at late elementary school students and found that lower SES students received an equal amount of cognitive instruction as higher SES students. This finding is inconsistent with previous literature (Covay Minor et al., 2015; Cueto et al., 2014) and could be partly due to the under examination of OTL in late elementary (Bachman et al., 2015). It may be helpful for future researchers to explore cognitively-challenging instruction longitudinally across grades to further understand OTL overtime. In closing, it may be of interest for future research to also consider educator race/ethnicity and grade(s) differences.

Limitations

There were several important limitations to this study. A primary challenge was that this study was based on secondary data analyses. As such, these analyses were dependent upon conceptualization and measure for SES selected by the initial researchers. Typical SES indicators used to observe academic outcomes are family income and FRPL (Bachman et al., 2015). However, FRPL alone, as a proxy for classroom SES does not capture individual poverty (Harwell, 2019; Harwell & LeBeau, 2010). Researchers found that when parceling out SES indicators, parental education at the classroom level was a more consistent predictor of students' instruction and learning (Bachman et al., 2015; Reid & Ready, 2013). Therefore, it is critical for future researchers to carefully conceptualize SES in the context of the research question and data available, to measure SES judiciously, especially if they are testing SES as a key variable of interest (APA, 2015; Diemer et al., 2013). Furthermore, future research that uses FRPL as an indicator for SES, should also consider issues of misclassification, school funding, and decreasing levels of students enrolled in FRPL in secondary education (US Department of Education, 2015 *as cited in* Harwell, 2019).

Another limitation was that educators' perceptions of administrators' support was observed at the classroom level. Meaning that even though the sample was composed of unique classrooms/educators, some of those classrooms come from the same school, which means multiple unique classroom/educators have the same principal and assistant principal. Even though most schools in the sample have one classroom/educator, future research should still account for these statistical repetitions for key variables prior to assessment. Additional limitations include the possibility of classrooms systematically missing items (as only 80% of the items extracted were required to develop a composite score), and if the missing items jeopardized the measurement validity of "school leadership". Overall, it is critical to focus on measurement validity (and reliability) of key variables.

