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The Role of Teacher Commitment and Burnout in Predicting Outcomes of Preschoolers with Autism Spectrum Disorders: A Multilevel Structural Equation Approach

Drew C. Coman
University of Miami, drewccoman@gmail.com

Drew Carson Coman
University of Miami

UNIVERSITY OF MIAMI

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By

Drew Carson Coman

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Drew Carson Coman

Approved:

Michael Alessandri, Ph.D. Clinical Professor of Psychology	M. Brian Blake, Ph.D. Dean of the Graduate School
Maria M. Llabre, Ph.D. Professor of Psychology	Heather Henderson, Ph.D. Associate Professor of Psychology
Saneya Tawfik, Ph.D. Clinical Assistant Professor of Psychology	Jason Jent, Ph.D. Assistant Professor of Clinical Pediatrics

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The recent economic downturn and political climate within the federal government has threatened special education resources for children with autism spectrum disorders (ASD). The literature suggests that one consequence may be teacher burnout; a syndrome shown to have detrimental effects on the educational outcomes of students. The aims of this study were to investigate burnout in three groups (i.e., TEACCH, LEAP, and HQSEP) of high fidelity preschool teachers, its associations with teacher commitment to philosophy, and the potential effects on the social and communicative functioning in preschoolers with ASD. A sample of 75 teachers and 198 students were investigated within a multilevel structural equation framework. Results did not support a direct relationship between teachers' commitment at the beginning of the year and student outcomes at the end, nor was there a relationship between burnout at mid-year and outcomes. None of the mediational relationships hypothesized were supported either. Results did, however, suggest associations between teachers' level of experience and burnout as well as teachers' levels of burnout at the beginning of the school year and their levels of commitment at the end of the year. Additionally, results revealed several interesting findings regarding teacher and student demographic variables, including their associations with language and social functioning outcomes at the end of the year. Implications for special education, school districts, and model developers are discussed.

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Chapter 1: Introduction

In 1975 Congress enacted the Individuals with Disabilities Education Act (IDEA) to ensure that children with all disabilities have available to them free and appropriate public education (National Dissemination Center for Children with Disabilities [NICHCY], 2011). This legislation has gone through several revisions since its introduction and currently emphasizes that special education and related services are to be designed to meet the unique needs of these students and to prepare them for meaningful post-secondary outcomes (IDEA, 2004). By and large, the IDEA ensures that the educational rights of children with disabilities and their families are protected under federal law.

The IDEA is an integral piece of legislation for children and families affected by autism spectrum disorders (ASD). This is due to the large number of children that are both identified with the disorder (1 out of 88) and served in public education programs (approximately 49,000 U.S. students; Center for Disease Control [CDC], 2012; IDEAdata.org, 2011). For most of these families, the primary source of intervention is provided through public school-based educational services (Lord et al., 2005). However, the recent economic downturn and contentious political climate within the federal government has threatened funding for special education programs for children with ASD (Council for Exceptional Children [CEC], 2011). In February 2011, the House of Representatives proposed to cut IDEA Part B by over 500 million dollars (CEC, 2011). In addition, the Budget Control Act that was put into motion this past year may result in a sequestration in funding, in the amount 1.2 trillion dollars, for all government spending including monies for public education. Although these extensive budget cuts have been

evaded up to this point, federal proposals like these indicate that it is essential to conduct research on the potential effects that reduced federal funding could have on the education and treatment of students with ASD.

The primary aim of this study was to investigate teacher level factors that prior research has shown to be impacted by reduced resources within schools and to demonstrate the possible adverse effects on student level outcomes. More specifically, this study examined three groups of teachers, their experienced levels of *teacher burnout*, and the associations with their *teacher commitment* to the philosophical tenets underlying *two* theoretically-driven classroom-based intervention approaches: Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) and Learning Experiences and Alternative Program for Preschoolers and Their Parents (LEAP). *Teacher burnout* is defined here as a unique stress syndrome that results from coping unsuccessfully with chronic stress in the classroom (Coman et al., 2012). *Teacher commitment* is defined here as an understanding and allegiance to the underlying philosophy, assumptions, practices, and principles of an intervention and/or teaching approach (Coman et al., 2012). Prior literature implicates an association between these two variables (Jennett, Harris, and Mesibov, 2003) and suggests they may influence student outcomes (Wisniewski & Gargiulo, 1997). Therefore, this study also examined an integrated multilevel (i.e., 2-level) model of these factors and their potential impact on outcomes of preschoolers with ASD.

This investigation was completed as part of a larger multi-site preschool treatment comparison study. Due to the design of the parent project, these variables were examined in three groups of educators: a TEACCH group, a LEAP group, and non-ASD specific,

but high quality special education program (HQSEP). All participating teachers were implementing their respective programs at above average ratings of fidelity of implementation, as assessed by empirically validated treatment fidelity instruments (see Hume, et al., 2011). It is acknowledged that these criteria resulted in an exclusion of teachers implementing their respective programs below "above average" levels of fidelity. However, exploring these constructs within a sample of "high fidelity" teachers enabled us to examine these variables in educators who were experienced, motivated, and who had received formal training in specialized practices within special education. Additionally, this group of teachers had a comprehensive understanding of, and was therefore likely to have a "commitment" to, the philosophical tenets underlying certain classroom-based programs for students with ASD. Moreover, and perhaps more importantly, this particular design allowed for an examination of the "true" variance in student outcomes that could be accounted for by *teacher burnout* and *commitment* over and above the level of fidelity of implementation of these programs.

Education Programs for Preschoolers with ASD

Preschool children with ASD are educated in a variety of classroom-based models. Some of these are guided by autism-specific theoretical frameworks and practices while others are not. Three of the most widely implemented approaches for preschoolers with ASD include: TEACCH, LEAP, and other non-ASD specific HQSEPs. TEACCH is a comprehensive treatment model that is guided by autism-specific theory and practice. It is typically a self-contained intervention that emphasizes "Structured Teaching" which arranges the environment and curriculum around the core features of autism (Mesibov & Shea, 2010). The theoretical foundations are largely based on

cognitive-social learning theory, developmental theory, neuropsychological theories of executive function, and applied behavior analysis (ABA; Bandura & Walters, 1963; Mischel, 1971; Hill, 2004; Lovaas, 1987; Ozonoff, 1995). The key programmatic components include: structuring the environment and activities in ways that are clear to students with ASD, using students' relative strengths in visual processing to supplement relatively weaker skills (e.g., expressive or receptive communication), using students' special interests to engage them in learning, and supporting self-initiated use of meaningful communication within the classroom (Mesibov & Shea, 2010).

LEAP is also a comprehensive classroom-based intervention that is guided by autism-specific theory and practice (Strain & Bovey, 2011). This model utilizes naturalistic classroom approaches and the inclusion of neurotypical peers to facilitate intervention strategies for students on the autism spectrum (Kohler, Strain, & Goldstein, 1996). The curriculum consists of instruction that mostly occurs through incorporating learning experiences in general childhood activities and routines (Kohler, Strain, & Goldstein, 1996). The theoretical foundations are largely based on ABA and developmental theory. The key programmatic features of LEAP include an individualized learning program that is monitored through data collection and the use of peer-mediated strategies with typically developing (TD) peers who are full-time class members (Kohler, Strain, & Goldstein, 1996).

HQSEPs are classroom models without any autism-specific theoretical framework. These classes may also be referred to as "eclectic" or "Business As Usual" classrooms. These models utilize a general developmental approach to providing special education practices (Stahmer, Collings, & Palinkas, 2005). It is the type of service that

children would typically receive from the local school system outside of an autism-specific treatment intervention. Stahmer et al. (2005) reported that over 50% of the intervention practices of community-based eclectic programs implemented the following: individualized support, systematic instruction, structured environments, specialized curriculum, functional behavior assessment, and family involvement. Thus, HQSEPs seem to share many features that parallel both TEACCH and LEAP, however, they are not theoretically autism-specific in their educational approach for students on the spectrum.

Current Economic Impact on Special Education

Recent evidence suggests that funding for these programs may be under significant duress in the near future. Data from the U.S. Department of Education (DOE) indicate that monies allocated by the federal government to education have significantly declined from 2006 to 2011 from approximately 67.1 billion to 43.9 billion dollars (U.S. DOE, 2011). Additionally, the CEC (2011), in collaboration with the Council of Administrators of Special Education (CASE), released findings from a survey study addressing the impact of the current economy on special education services. The results demonstrated that school districts across the nation are having significant difficulty in meeting the needs of students with disabilities. Approximately 90 % of the respondents, all CEC members, reported cuts to education programs as having already occurred or likely to occur in the near future. In addition, 94% of the respondents reported reduced funding in resources, such as technology, and 81 % reported the occurrence or the anticipation of layoffs of special education teachers, administrators, paraprofessionals, or related service personnel. These findings suggest that there are plans to make, or there have already been, reductions in resources for teachers and cuts in support staff and

administration (CEC, 2011). These results coupled with the recent proposals for federal budget cuts to special education raise significant concerns regarding the effects this may have on teachers, and the future quality of educational services provided for students with ASD.

Teacher Burnout & Student Outcomes

The extant literature suggests that one consequence resulting from teachers having limited resources and support is teacher burnout. Burnout is the endpoint in the process of coping unsuccessfully with chronic stress. Historically, burnout has been described as a syndrome with three dimensions: *emotional exhaustion* (EE; occurs when emotional resources are depleted and teachers feel they can no longer give psychologically of themselves); *depersonalization* (DP; occurs when teachers withdraw from their students and develop negative, cynical, and indifferent feelings towards them); and reduced feelings of *personal accomplishment* (PA; occurs when teachers perceive themselves as less effective in their work; Chernis, 1980, 1985; Maslach & Jackson, 1981). Bandura (1977a, 1977b) proposed a general model based on social learning theory for conceptualizing the process that leads to burnout in teachers. It was suggested that unrealized expectations impact human performance and organizational commitment. Therefore, when school districts and administrators create performance expectations, but fail to provide relevant resources, teachers experience some degree of uncertainty (i.e., role ambiguity) and this becomes an important source of anxiety and stress (Wisniewski & Garguilo, 1997).

Special educators are often expected to implement their programs without adequate institutional support and the necessary resources. Several studies have linked

this experience to teacher stress and burnout (see Belcastro & Gold, 1983; Cook & Lefingwell, 1982; Farber, 1991; Pullis, 1992; Wisniewski & Garguilo, 1997). In one recent study, McCarthy, Lambert, O'Donnell, and Melendres (2009) found that individual perceptions of the balance between resources and demands were most predictive of burnout in elementary school teachers. Specifically, they found that teachers who experienced high levels of EE reported higher perceived demands as well as an imbalance of such demands with classroom resources. Further, this group found that limited administrative support predicted levels of DP and classroom demands predicted symptoms of PA. In another study, Betoret (2009) found that limited resources (e.g., school equipment, didactic supplies, and qualified personnel for student support such as psychologists, speech therapists, and resource specialists) had an adverse and significant effect on job stressors, which in turn, had a direct and significant effect on burnout. In addition, they found that positive perceptions of school support resources had the effect of reducing potential stressors in primary school teachers. Overall, it appears teachers are likely to be more susceptible to experiencing burnout if they perceive an imbalance between the demands they face and the resources they have available (McCarthy et al., 2009).

The costs of teacher burnout are likely to be detrimental to the quality of education of children with ASD as well. Wisniewski and Garguilo (1997) indicated that stress and burnout are factors that have been shown to directly influence the quality of educational and related services for students with special needs. Prior research suggests that burnout results in reduced pupil-teacher rapport, teacher warmth, teacher satisfaction, pupil motivation, and ultimately effectiveness (Van Horn, Schaufeli, & Enzmann, 1999;

Maslach & Leiter, 1999; Cunningham, 1983). Additionally, frequent absenteeism along with decreases in the quality of job performance have both been associated with burnout and have been found to ultimately lead to poor student outcomes (Van Horn, Schaufeli, & Enzmann, 1999; Maslach & Leiter, 1999; Dedrick & Raschke, 1990; Firth & Mims, 1985; Maslach & Jackson, 1981). Moreover, occupational stress and burnout have been found to affect the quality of educational services by impacting instructional and interpersonal interactions as well as educators' physical and mental health (Wisniewski & Gargiulo, 1997). In a review conducted by Wisniewski & Gargiulo (1997), they found that teachers who experience burnout have also been shown to be less task-oriented, deliver less positive reinforcement, attend less to instructional tasks, and withdraw from students.

One important ramification of teacher burnout is a significant negative impact on the teacher-student relationship, which in turn, has been shown to adversely affect student outcomes. As Jennings and Greenberg (2008) indicate, "there is a substantive amount of literature providing evidence that supportive teacher-student relationships play an integral role in healthy school and classroom climates, students' connection to school, and desired student academic and social-emotional outcomes" (Abbott et al., 1998; Darling-Hammond, Ancess, & Ort, 2002; Gambone, Klem, & Connell, 2002; McNeely, Nonnemaker, & Blum, 2002; Osher et al., 2007). Therefore, during early childhood education in particular, a teacher's relationship with their students is essential for certain developmental outcomes (Alexander, Entwistle, & Thompson, 1987; Hamilton & Howes, 1992). Specifically, teachers' reported stress levels and emotional negativity towards their students have been associated with student misbehaviors (Yoon, 2002) and have

been shown to be a determinant of poor levels of social and communicative competence, motivation towards school, and academic achievement (Goodenow, 1993; Hamre & Pianta, 2001). As such, the teacher-child relationship has been linked with children's competencies with peers in the classroom (Howes et al., 1994) and trajectories toward academic success and failures (Birch & Ladd, 1996; Pianta et al., 1995; Van Ijzendoorn, Sagi, & Lambermon, 1992). These studies provide strong evidence suggesting that mitigating aspects of burnout for teachers is essential due to the potential negative effects on child development in the early years. This is particularly vital for special educators, who are working with students with developmental delays and/or academic weaknesses.

Teacher Commitment

A review of the teacher burnout literature highlights recommendations that have been made for school districts and administrators to mitigate the onset of this syndrome. Most of these suggestions entail the provision of extensive training for teachers. Fimian and Santoro (1983) suggested that relevant trainings at both the pre-professional and professional levels are essential in meeting the demands of the profession. Cherniss (1995) proposed that professionals who have the appropriate tools, such as adequate training or training in innovative techniques, can use these tools as effective coping mechanisms. Additionally, McCarthy et al. (2009) suggested that trainings that improve classroom management, instructional skills, and reduce ambiguity should also be provided. Some have also argued the need for trainings that elicit an understanding and commitment to the theory and philosophical tenets underlying teaching approaches. Jennett and her colleagues (2003) conducted a study on the benefits of teacher commitment and found that teachers who endorse the underlying philosophy of their

teaching approach were more satisfied with the work they were doing and exhibited less burnout. They concluded that exposure to training that elicits an understanding in the theory of a particular teaching approach may serve as a buffer to burnout. Overall, commitment was purported to serve as an "antidote" to burnout because it reduced the role of ambiguity and conflict and increased social support, control, and feelings of competence and self-efficacy (Jennett et al., 2003).

Coman et al. (2012) conducted a similar study on three groups (TEACCH, LEAP, and HQSEP) of "high fidelity" preschool teachers of students with ASD. They examined the potential benefits of teacher commitment to the philosophical tenets underlying two autism-specific classroom-based approaches: TEACCH and LEAP. Although, a linear relationship between teacher commitment and burnout was not supported, this particular study may have been limited by small sample sizes within each of the three groups (17 TEACCH, 15 LEAP, and 21 HQSEP). Interestingly, the results of this study did find that among these high fidelity teachers there are shared levels of commitment to specific philosophical tenets that underlie TEACCH and LEAP, irrespective of their classroom model. The results also indicated that HQSEP teachers report similar levels of commitment to both TEACCH and LEAP philosophy. Our goal in this present study was to again investigate the relationship between teacher commitment and burnout with a larger sample size of TEACCH, LEAP, and HQSEP teachers, and to examine their potential effects on student outcomes utilizing a more statistically sophisticated approach: multilevel structural equation modeling (MSEM; Preacher, Zyphur, & Zhang, 2010).

To reiterate, this current study examined *teacher burnout*, its associations with *teachers' commitment* to the philosophical tenets of TEACCH and LEAP, and the

potential impact on student outcomes of preschoolers with ASD. Specifically, this study examined the impact of these variables on students' level of *Expressive Communication*, *Receptive Communication*, *Parent Reported Reciprocal Social Interaction Skills*, and *Teacher Reported Reciprocal Social Interaction Skills*, all assessed at the end of the school year. These were investigated in three groups of teachers: TEACCH, LEAP, and HQSEP. The specific research hypotheses were as follows (see Figure 3 for a summary of procedures and assessment time points):

Preliminary Hypothesis A: We hypothesized that the indicators of interest would adequately load onto both the latent burnout and latent student outcome constructs, as defined in the *Analytical Approach* section.

Preliminary Hypothesis B: We hypothesized a directional relationship between commitment and burnout, such that assessments of *teacher commitment* at the beginning of the year (i.e., T1) would predict assessments of *teacher burnout*, and more specifically EE, in the middle of the year (i.e., T3). Further, EE in the beginning of the year (i.e., T1) would not predict commitment at the end of the year (i.e., T4). That is, we hypothesized that the commitment variable preceded the burnout variable in time. See Figure 1 for the general model.

Hypothesis I: We hypothesized that TEACCH teachers' level of commitment to the theoretical underpinnings of TEACCH, LEAP teachers' level of commitment to LEAP, and HQSEP teachers' level of overall commitment to both of these models would significantly predict a latent burnout construct assessed in the middle of the school year (i.e., T2 and T3).

Hypothesis II: It was also hypothesized that there would be a direct relationship between teachers' commitment at T1 and all of the latent student outcome variables at the end of the school year (i.e., POST).

Hypothesis III: In regards to burnout, we hypothesized that there would be a direct relationship between the latent burnout construct assessed in the middle of the year (i.e., T2 and T3) and all of the latent student outcomes at the end of the school year (i.e., POST).

Hypothesis IV: Lastly, it was hypothesized that the relationship between teacher commitment at T1 and each of the latent student outcomes at POST would be mediated by the latent burnout construct assessed at T2 and T3. All of the primary hypotheses were analyzed while controlling for selected variables.

Chapter 2: Method

Overview

This study was completed as part of a larger project entitled, *Comparison of Two Comprehension Treatment Models for Preschool-aged children with Autism and their families* (P.I. Odom, S.; funded by the Institute for Education Sciences (IES): R324B070219*)*. This was a four-year national multi-site investigation involving institutions in North Carolina, Florida, Colorado, and Minnesota. The overarching goal of the parent project was to contribute to the improvement of student outcomes of preschool-aged children identified with ASD and their families. This parent project concluded the final year of data collection in summer 2011. The methods of this current study mirror the methods of the parent project, which are further described below.

Inclusion Criteria for Teachers and Classrooms

The inclusion criteria for *all* teachers included the following: a) participants had to be teaching within a public school system; b) participants had to be certified in special education; and c) participants had to be screened-in based on an acceptable level of fidelity of implementation of their respective treatment models. Criterion (c) was assessed the spring prior to study enrollment with empirically validated fidelity instruments (see Hume, et al., 2011). A maximum of two fidelity assessments was used to select teachers and classrooms. If an acceptable level of fidelity was not met on the second assessment, that classroom was excluded from the project.

There were specific criteria used to screen teachers into the TEACCH group. TEACCH teachers had to meet the following criteria: 1) have attended a formal TEACCH training either by model developers or trained personnel within school

districts; 2) had to be implementing the model for at least two years prior to enrollment; 3) obtain an average score of 3.5 out of 5 across three domains (items 1-13; Physical Structure, Visual Schedules, and Work Systems) on the TEACCH fidelity measure; and 4) obtain an average score of 3 out of 5 on the entire Professional Development in Autism (PDA) instrument or an average score of 3 on 4 specific sections of the measure. The sections of the PDA included: (a) Classroom Structure, (b) Classroom Environment, (c) Curriculum & Instruction, and (d) Positive Instructional Climate. The TEACCH domains were selected on the basis of their statistical ability to discriminate between the three groups (see Hume, et al., 2011). Lastly, each TEACCH participant had to attend a mandatory two-day TEACCH booster training session. A certified TEACCH trainer provided this at the end of the summer prior to enrollment.

Similarly, explicit criteria were used to identify the teachers of the LEAP group. These participants had to meet the following criteria: 1) have attended a formal LEAP training either by model developers or trained personnel within the school districts; 2) had to be implementing the model for at least two years prior to enrollment; 3) score an average of 3.5 out of 5 across two domains (Teaching Strategies and Promoting Social Interactions) on the LEAP fidelity measure, where were again selected on the basis of their statistical ability to discriminate between three groups; and 4) needed to receive an average score of 3 out of 5 on the entire PDA instrument or an average score of 3 on 4 aforementioned sections. Lastly, each LEAP participant had to attend a mandatory two-day LEAP booster training provided by a certified LEAP trainer.

The HQSEP participants had to meet the following criteria: 1) teachers had to have taught in a classroom for preschool children with autism for at least two years prior

to enrollment; and 2) score an average of 4 out of 5 across the entire PDA instrument or an average score of 4 across 4 sections that included: (a) Classroom Structure, (b) Classroom Environment, (c) Curriculum & Instruction, and (d) Positive Instructional Climate was necessary to meet inclusion criteria. HQSEP'S were held to a higher standard (i.e., criteria scores of 4 out of 5) because these teachers did not have the benefit of attending any booster training.

Inclusion Criteria for Students/Families

Students between the ages of 3 to 5 years were recruited for the project if they had both a previous clinical diagnosis or educational eligibility of an ASD (i.e., Asperger's Disorder, Autistic Disorder, PDD-NOS) *and* met diagnostic algorithm cut-off scores on clinically administered modules of the *Autism Diagnostic Observation Schedule* (ADOS; Lord, Rutter, DiLavore, & Risi, 1999) as well as parent reports on the *Lifetime-Social Communication Questionnaire* (SCQ; Rutter, Bailey, & Lord, 2003). Children without a formal community diagnosis were also included in the project if they met diagnostic criteria on the ADOS and/or the SCQ, which were administered by research reliable project staff. Students with genetic conditions (e.g., Down Syndrome, Fragile X, and Tuberous Sclerosis) were also included if they met the diagnostic criteria noted above. First year enrollees to TEACCH, LEAP, or HQSEP'S classrooms were prioritized for recruitment, however, students who had been in a particular model for more than one year were also included. Students also had to be enrolled in the study by November 1st of that particular academic year.

In regards to exclusion criteria, students who were in one classroom model but had prior exposure to a different model were excluded. For example, a student enrolled

in a LEAP classroom who was previously enrolled in a TEACCH classroom the year prior, was excluded from participation. Additional exclusion criteria included: significant uncorrected vision/hearing/physical impairments, uncontrolled seizure disorder, history of traumatic brain injury, and/or families that were non-English speaking.