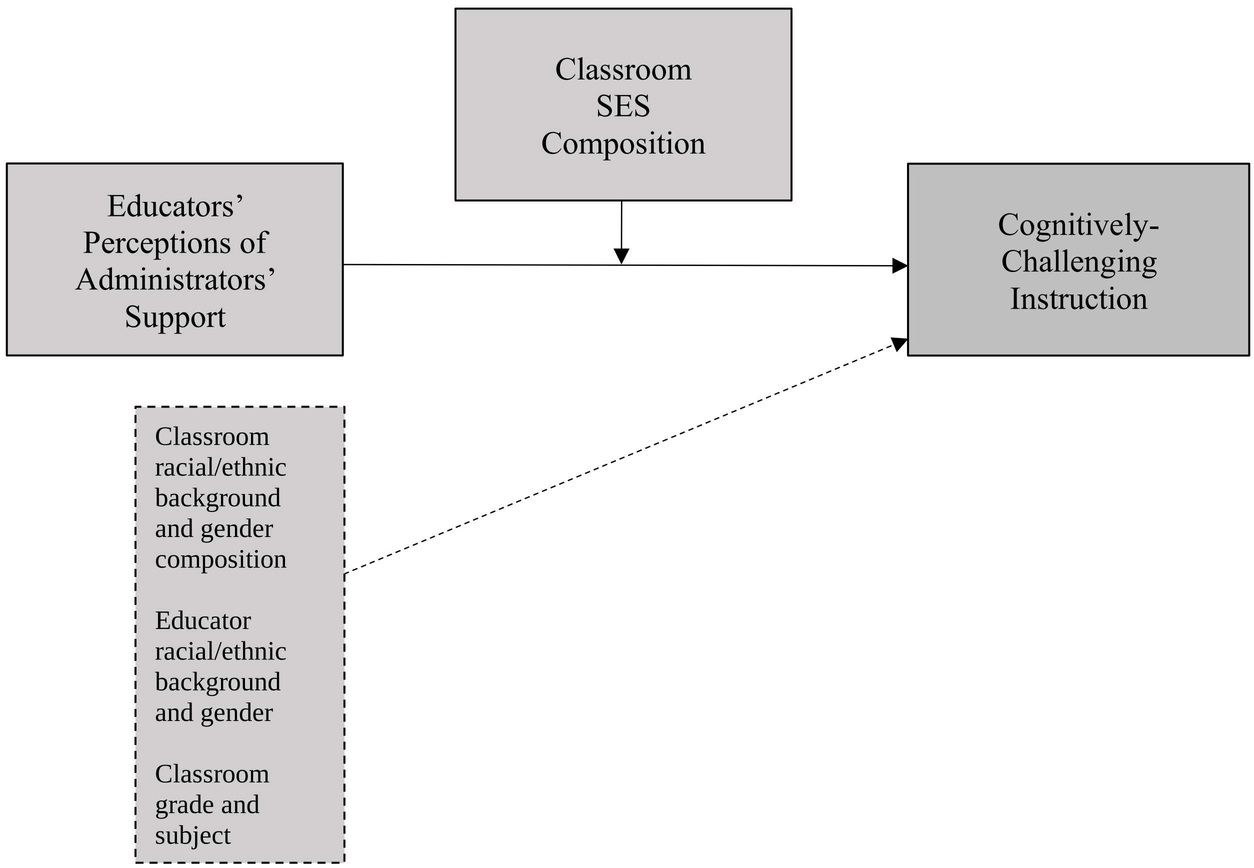
Conclusion and Implications

Prior research has found that positive perceptions of school administrators has in-direct consequences for class instruction, which in turn impacts student performance and achievement (Giles, 2019; Ross & Cozens, 2016). The analyses from this study did not find a positive relationship between educators' perceptions of administrators' support and cognitively-challenging instruction nor that classroom SES, as measured here, moderated the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction. Arguably, these findings are likely a result of the secondary data available for these analyses rather than of the conceptual underpinnings of this form of opportunities to learn. In practice, an OTL framing may still help administrators and educators reflect on key demographic compositions when developing and implementing instruction and curriculum in classrooms. Further, educator race/ethnicity and grade remain important factors for future researchers to consider in cognitively-challenging instruction. Lastly, using a qualitative scale to measure for cognitively-challenging instruction may help researchers reflect on the "process" rather than just the "outcomes" for students' cognitive development for learning.

Appendix A: Figure 1, Conceptual Diagram of Opportunities to Learn to be Assessed

Figure 1

Conceptual Diagram of Opportunities to Learn to be Assessed



Note. Conceptual diagram of OTL to be assessed. This visual depicts a simple moderation model of the relationship between educators' perceptions of administrators' support and cognitively-challenging instruction moderated by classroom SES composition. This illustration also includes the covariates in the model, such as, classroom racial/ethnic background and gender composition, educator racial/ethnic background and gender, classroom grade and subject.

Appendix A: Figure 2, Conceptualization of Cognitively-Challenging Instruction Scale

Figure 2

Conceptualization of Cognitively-Challenging Instruction Scale (Karras-Jean Gilles, López Hernández, Cabral, Nguyen, & Suárez-Orozco, 2020)

To Score

1-For each scale, first decide: Did the observation fall more on the left or on the right side of the spectrum?

2-Then decide: How far over on the positive or negative side did it fall?

3-Use the center/0 judiciously!

COGNITIVE STIMULATION (aka CHALLENGE)

-2 **-1** **0** **+1** **+2**

Low academic rigor
(e.g., teacher lectures on new material without asking students to actively engage with the material; teacher provides new instruction through facts or information in steps or a sequence of events only)

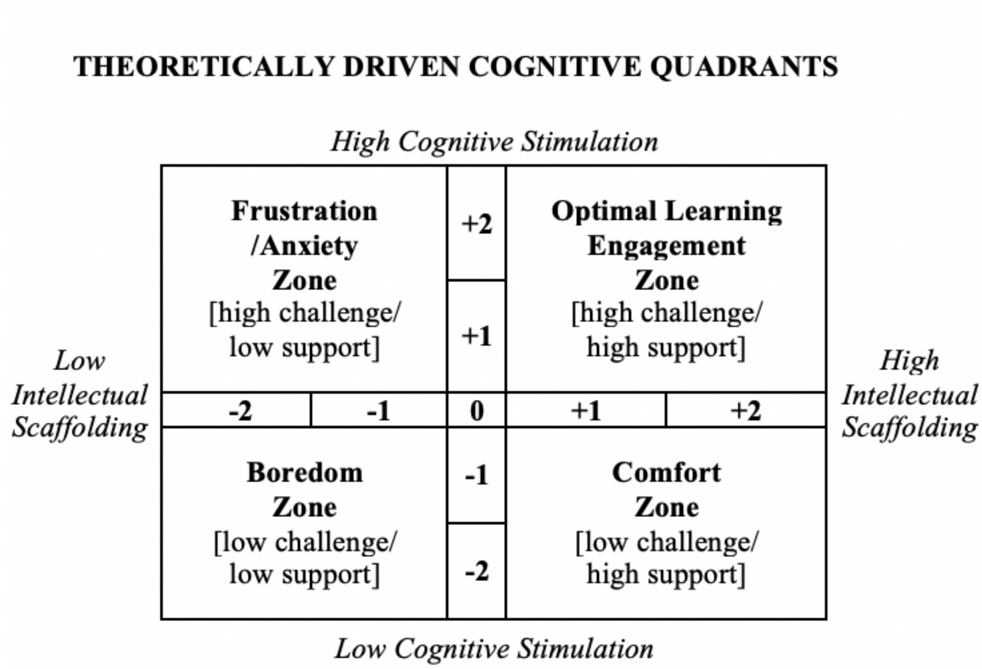
High academic rigor
(e.g., teacher asks students to solve a problem or answer a guiding question and then justify their assumptions or reasoning)

Low quality classroom talk
(e.g., teacher asks questions that elicit one word or short responses from students)

High quality classroom talk
(includes teacher talk (e.g., *asking* students how they solved a problem, *listening* to how they reasoned a task, or *discussing* their understanding of what they are reading, while also incorporating academic language) & student talk affording students with opportunities to make sense of content and engage in academic language)

Little to no question elicitation
(e.g., teacher exclusively asks factual – **what** and **when** questions. After a student responds, the teacher does not ask follow-up questions that give rise to student elaboration)

High question elicitation
(e.g., teacher asks a variety of **why**, and **how** questions, along with factual questions to engage students)



Note. Cognitively-challenging instruction scale and visual conceptualization of scale.

Appendix B: Table 1, Descriptive Statistics

Table 1

Descriptive Statistics

Variable	MIVAnalytic Sample Frequency/Percentage	299 Analytic Sample Frequency/Percentage	Mean (Standard Deviation)	Skewness, Kurtosis	Missing
Districts	6	5			-
Schools	223	151			-
Classrooms	610	369			-
Grade	-	-			0
4th	120 (20%)	68 (18%)			-
5th	128 (21%)	74 (20%)			-
6th	103 (17%)	76 (21%)			-
7th	73 (12%)	41 (11%)			-
8th	86 (14%)	49 (13%)			-
9th	100 (16%)	61 (17%)			-
Subject	-	-			0
English Language Arts (ELA)	250 (41%)	207 (56%)			-
ELA+Math	195 (32%)	0 (0%)			-
Math	165 (27%)	162 (44%)			-
Number of students	-	-	23.48 (5.43)	.62, 1.30	0
Male	-	-	.50 (.12)	-.01, 2.75	0
Free and reduced priced lunch (FRPL)	-	-	.54 (.30)	-.03, -1.30	0
Educators	610	369			0
Race/Ethnicity	-	-			-
White	390 (64%)	236 (64%)			-
Black	171 (28%)	98 (27%)			-
Latinx	37 (6%)	29 (8%)			-
Other	12 (2%)	6 (2%)			-
Gender	-	-			0
Female	494 (81%)	290 (79%)			-
Male	116 (19%)	79 (21%)			-

Note. Table 1 depicts descriptive statistics for the Making the Invisible Visible (MIV) analytic sample and the 299 analytic sample. The missing data is represented under "Missing" column.

Appendix B: Table 2, School-Classroom Frequency Cross-Tabulation

Table 2

School-Classroom Frequency Cross-Tabulation

Number of Schools	**Frequency of Classroom(s)**
50	1
44	2
20	3
24	4
8	5
2	6
1	7
2	8