Participants

After receiving approval from respective institutional review boards and local school districts at each of the sites, three groups of preschool teachers (TEACCH, LEAP, and HQSEP) of children with ASD were recruited as part of the larger study. All teachers were identified based on the classroom model they were implementing within a public school district. A total of 78 teachers (one teacher had 2 classrooms) were contacted, consented, and screened for fidelity. Out of these, a total of 74 teachers (25 TEACCH, 22 LEAP, and 27 HQSEP) and 75 classrooms were retained for participation. One HQSEP teacher had 2 classrooms. Three HQSEP classrooms were excluded due to the fact that they did not meet the fidelity criteria and one LEAP classroom was dropped due to insufficient student recruitment. These relatively low exclusion numbers are likely a reflection of the research team screening classrooms recommended by the local school districts. The sample retained for participation included 21 teachers (28.4%) from North Carolina, 14 (18.9%) from Colorado, 23 (31.1%) from Florida, and 16 (21.6%) from Minnesota. All of the participants were female, with the exception of 1 male. The sample also consisted of teachers who reported themselves to be the following ethnicities: non-Hispanic (n= 63; 85.1%); Hispanic (n= 11; 14.9%) and races: White (n= 71; 95.9%); Black (n= 2; 2.7%); and Bi/Multi-Racial (n= 1; 1.4%). Refer to Tables 1 and 2 for further demographics.

A total of 205 students and their families were contacted, consented, and then screened for inclusion/exclusion criteria. Out of these, 198 students and their families were retained for participation in the study including: 85 students in TEACCH classrooms (42.9%); 54 students in LEAP classrooms (27.3%); and 59 students in HQSEP classrooms (29.8%). Seven students and their families were excluded for a variety of reasons: 2 families were not interested in participation after consenting, 1 student was absent from the classroom for a large portion of the year, 1 student was enrolled in a TEACCH classroom but had prior LEAP exposure, 1 student was enrolled in a LEAP classroom but had prior TEACCH exposure, and 2 students did not meet ASD diagnostic criteria. The students retained for participation included 66 students (33.3%) from North Carolina, 34 (17.2%) from Colorado, 66 (33.3%) from Florida, and 32 (16.2%) from Minnesota. There were 163 males and 34 females, with a mean age of 47.6 months (*SD* = 7.50) at the time of enrollment. The mean calibrated ADOS score and SCQ total score at the PRE assessment time point were 7.24 (*SD* = 1.64) and 15.78 (*SD* = 6.31), respectively. The sample also consisted of students who were reported to be the following ethnicities: non-Hispanic (n= 130; 65.7%); Hispanic (n= 68; 34.3%); and races: White (n= 156; 78.3%); Black (n= 26; 13.1%); Asian (n= 10; 5.1%); and Bi/Multi-Racial (n= 7; 3.5%). Refer to Table 4 for further demographic information.

Procedures

After completing the screening and consent processes, all teachers were asked to complete the Autism Treatment Philosophy Questionnaire – Adapted Version at the beginning of the school year [T1 = early Fall (e.g., October)] and at the end [T4 = late Spring (e.g., May)]. This form was completed online electronically. The teachers were

also asked to complete a Classroom Demographic form at four time points throughout the school year [e.g., T1, T2 = late Fall (e.g., November), T3 = early Spring (e.g., March), and T4 = Late Spring (e.g., April)]. In addition, the Maslach Burnout Inventory – Educators Survey was collected at these four time points as well (Maslach, Jackson, Schwab, 1996). Lastly, subsequent to students being screened and consented into the project, teachers were asked to complete the *Social Responsiveness Scale* (SRS) for each student at the beginning of the year (e.g., PRE child assessment) and once at the end of the year (e.g., POST child assessment). The SRS *Preschool Version* was completed for those children who were 3 years of age or younger (see *Measures Section*). All PRE child data were collected by November 30th of the year of participation and research staff confirmed a 6-month window before conducting the POST assessment time point. All POST child data were collected by June 30th of the year of participation. The parent project also included a follow-up time point (6 months after POST); however, these data were not used in the current study. Teachers were compensated a total of $500 for their participation in the larger parent study. They were given this compensation in two increments (i.e., $250 at T1 and $250 after T4 assessments were completed).

Teachers were asked to distribute letters containing information regarding the project to the families of their students. Interested families who contacted research staff were invited to the clinics associated with each of the institutions or research staff met families at the schools to complete the screening and consent processes. The ADOS and SCQ were administered at this time (i.e., PRE) and families were then sent home with packets containing the *SRS* and the *Vineland Adaptive Behavior Scales* (VABS-II) parent forms. For those families that could not attend appointments at the clinic, all of the

aforementioned procedures were conducted at the child's school. The parent packets were then either picked up at the student's classroom or were mailed back to the research staff. Lastly, research staff administered the *Preschool Language Scale, Fourth Edition* (PLS-4) and the *Mullen Scales of Early Learning* (MSEL) within each child's classroom. Each of these measures was administered at the beginning of the year (i.e., PRE) and again at the end of the year (i.e., POST). It should also be noted that the ADOS was also administered at POST in the parent project, however, ADOS data from this time point were not included in the current study. Families were compensated $200 for participating, which was given in three increments (i.e., $67; $67; $66) corresponding to PRE, POST, and Follow-Up (FUP) assessment time points as employed in the parent project. Refer to Figure 3 for a summary of procedures.

Chapter 3: Measures

Autism Treatment Philosophy Questionnaire-Adapted Version (ATPQ-A)

To assess all teachers' commitment to TEACCH and LEAP model philosophy, the ATPQ-A was administered at T1 and T4. The ATPQ-A is an instrument with items that are statements about TEACCH and LEAP treatment approaches for autism. Each of the statements reflects the underlying theory and values of either the TEACCH approach or the LEAP approach. Participants are asked to rate each item on a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree) relative to how well that item fits their personal teaching approach. This questionnaire is an adaptation of the Autism Treatment Philosophy Questionnaire (TPQ; see Jennett et al., 2003). The research team worked with the TEACCH model developers to confirm items that reflect the TEACCH philosophy and with the LEAP model developers to add items that reflect the LEAP philosophy. The final questionnaire has 27 statements, 14 for TEACCH and 13 for LEAP, yielding a TEACCH commitment score, a LEAP commitment score, and an overall commitment score. Psychometric analysis indicated coefficient alpha reliability for the 27 items of the scale to be 0.96.

Descriptive discriminant analysis of the ATP-Q indicated individual items that comprise the measure's total score are able to discriminate between the three groups of teachers, $F(2, 242) = 2.46$, $p < .001$. The internal consistency for both the TEACCH subscale score (Cronbach's $\alpha = 0.92$) and the LEAP subscale score (Cronbach's $\alpha = 0.91$) was adequate. However, discriminant analyses also indicated that the omnibus test for the LEAP subscale was significant, $F(2, 147) = 4.23$, $p < .05$, but that it only discriminated LEAP teachers from TEACCH teachers, but not HQSEP teachers. Lastly,

discriminant analyses indicated that the omnibus test for the TEACCH subscale was not significant, $F(2, 147) = 1.13$, $p = n.s.$ Thus, the discriminant validity of the TEACCH subscale was not supported.

Maslach Burnout Inventory – Educators Survey (MBI-ES)

To assess burnout, the MBI-ES was administered (Maslach, Jackson, & Schwab, 1996). The instrument consists of 22 statements compromising three subscales, which include: *Emotional Exhaustion* (EE), *Depersonalization* (DP), and *Personal Accomplishment* (PA). The participant rates the frequency of the feelings addressed through each of the statements on a 7-point continuum (0 = never, 6 = every day). The EE subscale assesses feelings of being emotionally overextended and exhausted by one's work. The DP subscale measures negative feelings, impersonal response, and a sense of apathy towards one's students. The PA subscale measures the contentment and satisfaction one has relative to their accomplishments with their students. Adequate internal consistency and discriminant validity have been established for this inventory (see Maslach, Jackson, & Leiter, 1996). In regards to reliability, Cronbach α estimates have been reported to be 0.88 to 0.90 for the EE subscale, 0.74 to 0.76 for the DP subscale, and 0.72 to 0.76 for the PA subscale (Iwanicki & Schwab, 1981; Gold 1984).

Teacher, Classroom, and Family Demographics & Services Questionnaires

Teachers were asked to complete a demographic form which included the following information: gender, ethnicity, race, total # of years teaching, total # of years teaching children with ASD, types of formal training, and highest degree earned. In addition, this form included classroom model type, class size (e.g., # of students with ASD and DD), # of full time classroom staff, length of instructional day, and

duration/time of school day. Families were also asked to complete a demographic form as well as a services form at the PRE child assessment time point. The demographic form included: gender, ethnicity, race, community diagnosis, household income, and prescribed medications. The services form included: total number of hours of applied behavior analysis (ABA) received per month, number of hours of speech and language per month, and number of hours of social skills training per month. These variables were used to characterize both the teacher and student sample as well as to control for potential confounds.

Autism Diagnostic Observation Schedule (ADOS)

The ADOS is a semi-structured standardized assessment of communication, social interaction, and play or imaginative use of materials for individuals who are suspected to demonstrate symptoms of autism or other pervasive developmental disorders (Lord, Rutter, DiLavore, & Risi, 2002). This instrument was administered to confirm diagnoses as well as to assess autism symptomatology related to each student. The ADOS consists of four modules, each chosen based on specific developmental and language level of client, which can be each administered in 30-45 minutes. Each module is considered its own protocol and an observation period during which the examiner presents numerous opportunities for the individual being assessed to exhibit behaviors of interest that are related to ASD through standard "presses" for communication and social interaction (Lord et al., 2002). Items on the ADOS are typically scored on a 3-point scale from *0* (no evidence of abnormality related to autism) to *2* (definite evidence of abnormality). Some items include a code of *3* to indicate particularly severe abnormalities; however, these are converted to a *2* for analyses. A calibrated severity score was calculated as the metric in this current study because this has been shown to be valid in comparing assessments

across modules and time (see Gotham, Pickles, & Lord, 2009). The ADOS is considered the "gold standard" in ASD diagnostic assessment and has demonstrated strong interrater (r = .82 to .93) and test-retest (r = .59 to .82) reliability across modules and ASD-specific domains. Adequate internal consistency and discriminant validity have been established as well (see Lord et al., 2002).

Social Communication Questionnaire (SCQ)

Parents completed the SCQ to confirm diagnoses as well, which is a brief instrument for the verification of autism spectrum disorder symptoms in children (Berument et al., 1999). It was developed from the 40 diagnostic algorithm items of the larger Autism Diagnostic Interview-Revised (ADI-R), compiled into a parent report questionnaire, has a criterion score of 15 or higher (the inclusion criterion used in this study), and has demonstrated validity for the discrimination of ASD from non-ASD conditions (see Berument et al., 1999; Rutter et al., 2003). The diagnostic differentiation of the SCQ is valid in all ranges but is strongest in the higher IQ range. Scores are divided into the main areas of difficulty for individuals with autism: social interaction, communication, and restricted repetitive behaviors. Higher scores indicate greater impairment in these areas. Adequate internal consistency, reliability, and discriminant validity have been established for this inventory (see Berument et al., 1999).

Preschool Language Scale-4th Edition (PLS-4)

The PLS-4 (Zimmerman, Steiner, & Pond, 2002) is a clinician administered assessment that was used to assess student's receptive and expressive language abilities. The PLS-4 is composed of two subscales including the Auditory Comprehension (AC) and Expressive Communication (EC) scales. The AC is used to evaluate the receptive

language ability of each student. The EC is used to determine how adept the child is at communicating with others. The PLS-4 yields norm-referenced test scores for both of these subscales, as well as for an overall Total Language Score (TLS). However, in this study only the standard scores of the AC and EC subscales will be utilized. The assessment takes approximately 20 – 40 minutes to complete and consists of tasks that are designed to tap comprehension and expression of basic vocabulary, concepts, sentence structures, and grammatical markers. The psychometric properties for the subscale scores are adequate and are as follows: test-retest stability coefficients ranged from .90 to .97; internal consistency reliability coefficients ranged from .66 to .95; and an inter-rater reliability coefficient of .99 (Zimmerman, Steiner, & Pond, 2002).

Mullen Scales of Early Learning: AGS Edition (MSEL)

The MSEL (Mullen, 1995) is a clinically administered standardized developmental and cognitive assessment for children from birth to 68 months. This instrument assesses children's abilities as they relate to visual, linguistic, and motor domains, and distinguish between receptive and expressive processing (Mullen, 1995). The assessment duration is approximately 30 to 60 minutes for preschool-aged children and consists of the following domains: Early Learning Composite; Gross Motor; Visual Reception; Fine Motor; Receptive Language; and Expressive Language. Of interest to this particular study were the latter three domains. The psychometric properties of the measure are adequate and consist of the following: median values of internal consistency range from .75 to .83; test-retest reliability median values ranged from .76 to .84; and inter-rater reliability ranged from .91 to .99 (Mullen, 1995).

Vineland Adaptive Behavior Scale, Second Edition-Survey Interview Form (VABS-II)

The VABS-II (Sparrow, Balla, & Cicchetti, 1984) is a well-established survey consisting of 297 questions asked of the parent or caretaker. The VABS-II consists of questions concerning daily functioning in the domains of communication, daily living skills, socialization, and motor skills. It requires approximately 60 minutes for completion. This instrument was employed to assess receptive and expressive language levels in this current study and raw scores were utilized. The psychometric properties of the VABS-II for the age range of interest (i.e., 3 to 5 years) are satisfactory and are as follows: test-retest reliability coefficients across all domains were .78 to 93, internal consistency (split-half reliability) coefficients were .91 to .89, and interrater reliability coefficients ranged from .62 to .78. Refer to Sparrow, Balla, and Cicchetti (1984) for further psychometric properties.

Social Responsiveness Scale (SRS) & Preschool Version (SRS-P)

Parents and teachers also completed the SRS standard version (Constantino, 2002) for children ages 4 and above or the SRS-Preschool Version (SRS-P) for those children who were 3 years of age (Pine, Luby, Abbachi, & Constantino, 2006). The SRS is a 65-item questionnaire that assesses the severity of symptoms associated with ASD. Parents and teachers rate participants on a 4-point Likert scale ranging from 0 (*never true*) to 3 (*almost always true*). The measure results in five separate domains or subscales including: social awareness, social cognition, social communication, social motivation, autistic mannerisms. There is also a total score. Higher scores are indicative of higher levels of impairment on each domain. T-scores of 60 to 75 are considered mild to moderate range of severity, while scores 76 or higher are considered severe (Constantino,

2002). The psychometric properties of the SRS are robust with an overall internal consistency ($\alpha = .97$), a retest temporal stability in males and females ($r = .85$ and $r = .77$, respectively), and internal consistency for each subscale yielding high Cronbach alpha scores, with social communication demonstrating the highest [$\alpha = .92$] (Constantino, 2002). The item content of the SRS-P and the SRS differs only on the basis of developmental appropriateness of the wording for rating the behaviors of children in the respective age groups (Pine et al., 2006). The psychometric properties of the SRS-P are similarly adequate (see Pine et al., 2006).

Chapter 4: Analytic Approach

Data Diagnostics and Missing Variables

All continuous predictor and outcome variables were examined to ensure values for skewness were less than four and kurtosis less than 10. Multicollinearity for each analysis was examined by ensuring tolerance values close to 1 and variance inflation factor (VIF) values less than 10. Additionally, the data were examined to detect potential outliers by utilizing calculations of standardized residuals and Cook's D for measures of significant influence. One outlier was identified in the ATPQ-A data for one TEACCH teacher's score, thus, it was removed from the analyses. Refer to Tables 1 and 2 for the correlations between all continuous level 1 (within) and level 2 (between) variables utilized within the analyses.

There were no known systematic processes or predictors contributing to missing data, therefore, all missing data were classified as *Missing Completely At Random (MCAR)*. Refer to Table 3 for frequencies and percentages of missing data. One-way univariate analysis of variances (ANOVA), multivariate analysis of variances (MANOVA), and nonparametric Chi-Square tests were employed to analyze all group differences in the teacher and student samples. Regarding post hoc analyses, if error variances of dependent variables were not equal across the three groups, as indicated by Levene's test of homogeneity, then Dunnett's C tests were employed. Otherwise, Tukey HSD tests were utilized. All other analyses were conducted within a structural equation modeling (SEM) or multilevel SEM (MSEM) framework in Mplus Version 6.0 (Muthèn & Muthèn, 2004). SEM utilizes a statistically modern and sound approach (i.e., full information maximum likelihood [FIML]) to rectify issues related to "*missingness*" (see

Collins et al., 2001). Within all analyses involving SEM and MSEM, selected fit indices were utilized to assess model fit and included the following: chi-squared test of model fit; root mean squared error of approximation (RMSEA); comparative fit index (CFI); and the standardized root mean square residual (SRMR). Generally, favorable model fit indices include a model chi-square with a $p > .05$, a RMSEA $\leq .08$, a CFI $> .95$, and a SRMR $< .10$ (see Kline, 2005).

Teacher Commitment: ATPQ-A Commitment Variable (X_1)

The ATPQ-A commitment variable was an observed variable collected at two time points, T1 and T4. SEM was utilized in a preliminary test of the directionality of the relationship between the ATPQ-A commitment variable and burnout (*Hypothesis B*; see Figure 1). In addition, this variable was examined as an exogenous observed variable in evaluating *Hypotheses I*, *II*, and *IV* (see X_1 in Figure 2). In each of these analyses, the ATPQ-A commitment variable was constructed of the following scores: the TEACCH teachers' ATPQ-A TEACCH Commitment score, the LEAP teachers' ATPQ-A LEAP Commitment score, and the HQSEP teachers' TPQ-A Overall Commitment score. The TEACCH Commitment score was calculated as a proportion or percentage of the maximum score (maximum TEACCH score = 84) that is obtainable on all the TEACCH items (i.e., Obtained TEACCH Score / 84 = TEACCH commitment score). The LEAP Commitment scores was calculated as a proportion or percentage of the maximum score (maximum LEAP score = 78) that is obtainable on all the LEAP items. (i.e., Obtained LEAP Score / 78 = LEAP commitment score). The Overall Commitment score was calculated as a proportion or percentage of the maximum score (maximum overall score = 162) that is obtainable on the entire TPQ-A measure (e.g., Obtained overall TPQ-A

score / 162 = Overall TPQ-A Score). See Figure 4 for an illustration of the construction of the ATPQ-A commitment variable.

Teacher Burnout (η_1)

To test *Hypothesis B*, only observed measurements of EE at time points T1 and T3 were utilized. See Figure 1 for an illustration of the model tested. EE was selected as the observed variable in this analysis because this particular domain has been specifically shown to be associated with teacher commitment in the prior literature (see Coman et al., in press; Jennett et al., 2003). In order to test *Hypotheses A*, *I*, *III*, and *IV*, a latent teacher burnout variable was constructed. Refer to η_1 in Figure 2 for an illustration of the latent teacher burnout construct. The first step involved running a general confirmatory factor analysis (CFA) to test the measurement model of the burnout variable and each of its indicators to confirm it was properly specified and had adequate loadings. The hypothesized latent burnout variable included six indicators (EE at T2 and T3, DP at T2 and T3, PA at T2 and T3) all measured by the MBI-ES. As previously noted, the MBI-ES was administered 4 times across the year, however, given the prior literature (Coman et al., 2012) as well as the temporal precedence necessary to establish mediation (Collins et al., 2001) only the 2 mid-year time points at T2 and T3 were utilized.

Student Outcomes ($\eta 3$)

The student outcomes assessed were all constructed as endogenous latent variables measured at T4. These factors included: *Expressive Communication*; *Receptive Communication*; *Parent Rated Reciprocal Social Interaction Skills*; and *Teacher Rated Reciprocal Social Interaction Skills*. Each of the latent student outcome variables was hypothesized to comprise the following observed indicators:

- **Expressive Communication**: *PLS-4*: Expressive Communication (EC) standard score (SS); *MSEL*: Expressive Language SS; *VABS-II*: Expressive Language raw score (RS).

- **Receptive Communication**: *PLS-4*: Auditory Comprehension (AC) SS; *MSEL*: Receptive Language SS; *VABS-II*: Receptive Language RS.

- **Teacher Rated Reciprocal Social Interaction**: *SRS-P*: Social Awareness T-Score (TS); *SRS-P*: Social Cognition TS; *SRS-P*: Social Communication TS; *SRS-P*: Social Motivation TS.

- **Parent Rated Reciprocal Social Interaction**: *SRS-P*: Social Awareness TS; *SRS-P*: Social Cognition TS; *SRS-P*: Social Communication TS; *SRS-P*: Social Motivation TS.

Refer to η_3 in Figure 2 for an illustration of the general framework of each of the student outcome variables. The first aim was to test a general CFA measurement model of each student outcome variable and its indicators to confirm they were properly specified and had adequate loadings.

SEM was employed next to test the proposed model underlying *Hypothesis I*. Specifically, this stage in the analyses tested variables only at the teacher-level, which involved the relationship between the ATPQ-A commitment variable and the latent burnout variable (see Figure 11). Moreover, this step also assessed the control variables of interest that pertain to the teachers. In this analysis, the following variables were controlled for: total number of years teaching (YrsTch); teaching within a TEACCH classroom relative to a HQSEP (dummy coded, T_dum); teaching within a LEAP classroom relative to a HQSEP (dummy coded, L_dum); average class size across time points T1 to T3 (Class_13); average number of students with ASD from T1 to T3 (ASD_13); average number of fulltime staff members within classroom from T1 to T3 (Staff_13).

MSEM was then employed to test the proposed mediation models underlying *Hypothesis IV* because traditional methods for assessing mediation (e.g., Baron & Kenny, 1986; MacKinnon et al., 2002) are inappropriate when analyzing clustered data (i.e., students nested within teachers and/or classrooms). In addition, standard multilevel modeling (MLM) approaches are unable to accommodate simultaneous estimation of multilevel mediation models with latent variables (Muthèn & Asparouhov, 2008; Preacher, Zyphur, Zhang, 2010). Specifically, an integrative 2-level MSEM framework was used to estimate all direct and indirect effects as well as parameters of interest to test the primary meditational hypotheses in *Hypothesis IV*. To assess whether burnout at T2 and T3 mediated the relationship between teacher commitment at T1 and each of the student outcomes at T4, while controlling for selected variables, it was necessary to analyze these questions under the consideration that the students (N = 198) were nested within teachers and/or classrooms (j = 74), where i indexes student individual cases, j indicates cluster into teachers. Furthermore, Muthèn and Asparouhov's (2008) approach to MSEM was utilized because it accounts for unbalanced clusters or inequality of the number of students nested within teachers or classrooms (i.e., some classrooms can have only one student while others may have three or four students enrolled in the study). All analyses were conducted utilizing maximum likelihood and under a two-level random analytical approach (Preacher, Zyphur, & Zhang, 2010).