Appendix B: Table 4, Correlations

Table 4

Correlations

Variable	1	2	3	4	5	6	7	8	9
1. Cognitively-Challenging Instruction	1	.147**	-.091	.020	-.090	-.025	.133*	.011	-.019
2. Educators' Perceptions of Administrators' Support	.147**	1	-.214**	-.041	-.166**	.082	-.097	.225**	-.012
3. Classroom SES Composition	-.091	-.214**	1	-.059	.636**	-.159**	-.072	-.455**	.056
4. Classroom Black Student Composition	.020	-.041	-.059	1	-.411**	-.318**	-.239**	-.590**	.004
5. Classroom Latinx Student Composition	-.090	-.166**	.636**	-.411**	1	-.143**	-.048	-.409**	.104*
6. Classroom Other Race Student Composition	-.025	.082	-.159**	-.318**	-.143**	1	-.054	.337**	-.064
7. Classroom Asian Student Composition	.133*	-.097	-.072	-.239**	-.048	-.054	1	-.074	-.066
8. Classroom White Student Composition	.011	.225**	-.455**	-.590**	-.409**	.337**	-.074	1	-.060
9. Classroom Male Student Composition	-.019	-.012	.056	.004	.104*	-.064	-.066	-.060	1

Note. ** $p < .01$, * $p < .05$.

Appendix B: Table 5, Chi-Square Tests for 299 and MIV Analytic Sample

Table 5

Chi-Square Tests for 299 and MIV Analytic Sample

	299 Analytic Sample		MIV Analytic Sample	
Variables	χ^2	p	χ^2	p
Black Educator * ELA Classroom	5.005	.025*	1.287	.257
Black Educator * Fourth Grade	.082	.775	1.068	.301
Black Educator * Fifth Grade	.037	.848	.031	.861
Black Educator * Sixth Grade	.674	.412	1.395	.238
Black Educator * Seventh Grade	.002	.967	2.992	.084
Black Educator * Eighth Grade	.476	.490	2.384	.123
Black Educator * Ninth Grade	2.723	.099	8.173	.004*
Latinx Educator * ELA Classroom	2.707	.100	3.934	.047*
Latinx Educator * Fourth Grade	.450	.502	.016	.900
Latinx Educator * Fifth Grade	.770	.380	2.923	.087
Latinx Educator * Sixth Grade	3.711	.054*	3.621	.057
Latinx Educator * Seventh Grade	.019	.891	.082	.775
Latinx Educator * Eighth Grade	.007	.932	.497	.481
Latinx Educator * Ninth Grade	.171	.679	.366	.545
Other Race Educator * ELA Classroom	2.314	.128	3.676	.055
Other Race Educator * Fourth Grade	1.378	.240	3.267	.071
Other Race Educator * Fifth Grade	.044	.834	.257	.612
Other Race Educator * Sixth Grade	.605	.437	4.273	.039*
Other Race Educator * Seventh Grade	3.050	.081	1.674	.196
Other Race Educator * Eighth Grade	.934	.334	.455	.500
Other Race Educator * Ninth Grade	.000	.993	.008	.929
White Educator * ELA Classroom	2.361	.124	.390	.533
White Educator * Fourth Grade	.178	.673	2.081	.149
White Educator * Fifth Grade	.524	.469	1.405	.236
White Educator * Sixth Grade	4.160	.041*	7.237	.007*
White Educator * Seventh Grade	.178	.673	3.444	.063
White Educator * Eighth Grade	.183	.669	2.544	.111
White Educator * Ninth Grade	3.053	.081	8.998	.003*
Male Educator * ELA Classroom	3.601	.058	.735	.391
Male Educator * Fourth Grade	14.314	.000*	12.421	.000*
Male Educator * Fifth Grade	4.704	.030*	4.157	.041*
Male Educator * Sixth Grade	.159	.690	.933	.334
Male Educator * Seventh Grade	4.447	.035*	1.423	.233
Male Educator * Eighth Grade	1.723	.189	5.513	.019*
Male Educator * Ninth Grade	13.971	.000*	14.301	.000*

Note. ELA = English Language Arts, χ^2 = Chi-Square Value, p = Significance Value, * $p < .05$.

Appendix B: Table 6 and 7, Independent Samples *t*-Test for 299 and MIV Analytic Sample

Table 6

Independent Samples t-Test for 299 Analytic Sample

		Levene's Test for Equality of Variances		*t*-Test for Equality of Means					95% Confidence Interval of the Difference	
		F	**Sig.**	***t***	***df***	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**Lower**	**Upper**
Cognitively-Challenging Instruction	Equal variances assumed	1.779	.183	-.314	367	.753	-.06024	.19161	-.43702	.31655
	Equal variances not assumed			-.300	116.769	.764	-.06024	.20052	-.45736	.33689

Note. Results represent cognitively-challenging instruction compared to educator gender (0 = Female, 1 = Male).

Table 7

Independent Samples t-Test for MIV Analytic Sample

		Levene's Test for Equality of Variances		*t*-Test for Equality of Means					95% Confidence Interval of the Difference	
		F	**Sig.**	***t***	***df***	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**Lower**	**Upper**
Cognitively-Challenging Instruction	Equal variances assumed	.295	.587	-.043	606	.966	-.00675	.15689	-.31487	.30137
	Equal variances not assumed			-.042	165.409	.966	-.00675	.16009	-.32284	.30934

Note. Results represent cognitively-challenging instruction compared to educator gender (0 = Female, 1 = Male).

Appendix B: Table 8-13, One-Way ANOVA Tests for 299 and MIV Analytic Sample

Table 8

One-Way ANOVA Tests for 299 Analytic Sample

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	20.663	1	20.663	9.292	.002
Within Groups	816.118	367	2.224		
Total	836.780	368			

Note. Results represent cognitively-challenging instruction by classroom subject.

Table 9

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	8.648	3	2.883	1.271	.284
Within Groups	828.132	365	2.269		
Total	836.780	368			

Note. Results represent cognitively-challenging instruction by educator race/ethnicity.

Table 10

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	52.387	5	10.477	4.849	.000
Within Groups	784.394	363	2.161		
Total	836.780	368			

Note. Results represent cognitively-challenging instruction by classroom grade.

Table 11

One-Way ANOVA Tests for MIV Analytic Sample

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	63.036	2	31.518	14.425	.000
Within Groups	1326.323	607	2.185		
Total	1389.359	609			

Note. Results represent cognitively-challenging instruction by classroom subject.

Table 12

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	12.508	3	4.169	1.839	.139
Within Groups	1369.170	604	2.267		
Total	1381.678	607			

Note. Results represent cognitively-challenging instruction by educator race/ethnicity.

Table 13

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	95.492	5	19.098	8.915	.000
Within Groups	1293.867	604	2.142		
Total	1389.359	609			

Note. Results represent cognitively-challenging instruction by classroom grade.

Appendix B: Table 14, Multiple Regression Analysis Results

Table 14

Multiple Regression Analysis Results

Model Summary							
	R	***R*²**	***MSE***	***F***	***df1***	***df2***	***p***
	.3580	.1282	2.0904	2.7000	19.0000	349.0000	.0002