From a conceptual standpoint, the within variation in student outcomes due to nesting or clustering into teachers was accounted for at Level-1 (L1), whereas the tests for mediation occurred at Level-2 (L2) because the commitment and burnout variables occurred at the teacher level. Refer to Figure 2 for an illustration of the entire general

MSEM framework employed for testing the meditational relationships for all four of the student outcomes. Overall, a total of four separate mediation models were run.

Control Variables

Multiple variables were controlled for at both the teacher- (i.e., L2) and student-levels (i.e., L1) for *Hypotheses I* through *IV*. The variables included in specific analyses were based on theoretical considerations as well as their correlations with the primary outcome variables of interest. Specific tests involved controlling for some variables and not others; which is further delineated below in the *Results* section. Overall, the selected student level variables controlled during the analyses included the following: chronological age (in months; CA); total hours of reported school speech therapy per month (School_SL), total hours of reported private speech therapy per month (Private_SL), classroom model type (T_dum and L_dum), and total hours of reported ABA therapy per month (Private_ABA). Despite the fact that one of this study's aims were to investigate social interaction skills, total hours of reported social skills training per month was not utilized as a control variable because of the following: (a) there were no group differences between classroom types; (b) as might be expected for this age range there were nominal hours reported overall (M = 0.27; SD = 2.02), and (c) the types of social skills training (i.e., formal or informal) that parents were reporting was unclear. Refer to Table 7 for further descriptive data. PRE assessment scores (e.g., PRE scores of *Expressive Communication*) were also not used as control variables in any of the analyses for reasons described below in the *Results* section. It should be noted that we were particularly interested in the average scores of the teacher and student demographics from

T1 to T3 (e.g., average class size from T1 to T3) as control variables, as these aligned with the temporality involved in *Hypothesis I* through *IV*.

Chapter 5: Results

Descriptive Data

Refer to Tables 4 and 5 for teacher demographics. Results indicated there were no group differences in the highest degree attained by teachers, χ^2 (6, n = 74) = 5.78, p = 0.45, or the total number of years of teaching, $F(2, 71) = 3.01$, $p = .06$, although this approached significance. In addition, there were no group differences on reported ethnicity, χ^2 (2, n = 74) = 0.52, $p = 0.77$, reported race, χ^2 (4, n = 74) = 3.63, $p = 0.46$, or gender, χ^2 (2, n = 74) = 2.40, $p = 0.30$. Significant differences were noted, however, between the three groups on the length of instructional day (i.e., < 2 hours, between 2 and 3 hours, between 3 and 4 hours, between 4 and 5 hours, and > 5 hours) of the classroom session recruited for the project, χ^2 (6, n = 74) = 33.30, $p < .001$. Additionally, the three groups differed on the duration/time of day of the classroom session that was recruited for the project [i.e., Full Day, Morning (AM) ½ Day, and Afternoon (PM) ½ Day], χ^2 (4, n = 74) = 39.02, $p < .001$. Refer to Table 4 for frequencies within each group.

The three groups of teachers also differed on the number of years teaching children with ASD, $F(2, 71) = 3.82$, $p < .05$, the average number of fulltime staff in the classroom across the year, $F(2, 71) = 4.80$, $p < .05$, the average number of TD students per classroom, $F(2, 71) = 48.48$, $p < .001$, and the average number of total students within their classroom throughout the year, $F(2, 71) = 18.82$, $p < .001$. Post-hoc analyses indicated the following: LEAP teachers reported a significantly higher number of years teaching children with ASD relative to the TEACCH group; a significantly higher number of staff in the classroom across the year relative to the HQSEP group; and significantly more TD students across the year relative to both groups. Additionally, the

TEACCH group, on average, reported significantly fewer TD students and smaller classroom size overall, relative to the LEAP and HQSEP groups. Lastly, group differences were noted on the average number of ASD students within their classroom, $F(2, 71) = 30.23$, $p < .001$, such that the TEACCH group reported having significantly more students diagnosed with ASD in their classrooms relative to the two other groups. See Table 5 for means and standard deviations. Because we were particularly interested in the average classroom demographics from T1 to T3 as control variables, these analyses were re-run on these specific time points and results were consistent with the aforementioned (see Table 5).

Refer to Tables 6 for the demographic data pertinent to the student sample. Results indicated there were no differences between classroom types in reported student ethnicity, χ^2 (2, n = 198) = 3.23, $p = 0.20$, reported race, χ^2 (6, n = 198) = 4.35, $p = 0.63$, gender, χ^2 (2, n = 198) = 1.54, $p = 0.46$, frequency in students on prescribed medication, χ^2 (2, n = 194) = 3.79, $p = 0.15$, or reported household income for each student, χ^2 (12, n = 194) = 4.71, $p = 0.97$. However, significant differences were noted regarding the recruitment of classroom type at each site, χ^2 (6, n = 198) = 49.14, $p < .001$, and the reported community diagnoses between each classrooms type, χ^2 (8, n = 188) = 29.47, $p < .001$.

Tables 7, 8, and 9 provide descriptive data on the student sample. Results indicated there were no differences between groups on students' chronological age, $F(2, 195) = 0.55$, $p = 0.58$, total hours of reported private (i.e., received outside of school) ABA per month, $F(2, 195) = 0.99$, $p = 0.37$, or total hours of reported private social skills training per month, $F(2, 195) = 0.45$, $p = 0.64$. However, significant differences were

noted between groups on the ADOS Calibrated Severity Score, $F(2, 194) = 3.36$, $p < .05$, as post hoc tests revealed TEACCH teachers had students with significantly higher (more symptomatic) scores on the ADOS relative to the HQSEP group. Similarly, the groups differed on the SCQ Total score, $F(2, 180) = 4.81$, $p < .01$, as the TEACCH group had more symptomatic students enrolled in their classroom relative to the HQSEP group. Significant differences were also noted between the groups on the total hours of reported private speech and language therapy for the students, $F(2, 195) = 4.38$, $p < .05$, such that the LEAP group had students receiving significantly more hours of speech and language therapy relative to the HQSEP group. In addition, significant differences were noted between the groups on the total hours of reported speech and language therapy in the schools for students, $F(2, 195) = 4.63$, $p < .05$, as the LEAP group had students receiving significantly more hours of speech and language therapy relative to TEACCH group.

There were also significant group differences in students' assessment scores at the PRE time point. The TEACCH group had students with significantly lower scores on the PLS-4 Expressive Communication (EC), $F(2, 194) = 7.99$, $p < .001$, the MSEL Expressive Language (EL) scores, $F(2, 193) = 8.18$, $p < .001$, the MSEL Receptive Language (RL) scores, $F(2, 192) = 7.57$, $p < .01$, the VABS-II Expressive Language (EL) scores, $F(2, 182) = 9.48$, $p < .001$, and the VABS-II RL scores, $F(2, 182) = 5.58$, $p < .01$, relative to the two other groups. On the PLS-4 Auditory Comprehension (AC) subscale score, $F(2, 195) = 9.02$, $p < .001$, results indicated the HQSEP group had students with significantly higher scores relative to the TEACCH group only. In addition, scores indicated by parent report on the Social Awareness subscale of the SRS/SRS-P, $F(2, 181) = 4.30$, $p < .05$, were significantly higher (more symptomatic) for TEACCH students

relative to the two other groups. There were no group differences reported by teachers on any of the SRS/SRS-P subscales at PRE.

Results also indicated there were significant group differences in students' assessment scores at the POST time point as well. The TEACCH group had students with significantly lower scores on the PLS-4 EC subscale score, $F(2, 179) = 9.64$, $p < .001$, the PLS-4 AC subscale score, $F(2, 179) = 7.49$, $p < .01$, the MSEL EL scores, $F(2, 180) = 8.39$, $p < .001$, the MSEL RL scores, $F(2, 180) = 9.63$, $p < .001$, and the VABS-II EL scores, $F(2, 155) = 9.46$, $p < .001$. On the VABS-II RL scores, $F(2, 156) = 3.68$, $p < .05$, results indicated the HQSEP group had students with significantly higher scores relative to the TEACCH group only. Additionally, scores indicated by parent report on the Social Awareness subscale of the SRS/SRS-P, $F(2, 155) = 3.25$, $p < .05$, were again significantly higher (more symptomatic) for TEACCH students, however, this was only relative to the HQSEP group. There were no group differences reported by teachers on any of the SRS/SRS-P subscales at POST. Overall, these results provided evidence of possible confounds for predicting the student outcomes of interest at POST.

Group Differences between Levels of Commitment

Refer to Table 10 for descriptive data on the ATPQ-A variable. Results indicated no significant differences between the groups on the TEACCH Commitment Score at T1, $F(2, 61) = 0.42$, $p = n.s.$, or at T4, $F(2, 62) = 0.09$, $p = n.s.$ However, the groups did significantly differ on the LEAP Commitment Score at T1, $F(2, 61) = 9.55$, $p<.001$, $\eta^2 = .30$, such that the LEAP group reported significantly higher LEAP Commitment Score than the TEACCH group and the HQSEP group. In addition, they differed on this same score at T4, $F(2, 62) = 13.47$, $p <.001$, $\eta^2 = .30$, such that the TEACCH group scored

significantly lower relative to the other two. Additionally, there were significant differences between the groups on the Overall Commitment Score at T1, $F(2, 61) = 3.44$, $p < .05$, $\eta^2 = .10$, and at T4, $F(2, 62) = 6.27$, $p < .05$, $\eta^2 = .17$. Specifically, the LEAP group reported higher Overall Commitment Scores relative to the TEACCH group at T1 and the TEACCH group reported lower Overall Commitment Scores relative to both groups at T4. No significant differences were noted between the TEACCH and LEAP Commitment Scores within the HQSEP group at T1, $t(25) = 1.12$, $p = n.s.$, or at T4, $t(25) = .67$, $p = n.s.$ Lastly, teachers' ATPQ-A scores from T1 ($M = .905$, $SD = .06$) to T4 ($M = .915$, $SD = .05$) did not significantly increase across time, $t(58) = -1.78$, $p = .08$., however, a trend was indicated.

Group Differences between Levels of Burnout

Refer to Tables 11 through 13 for descriptive data on the MBI-ES burnout variable. In addition, normative data is also provided in Tables 11 and 12. Results indicated that there were no significant differences between the three groups on the average (i.e., average of T1 – T4) amount of EE $F(2, 63) = 0.98$, $p = n.s.$, DP , $F(2, 63) = 2.75$, $p = .07$, or PA subscale, $F(2, 63) = 2.11$, $p = n.s.$, reported across the year. However, a trend was indicated for the DP subscale. Similarly, results indicated that there were no significant differences between the three groups on the average amount of EE reported during mid-year (i.e., average of T2 - T3), $F(2, 68) = 1.49$, $p = n.s.$, the DP subscale, $F(2, 68) = 2.96$, $p = .06$, or the PA subscale, $F(2, 68) = 2.68$, $p = .08$, reported during the year. However, trends were indicated on the latter two subscales. Lastly, no significant differences were noted across time points within each domain, with the exception of DP assessed at T3 and T4, $t(68) = 2.50$, $p < .05$. Teachers reported

significantly higher levels of DP at T3 (*M* = 2.37, *SD* = 3.27) relative to T4 (*M* = 1.83, *SD* = 2.64).

Preliminary Hypothesis A: CFA of Latent Variables

Burnout Latent Variable

As illustrated in Figure 2, the hypothesized latent burnout variable included six indicators (EE at T2 and T3, DP at T2 and T3, PA at T2 and T3) all of which were measured by the MBI-ES. The factor loading for the EE indicator at T2 was set to one. A CFA was completed on the teacher sample (n = 74) to test the measurement model of the latent burnout variable and each of its indicators. Results of the CFA indicated that values of the selected fit indices for the hypothesized model were χ^2 (9) = 102.00, p < .001, RMSEA = 0.38, with the 90% confidence interval = 0.31 - 0.44, CFI = 0.75, and SRMR = 0.08. Overall, these results indicated poor model fit to the data. Further analysis of the resulting Modification Indices (MI), which indicates the expected reduction in the χ^2 if particular parameters were added, as well as the estimated residual variances, empirically suggested an investigation of a respecification of the latent variable. In line with these modifications, four correlations between residuals were introduced to the model which included the following: EE at T2 with EE at T3 (r = .65, p < .001); PA at T2 with PA at T3 (r = .65, p < .001); DP at T2 with EE at T2 (r = -.50, p < .01); and DP at T2 with EE at T3 (r = -.86, p < .001). Additionally, the residual variances for each domain were set equal, as they were similar in magnitude. Results of the CFA indicated that values of the selected fit indices for the new model were χ^2 (8) = 7.67, p = 0.46, RMSEA = 0.00, with the 90% confidence interval = 0.00 - 0.13, CFI = 1.00, and SRMR = 0.06. Overall, these results indicated good model fit to the data and adequate

factor loadings (above .40 and significant at the $p < .001$ level), thus, this model was utilized for all further analyses. See Figure 5 for an illustration of the final model. Refer to Table 14 for all factor loadings for each of the models. As can be seen in Table 14, employing the modifications did not significantly change the factor loadings across models.

Expressive Communication Latent Variable

A CFA was completed on the student sample (n = 198) to test the measurement model of the latent *Expressive Communication* outcome variable and each of its indicators at the POST assessment time point. Additionally, a CFA was completed to test this same latent variable at the PRE assessment time point, as this was proposed to be a confounding variable in the prediction of the POST outcome. The factor loadings for the PLS-4 EC indicator at both PRE and POST latent variables were set to 1. Given that the CFA model was hypothesized with three indicators, each of the PRE and POST models were just identified (i.e., model fits the data perfectly) and indicated adequate factor loadings for each indicator. Refer to Table 15 for all factor loadings for each of the models. Refer to Figure 6 for an illustration of the final latent *Expressive Communication* variable at POST utilized in *Hypotheses II* through *IV*.

In addition to testing the measurement model for both the PRE and POST outcomes, analyses were also completed to test whether the two factors demonstrated a high level of stability across PRE and POST time points. Therefore, these two factors were correlated with one another in a model. Model fit indices indicated both good model fit, χ^2 (4) = 8.07, p = 0.08, RMSEA = 0.07, with the 90% confidence interval = 0.00 - 0.14, CFI = 0.99, and SRMR = 0.01, and that these variables were highly stable (r

= .97, $p < .001$) across time. Thus, this gave strong indication that controlling for the latent Expressive Communication variable at PRE would remove most of the variability at POST, as the ranking of students was highly stable across time. Therefore, the PRE *Expressive Communication* factor was not utilized as a control variable in the further analyses.

Receptive Communication Latent Variable

A CFA was also completed on the student sample to test the measurement model of the latent *Receptive Communication* outcome variable and each of its indicators at the POST assessment time point. Additionally, the measurement model of this factor at the PRE assessment time point was also tested. The factor loadings for the PLS-4 AC indicator at both PRE and POST latent variables were set to one and each of the PRE and POST models were just identified and indicated adequate factor loadings for each indicator. However, the initial results demonstrated that the residual variance for the PLS-4 AC indicator at both PRE and POST was negative. Therefore, the residual variance of this indicator was constrained to zero in the final factor model. It was noted that this modification did not significantly change factor loadings for either the PRE or POST model. Results of the CFA indicated that values of the selected fit indices for the final *Receptive Communication* variable at POST were favorable: χ^2 (1) = .01, p = 0.94, RMSEA = 0.00, with the 90% confidence interval = 0.00 - 0.04, CFI = 1.00, and SRMR = 0.001. The indices for the final model at PRE were also favorable: χ^2 (1) = 1.08, p = 0.30, RMSEA = 0.02, with the 90% confidence interval = 0.00 - 0.19, CFI = 1.00, and SRMR = 0.01. In addition, results indicated adequate factor loadings. Refer to Table 15

for all factor loadings. Refer to Figure 7 for an illustration of the final latent *Receptive Communication* variable at POST utilized in *Hypotheses II* through *IV*.

Analyses were also completed to test whether the two factors demonstrated a high level of stability across PRE and POST time points. Therefore, these two factors were correlated with one another in a separate model. Model fit indices indicated both good model fit, χ^2 (8) = 6.45, p = 0.60, RMSEA = 0.00, with the 90% confidence interval = 0.00 - 0.07, CFI = 1.00, and SRMR = 0.02, and that these variables were highly stable (r = .97, p < .001) across time. This also gave strong indication that controlling for the PRE factor would remove most of the variability at POST, as again the ranking of students was highly stable across time. Therefore, the PRE *Receptive Communication* factor was not utilized as a control variable in the further analyses.

Parent Rated Reciprocal Social Interaction

A CFA was then employed on the student sample to test the measurement model of the latent *Parent Rated Reciprocal Social Interaction* outcome and each of its indicators at both the PRE and POST assessment time points. The factor loadings for the SRS-P Social Awareness indicator at both PRE and POST latent variables were set to one. Results indicated that the initial model for the POST latent variables demonstrated adequate model fit, χ^2 (2) = 5.14, p = 0.08, RMSEA = 0.09, with the 90% confidence interval = 0.00 - 0.21, CFI = 0.99, and SRMR = 0.02, and factor loadings. However, results of the initial model for the PRE latent variable demonstrated poor model fit to the data. A review of the MI empirically suggested correlating the *SRS-P* Social Awareness and Social Cognition indicators which resulted in good model fit, χ^2 (1) = 0.13, p = 0.72, RMSEA = 0.00, with the 90% confidence interval = 0.00 - 0.14, CFI = 1.00, and SRMR

= 0.00. It was noted that this did not significantly change the factor loadings. Refer to Table 16 for all factor loadings for each of the models. Refer to Figure 8 for an illustration of the final latent *Parent Rated Reciprocal Social Interaction* variable at POST that was utilized in *Hypotheses II* through *IV*. Correlating them in a separate model also assessed the stability of these two factors across PRE and POST time points. Model fit indices indicated both good model fit, χ^2 (13) = 18.80, p = 0.13, RMSEA = 0.05, with the 90% confidence interval = 0.00 - 0.09, CFI = 1.00, and SRMR = 0.03, and that these variables were highly stable (r = .81, p < .001) across time. Thus, this also gave strong indication that it was not possible to control for PRE assessments due to the fact that trajectories of students were highly stable across time.

Teacher Rated Reciprocal Social Interaction

The final CFA was conducted to test the measurement model of the latent *Teacher Rated Reciprocal Social Interaction* outcome and each of its indicators at both the PRE and POST assessment time points. The factor loadings for the SRS-P Social Awareness indicator at both PRE and POST latent variables were again set to one. Results indicated good model fit for the POST latent, χ^2 (2) = 3.07, p = 0.22, RMSEA = 0.05, with the 90% confidence interval = 0.00 - 0.17, CFI = 1.00, and SRMR = 0.01, and the PRE latent variable, χ^2 (2) = 3.34, p = 0.19, RMSEA = 0.06, with the 90% confidence interval = 0.00 - 0.16, CFI = 1.00, and SRMR = 0.01. Adequate factor loadings were also indicated and can be seen in Table 16. Refer to Figure 9 for an illustration of the latent *Teacher Rated Reciprocal Social Interaction* variable at POST that was utilized in *Hypotheses II* through *IV*. The stability of these two factors across PRE and POST time points was also assessed by correlating them in a separate model. Model fit indices

indicated both good model fit, χ^2 (13) = 15.26, p = 0.43, RMSEA = 0.01, with the 90% confidence interval = 0.00 - 0.07, CFI = 1.00, and SRMR = 0.02, and that these variables were highly stable (r = .80, p < .001) across time. This again gave strong indication that it was not possible to control for PRE assessments due to the fact that trajectories of students' were highly stable across time.

Preliminary Hypothesis B: Temporality of Teacher Commitment and Burnout

As previously noted, SEM was utilized in a preliminary test of the directionality of the relationship between the ATPQ-A commitment variable (assessed at T1 and T4) and burnout (observed measurement at T1 and T3). Unstandardized path coefficients, standard errors, and *z*-scores are presented in Table 17. Standardized path coefficients and the model are illustrated in Figure 10. The direct pathway from the ATPQ-A score at T1 (ATPQ-A1) to this same variable at T4 (ATPQ-A4) was significant (β = 0.78, p < .001), indicating that for every one standard deviation increase in ATPQ-A1, the ATPQ-A4 variable increases 0.78 standard deviations. The pathway from the EE score at T1 (EE1) and this same variable at T3 (EE3) was also significant, (β = 0.71, p < .001), indicating that for every one standard deviation increase in EE1, the EE4 variable increases 0.71 standard deviations. Lastly, the direct pathway from EE1 to ATPQ-A4 was significant (β = -0.26, p < .001), indicating that for every one standard deviation increase in EE1, the ATPQ-A4 decrease 0.26 standard deviations. The path from ATPQ-A1 to EE3 was not significant.

Hypothesis I: Burnout on Teacher Commitment

SEM was also employed to assess *Hypothesis I*, a test of the relationship between the ATPQ-A commitment variable and the latent burnout variable, while controlling for

the aforementioned teacher variables (see Figure 11). Initial results indicated poor model fit, however, further analyses empirically suggested that it was necessary to constrain the correlations between some observed exogenous variables to zero. This included the correlations between ATPQA1 and YrsTch, ATPQ-A1 and Class_13, and YrsTch with Class_13. This resulted in a more parsimonious model and was corroborated by an examination of the bivariate correlations in Table 2 between these variables; which were close to zero (r's of -.08, .05, and .07, respectively). After employing these modifications, results indicated good model fit, χ^2 (46) = 53.17, p = 0.22, RMSEA = 0.05, with the 90% confidence interval = 0.00 - 0.09, CFI = 0.98, and SRMR = 0.06. It was noted that these modifications did not significantly change factor loadings or path loadings. Unstandardized path coefficients, standard errors, *z*-scores, and correlations are presented in Table 18. Standardized path coefficients and the model are illustrated in Figure 11. The only significant effect was from YrsTch to the latent burnout variable (β = -0.30, p < .01), indicating that for every one standard deviation increase in YrsTch, the burnout variable decreases 0.30 standard deviations, while controlling for all other correlated variables at the same level.

Hypotheses II-IV: Student Outcomes on Commitment, Burnout, and Mediation

The results of *Hypotheses II* through *IV* are included in this section because *II* and *III* are hypothesized pathways that underlie, or are by definition lie within, the mediation models hypothesized in *IV*. Therefore, all results pertinent to these hypotheses are presented in this section. Additionally, the results pertaining to *Hypothesis I* informed several decisions as to which variables were necessary to control for at the teacher-level in the final stages of the analyses. First and foremost, results indicated that five of the six

control variables were not significantly related to the latent burnout variable (see Table 18 and Figure 11) in the test of the model in *Hypothesis I.* In addition, given the teacher sample size (n = 75) and the number of variables under investigation it is suggested that parsimony is best when employing complex MSEM (see Kline, 2005). Therefore, four teacher-level control variables were dropped (T_dum, L_dum, ASD_13, and Staff_13) from the tests of *Hypotheses II* through *IV*. However, given that YrsTch demonstrated a significant direct effect on the latent burnout construct and Class_13 was purported to theoretically have a potential impact on the parameter estimates related to burnout and student outcomes, these two variables were retained as control variables at the teacher-level. As such, a path was specified in each of the models from YrsTch to the latent burnout construct and from Class_13 to both burnout and the student outcome being analyzed. Secondly, as indicated in the tests of *Hypothesis I,* the correlations between the exogenous observed variables of ATPQ-A with YrsTch and Class_13, and YrsTch with Class_13, were all again set to zero. As noted, four student-level control variables were also introduced at this stage for each analysis and included: School_SL; Private_SL; Private_ABA; and CA in months. All of these aforementioned model specifications were employed in each test of the four student outcomes of interest.

The latent *Expressive Communication* student outcome was the first mediation model tested. The final model is illustrated in Figure 12. In order to obtain good model fit to the data, unique model specifications were employed. This included constraining the residual variances of the PLS-4 EC and the MSEL EL indicators of the latent *Expressive Communication* outcome equal to one another at the within-level as well as the between-level. An examination of the parameter estimates of the residual variances

indicated that each of these were similar in magnitude and not significant, thus, corroborating this modification. Additionally, these variables are measured on the same metric of SS. It was noted that other parameter estimates, including factor loadings, were not significantly changed. Employing these modifications resulted in adequate model fit indices, χ^2 (60) = 76.59, p = 0.07, RMSEA = 0.04, CFI = 0.98, and a SRMR value within = 0.06 and between = 0.11. Overall, these model specification constraints allowed for the assumption of homogeneity of variance to be upheld. Unstandardized path coefficients, standard errors, *z*-scores, and correlations at the within-level are presented in Table 19 and at the between-level these are presented in Table 20. Unstandardized path coefficients and factor loadings at both levels, along with the final model, are presented in Figure 12.

At the within-level, the only significant direct effect while controlling for those at the same level of all other correlated variables, was from Private_ABA to *Expressive Communication* (b [unstandardized coefficient] = -.23, p < .05). This indicates that a 1-unit increase in Private_ABA in its original metric predicts a .23-point decrease on the *Expressive Communication* construct in its original metric. At the between-level, and while controlling for those at the same level of all correlated variables, a significant direct path was indicated between the relationship from YrsTch to burnout (b = -.35, p < .05), indicating that a 1-unit increase in YrsTch in its original metric predicts a .35-unit decrease in the burnout construct in its original metric. A significant direct path was also noted between Class_13 to *Expressive Communication* (b = 2.02, p < .001), indicating that a 1-unit increase in Class_13 predicts a 2.02-unit increase in *Expressive Communication*. A trend was also indicated in the direct effect from Class_13 to burnout

(b = -.35, SE = .20, *z*-score = -1.71, p = .09). No other significant pathways were noted. Lastly, the indirect relationship between the ATPQA1 variable and *Expressive Communication* was not significant (b = 2.07, SE = 5.67, *z*-score = 0.71, p = 0.71).

The mediation model comprising the *Receptive Communication* student outcome was tested next. The final model is illustrated in Figure 13. In order to obtain good model fit to the data, unique model specifications were also employed. Specifically, this involved constraining the residual variances of the MSEL RL indicator of the latent *Receptive Communication* outcome to zero at both the within- and between-levels. An examination of this residual variance indicated that it was negative, close to zero, and not significant; thus corroborating this modification. It was noted that the other parameter estimates, including factor loadings, were not significantly changed. Employing these modifications resulted in adequate model fit indices, χ^2 (60) = 76.25, p = 0.08, RMSEA = 0.04, CFI = 0.98, and a SRMR value within = 0.01 and between = 0.11. Unstandardized path coefficients, standard errors, *z*-scores, and correlations at the within-level are presented in Table 21 and at the between-level these are presented in Table 22. Unstandardized path coefficients and factor loadings at both levels, along with the final model, are presented in Figure 13.

At the within-level, the only significant direct effect while controlling for those at the same level of all other correlated variables, was from Private_ABA to *Receptive Communication* (b = -.22, p < .05). This indicates that a 1-unit increase in Private_ABA in its original metric predicts a .22-point decrease on the *Receptive Communication* construct in its original metric. A trend was also observed at this level with the direct effect of Private_SL and *Receptive Communication* (b = -.82, SE = .46, *z*-score = -1.78, p

= .07). At the between-level, and while controlling for those at the same level of all correlated variables, a significant direct path was again indicated between the relationship from YrsTch to burnout (b = -.35, p < .05), indicating that a 1-unit increase in YrsTch in its original metric predicts a .35-unit decrease in the burnout construct in its original metric. A significant direct path was also noted between Class_13 to *Receptive Communication* (b = 2.18, p < .001), indicating that a 1-unit increase in Class_13 predicts a 2.18-unit increase in *Receptive Communication*. A trend was also again indicated in the direct effect from Class_13 to burnout (b = -.35, SE = .20, *z*-score = -1.71, p = .09). No other significant pathways were noted. Lastly, the indirect relationship between the ATPQA1 variable and *Receptive Communication* was not significant (b = 1.78, SE = 4.97, *z*-score = 0.36, p = 0.72).

The mediation model comprising the *Parent Reported Reciprocal Social Interaction* outcome was then tested. The final model is illustrated in Figure 14. Results indicated good model fit indices, χ^2 (75) = 79.81, p = 0.33, RMSEA = 0.02, CFI = 0.99, and a SRMR value within = 0.02 and between = 0.07. Unstandardized path coefficients, standard errors, *z*-scores, and correlations at the within-level are presented in Table 23 and at the between-level these are presented in Table 24. Unstandardized path coefficients and factor loadings at both levels, along with the final model, are presented in Figure 14.

At the within-level, no significant direct effects were observed. However, a trend was indicated with the direct effect of Private_ABA to *Parent Reported Reciprocal Social Interaction* (b = .10, SE = .05, *z*-score = 1.90, p = .06). At the between-level, while controlling for those at the same level of all correlated variables, a significant direct

path was again indicated between the relationship from YrsTch to burnout (b = -.35, p < .05), indicating that a 1-unit increase in YrsTch in its original metric predicts a .35-unit decrease in the burnout construct in its original metric. A significant direct path was also again noted between Class_13 to the student outcome (b = -.55, p < .05), indicating that a 1-unit increase in Class_13 predicts a .55-unit decrease in *Parent Reported Reciprocal Social Interaction Skills*. A trend was also again indicated in the direct effect from Class_13 to burnout (b = -.35, SE = .21, *z*-score = -1.74, p = .08). No other significant pathways were noted. Lastly, the indirect relationship between the ATPQA1 variable and this student outcome was not significant (b = -1.22, SE = 3.56, *z*-score = -0.34, p = 0.73).

The *Teacher Reported Reciprocal Social Interaction* student outcome was the final mediation model tested. This model is illustrated in Figure 15. Initial results indicated that unique model specifications were necessary in order to obtain good model fit to the data and meet homogeneity of variance. First, it was necessary to constrain the residual variances of the SRS Social Awareness (AW), Social Cognition (CG), and Social Motivation (MT) indicators of the latent *Teacher Reported Reciprocal Social Interaction* outcome equal to one another at the both the within- and between-levels. An examination of the parameter estimates of the residual variances indicated that each of these were similar in magnitude and not significant, thus, corroborating this modification. Additionally, these variables are measured on the same metric of TS. The Social Communication (CM) indicator had a residual variance that was not comparable to the other three, thus, this was not constrained to be equal to the others. Secondly, it was necessary to include three additional paths in order to achieve adequate model fit to the data. These included a direct path from ATPQ-A1 to the CG and CM indicators as well

as a path from YrsTch to the CM indicator. It was noted that other parameter estimates, including factor loadings, were not significantly changed. Employing these modifications resulted in adequate model fit indices, χ^2 (76) = 95.54, p = 0.06, RMSEA = 0.04, CFI = 0.98, and a SRMR value within = 0.02 and between = 0.07. Unstandardized path coefficients, standard errors, *z*-scores, and correlations at the within-level are presented in Table 25 and at the between-level these are presented in Table 26. Unstandardized path coefficients and factor loadings at both levels, along with the final model, are presented in Figure 15.

At the within-level, the only significant direct effect while controlling for those at the same level of all other correlated variables, was from Private_ABA to the student outcome (b = .11, p < .05). This indicates that a 1-unit increase in Private_ABA in its original metric predicts a .11-point increase on the *Teacher Reported Reciprocal Social Interaction* construct in its original metric. At the between-level, and while controlling for those at the same level of all correlated variables, a significant direct path was again indicated between the relationship from YrsTch to burnout (b = -.35, p < .05), indicating that a 1-unit increase in YrsTch in its original metric predicts a .35-unit decrease in the burnout construct in its original metric. Significant direct paths were also noted between the ATPQ-A1 variable to the CG indicator (b = 38.45, p < .01) and the CM indicator (b = 17.43, p < .05), indicating that a 1-unit increase in the ATPQ-A1 variable in its original metric predicts a 38.45-unit increase or a 17.43 increase in these indicators in their original metric. A significant direct path was also noted between the YrsTch variable to the CM indicator (b = .13, p < .05), indicating that a 1-unit increase in the YrsTch variable in its original metric predicts a .13-unit increase in this indicator in their original

metric. A trend was also again indicated in the direct effect from Class_13 to burnout (b = -.35, SE = .21, *z*-score = -1.73, p = .08). In addition, a trend was noted between the ATPQ-A1 variable and the student outcome (b = -19.60, SE = 11.67, *z*-score = -1.68, p = .09). No other significant pathways were noted. Lastly, the indirect relationship between the ATPQA1 variable and the *Teacher Reported Reciprocal Social Interaction* construct was not significant (b = -.76, SE = 2.41, *z*-score = -.31, p = 0.75).

Chapter 6: Discussion

The recent economic downturn and political climate within the federal government has threatened special education resources for children with ASD. The literature suggests that one consequence may be teacher burnout. Therefore, the aim of this study was to investigate the levels of burnout experienced by three groups (i.e., TEACCH, LEAP, and HQSEP) of high fidelity preschool teachers, the associations burnout may have with their commitment levels to TEACCH and LEAP model philosophy, and the effects each of these variables may have on the outcomes of preschoolers with ASD. Results did not support a direct relationship between teachers' commitment and student outcomes, nor was there a relationship between burnout at mid-year and these outcomes. None of the mediational relationships hypothesized were supported either. Results did, however, support differences between these groups of teachers in their commitment levels, demonstrated compelling student differences among these groups, and revealed several interesting findings regarding the relationship between teacher and student demographic variables and student outcomes that may have important implications for school districts and model developers.

First, the results of the descriptive analyses revealed several significant differences between the three groups that are important to address. Relative to the two other groups, TEACCH teachers reported longer instructional days (i.e., >5 hours). Relatedly, more TEACCH teachers reported working within a full day classroom setting as opposed to a half-day session, relative to their counterparts in this study (see Table 4). These differences were not surprising as TEACCH classrooms are traditionally scheduled as full day programs throughout most school districts. TEACCH teachers also reported

more students diagnosed with ASD, fewer TD students, and fewer students overall across the year relative to the LEAP and HQSEP groups. These discrepancies were also anticipated as traditionally only students with ASD, or those suspected on the autism spectrum, are staffed into TEACCH classrooms (i.e., self-contained classroom model). In contrast, TD students are staffed into LEAP classrooms as part of the criteria of that model (i.e., inclusion of TD peers at approximately a 2:1 ratio) and are, at times, staffed into HQSEPs (Kohler, Strain, & Goldstein, 1996). This is not a criterion for HQSEPs, however. As such, the LEAP teachers reported a significantly higher number of TD children in their classrooms relative to the two other groups. Thus, the criteria and traditional enrollment practices associated with each of these models may account for the differences in diagnostic categories within the classrooms and the overall classroom size discrepancies noted between them. These particular group differences are consistent with prior research (see Coman et al., 2012).

Interestingly, however, there were some inconsistencies noted between the descriptive results of this study and prior investigations, including the work by Coman et al. (2012). The results here indicated that LEAP teachers reported more fulltime staff members relative to the HQSEP group. This may be due to the LEAP model criteria, which mandates a certain number of staff members assigned to each classroom, typically a staff to student ratio of 1:5 (Kohler, Strain, & Goldstein, 1996). Although a low teacher to student ratio is considered good practice for HQSEPs (see Hume et al., 2011), this is not a criterion for this model and ratios tend to be variable across settings and districts. The higher number of staff members may have also been observed in this particular sample of LEAP teachers because they had approximately 3 more students, on average,

relative to the HQSEP group from T1 to T3 (see Table 5). Although this difference was not statistically significant, it is plausible more staff members were placed within these LEAP classrooms due the higher student enrollment. Overall, these differences were considered insignificant as neither the grouping variables, average overall classroom size, average number of students diagnosed with ASD, or average number of staff members were found to be significantly related to the latent burnout construct in the primary analyses (see Figure 10).

Another inconsistent finding between this current study and the Coman et al. (2012) investigation was LEAP teachers reported a significantly higher number of years teaching children with ASD relative to the TEACCH group. As shown in Table 5, LEAP teachers (M = 8.41; SD = 5.59) reported almost double the number of years teaching children with ASD relative to TEACCH teachers (M = 4.76; SD = 3.02). This inconsistency with Coman et al. (2012) may simply be due to the larger, and plausibly more representative, sample size examined here. Additionally, often teachers who have been working within the school districts longer and who have established seniority are able to choose their preferred classroom model, and it may be co-teaching and inclusion models, such as LEAP. In contrast, newly hired special education teachers are typically placed into TEACCH or self-contained classrooms initially, and as they gain seniority, they are able to transition into the more inclusive classroom settings.

It is also possible this is an indication of turnover in teachers working within the TEACCH model, a self-contained classroom. Prior research supports this notion as it suggests that special education teachers in self-contained classrooms are at a significantly greater risk of leaving their field relative to those in other settings (see Brownell and

Smith; 1993; George, George, & Grosenick, 1992, and Metzke, 1988). Specifically, teachers in self-contained settings with a heterogeneous group of students presenting with an array of disabilities, behavior problems, emotional difficulties, and varied learning styles, have been shown to be at the greatest risk for leaving their classroom. This is particularly true when these teachers do not have support or perceive a lack of institutional support and resources (see McCarthy et al., 2009). Brownell and Smith (1993) purported that these teachers may experience a sense of isolation from their professional peers and an inability to effectively instruct students with such a varying amount of need. This may decrease feelings of personal accomplishment, increase ambiguity and conflict, and ultimately lead to burnout (Jennett et al., 2003) and the decision to leave that particular classroom setting (Nichols & Sosnowsky, 2002). Although further research is warranted, it may be the case that this is a result of the reported cuts to special education as indicated by the U.S. DOE and CEC. If these self-contained teachers do not have the appropriate supports in place and they are working with these students who often have a heterogeneity in the presentation of their symptoms (Mundy, Henderson, Inge, & Coman, 2007), it is plausible that TEACCH teachers experience higher levels of burnout and are at greater risk for leaving their self-contained setting. As further discussed below, the data do not support that these TEACCH teachers were experiencing *significantly* higher levels of burnout (although higher mean levels) than their counterparts (see Tables 11 and 12). Thus, relative to LEAP teachers, it may be more likely the case here that TEACCH teachers are moving into inclusion or co-teaching settings once that option becomes available to them. Future research is warranted on this topic.

Significant group differences in the demographics as well as the levels of functioning of the students were also observed and mostly anticipated. First, group differences were noted regarding the type of classrooms that were recruited for each site. As shown in Table 6, there are far more TEACCH classrooms recruited at the NC site, particularly when compared to the MN or CO sites. However, these recruitment differences were not surprising given that some geographical regions are likely to have more TEACCH (i.e., NC) or more LEAP (i.e., CO) classrooms. This may be due to the fact that the models were developed in those regions (i.e., TEACCH was developed in NC) or the developers currently reside in those areas (i.e., LEAP developer currently resides in CO). Secondarily, a review of Table 6 also indicates that there appear to be significantly more children with a diagnosis of Autism, as opposed to Pervasive Developmental Disorder—NOS (PDD-NOS) or Asperger's, in the TEACCH classrooms. It is possible that children with significantly more language impairments and/or more severe symptoms associated with autism are staffed into the self-contained TEACCH classrooms.

A review of the PRE assessment data (Tables 8 and 9) provides support for this notion. Students in the TEACCH classrooms had significantly lower scores, relative to the two other groups, on the PLS-4 EC, the MSEL EL, the MSEL RL, the VABS-II EL, and the VABS-II RL. Scores indicated by parent report on the Social Awareness subscale of the SRS/SRS-P were also significantly higher (i.e., more symptomatic) for TEACCH students relative to the two other groups. The TEACCH students also had significantly lower scores on the PLS-4 AC, higher ADOS scores (more symptomatic), and higher SCQ Total scores (more symptomatic) relative to the HQSEP group. These

same patterns were relatively consistent when reviewing the student's scores at POST (see Tables 8 and 9). There were no group differences reported by teachers on any of the SRS/SRS-P subscales at PRE or POST. This is a common phenomenon as prior research has demonstrated low to moderate (e.g., *r*'s often in the .20s) agreement between parent and teacher reports on behavior rating scales (see De Los Reyes & Kazdin, 2005; Achenbach, McConaughy, & Howell, 1987). Overall, findings support the notion that the TEACCH students who were demonstrating lower levels of functioning in the areas of expressive and receptive language and in some aspects of social functioning were indeed staffed into the TEACCH classrooms. This is likely due to the theoretical tenets underlying the TEACCH model that focus on molding the environment around the difficulties observed in ASD and supplementing visual supports for language based tasks.

Despite data suggesting the TEACCH students in this sample were experiencing significantly more symptoms associated with ASD, another interesting group difference was in regards to the intervention services that students were receiving. There were no group differences reported in the amount of reported hours of social skills training or ABA per month. However, the LEAP students were reported to be receiving more hours of speech and language therapy relative to the two other groups (see Table 7). Specifically, LEAP students (M = 2.72; SD = 4.69) were reported to be receiving more hours of *private* speech and language per month relative to students in the HQSEPs (M = 0.89; SD = 1.80. Further, these students (M = 2.57; SD = 2.54) were also reported to be receiving more hours of *school-based* speech and language per month relative to students in the TEACCH classrooms (M = 2.26; SD = 1.98). A closer review of Table 7 provides some explanation for these results. Both TEACCH and HQSEP students were receiving

most of their therapy hours within the school setting. Although, TEACCH students received almost double the amount of hours in private therapy services relative to the HQSEP students. Thus, this may be one reason as to why there were reported group differences that were specific to the treatment setting. Of note, however, is that these data suggest the LEAP group was reported to be receiving almost double the amount of speech and language services, both school-based and private, relative to the two other groups. As can be calculated from Table 7, the LEAP students on average were receiving approximately 6.5 hours of therapy per month, the TEACCH students were receiving 3.81 hours per month, and the HQSEP group were receiving 3.46 hours per month. This may be due to the fact that LEAP is a half-day program, allowing more time for families to enroll their students in additional interventions services. In addition, in some school districts those students with some language receive more speech and language therapy whereas those with minimal language abilities receive less, particularly if their language abilities are commensurate with estimates of intellectual functioning. Nonetheless, this warrants further investigation into why LEAP students appear to be receiving far more speech and language services relative to the TEACCH and HQSEP students.

In regards to teacher commitment, results indicated no significant differences between the groups on the TEACCH Commitment Score (TCS) at the beginning or end of the school year (i.e., T1 or T4). However, the groups did significantly differ on the LEAP Commitment Score (LCS) at beginning of the school year, such that the high fidelity LEAP group reported significantly higher scores than the two other groups. The TEACCH group also scored significantly lower on the LCS at the end of the school year, relative to LEAP and HQSEP teachers. Additionally, the LEAP group reported higher

Overall Commitment Scores (OCS) relative to the TEACCH group at T1 and the TEACCH group reported lower on this same score relative to both other groups at T4. No significant differences were noted between the TCS or LCS within the HQSEP group at T1 or T4. These findings are consistent with the Coman et al. (2012) study where they found, relative to the two other groups, high fidelity LEAP teachers reported significantly higher levels of commitment to LEAP philosophy; while high fidelity TEACCH teachers did not report higher commitment levels to TEACCH philosophy. Furthermore, educators in other high quality special education programs (i.e., HQSEP teachers) reported similar levels of commitment to both philosophies. Coman et al. (2012) provides an explanation for this as they found LEAP and HQSEP teachers share a degree of commitment to some of the underlying principles and practices of TEACCH because its core principles are likely more generalizable across models. Additionally, they posited that TEACCH teachers might not share similar levels of commitment to LEAP because of the theoretical and logistical differences underlying these two approaches. Integrating the components of LEAP into a TEACCH classroom, particularly a self-contained classroom, is often difficult and logistically unfeasible (e.g., TEACCH classrooms do not generally include TD peers) within some school districts or settings (Coman et al., 2012). Lastly, HQSEP teachers likely might not report as high a commitment level to LEAP, relative to the LEAP teachers, because they do not receive formal or didactic training in this classroom approach (Coman et al., 2012).

The results of this current study extended this prior work by examining teacher commitment levels at the end of the school year as well. Interestingly, the results indicated that HQSEP teachers are not reporting as high levels of commitment to LEAP

philosophy, relative to the LEAP group, at the beginning of the school year. However, their commitment score increases across time. Therefore, by the end of the school year, HQSEP teachers are reporting levels of commitment to LEAP philosophy comparable to the LEAP group. Further results also indicate that the teachers' ATPQ-A scores from T1 from T4 did not significantly increase over time, but a trend was indicated. Specifically, the TEACCH teachers' TCS was stable from T1 ($M = 0.91$) to T4 ($M = 0.91$), the LEAP teachers' LCS decreased from T1 ($M = 0.94$) to T4 ($M = 0.93$), and the HQSEP's OCS increased from T1 ($M = 0.88$) to T4 ($M = 0.91$). A review of Table 10 suggests that the HQSEP teachers' commitment score to both models increased, but more so to LEAP philosophy. Therefore, the trend indicated was likely due to the HQSEP teachers' commitment scores increasing over time (see Table 10). Future research is warranted to examine whether HQSEP teachers' commitment continues to increase over time.