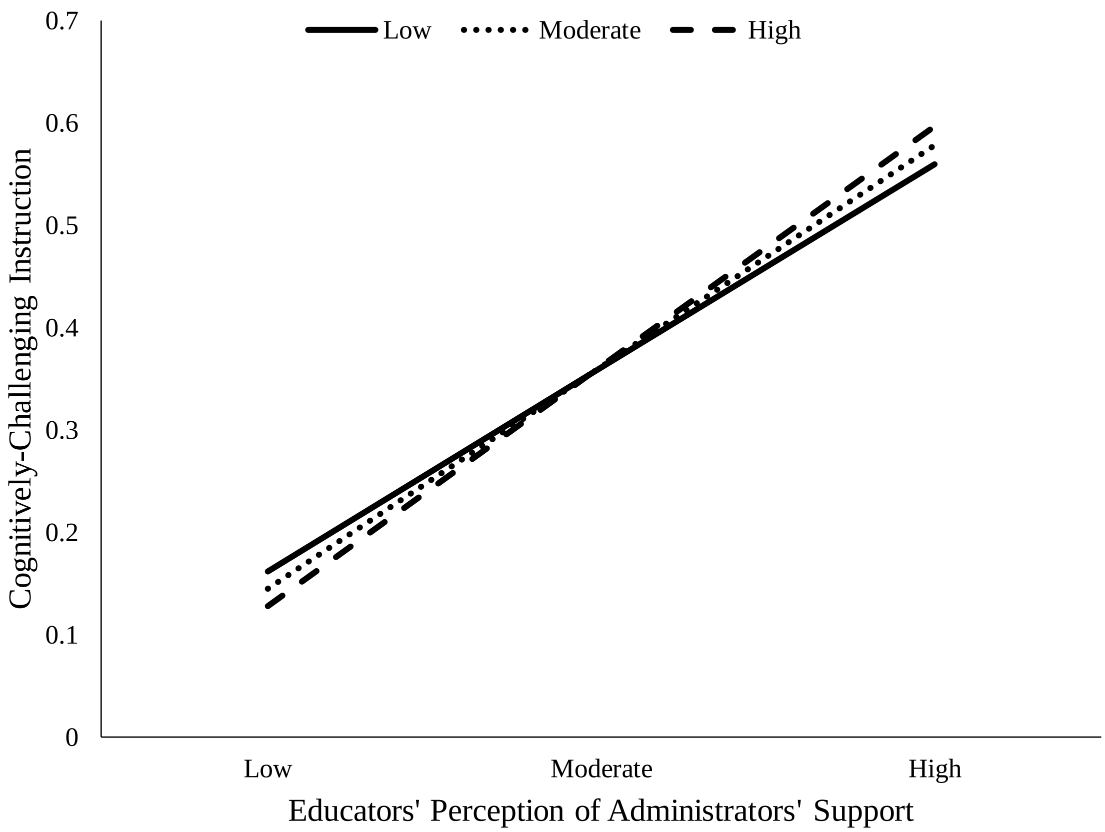
Model				
Variable	***b***	***SE***	***t***	***p***
Constant	3.6442	7.0638	.5159	.6063
TWC_SCHO	.3527	.3057	1.1540	.2493
DAD_PERC	-.3335	1.4859	-.2244	.8226
Int_1	.1152	.4922	.2340	.8152
DAD_BLAC	.4557	.2171	2.0990	.0365
DAD_HISP	-.0154	.2955	-.0520	.9586
DAD_RACE	.8102	.6189	1.3093	.1913
DAD_MALE	.3383	.2000	1.6918	.0916
BLACK_Se	-6.4545	7.0492	-.9156	.3605
HISPANIC	-6.2434	7.0817	-.8816	.3786
RACEOTHE	-7.3917	7.3076	-1.0115	.3125
ASIAN_Se	-4.3066	7.0525	-.6106	.5418
White.y_	-5.9348	7.0180	-.8457	.3983
Male_Sec	-.2966	.6416	-.4623	.6442
SUBJECT.	-.2775	.1659	-1.6725	.0953
FOURTHGR	.6763	.2826	2.3933	.0172
FIFTHGRA	.5785	.2767	2.0902	.0373
SIXTHGRA	.5419	.2633	2.0577	.0404
SEVENTHG	-.0030	.3042	-.0099	.9921
EIGHTHGR	-.2491	.2912	-.8556	.3928

Note. The dependent variable is COG_STIM = Cognitively-challenging instruction, TWC_SCHO = Educators' perceptions of administrators' support, DAD_PERC = Classroom SES composition, DAD_BLAC = Black educator, DAD_HISP = Latinx educator, DAD_RACE = Race Other educator, BLACK_Se = Black student classroom composition, HISPANIC = Latinx student classroom composition, RACEOTHE = Race other student classroom composition, ASIAN_Se = Asian student classroom composition, WHITE.y_ = White student classroom composition, MALE_Sec = Classroom gender composition, SUBJECT. = Classroom subject, FOURTHGR = Fourth grade, FIFTHGRA = Fifth grade, SIXTHGRA = Sixth grade, SEVENTHG = Seventh grade, and EIGHTHGR = Eighth grade.

Appendix B: Figure 3, Scatterplot of Simple Moderation Model

Figure 3

Scatterplot of Simple Moderation Model



Note. Visual representation of the interaction tested or plot of the conditional effect of *X* (Educators' Perception of Administrators' Support) on *Y* (Cognitively-Challenging Instruction) across values of *W* (Classroom SES Composition). The legend represents the moderator Classroom SES Composition.

Appendix B: Table 15, Revised Multiple Regression Analysis Results

Table 15

Revised Multiple Regression Analysis Results

Model Summary							
	R	***R*²**	***MSE***	***F***	***df1***	***df2***	***p***
	.358	.128	1.44386	2.855	18.0000	350.0000	.000

Model				
Variable	***b***	***SE***	***t***	***p***
Constant	3.458	7.009	.493	.622
TWC_SCHO	.414	.156	2.657	.008
DAD_PERC	.003	.370	.009	.993
DAD_BLAC	.456	.217	2.101	.036
DAD_HISP	-.011	.294	-.037	.971
DAD_RACE	.807	.618	1.306	.192
DAD_MALE	.337	.200	1.690	.092
BLACK_Se	-6.449	7.040	-.916	.360
HISPANIC	-6.236	7.072	-.882	.379
RACEOTHE	-7.389	7.298	-1.012	.312
ASIAN_Se	-4.286	7.042	-.609	.543
White.y_	-5.930	7.008	-.846	.398
Male_Sec	-.298	.641	-.466	.642
SUBJECT.	-.278	.166	-1.679	.094
FOURTHGR	.673	.282	2.388	.017
FIFTHGRA	.575	.276	2.083	.038
SIXTHGRA	.541	.263	2.057	.040
SEVENTHG	-.005	.304	-.018	.986
EIGHTHGR	-.255	.290	-.882	.379

Note. The model was re-estimated without the interaction term, meaning that classroom SES composition (DAD_PERC) was inserted as a covariate. The dependent variable is cognitively-challenging instruction (COG_STIM).

Appendix C: Table 3, Identification Variables, Classroom Variables, Survey Item Variables, and Other Variables

Table 3

Identification Variables, Classroom Variables, Survey Item Variables, and Other Variables

Identification Variables				
Name	**Description**	**Type**	**Range/Scale**	**Data File**
TEACHER_ICPSR_ID	Teacher identification name	Categorical, Numeric	-	MET - Class Section File
SECTION_ICPSR_ID	Classroom identification name	Categorical, Numeric	-	MET - Class Section File
SCHOOL_ICPSR_ID	School identification name	Categorical, Numeric	-	MET - Class Section File
DISTRICT_ICPSR_ID	District identification name	Categorical, Numeric	-	MET - Class Section File
YEAR	Year section existed in the MET study	Categorical, Dichotomous	1 = 2010 2 = 2011	MET - Class Section File
Classroom Variables				
Name	**Description**	**Type**	**Range/Scale**	**Data File**
DAD_PERCFRL	Percent of students ever listed in the section with Free and Reduced	Continuous, Percentage	0 = Not in FRPL 1 = Enrolled in FRPL	MET - Class Section File

	Priced Lunch (FRPL) status			
DAD_PERCWHITE	Percent of White students in section of those ever listed in the section	Categorical, Dichotomous	0 = White 1 = Not White	MET - Class Section File
DAD_PERCBLACK	Percent of Black students in section of those ever listed in the section	Categorical, Dichotomous	0 = Black 1 = Not Black	MET - Class Section File
DAD_PERCHISPANIC	Percent of Hispanic students in section of those ever listed in the section	Categorical, Dichotomous	0 = Hispanic 1 = Not Hispanic	MET - Class Section File
DAD_PERCASIAN	Percent of Asian students in section of those ever listed in the section	Categorical, Dichotomous	0 = Asian 1 = Not Asian	MET - Class Section File
DAD_PERCRACEOTHER	Percent of students of other race in section of those ever listed in the section	Categorical, Dichotomous	0 = Other 1 = Not Other	MET - Class Section File
DAD_PERCMALE	Percent of students ever listed in the section who are male	Categorical, Dichotomous	0 = Male 1 = Not Male	MET - Class Section File
GRADE	Grade of MET section	Categorical, 6 options	1 = 4 2 = 5	MET - Class Section File

			3 = 6 4 = 7 5 = 8 6 = 9	
FOURTHGRADE_299Project	Indicator for if classroom is fourth grade	Categorical, Dichotomous	0 = Not Fourth Grade 1 = Fourth Grade	299 Project - Merged Data File
FIFTHGRADE_299Project	Indicator for if classroom is fifth grade	Categorical, Dichotomous	0 = Not Fifth Grade 1 = Fifth Grade	299 Project - Merged Data File
SIXTHGRADE_299Project	Indicator for if classroom is sixth grade	Categorical, Dichotomous	0 = Not Sixth Grade 1 = Sixth Grade	299 Project - Merged Data File
SEVENTHGRADE_299Project	Indicator for if classroom is seventh grade	Categorical, Dichotomous	0 = Not Seventh Grade 1 = Seventh Grade	299 Project - Merged Data File
EIGHTHGRADE_299Project	Indicator for if classroom is eighth grade	Categorical, Dichotomous	0 = Not Eight Grade 1 = Eighth Grade	299 Project - Merged Data File
NINTHGRADE_299Project	Indicator for if classroom is ninth grade (reference group)	Categorical, Dichotomous	-	299 Project - Merged Data File
SUBJECT	Subject of MET section	Categorical, 4 options	1 = BIO 2 = ELA 3 = ELA + Math	MET - Class Section File