Regarding burnout, the results were largely consistent with the prior work conducted by Coman et al. (2012). The data suggested no significant differences between the three groups on the average amount of experienced burnout across the year (i.e., average of T1 – T4). Further, there were no significant differences between the three groups on the average amount of burnout experienced during mid-year (i.e., T2 and T3). Although, some trends were noted on the DP and PA (mid-year only) subscales, warranting further investigation into whether TEACCH teachers may experience more DP and less PA at mid-year relative to the two other groups. This supports the previously noted group differences in the numbers of years teaching for TEACCH teachers and further contributes to concerns regarding their potential risk for attrition. Nonetheless, these findings replicate Coman et al.'s (2012) study and provide additional evidence that

the level of experienced burnout across the year does not significantly differ among these three groups of high fidelity teachers. These findings are also consistent with the findings of the Jennett et al. (2003), who did not demonstrate significant group differences in experienced levels of burnout between ABA and TEACCH teachers. It seems that implementing one classroom approach over the other does not increase the likelihood of experiencing significantly higher or lower levels of burnout, despite their differences (Coman et al., 2012).

No significant differences were noted across time points within each domain either, with the exception of DP assessed at T3 and T4. Teachers reported significantly higher levels of DP at T3 (M = 2.37, SD = 3.27) relative to T4 (M = 1.83, SD = 2.64), possibly indicating that this is a more stressful time of year for teachers. Consistent with Coman et al. (2012), these high fidelity teachers reported substantially lower levels of EE and DP, and higher levels of PA, in comparison to the normative sample utilized in the validation study of the MBI-ES (Maslach, Jackson, & Leiter, 1996). The normative means and standard deviations for each subscale are listed in Tables 11 and 12. The sample in this current study reported burnout levels that were low to moderate (Maslach, Jackson, & Leiter, 1996). Specifically, all three groups on average reported low (scores 0 to 16) to moderate (scores 17 to 26) levels of EE, with the TEACCH group reporting the highest levels (Maslach, Jackson, & Schwab, 1996). In addition, all three groups reported low levels (scores 0 to 8) of DP and high levels of PA (scores 39 and over; Maslach, Jackson, & Schwab, 1996; Maslach, Jackson, & Leiter, 1996). This study again provides further evidence that these high fidelity teachers are experiencing nominal feelings of emotional overextension, few negative feelings, little impersonal response,

and minimal withdraw from their students (Coman et al., 2012). In addition, they are reporting high levels of contentment and satisfaction relative to their accomplishments with their students.

In regards to this current study's primary aims, we first hypothesized that the indicators of interest would adequately load onto both the latent burnout and latent student outcome constructs, as defined in the *Analytical Approach* section (see Figure 2). The CFA's conducted to test the preliminary hypothesis (*Hypotheses A*) provided partial support of the hypothesized latent constructs. Results revealed that modifications were necessary to obtain good model fit and adequate factor loadings for two of the five latent variables at POST, including the burnout construct (see Figure 5) and the *Receptive Communication* outcome (see Figure 7). However, good model fit and adequate factor loadings were obtained with the *Expressive Communication* outcome (see Figure 6), the *Parent Rated Reciprocal Social Interaction* outcome (see Figure 8), and the *Teacher Rated Reciprocal Social Interaction* outcome (see Figure 9) without modifications. Nevertheless, the few modifications employed allowed for good model fit to the data and adequate factor loadings for all latent constructs (see Tables 14 – 16). Furthermore, analyses of the stability of these constructs across time revealed that each of these variables were highly stable across time (*r*'s from .80 to .97). This suggests that the students' rankings in regards to their level of functioning are highly stable across the year in each of these high fidelity classrooms. Thus, the students who are starting the year at higher levels functioning are continuing to be assessed at these same high levels at the end of the year. The same effect is indicated for those students at lower levels of functioning.

A test of the directionality of the relationship between the ATPQ-A commitment variable and burnout was also an aim of this current study. As expected, results suggest that there was a direct and highly predictive ($\beta = 0.78$, $p < .001$) relationship between TEACCH teachers' commitment to TEACCH philosophy, LEAP teachers' commitment to LEAP philosophy, and HQSEP teachers' commitment to both model philosophies at the beginning of the year and their commitment levels at the end of the year. In addition, teachers' reported levels of experienced EE at the beginning of the year was also highly predictive ($\beta = 0.71$, $p < .001$) of their reported EE levels at mid-year. These findings are consistent with the descriptive results previously discussed, as commitment scores and levels of EE were noted to be fairly stable across time for all three groups (see Tables 10 and 13).

Contrary to our hypothesis, however, the results did not provide support that the teachers' level of commitment at the beginning of the year was directly related to burnout assessed at mid-year. Therefore, our attempt to provide preliminary support that the commitment variable precedes the burnout variable in time was not demonstrated here. In fact, the results suggest that teachers' experienced levels of EE at the beginning of the school year are not only predictive of their levels of EE at mid-year, but they are also a determinant of their commitment to model philosophy at the end of the year. More specifically, an inverse relationship was indicated such that increased levels of EE experienced by teachers at beginning of the school year may result in a significant decrease in commitment to TEACCH and LEAP philosophy at the end of the year. Therefore, TEACCH and LEAP teachers with higher levels of burnout at the beginning of the school year are more likely to exhibit lower levels of commitment to their

respective model philosophies by the end of the year. This also suggests that the HQSEP teachers who experience higher levels of EE at the beginning of school also become less committed to both TEACH and LEAP philosophy.

To our knowledge, these findings are the first to demonstrate this temporal relationship between teacher commitment and aspects of burnout. This may be an important factor to assess for these model developers and administrators who are trying to employ these preschool programs in their local school districts. Taken together, this suggests that the commitment and burnout levels at the beginning of the year, for high fidelity teachers, may be used as a predictor of both their commitment levels at the end of the year and levels of experienced burnout at mid-year. Furthermore, their experienced levels of burnout at the beginning of the year may adversely impact their levels of commitment to the principles underlying TEACCH and LEAP model philosophy at the end of the school year. Overall, this is an important finding for school districts and model developers as it suggests an assessment of a teachers' level of commitment and burnout at the start of each year may provide important information about their educators.

Hypothesis I, a test of the relationship between the ATPQ-A commitment variable and the latent burnout variable while controlling for specific teacher variables, was also not supported here (see Figure 11). The TEACCH teachers' level of commitment to the theoretical underpinnings of TEACCH, LEAP teachers' level of commitment to LEAP, and HQSEP teachers' level of overall commitment to both of these models did not significantly predict the latent burnout construct assessed in the middle of the school year (i.e., T2 and T3). Therefore, despite utilizing a healthier sample and more advanced statistical methodologies in this current study, we were unable to provide support for the

relationship between these variables. This is consistent with the preliminary tests of directionality noted above. One explanation of this finding, as well as a limitation of the study, is the fact that this was a selective sample of high fidelity teachers who were highly motivated, well-trained, highly committed (see Table 10), and who were experiencing nominal levels of burnout (see Tables 11-13). Therefore, the amount of variance that could have been accounted for in the latent burnout construct was likely limited by these factors and may have contributed to these null findings.

Interestingly, a significant inverse relationship between the YrsTch variable and the latent burnout construct at T2 and T3 was the only association supported. As noted in the descriptive analyses, there were no significant group differences in the total number of years teaching (see Table 5). Overall, this suggests that teachers who have been working longer in the field are experiencing lower levels of burnout during the middle of the school year. Conversely, those teachers who have been working a fewer number of years are reporting the highest levels of burnout during this same period. Prior research on this relationship has shown inconsistent findings. Zabel and Zabel (1983) conducted a study providing support of this association as they found that older more experienced teachers report experiencing lower levels of burnout across the year. Banks and Necco (1990) also found that older teachers have lower burnout scores; however, they did not find a significant relationship between number of years teaching and burnout. This warrants further research into clarifying this relationship. Further, a review of Table 5 indicates that the LEAP and HQSEP teachers reported a higher number of years teaching in total, although not statistically significant, relative to the TEACCH group. This again may provide some evidence that TEACCH teachers may be at risk for higher levels of

burnout given their fewer amount of years teaching. It is plausible that the TEACCH teachers is the group driving the observed association between the number of years teaching and teacher burnout in this overall analyses. This is consistent with some of the trends noted on the DP and PA (mid-year only) subscales discussed above.

Although good model fit was obtained for all of the proposed models (see Figures 12 through 15), the results did not provide support for *Hypotheses II* through *IV*. Specifically, results did not support a direct relationship between teachers' commitment at T1 and any of the latent student outcome variables at POST, nor was there a direct relationship between the latent burnout construct assessed at T2 and T3 and any of the latent student outcomes at POST. As such, the mediational relationships between teacher commitment at T1 and each of the latent student outcomes at POST via the latent burnout construct were also not supported. As noted, the fact that these teachers are not experiencing high or varied levels of burnout and are also highly committed to TEACCH and LEAP model philosophy may be one reason as to why these hypotheses were not supported. A further review of the data, however, suggests some other interesting findings.

There were some common results across each of the four models tested (Figures 12-15). As noted in the discussion of *Hypothesis I*, results provided support of the relationship between YrsTch and burnout, which was found to be significant within all of the proposed models tested. Thus, this significant effect upheld when looking at these variables within a MSEM framework. This consistency across tests provides further support of this relationship, indicating that teachers with more experience in the field may have lower levels of burnout during mid-year. In addition, across each of the four models

tested, a trend was indicated in the relationship between Class_13 and the latent burnout variable. The magnitude (b = -.35) of the relationship was consistent across all tests. Although not statistically significant, this finding is in line with the Coman et al. (2012) study where they found that the average # of TD students per class accounted for a significant proportion of the variance in aspects of burnout. They reported that teachers with more TD students, which typically result in a larger overall classroom size, experienced lower levels of EE and DP. Taken together, these data suggest that classroom demographics, such as overall classroom size and student composition, may impact the level of experienced burnout by teachers in the middle of the year.

Several other findings specific to each of the models tested were revealed and are also worthy of discussion. The first two mediation models tested, involving the latent *Expressive Communication* and *Receptive Communication* student outcomes, revealed some interesting results (see Figures 12 and 13). At the within-level, the relationships between the number of reported hours of private ABA services (Private_ABA) and *Expressive Communication* ($b = -.23$, $p < .05$) and *Receptive Communication* ($b = -.22$, $p < .05$) were significant. That is, results suggest that the more hours of private ABA services that students receive the lower their scores (i.e., more impairment) in assessments of expressive and receptive communication at POST. *It is important to prudent in our interpretation of these results.* It is more than likely that the students who are receiving more hours of private ABA are those who are beginning the year at lower levels of functioning relative to their expressive and receptive language skills. Thus, it may be the case that those who are receiving more services, have more language impairments, and are ending the year with lower levels of language. This by no means

indicates that these students are not benefiting from their received services, it may just be indicative of the fact that they are starting at a lower levels, relative to their higher functioning peers, who are likely receiving a fewer number of hours. Similarly, results of the mediation model involving the *Receptive Communication* student outcome, revealed a trend in the relationship between the amount of reported private speech and language hours (Private_SL) and *Receptive Communication* ($b = -.82$, $p = .07$). That is, results suggest that students with more hours of reported private speech and language services had lower receptive language scores at the POST assessment. Overall, these results are more than likely a reflection that the lower functioning students are receiving more services within private settings.

At the between-level, the average overall classroom size from T1 to T3 was also significantly and directly related to these same student outcomes: *Expressive Communication* ($b = 2.02$, $p < .001$) and *Receptive Communication* ($b = 2.18$, $p < .001$). Therefore, these findings suggest that the higher the average overall classroom size from T1 to T3, the higher the scores (i.e., less impairment) students are receiving on assessments of expressive and receptive outcomes at POST. One explanation may be that the larger classrooms are inclusion classrooms with a larger enrollment of TD students. Therefore, it may be the case that these students with ASD are benefiting from the TD peer mediated instruction practices in their classrooms. This supports the underlying theories of the LEAP model as it emphasizes that same-aged TD peers facilitate learning within the classroom and children with ASD learn best, and deficits are more successfully remediated, through peer-mediated interventions in natural classroom environments (see Strain, et al., 1996). On the other hand, this finding may also be a result of the previous

points discussed above, where it was noted that the higher functioning children are traditionally staffed into the LEAP or HQSEP programs (refer to Tables 8 and 9), as opposed to TEACCH classrooms. Our data here suggests (see Tables 8 and 9) that these students are higher functioning at PRE, and are therefore, placed into these larger LEAP and HQSEP classrooms and subsequently assessed at higher levels of language at POST.

The next mediation model tested, involving the latent *Parent Report Reciprocal Social Interaction* outcome, also revealed some noteworthy findings (see Figure 14). At the within-level, a trend was indicated for the direct effect of Private_ABA to *Parent Reported Reciprocal Social Interaction* (b = .10, p = .06). Although not statistically significant, these results suggest that the number of reported hours of private ABA services may be directly related to parent reports of reciprocal social interaction skills at the end of the school year. Although future research is warranted here, this provides some indication that the more hours of ABA services a child is receiving, the higher (i.e., more ASD symptoms) their parents are rating them on the SRS, a measure of reciprocal interaction skills. Additionally, the overall classroom size from T1 to T3 was significantly, but *inversely*, related to the parent reports of reciprocal social interactions skills. Therefore, the larger, on average, the overall classroom size from T1 to T3 the lower the scores (i.e., fewer ASD symptoms), or the less impaired, these children are at POST via parent reports of social interaction skills.

These two findings are consistent to the previous discussion points around Figures 12 and 13, where the more hours of private ABA hours were associated with lower levels of language abilities and a larger, on average, classroom size was associated with higher levels of language. In regards to the relationship between ABA hours and reciprocal

social interaction, it is again likely that the students who are receiving more hours of private ABA are those who are beginning the year at lower levels of functioning relative to their social skills. Thus, it may be the case that those who are receiving more services have more social impairments. However, we must again recall this was not statistically significant, and more importantly, it is often the quality of these services not the number of hours that leads to progress within an intervention. In addition, it may again be the case that these students are benefiting from larger classrooms, because they likely have more TD peers in their classroom. This provides further support for the LEAP model. However, it is imperative to note that this may be a result of the fact that the higher functioning children are traditionally staffed into the LEAP or HQSEP programs (refer to Tables 8 and 9), as opposed to TEACCH classrooms. It is possible that these students are placed into these larger LEAP and HQSEP classrooms and are reported at higher levels of language at POST due to their more developed skills at the beginning of the year. Wright, Horn, Sanders, and Williams (1997) provide strong evidence for this as they conducted a longitudinal analysis on student achievements in efforts to make estimates of the effects of school, class size, teacher qualities, and other effects. The results demonstrated that the effectiveness of the teacher is the dominant factor affecting student outcomes and that the classroom context variables, such as class size, have relatively little influence on academic or outcomes. Thus, a major conclusion is that teachers make a difference, not classroom demographics (Wright et al., 1997).

The last mediation model tested, involving the latent *Teacher Report Reciprocal Social Interaction* outcome, also revealed some interesting findings (see Figures 14 and 15). At the student-level, a significant and direct relationship between Private_ABA and

Teacher Reported Reciprocal Social Interaction (b = .11, p < .05) was noted. Results suggest that students with the higher number of reported hours of private ABA services were being reported as having significantly higher SRS scores (i.e., more impairment) as per teacher reports at POST. Again, one explanation of these findings may be that this relationship is due to the fact that the students who are receiving more hours of private ABA are those who are beginning the year at lower levels of functioning relative to their social skills. Therefore, similar to parent report, teachers may be reporting these students as having more difficulties related to their reciprocal social interaction abilities at POST because they actually came into the classroom with fewer skills.

One other important factor to be mindful of when interpreting such results is the fact that teachers' are also subjectively reporting on their students' progress throughout the year. This may result in a biased report given these teachers are often aware of the amount of services a student is receiving and/or is mindful of the amount of time a student is pulled from their classroom for these services. Although this could also be true for parent reports, a further review of the data indicates more evidence of this phenomenon in teacher reports. As described above and illustrated in Figure 15, it was necessary to include three additional paths in order to achieve adequate model fit to the data in the test of this particular model. These included a direct path from the ATPQ-A1 variable (i.e., teacher commitment) to the CG and CM indicators, as well as a path from YrsTch to the CM indicator. Results indicated there were significant direct relationships between the ATPQ-A1 variable and the CG indicator (b = 38.45, p < .01), this same variable and the CM indicator (b = 17.43, p < .05), and the YrsTch variable and the CM indicator (b = .13, p < .05). These findings initially suggest that the higher the teachers'

commitment levels to TEACCH and/or LEAP philosophy, depending on their respective model, the lower they are reporting their students' level of functioning as it relates to social cognition (CG) and social communication (CM) as assessed by completion of the SRS at POST. Additionally, this also suggests that teachers with a higher number of years of teaching experience are reporting their students to have lower social interaction skills, particularly social communication abilities at POST. As shown here, the LEAP teachers are the highest committed to their respective model and reported the higher number of years teaching. In addition, these teachers have TD students within their classroom. Thus, it is possible that these teachers may be using their TD students as a reference when rating their students with ASD, which may bias their reports. However, a trend was also noted between the ATPQ-A1 variable and the latent student outcome ($b = -19.60$, $p = .09$), suggesting an *inverse* relationship between these variables. Therefore, inconsistencies were observed between how the ATPQ-A1 variables impacted the latent construct versus how it impacted the CM and CG indicators of that construct. Further research is warranted in clarifying this relationship.

Conclusions, Limitations, and Future Directions

From a broader perspective, these findings provide some indication that despite the reported decline in funding for education (U.S. DOE, 2011) and the current difficulties school districts are facing (CEC, 2011), these particular teachers are reporting significantly high levels of commitment to their intervention and nominal levels of burnout. One important implication is that these particular teachers appear to have some resiliency and/or protective factors that have either mitigated the effects of the possible reduced resources within their districts or these particular programs are possibly highly

supported by their districts. It may be that these high fidelity teachers have particular personality traits that assist them in staving off or buffer the impact of these factors. It may also be that these types of classrooms promote extensive support from their districts given their many intervention components, and thus, these specific teachers are not being impacted by the current reduction in resources. Nonetheless, future research is warranted in investigating how these teachers have been able to remain resilient, committed, motivated, and emotionally well.

There were specific challenges to conducting this study. Perhaps most challenging is the fact that we attempted to investigate the proposed hypotheses within a highly selected sample of teachers. Given that these teachers were highly motivated and implementing their programs at high levels of fidelity, there was not much variability in their reports of commitment to their model philosophies or burnout. Therefore, this limited variability was likely a significant factor contributing to the null results. Furthermore, the assessments that were completed on these children were administered only 6 months apart, which also limited the variability in outcomes and also prevented us from being able to control for PRE assessment scores. In addition, there were several other notable limitations to this study. First, the discriminant validity of the TEACCH subscale of the ATPQ-A was not supported, thus, a re-evaluation of the TEACCH items and psychometrics is warranted. Additionally, the generalizability of the results is unknown as the sample of preschool teachers here were implementing their specific programs at high levels of fidelity and reported high levels of commitment and nominal levels of burnout. There were also several control variables that were excluded here (e.g., pre-assessment scores, number of students with ASD, and number of fulltime staff,

teaching model) for the sake of parsimony of the models and the restrictions placed upon the analyses due to the sample size utilized here. A larger and more varied sample of teachers would be important for future work to allow these variables to be included and to further examine the relationships observed in this study. Future investigations should also investigate whether TEACCH teachers, or teachers in self-contained classrooms, are at greater risk for burnout or attrition as suggested here. In addition, future work should examine whether LEAP students are indeed receiving more services, relative to other groups of students, and further elucidate the current enrollment practices in school districts, including identifying which profile(s) of students are being staffed into which types of classrooms. Overall, future investigations should be geared towards longitudinal designs comprising assessments of commitment, burnout, fidelity, direct measures of teacher attrition, and how all these may impact outcomes of preschoolers with ASD. Improving our understanding of the effects of these constructs and the types of resources needed to mitigate the onset of burnout may help improve the outcomes of *all* students with exceptionalities.

Table 1. Bivariate correlations between all continuous variables at the *within* level (i.e., student-level; L1).

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. CA (mos)	1.00																	
2. ABA (hrs)	.01	1.00																
3. Private SL (hrs)	.01	.20**	1.00															
4. School SL (hrs)	-.13	.11	.09	1.00														
5. *PLS-4*, EC	.05	-.15*	-.11	-.00	1.00													
6. *PLS-4*, AC	.11	-.14	-.14	-.05	.91**	1.00												
7. *MSEL*, EL	.03	-.12	-.06	-.05	.87**	.84**	1.00											
8. *MSEL*, RL	.07	-.11	-.04	-.08	.86**	.85**	.88**	1.00										
9. *VABS-II*, EL	.33**	-.12	-.07	-.05	.76**	.76**	.69**	.68**	1.00									
10. *VABS-II*, RL	.29**	-.08	-.05	-.05	.59**	.61**	.54**	.52**	.85**	1.00								
11. *SRS-P*, Aw	.06	.23**	.08	.01	-.34**	-.31**	-.33**	-.31**	-.45**	-.48**	1.00							
12. *SRS-P*, Co	.04	.10	.03	-.02	-.37**	-.35**	-.36**	-.29**	-.44**	-.47**	.71**	1.00						
13. *SRS-P*, Cm	.05	.12	.02	.00	-.44**	-.40**	-.40**	-.36**	.52**	-.55**	.73**	.82**	1.00					
14. *SRS-P*, Mt	.04	.08	-.01	.02	-.29**	-.29**	-.26**	-.22**	.34**	.40**	.57**	.71**	.76**	1.00				
15. *SRS-T*, Aw	-.09	.16*	.06	.13	-.48**	-.45**	-.42**	-.43**	-.49**	-.46**	.35**	.38**	.45**	.34**	1.00			
16. *SRS-T*, Co	-.19**	.12	.05	.09	-.47**	-.48**	-.40**	-.41**	-.51**	-.43**	.37**	.44**	.45**	.33**	.73**	1.00		
17. *SRS-T*, Cm	-.10	.13	.04	.10	-.51**	-.50**	-.42**	-.45**	-.53**	-.48**	.39**	.42**	.50**	.38**	.83**	.84**	1.00	
18. *SRS-T*, Mt	-.11	.18*	.10	.09	-.47**	-.46**	-.37**	-.37**	-.45**	-.41**	.33**	.34**	.41**	.43**	.66**	.73**	.79**	1.00

Note: * $p < .05$; ** $p < .01$. Speech and Language therapy = SL; Expressive Language = EL; Receptive Language = RL; Chronological Age in months = CA; SRS-P indicates parent report, and SRS-T indicates teacher report. Additionally, SRS scores included Awareness =Aw; Cognition = Co; Communication = Cm; Motivation = Mt. All student outcomes are scores at POST assessment. ABA, Private SL, and School SL were average hours across T1 to T3. PLS-4 and MSEL scores were in Standard Scores, VABS-II scores were in raw scores, and all SRS were in T-Scores.