			4 = Math	
SUBJECT.y_SectionFile_ELA_299Project	Indicator for if classroom is ELA	Categorical, Dichotomous	0 = Not ELA 1 = ELA	299 Project - Merged Data File
Educator Variables				
Name	**Description**	**Type**	**Range/Scale**	**Data File**
DAD_WHITE	Indicator for teacher is White	Categorical, Dichotomous	1 = White 2 = Not White	MET - Teacher File
DAD_BLACK	Indicator for teacher is Black	Categorical, Dichotomous	1 = Black 2 = Not Black	MET - Teacher File
DAD_HISPANIC	Indicator for teacher is Hispanic	Categorical, Dichotomous	1 = Hispanic 2 = Not Hispanic	MET - Teacher File
DAD_RACEOTHER	Indicator for teacher is other race	Categorical, Dichotomous	1 = Other 2 = Not Other	MET - Teacher File
DAD_MALE	Indicator for teacher is male	Categorical, Dichotomous	0 = Male 1 = Not Male	MET - Teacher File
Survey Item Variables				
Name	**Description**	**Type**	**Range/Scale**	**Data File**
TWC_SHOOLLEADERSHIP_2	Composite score of survey items	Continuous, Composite Score	Minimum = 1 Maximum = 4	299 Project - Merged Data File
LDL21SHAREDVIS	“The faculty and leadership have a shared vision.”	Likert, 5-point	1 = Strongly disagree 2 = Disagree 3 = Agree	MET - Teacher File

			4 = Strongly agree 5 = Don’t know	
EML21TRUSTRESP	“There is an atmosphere of trust and mutual respect in this school.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21RAISECONC	“Teachers feel comfortable raising issues and concerns that are important to them.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21TCHRSUPP	“The school leadership consistently supports teachers.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21PROFSTDS	“Teachers are held to high professional standards for delivering instruction.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21USEDATA	“The school leadership facilitates using data to improve student learning.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21TCHRPERF	“Teacher performance is	Likert, 5-point	1 = Strongly disagree –	

	assessed objectively."		5 = Don't know	MET - Teacher File
LDL21FDBKIMPR	"Teachers receive feedback that can help them improve teaching."	Likert, 5-point	1 = Strongly disagree – 5 = Don't know	MET - Teacher File
LDL21EVALCONSIS	"The procedures for teacher evaluation are consistent."	Likert, 5-point	1 = Strongly disagree – 5 = Don't know	MET - Teacher File
LDL21SIPEFFECT	"The school improvement team provides effective leadership at this school."	Likert, 5-point	1 = Strongly disagree – 5 = Don't know	MET - Teacher File
LDL21RECOGACCOM	"The faculty are recognized for accomplishments."	Likert, 5-point	1 = Strongly disagree – 5 = Don't know	MET - Teacher File
LDL21EFFORTLD	"The school leadership makes a sustained effort to address teacher concerns about: Leadership issues."	Likert, 5-point	1 = Strongly disagree – 5 = Don't know	MET - Teacher File
LDL21EFFORTFR	"The school leadership makes a sustained effort to address teacher concerns about:	Likert, 5-point	1 = Strongly disagree – 5 = Don't know	MET - Teacher File

	Facilities and resources.”			
LDL21EFFORTTM	“The school leadership makes a sustained effort to address teacher concerns about: The use of time in my school.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21EFFORTPD	“The school leadership makes a sustained effort to address teacher concerns about: Professional development.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21EFFORTT	“The school leadership makes a sustained effort to address teacher concerns about: Teacher leadership.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21EFFORTCS	“The school leadership makes a sustained effort to address teacher concerns about: Community support and involvement.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21EFFORTSC	“The school leadership makes a	Likert, 5-point	1 = Strongly disagree –	MET - Teacher File

	sustained effort to address teacher concerns about: Managing student conduct.”		5 = Don’t know	
LDL21EFFORTIP	“The school leadership makes a sustained effort to address teacher concerns about: Instructional practices and support.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
LDL21EFFORTMN	“The school leadership makes a sustained effort to address teacher concerns about: New teacher support.”	Likert, 5-point	1 = Strongly disagree – 5 = Don’t know	MET - Teacher File
Other Variables				
Name	**Description**	**Type**	**Range/Scale**	**Data File**
COGSTIM_recoded	Level of cognitively-challenging instruction in section	Ordinal, 5 levels	-2 = No challenge – +2 = High challenge	MIV - Merged Data File

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