Table 2. Bivariate correlations between all continuous variables at the *between* (i.e., teacher-level; L2) level and outcomes.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. ATPQ-A	1.00																									
2. ATPQ-A4	.73**	1.00																								
3. Years Teaching	-.08	.07	1.00																							
4. Class Size	.05	.22	.07	1.00																						
5. ASD Students	-.13	.03	-.13	-.34**	1.00																					
6. Fulltime Staff	.13	.06	-.06	.03	.11	1.00																				
7. *MBI-ES*, EE2	-.17	-.33**	-.21	-.20	.08	.01	1.00																			
8. *MBI-ES*, EE3	-.10	-.30*	-.14	-.27*	.05	.10	.84**	1.00																		
9. *MBI-ES*, DP2	.03	-.19	-.30*	-.14	.26*	.11	.53**	.48**	1.00																	
10. *MBI-ES*, DP3	-.06	-.24	-.33*	-.21	.27*	.06	.64**	.68**	.83**	1.00																
11. *MBI-ES*, PA2	.06	.26*	.34**	.06	-.18	-.04	-.58**	-.58**	-.66**	-.64**	1.00															
12. *MBI-ES*, PA3	.08	.31*	.36**	.11	-.30*	-.04	-.50**	-.55**	-.72**	-.70**	.85**	1.00														
13. *PLS-4*, EC	-.21	-.26*	.14	.03	-.08	-.12	.19	.10	-.10	-.14	.16	.11	1.00													
14. *PLS-4*, AC	-.11	-.21	.19	.03	-.01	.00	.12	.13	.02	-.05	.10	.00	.91**	1.00												
15. *MSEL*, EL	-.23	-.28*	.11	.14	-.12	-.10	.14	.04	-.08	-.12	.13	.07	.87**	.84**	1.00											
16. *MSEL*, RL	-.20	-.21	.11	.08	-.05	-.14	.12	.07	-.03	-.07	.09	.03	.86**	.85**	.88**	1.00										
17. *VABS-II*, EL	-.14	-.32*	.17	-.21	.02	-.01	.29*	.29*	.13	.09	.00	.00	.76**	.76**	.69**	.68**	1.00									
18. *VABS-II*, RL	-.15	-.31*	.05	-.24	.06	-.04	.33**	.40**	.20	.20	-.14	-.20	.59**	.61**	.54**	.52**	.85**	1.00								
19. *SRS-P*, Aw	.11	.14	.12	-.01	-.06	-.10	-.06	-.04	-.06	.06	.04	.05	-.34**	-.31**	-.33**	-.31**	-.45**	-.48**	1.00							
20. *SRS-P*, Co	.20	.16	-.01	-.13	-.08	-.12	.00	.07	.03	.07	-.08	-.08	-.37**	-.35**	-.36**	-.29**	-.44**	-.47**	.71**	1.00						
21. *SRS-P*, Cm	.19	.13	-.04	-.15	.11	.07	.01	.04	.10	.16	-.11	-.12	-.44**	-.40**	-.40**	-.36**	-.52**	-.55**	.73**	.82**	1.00					
22. *SRS-P*, Mt	.14	.11	-.08	-.13	-.03	-.13	.04	.08	.02	.09	-.20	-.19	-.29**	-.29**	-.26**	-.22**	-.34**	-.40**	.57**	.71**	.76**	1.00				
23. *SRS-T*, Aw	.31*	.23	-.01	-.01	.10	.30*	-.20	-.09	-.12	.01	.11	.09	-.48**	-.45**	-.42**	-.43**	-.49**	-.46**	.35**	.38**	.45**	.34**	1.00			
24. *SRS-T*, Co	.37*	.36**	-.07	.06	-.07	.10	-.18	-.14	-.23	-.16	.11	.15	-.47**	-.48**	-.40**	-.41**	-.51**	-.43**	.37**	.44**	.45**	.33**	.73**	1.00		
25. *SRS-T*, Cm	.33*	.30*	.04	.12	-.06	.15	-.12	-.09	-.15	-.08	.03	.06	-.51**	-.50**	-.42**	-.45**	-.53**	-.48**	.39**	.42**	.50**	.38**	.83**	.84**	1.00	
26. *SRS-T*, Mt	.12	.21	.06	.16	-.08	-.14	-.11	-.06	-.22	-.14	-.01	.04	-.47**	-.46**	-.37**	-.37**	-.45**	-.41**	.33**	.34**	.41**	.43**	.66**	.73**	.79**	1.00

Note: * $p < .05$; ** $p < .01$. ATPQ-A4 = ATP at T4. Emotional Exhaustion at T2 = EE2; Depersonalization at T2 = DP2; Personal Accomplishment at T2 = PA2. Burnout domains assessed at T3 are indicated in the same fashion. All student outcomes are POST assessment scores. The shaded statistics are correlations between continuous teacher- and student-level variables. Class Size, ASD students, and Fulltime Staff were average hours across T1 to T3. PLS-4 and MSEL scores were in Standard Scores, VABS-II scores were in raw scores, and all SRS were in T-Scores.

Table 3. Frequencies of missing data points and percentages at pre and post assessment time points.

Variable	*f*	*% Missing*
Teacher Demographics	1	1.3
ATPQ-A		
T1	9	12.2
T4	9	12.2
MBI-ES		
T1	4	5.4
T2	3	4.1
T3	4	5.4
T4	5	6.8
ADOS Calibrated Score	1	0.5
SCQ	15	7.5
PLS-4, Expressive Communication		
Pre	1	0.05
Post	16	8.1
PLS-4, Auditory Comprehension		
Pre	0	0
Post	16	8.1
MSEL, Expressive Language		
Pre	1	0.05
Post	15	7.6
MSEL, Receptive Language		
Pre	3	1.5
Post	3	7.6
VABS-II, Expressive Language		
Pre	13	6.6
Post	40	20.2
VABS-II, Receptive Language		
Pre	13	6.6
Post	39	19.7
SRS/SRS-P, *Parent Report*		
Pre	14	7.1
Post	40	20.2
SRS/SRS-P, *Teacher Report*		
Pre	1	0.05
Post	14	7.1

Note: Missing data for MBI-ES and SRS/SRS-P were for all domains assessed by these measures.

Table 4. Teacher and classroom demographics.

Variable	*Level*	TEACCH *(n = 25)*	LEAP *(n = 22)*	HQSEP *(n =27)*	Overall *(N = 74)*
Education	AA	0	1	0	1
	BS/BA	10	6	14	30
	Med/MS/MA	14	14	11	39
	Above Med/MS/MA	1	1	2	4
Ethnicity	non-Hispanic	21	18	24	63
	Hispanic	4	4	3	11
Race	White	24	20	27	71
	Black	1	1	0	2
	Bi/Multi	0	1	0	1
Gender	Female	25	21	27	73
	Male	0	1	0	1
Length of Day*	2-3 hrs	5	21	20	46
	3-4 hrs	1	1	0	2
	4-5 hrs	4	0	2	6
	> 5 hrs	15	0	5	20
Duration/Time* of day	Full Day	20	0	7	27
	½ Day AM	3	17	10	30
	½ Day PM	2	5	10	17

Note: * indicates a significant difference at $p < .001$

Table 5. Additional teacher and classroom demographics.

Variable	*Mean (SD)*			
	TEACCH	LEAP	HQSEP	Overall
Years Teaching	7.98 (4.46)	11.91 (5.82)	11.35 (7.38)	10.38 (6.22)
Years Teaching Children with ASD	4.76 (3.02)	8.41 (5.59)*	6.65 (4.71)	6.53 (4.70)
Average # of Fulltime Staff per Class (T1 – T4)	3.05 (0.71)	3.31 (0.70)*	2.68 (0.76)	2.99 (0.76)
Average # of Children with ASD per Class (T1 – T4)	6.37 (1.51)**	3.28 (1.13)	3.32 (1.97)	4.35 (2.15)
Average # of TD Children per Class (T1 – T4)	0.22 (0.63)**	8.54 (2.68)**	3.33 (4.12)	3.83 (4.42)
Average Class Size (T1 – T4)	7.42 (2.17)**	13.14 (2.99)	10.59 (4.09)	10.27 (3.91)
Average # of Fulltime Staff per Class (T1 – T3)	3.04 (0.72)	3.34 (0.75)*	2.65 (0.75)	2.98 (0.78)
Average # of Children with ASD per Class (T1 – T3)	6.12 (1.46)**	3.30 (1.11)	3.17 (1.84)	4.21 (2.04)
Average # of Typically Developing Children per Class (T1 – T3)	0.27 (0.76)**	8.53 (2.74)**	3.36 (4.13)	3.85 (4.42)
Average Class Size (T1 – T3)	7.17 (2.29)**	13.07 (3.01)	10.33 (4.22)	10.07 (4.04)

Note: Across the year, LEAP teachers reported a significantly higher number of years teaching children with ASD relative to the TEACCH group, a significantly higher number of staff relative to the HQSEP group, and more TD students across the year relative to the two other groups. TEACCH teachers reported significantly more students diagnosed with ASD, fewer TD students, and fewer students overall, relative to the LEAP and HQSEP groups. These same patterns held true for the averages of the T1-T3 time points. * $p < .05$ ** $p < .001$

Table 6. Student and family demographics.

Variable	*Level*	TEACCH *(n = 85)*	LEAP *(n = 54)*	HQSEP *(n =59)*	Overall *(N = 198)*
Site Location*	NC	45	0	21	66
	CO	8	17	9	34
	FL	26	25	15	66
	MN	6	12	14	32
Ethnicity	non-Hispanic	54	32	44	130
	Hispanic	31	22	15	68
Race	White	61	45	49	155
	Black	15	5	6	26
	Asian	5	2	3	10
	Bi/Multi	4	2	1	7
Gender	Female	14	12	8	34
	Male	71	42	51	164
Prescribed Medication(s)	Yes	19	11	6	36
	No	64	42	52	158
	Not Reported	2	1	1	4
Community* Diagnosis	PDD-NOS	6	15	7	28
	Autism	59	24	25	108
	Asperger's	0	3	2	5
	Other	18	8	19	45
	None	0	2	0	2
	Not Reported	2	2	6	10
Household Income	< $20,000	12	6	7	25
	$20,000-$39,999	17	8	10	35
	$40,000-$59,999	11	11	6	28
	$60,000-$79,999	11	7	7	25
	$80,000-$99,999	8	6	6	20
	>$100,000	21	12	19	52
	Not Reported	5	4	4	13

Note: * indicates significant group differences at $p < .001$

Table 7. Student descriptive data at enrollment and pre assessment time point.

Variable	*Mean (SD)*			
	TEACCH	LEAP	HQSEP	Overall
Chronological Age (Months)	47.42 (6.77)	46.98 (8.46)	48.41 (7.61)	47.60 (7.50)
ADOS Calibrated Severity Score	7.55 (1.52)*	7.22 (1.71)	6.83 (1.69)	7.24 (1.65)
SCQ Total Score	17.28 (6.40)**	15.61 (6.26)	13.91 (5.80)	15.78 (6.31)
Total Hours of *Private* Speech Therapy/Month	1.55 (3.06)	2.72 (4.69)*	0.89 (1.80)	1.67 (3.37)
Total Hours of *School* Speech Therapy/Month	2.26 (1.98)	3.80 (4.39)*	2.57 (2.54)	2.77 (3.03)
Total Hours of ABA/Month	3.31 (12.05)	6.87 (22.23)	3.22 (14.18)	4.25 (16.02)
Total Hours of Social Skills Training/Month	0.33 (2.16)	0.41 (2.73)	0.07 (0.52)	0.27 (2.02)

Note: The TEACCH group had significantly more symptomatic students relative to the HQSEP. LEAP teachers had students who reportedly were receiving significantly more hours of private speech and language therapy relative to the HQSEP group and more school-based therapy relative to the TEACCH group.
* $p < .05$; ** $p < .01$

Table 8. Descriptive data of expressive and receptive indicators at pre and post assessment time points.

Variable	*Mean (SD)*			
	TEACCH	LEAP	HQSEP	Overall
PLS-4, *Expressive Communication, SS*				
Pre††	62.65 (17.09)***	73.43 (26.63)	74.03 (17.86)	68.95 (19.98)
Post††	64.58 (21.60)***	77.64 (24.62)	80.36 (20.70)	72.94 (23.25)
PLS-4, *Auditory Comprehension, SS*				
Pre†	62.73 (19.40)***	71.52 (24.83)	78.44 (23.11)	69.81 (22.98)
Post††	67.03 (22.05)**	77.60 (25.84)	82.58 (23.70)	74.63 (24.47)
MSEL, *Expressive Language, SS*				
Pre††	24.78 (9.35)***	31.00 (12.00)	30.75 (10.51)	28.22 (10.83)
Post††	24.62 (9.37)***	30.37 (12.57)	32.04 (11.50)	28.45 (11.42)
MSEL, *Receptive Language, SS*				
Pre††	24.74 (9.70)**	30.31 (13.95)	32.27 (13.23)	28.50 (12.45)
Post††	25.05 (9.89)***	31.78 (14.71)	33.95 (12.62)	29.60 (12.78)
VABS-II, *Expressive Language, RS*				
Pre††	37.45 (23.28)***	52.73 (27.66)	53.95 (23.17)	46.83 (25.63)
Post††	44.45 (23.43)***	59.06 (27.04)	63.90 (23.18)	55.29 (25.79)
VABS-II, *Receptive Language, RS*				
Pre††	18.29 (8.11)**	22.12 (8.74)	22.48 (7.41)	20.66 (8.23)
Post†	21.37 (8.30)*	24.00 (8.79)	25.40 (6.69)	23.48 (8.11)

Note: SS indicates Standard Scores and RS indicates raw scores. * $p < .05$; ** $p < .01$; *** $p < .001$. †† indicates significant difference between TEACCH and the other two groups. † indicates significant difference between TEACCH and HQSEP only.

Table 9. Descriptive data of parent and teacher rated reciprocal social interaction at pre and post assessment time points.

Variable	*Mean (SD)*			
	TEACCH	LEAP	HQSEP	Overall
SRS/SRS-P, *Social Awareness, Parent Report*				
Pre††	70.99 (11.17)*	65.78 (13.94)	66.02 (9.66)	67.98 (11.76)
Post†	69.37 (11.87)*	64.41 (13.67)	63.90 (12.22)	66.13 (12.71)
SRS/SRS-P, *Social Cognition, Parent Report*				
Pre	75.89 (12.22)	71.02 (15.18)	71.81 (13.68)	73.27 (13.65)
Post	73.85 (12.55)	69.46 (14.29)	68.39 (14.84)	70.77 (13.97)
SRS/SRS-P, *Social Communication, Parent Report*				
Pre	74.73 (12.48)	70.08 (15.96)	69.34 (13.19)	71.74 (13.88)
Post	72.86 (13.13)	69.40 (16.08)	66.98 (15.53)	69.90 (14.96)
SRS/SRS-P, *Social Motivation, Parent Report*				
Pre	67.68 (12.75)	63.52 (12.14)	64.75 (14.18)	65.61 (13.12)
Post	65.73 (13.84)	61.79 (13.22)	62.12 (13.13)	63.37 (13.47)
SRS/SRS-P, *Social Awareness, Teacher Report*				
Pre	66.56 (10.28)	67.94 (10.05)	65.81 (10.43)	66.72 (10.24)
Post	64.35 (10.50)	64.13 (11.41)	65.15 (12.24)	64.53 (11.25)
SRS/SRS-P, *Social Cognition, Teacher Report*				
Pre	68.11 (7.97)	68.79 (8.22)	67.14 (9.80)	68.00 (8.61)
Post	65.44 (9.19)	64.54 (10.61)	62.25 (11.03)	64.23 (10.21)
SRS/SRS-P, *Social Communication, Teacher Report*				
Pre	66.32 (9.23)	67.02 (9.20)	64.66 (10.34)	66.02 (9.56)
Post	63.71 (9.47)	63.27 (10.67)	61.82 (11.73)	63.02 (10.50)
SRS/SRS-P, *Social Motivation, Teacher Report*				
Pre	61.02 (9.72)	60.35 (9.20)	59.54 (10.37)	60.40 (9.75)
Post	58.74 (10.32)	56.48 (10.03)	57.27 (11.89)	57.66 (10.72)

Note: All scores provided are T-scores. * $p < .05$; ** $p < .01$; *** $p < .001$. †† indicates significant difference between TEACCH and the other two groups. † indicates significant difference between TEACCH and HQSEP only.

Table 10. Mean (percentages) of Commitment to Philosophy

	TEACCH		LEAP		HQSEP		Overall	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Autism Treatment Philosophy-Adapted Version								
TEACCH %								
T1	0.91	0.04	0.90	0.07	0.89	0.06	0.90	0.06
T4	0.91	0.06	0.91	0.04	0.91	0.05	0.91	0.05
LEAP %								
T1	0.83	0.09	0.94***	0.05	0.87	0.09	0.88	0.09
T4	0.82***	0.09	0.93	0.06	0.90	0.07	0.88	0.09
Overall %								
T1	0.87	0.06	0.92*	0.06	0.88	0.06	0.89	0.06
T4	0.86**	0.07	0.92	0.04	0.91	0.05	0.90	0.06

Note: The LEAP group reported significantly higher LEAP commitment scores relative to both the TEACCH and HQSEP group and higher overall scores relative to the TEACCH group at T1. The TEACCH group reported significantly lower LEAP and Overall commitment scores relative to both the LEAP and HQSEP groups at T4.
* $p < .05$ ** $p < .01$ *** $p < .001$

Table 11. Means and standard deviations of burnout scores across groups and normative data for the school year.

	TEACCH		LEAP		HQSEP		Overall		*Norms* (n = 4,163)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Maslach Burnout Inventory										
Emotional Exhaustion	17.20	10.16	15.51	8.84	13.27	9.24	15.30	9.44	21.25	11.01
Depersonalization	3.23	4.04	1.58	2.31	1.26	2.31	2.02	3.08	11.00	6.19
Personal Accomplishment	40.99	5.20	42.74	5.45	43.78	2.80	42.52	4.68	33.54	6.89

Note: Higher scores on the Emotional Exhaustion domain and Depersonalization domain indicate higher levels of burnout. In contrast, higher scores on the Personal Accomplishment domain indicate lower levels of burnout. Normative data was collected on teachers in elementary and secondary, grades K-12 (Maslach, Jackson, Leiter, 1996).

Table 12. Means and standard deviations of burnout scores across groups in the middle of the year (average of T2 and T3) and normative data.

	TEACCH		LEAP		HQSEP		Overall		*Norms* (n = 4,163)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Maslach Burnout Inventory										
Emotional Exhaustion	18.72	10.74	16.23	9.52	13.77	9.73	16.28	10.10	21.25	11.01
Depersonalization	3.48	3.98	1.93	3.11	1.29	2.38	2.26	3.33	11.00	6.19
Personal Accomplishment	40.70	5.46	42.45	5.56	43.90	3.15	42.32	4.95	33.54	6.89

Note: Higher scores on the Emotional Exhaustion domain and Depersonalization domain indicate higher levels of burnout. In contrast, higher scores on the Personal Accomplishment domain indicate lower levels of burnout. Normative data was collected on teachers in elementary and secondary, grades K-12 (Maslach, Jackson, & Leiter, 1996).

Table 13. Means and standard deviations of burnout scores at each time point across the year for the overall sample.

Variable	T1 = early Fall		T2 = late Fall		T3 = early Spring		T4 = late Spring	
	M	SD	M	SD	M	SD	M	SD
Maslach Burnout Inventory								
Emotional Exhaustion	14.76	10.08	16.31	10.27	16.11	10.78	15.11	10.05
Depersonalization	1.80	3.60	2.12	3.67	2.37*	3.27	1.83	2.64
Personal Accomplishment	42.54	4.96	42.38	5.29	42.32	5.00	42.63	5.00

Note: Teachers reported significantly higher levels of DP at T3 relative to T4. No other significant differences were noted.
* $p < .05$

Table 14. Confirmatory factor analysis of the latent burnout variable.

Latent Construct	**Factor Loadings***		
Observed Indicators	unstandardized	SE	standardized
Hypothesized Latent Burnout Construct			
EE at T2	1.0	--	.72
EE at T3	1.06	.17	.72
DP at T2	.42	.06	.84
DP at T3	.39	.06	.88
PA at T2	-.59	.09	-.82
PA at T3	-.57	.09	-.85
Final Latent Burnout Model			
EE at T2	1.0	--	.72
EE at T3	1.10	.11	.75
DP at T2	.46	.07	.92
DP at T3	.40	.06	.90
PA at T2	-.53	.09	-.75
PA at T3	-.52	.09	-.74

*All factor loadings were significant, $p < .001$.

Table 15. Confirmatory factor analyses of the latent student expressive and receptive variables at pre and post assessment points.

Latent Construct	**Factor Loadings***		
Observed Indicators	unstandardized	SE	standardized
Expressive Communication at PRE			
PLS-4, *Expressive Communication, SS*	1.0	--	.99
MSEL, *Expressive Language, SS*	.48	.03	.87
VABS-II, *Expressive Language, RS*	.85	.08	.66
Expressive Communication at POST			
PLS-4, *Expressive Communication, SS*	1.0	--	.98
MSEL, *Expressive Language, SS*	.45	.02	.89
VABS-II, *Expressive Language, RS*	.90	.07	.78
Receptive Communication at PRE			
PLS-4, *Auditory Comprehension, SS*	1.0	--	1.0
MSEL, *Receptive Language, SS*	.46	.02	.85
VABS-II, *Expressive Language, RS*	.17	.02	.48
Receptive Communication at POST			
PLS-4, *Auditory Comprehension, SS*	1.0	--	1.0
MSEL, *Receptive Language, SS*	.45	.02	.85
VABS-II, *Expressive Language, RS*	.20	.02	.61

*All factor loadings were significant, $p < .001$. Standard Score = *SS* and Raw Score = *RS*.

Table 16. Confirmatory factor analyses of the latent student reciprocal social interaction variables at pre and post assessment points.

Latent Construct	**Factor Loadings***		
Observed Indicators	unstandardized	SE	standardized
Reciprocal Social Interaction-Parent at PRE			
SRS-P, *Social Awareness*, *TS*	1.0	.00	.72
SRS-P, *Social Cognition*, *TS*	1.32	.11	.81
SRS-P, *Social Communication*, *TS*	1.59	.14	.96
SRS-P, *Social Motivation*, *TS*	1.20	.12	.77
Reciprocal Social Interaction-Parent at POST			
SRS-P, *Social Awareness*, *TS*	1.0	.00	.78
SRS-P, *Social Cognition*, *TS*	1.24	.10	.88
SRS-P, *Social Communication, TS*	1.43	.11	.94
SRS-P, *Social Motivation*, *TS*	1.09	.10	.80
Reciprocal Social Interaction-Teacher at PRE			
SRS-P, *Social Awareness*, *TS*	1.0	.00	.82
SRS-P, *Social Cognition*, *TS*	.84	.06	.83
SRS-P, *Social Communication*, *TS*	1.09	.06	.96
SRS-P, *Social Motivation*, *TS*	.90	.07	.78
Reciprocal Social Interaction-Teacher at POST			
SRS-P, *Social Awareness*, *TS*	1.0	.00	.85
SRS-P, *Social Cognition*, *TS*	.92	.06	.86
SRS-P, *Social Communication*, *TS*	1.07	.06	.98
SRS-P, *Social Motivation*, *TS*	.91	.07	.81

*All factor loadings were significant, $p < .001$. T-Score = *TS*.

Table 17. Unstandardized coefficients, standard errors, and *z*-scores for model testing directionality of commitment and burnout (Hypothesis B).

	unstandardized	SE	*z*-score
Direct Pathways			
ATPQ-A1 to EE3	-3.53	14.53	-0.24
ATPQ-A1 to ATPQ-A4	.68*	.06	10.70
EE1 to EE3	.75*	.09	8.54
EE1 to ATPQ-A4	-.001*	.00	-3.75

Commitment Variable at T1 = ATPQ-A1. Commitment Variable at T4 = ATPQ-A4
Emotional Exhaustion at T1 = EE1. Emotional Exhaustion at T3 = EE3. * p <.001.

Table 18. Unstandardized coefficients, standard errors, *z*-scores, and correlations for model testing relationship between teacher commitment and burnout (*Hypothesis I*).

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Burnout on			
ATPQ-A1	-11.89	15.61	-.76
YrsTch	-.34*	.14	-2.48
T_dum	1.22	2.69	.45
L_dum	3.55	2.42	1.47
Class_13	-.38	.25	-1.49
ASD_13	.49	.55	.89
Staff_13	-.24	1.08	-.22
Class_13 with			
T_dum	-.91	.24	-3.88
L_dum	.85	.22	3.83
T_dum with			
ATPQ-A1	.00	.00	.05
YrsTch	-.75	.31	-2.43
L_dum with			
ATPQ-A1	.01	.00	2.85
YrsTch	.38	.27	1.40
T_dum	-.09	.03	-3.68
ASD_13 with			
ATPQ-A1	-.02	.01	-1.18
YrsTch	-1.64	1.40	-1.17
T_dum	.64	.13	4.94
L_dum	-.24	.11	-2.29
Class_13	-2.55	.97	-2.62
Staff_13 with			
ATPQ-A1	.01	.01	1.03
YrsTch	-.25	.56	-.45
T_dum	.02	.04	.53
L_dum	.11	.04	2.53
Class_13	.10	.36	.28

ASD_13	.19	.18	1.02

* p < .01

Table 19. Within-level (student-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *expressive communication* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Expressive Communication on			
School_SL	-.71	.63	-1.13
Private_SL	-.66	.44	-1.50
Private_ABA	-.23*	.09	-2.53
CA	-.17	.23	-.74

* p < .05

Table 20. Between-level (teacher-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *expressive communication* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Expressive Communication on			
Burnout	-.38	.32	-1.20
ATPQ-A1	-11.02	39.39	-.28
Class_13	2.02**	.55	3.66
Burnout on			
ATPQ-A1	-5.46	14.27	-.38
YrsTch	-.35*	.14	-2.56
Class_13	-.35	.20	-1.78
EE2 with			
EE3	34.04**	8.81	3.87
DP2	-4.51*	1.78	-2.53
PA2 with			
PA3	7.33**	1.68	4.37
DP2 with			
EE3	-7.86**	1.92	-4.10

* $p < .05$ ** $p < .001$

Table 21. Within-level (student-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *receptive communication* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Receptive Communication on			
School_SL	-1.0	.66	-1.53
Private_SL	-.81	.46	-1.79
Private_ABA	-.22*	.09	-2.31
CA	.03	.24	.12

* p < .05

Table 22. Between-level (teacher-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *receptive communication* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Receptive Communication on			
Burnout	-.32	.34	-.93
ATPQ-A1	-22.65	40.93	-.55
Class_13	2.18**	.60	3.66
Burnout on			
ATPQ-A1	-5.55	14.26	-.38
YrsTch	-.35*	.14	-2.56
Class_13	-.35	.20	-1.78
EE2 with			
EE3	34.04**	8.82	3.86
DP2	-4.47*	1.78	-2.52
PA2 with			
PA3	7.31**	1.68	4.36
DP2 with			
EE3	-7.82**	1.91	-4.10

* $p < .05$ ** $p < .001$

Table 23. Within-level (student-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *parent reported reciprocal social interaction* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Reciprocal Social Interaction on			
School_SL	.07	.27	.28
Private_SL	.04	.23	.16
Private_ABA	.10	.05	1.90
CA	.07	.11	.64

Table 24. Between-level (teacher-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *parent reported reciprocal social interaction* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Reciprocal Social Interaction on			
Burnout	.23	.18	1.33
ATPQ-A1	-4.44	25.43	-.18
Class_13	-.55*	.28	-2.01
Burnout on			
ATPQ-A1	-5.23	14.44	-.36
YrsTch	-.35*	.14	-2.53
Class_13	-.35	.21	-1.74
EE2 with			
EE3	33.45**	8.72	3.84
DP2	-4.62*	1.79	-2.60
PA2 with			
PA3	7.35**	1.68	4.38
DP2 with			
EE3	-7.98**	1.93	-4.14

* $p < .05$ ** $p < .001$

Table 25. Within-level (student-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *teacher reported reciprocal social interaction* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Reciprocal Social Interaction on			
School_SL	.37	.27	1.40
Private_SL	.09	.22	.41
Private_ABA	.11*	.05	2.40
CA	-.13	.10	-1.28

* p < .05

Table 26. Between-level (teacher-level) unstandardized coefficients, standard errors, and *z*-scores of the mediation model testing the latent *teacher reported reciprocal social interaction* outcome.

Direct Pathways or Correlations	unstandardized	SE	*z*-score
Reciprocal Social Interaction on			
Burnout	.16	.11	1.47
ATPQ-A1	-19.60	11.67	-1.68
Class_13	-.13	.14	-.94
Burnout on			
ATPQ-A1	-4.63	14.36	-.32
YrsTch	-.35	.14	-2.54
Class_13	-.35	.21	-1.73
SRS CG on			
ATPQ-A1	38.45**	11.76	3.27
SRS CM on			
ATPQ-A1	17.43*	8.76	1.99
YrsTch	.13*	.06	2.31
EE2 with			
EE3	33.63**	8.71	3.86
DP2	-4.54*	1.76	-2.58
PA2 with			
PA3	7.29**	1.67	4.36
DP2 with			
EE3	-7.71**	1.88	-4.10

Social Cognition = CG, Social Communication = CM
* p < .05 ** p < .01 *** p < .001

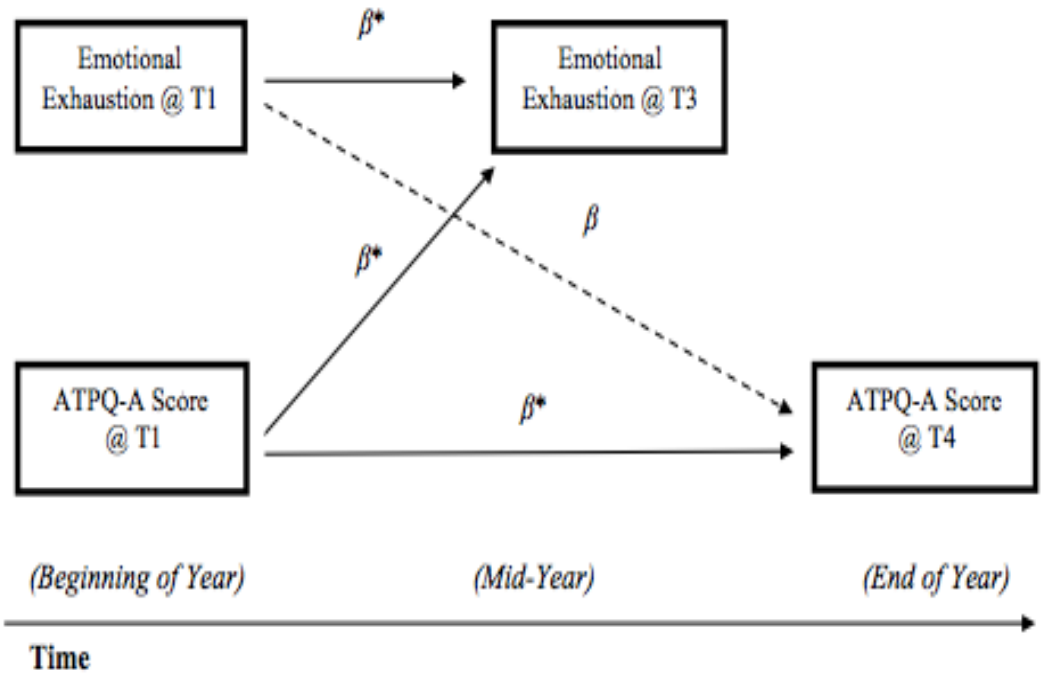

Figure 1. Preliminary Hypothesis B Analytical Model. Illustration of the preliminary analytical approach to assess the directionality and temporality between the observed teacher commitment variable and the observed teacher burnout variable at pre- and mid-assessment time points. * indicates pathways that are hypothesized to be significant at least at the $p < .05$ level.

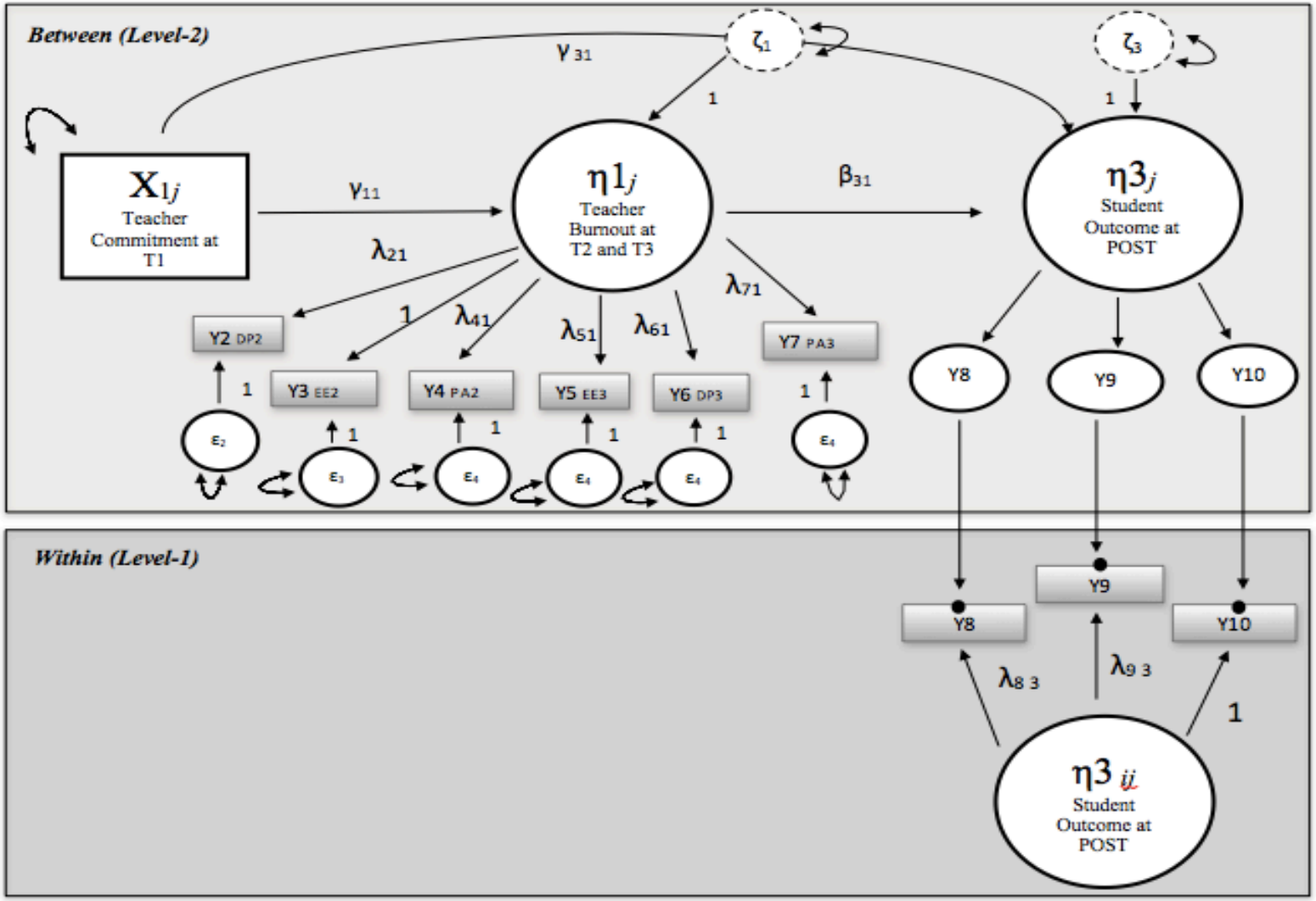

Figure 2. Illustration of conceptual mediation model for 2-2-1 design. Structural model hypothesized to evaluate the relationships between teacher commitment at T1, burnout at T2 and T3, and student outcomes at T4.

Measures	PRE	T 1 (October)	T 2 (November)	T 3 (March)	T4 (April)	POST
ATPQ-A		X			X	
Classroom Demographic Form		X	X	X	X	
MBI-ES		X	X	X	X	
Family Demographic & Services Forms	X					
SCQ	X					
ADOS	X					
SRS-P (Parent and Teacher)	X					X
MSEL	X					X
VABS-II	X					X
PLS-4	X					X

Figure 3. Illustration of Procedures. An "X" indicates that the measure in that row was administered during that time point. The months indicated are approximate.

ID	TEACCH (%)	LEAP (%)	Overall (%)	TPQ Variable
01	◆	▲	●	◆
02	◆	▲	●	◆
03	◆	▲	●	◆
04	◆	▲	●	◆
05	◆	▲	●	▲
06	◆	▲	●	▲
07	◆	▲	●	▲
08	◆	▲	●	▲
09	◆	▲	●	●
10	◆	▲	●	●
11	◆	▲	●	●
12	◆	▲	●	●

KEY: TEACCH = RED; LEAP = GREEN; HQSEP = BLUE

Figure 4. Illustration of the construction of the TPQ-A predictor variable. Cases that are listed in red are TEACCH teachers, in green are LEAP teachers, and in blue are HQSEP teachers.

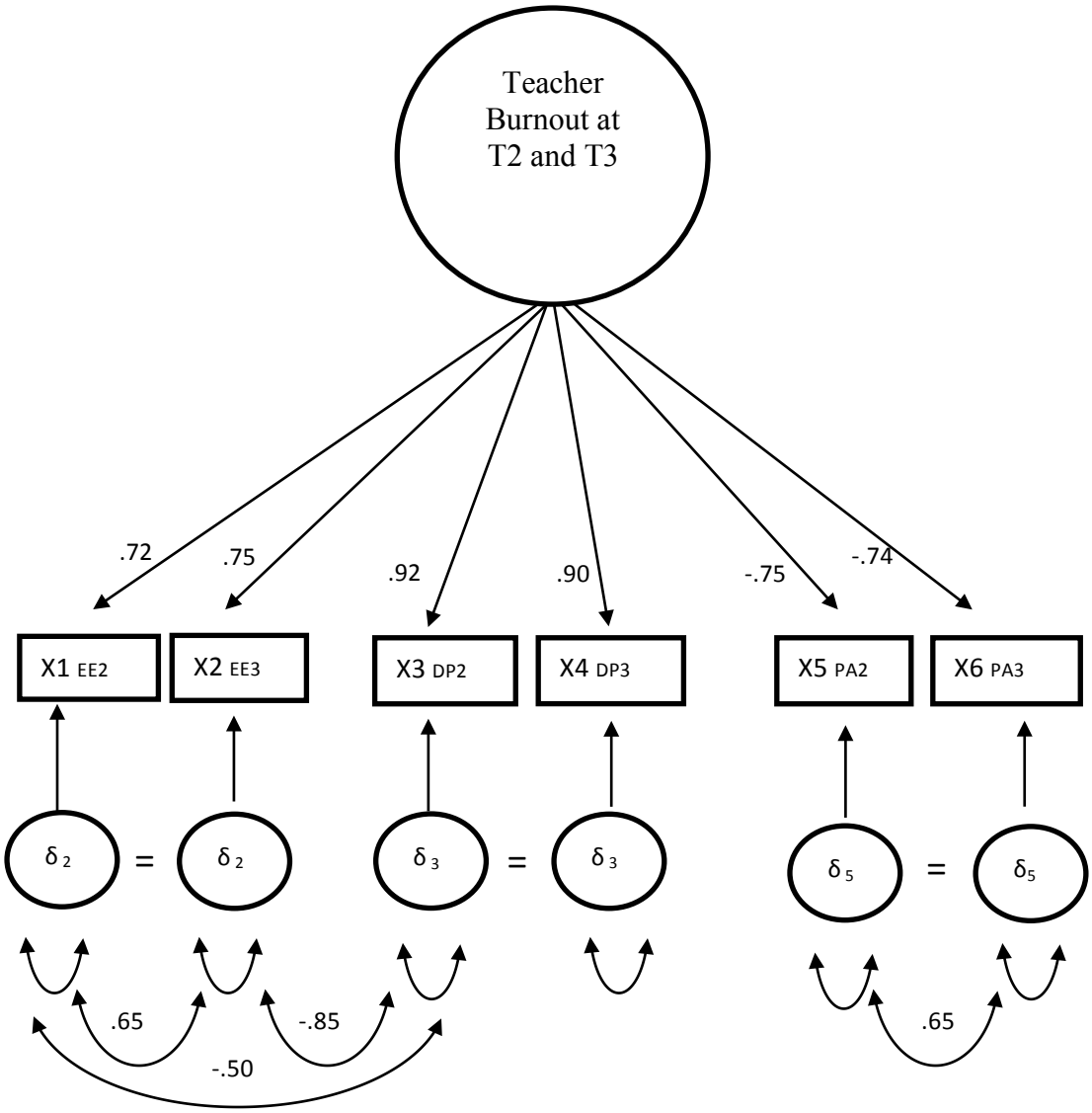

Figure 5. Final Burnout Latent Model. Illustration of the final latent burnout model utilized in analyses. Standardized factors loadings and correlations are presented. All loadings were significant at the $p < .001$ level.

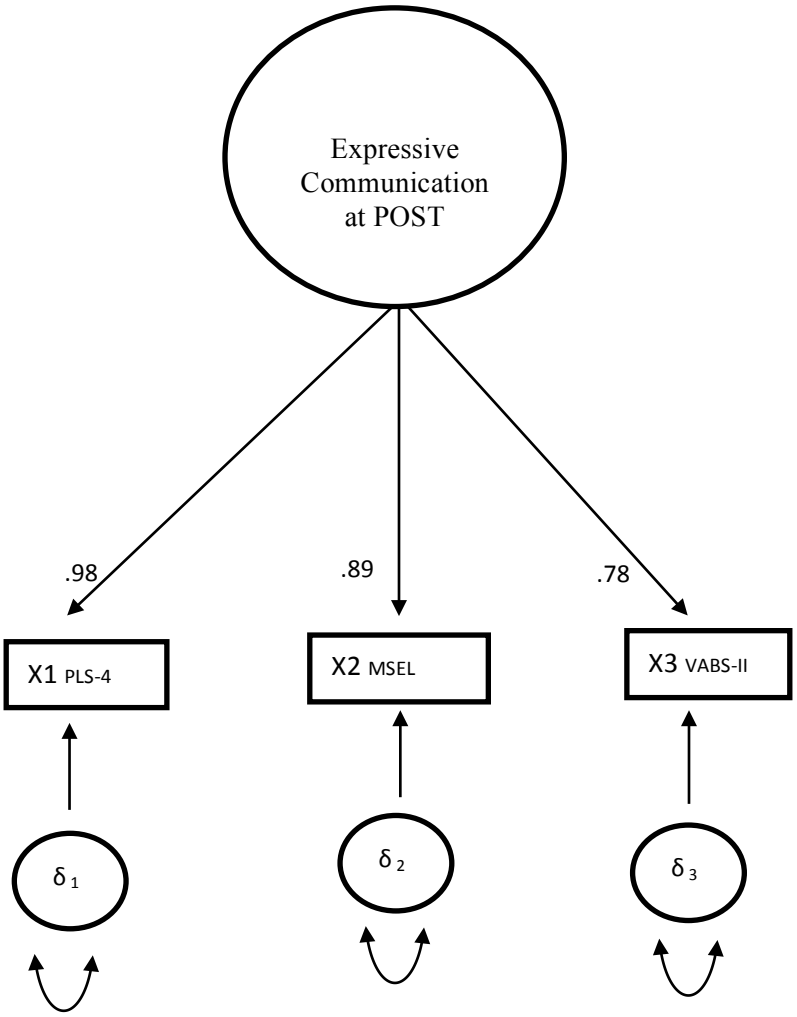

Figure 6. Final Expressive Communication Factor at POST. Illustration of the final Expressive Communication factor utilized in the analyses. Standardized factors loadings are presented. All loadings were significant at the $p < .001$ level.

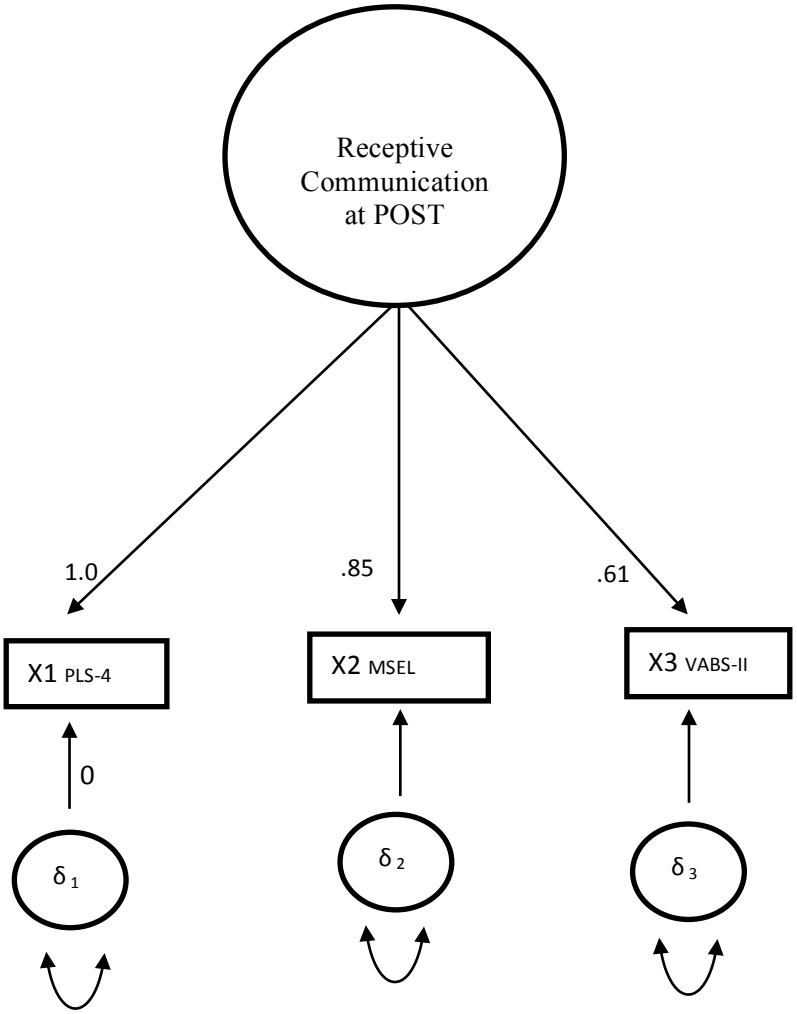

Figure 7. Final Receptive Communication Factor at POST. Illustration of the final Receptive Communication factor utilized in the analyses. Standardized factors loadings are presented. The residual variance of *PLS-4* AC indicator was constrained to 0. All loadings were significant at the $p < .001$ level.

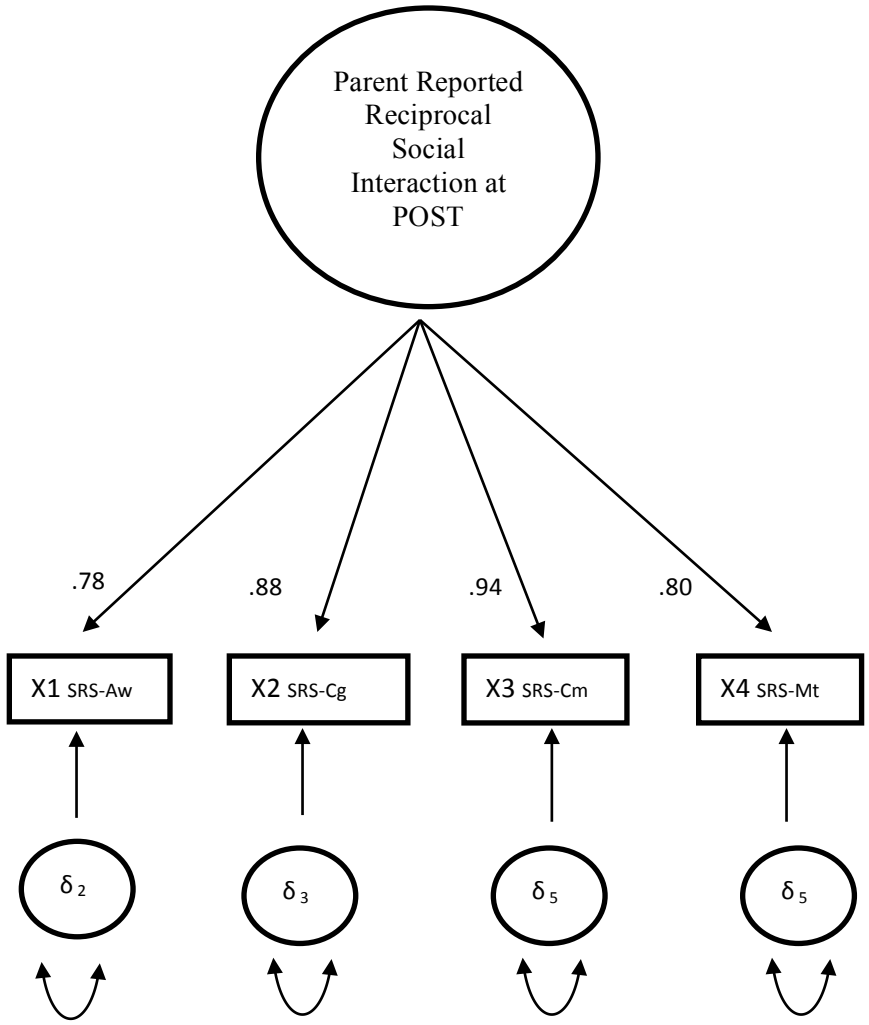

Figure 8. Final Parent Reported Reciprocal and Social Interaction Factor at POST. Illustration of the final Parent Reported Reciprocal and Social Interaction factor utilized in the analyses. Awareness (Aw), Cognition (Cg), Communication (Cm), and Motivation (Mt) were the four indicators. Standardized factors loadings are presented. All loadings were significant at the $p < .001$ level.

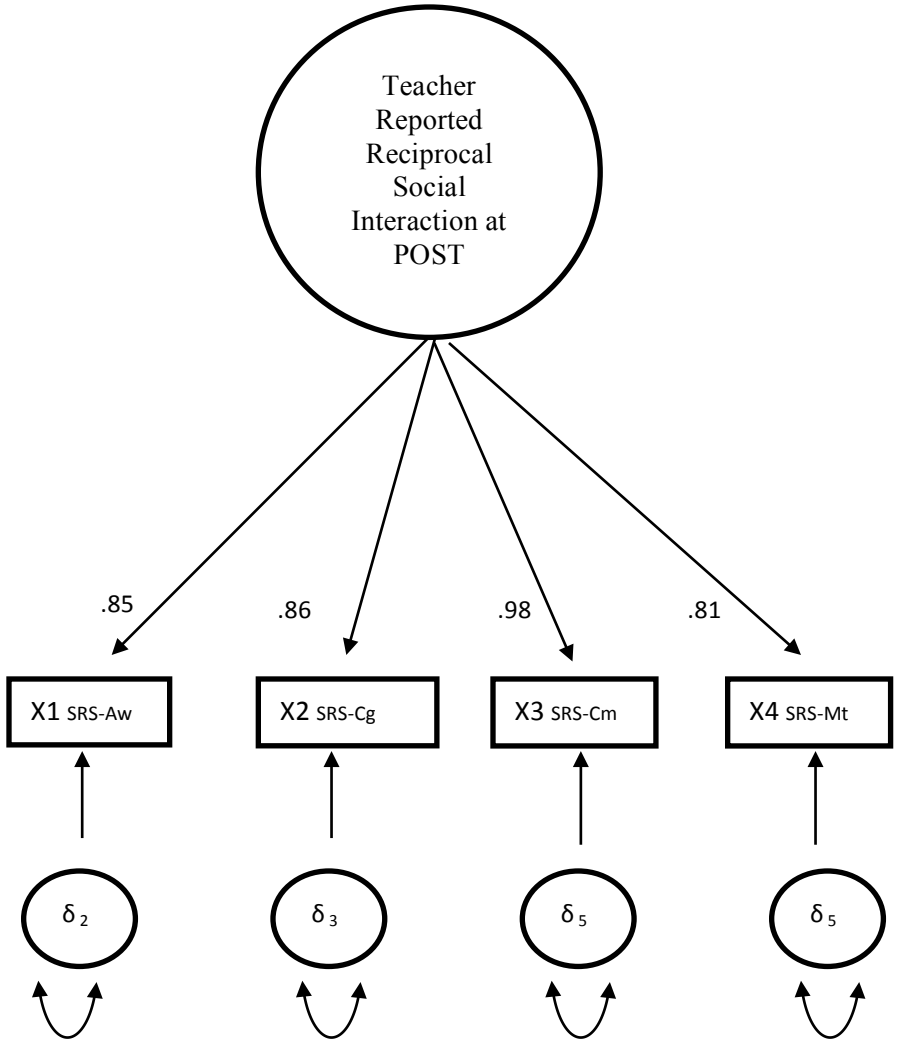

Figure 9. Final Teacher Reported Reciprocal and Social Interaction Factor at POST. Illustration of the final Parent Reported Reciprocal and Social Interaction factor utilized in the analyses. Awareness (Aw), Cognition (Cg), Communication (Cm), and Motivation (Mt) were the four indicators. Standardized factors loadings are presented. All loadings were significant at the $p < .001$ level.

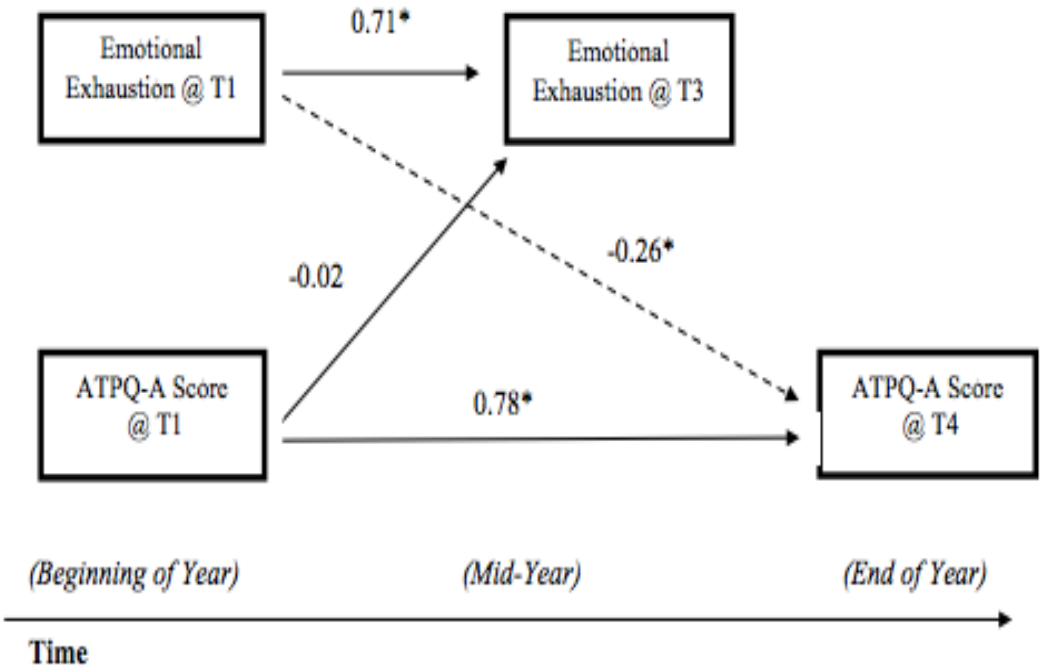

Figure 10. *Preliminary Hypothesis B Model.* Illustration of the preliminary analytical approach to assess the directionality and temporality between the observed teacher commitment variable and the observed teacher burnout variable at pre- and mid-assessment time points. Standardized regression coefficients (β) are presented. * $p < .001$

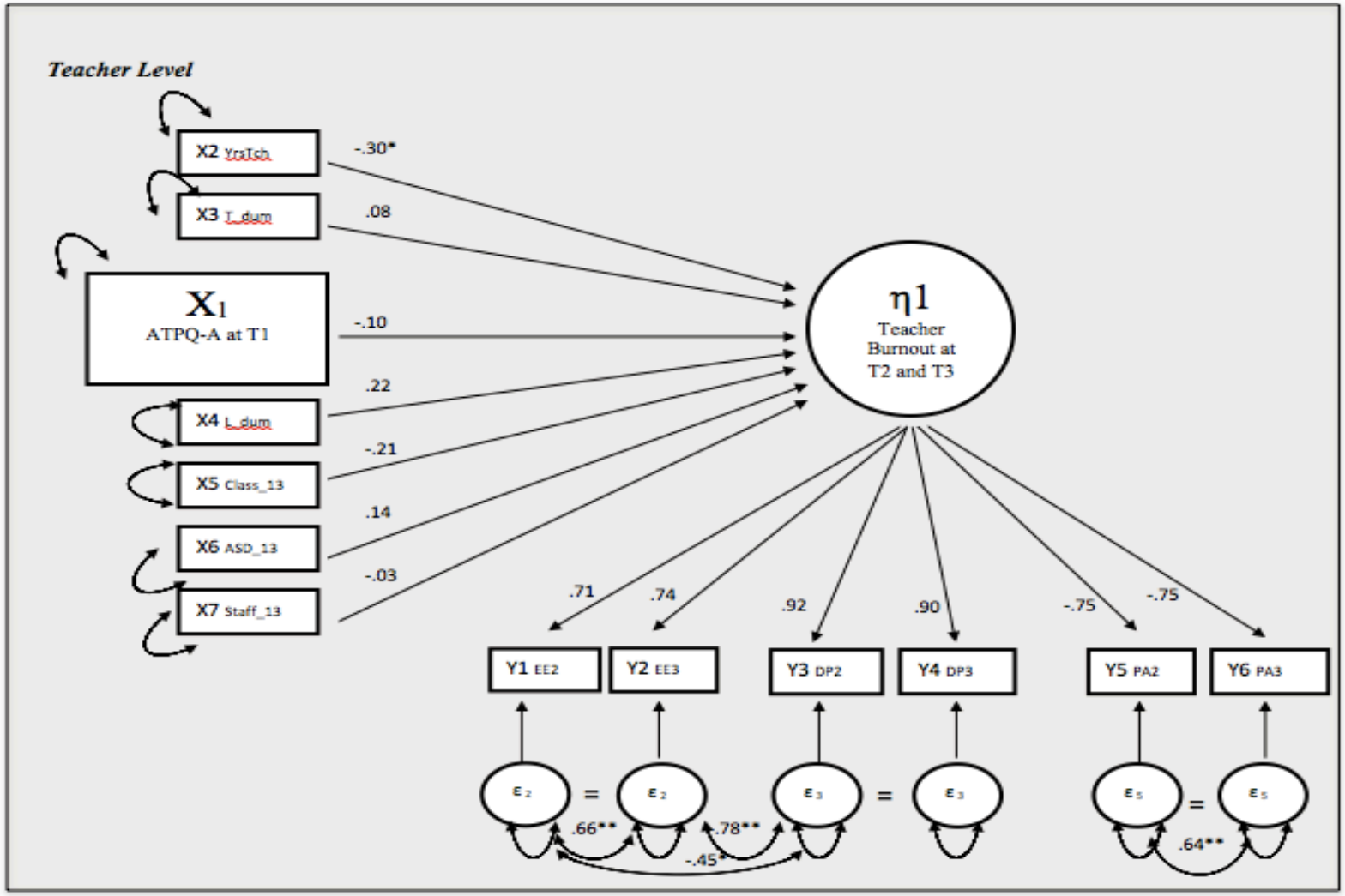

Figure 11. Final model of hypothesized relationship between teacher commitment at T1 and burnout at T2 and T3. All exogenous observed variables were correlated, with the exception of ATPQ-A with YrsTch and Class_13, and YrsTch with Class_13. Only standardized coefficients for paths, factor loadings and correlations are presented. * $p < .01$ ** $p < .001$

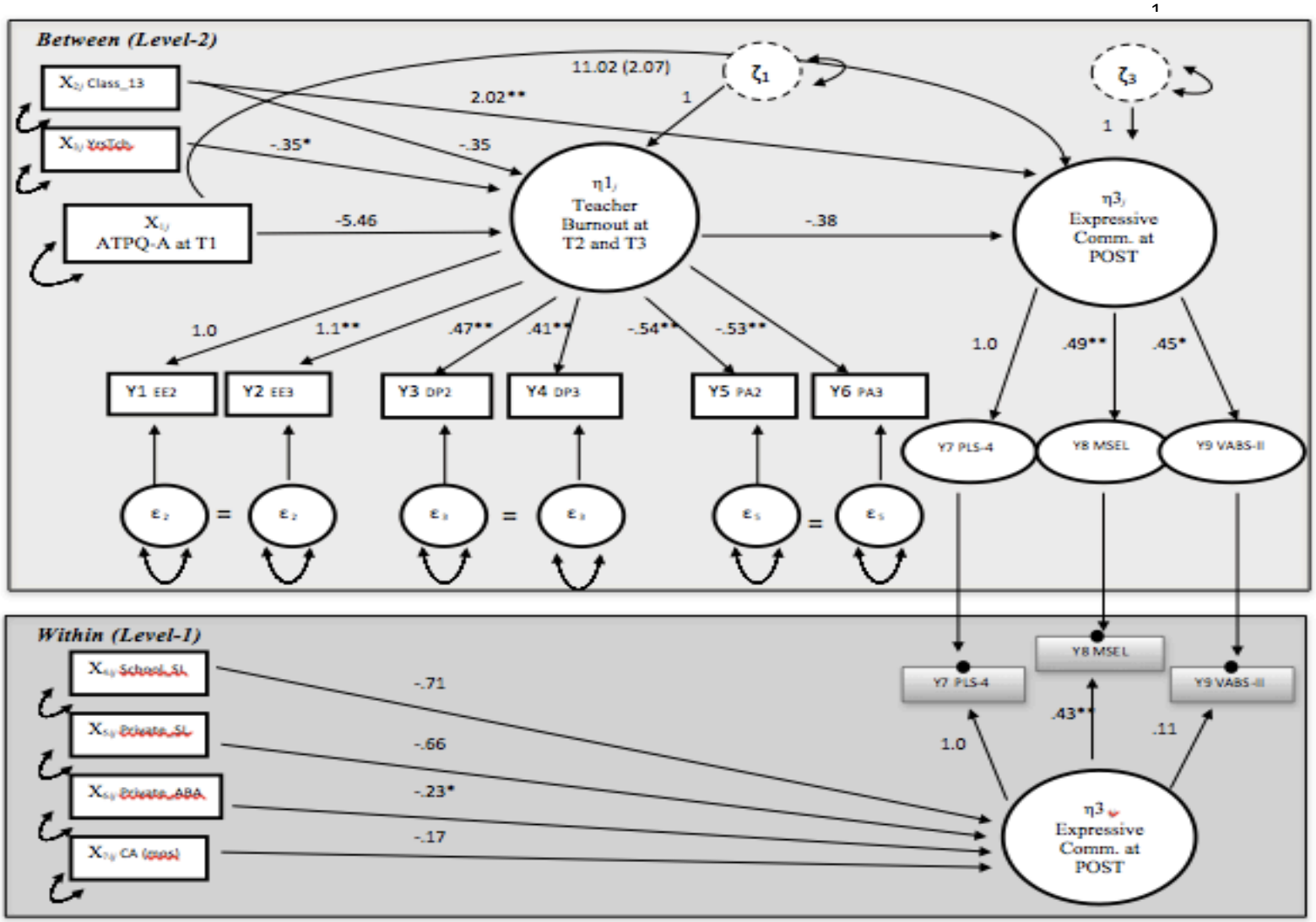

Figure 12. Final mediation model of hypothesized relationship between teacher commitment at T1, burnout at T2 and T3, and *Expressive Communication* at POST. ATPQ-A with YrsTch and Class_13, and YrsTch with Class_13 were set to zero. Residual variances were set equal at both levels for PLS-4 and MSEL indicators. Unstandardized path coefficients and factor loadings are presented. * p < .01 ** p < .001

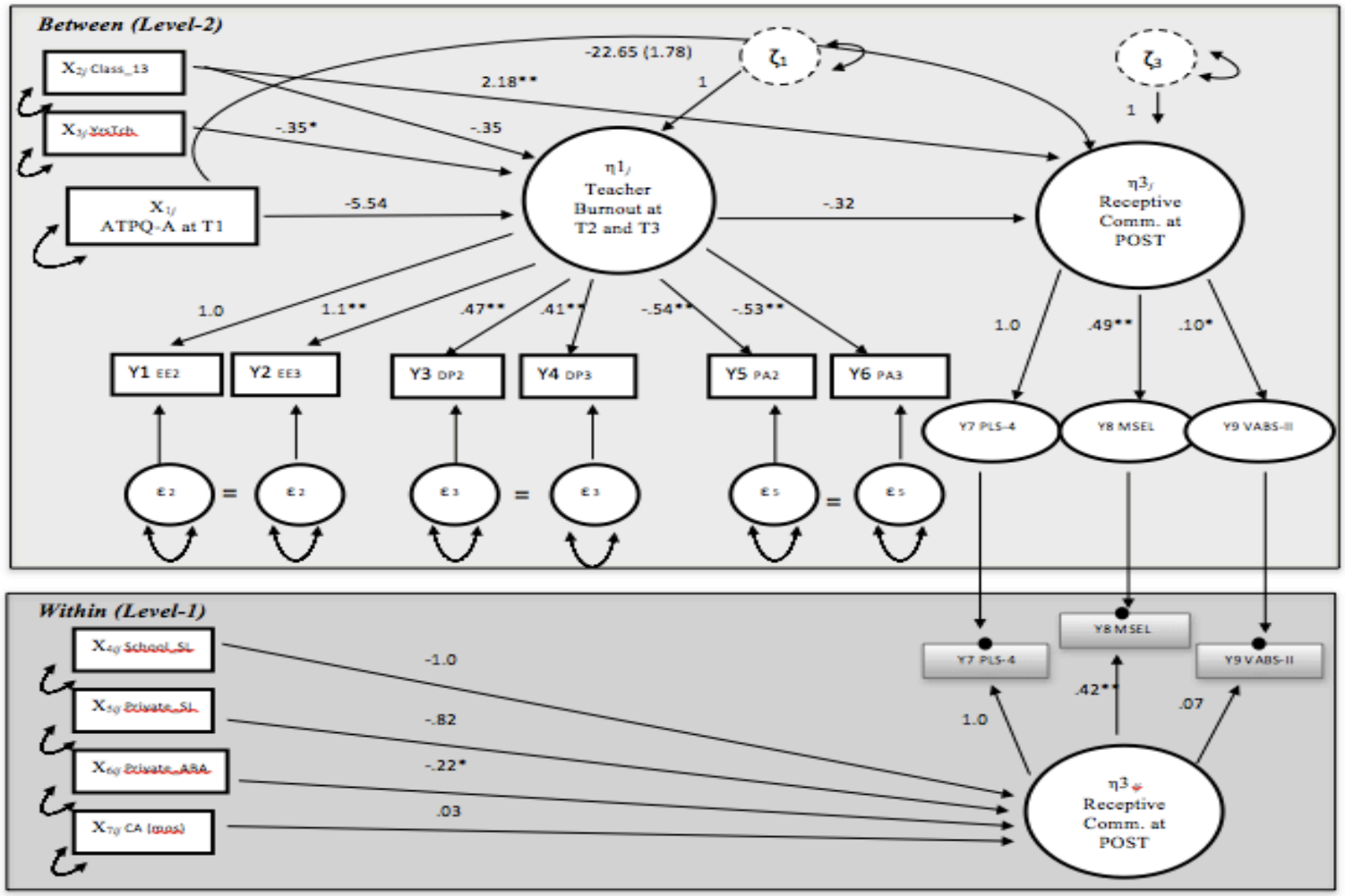

Figure 13. Final mediation model of hypothesized relationship between teacher commitment at T1, burnout at T2 and T3, and *Receptive Communication* at POST. ATPQ-A with YrsTch and Class_13, and YrsTch with Class_13 were set to zero. The residual variances was set to zero at both levels for the MSEL indicator. Unstandardized path coefficients and factor loadings are presented. * $p < .01$ ** $p < .001$

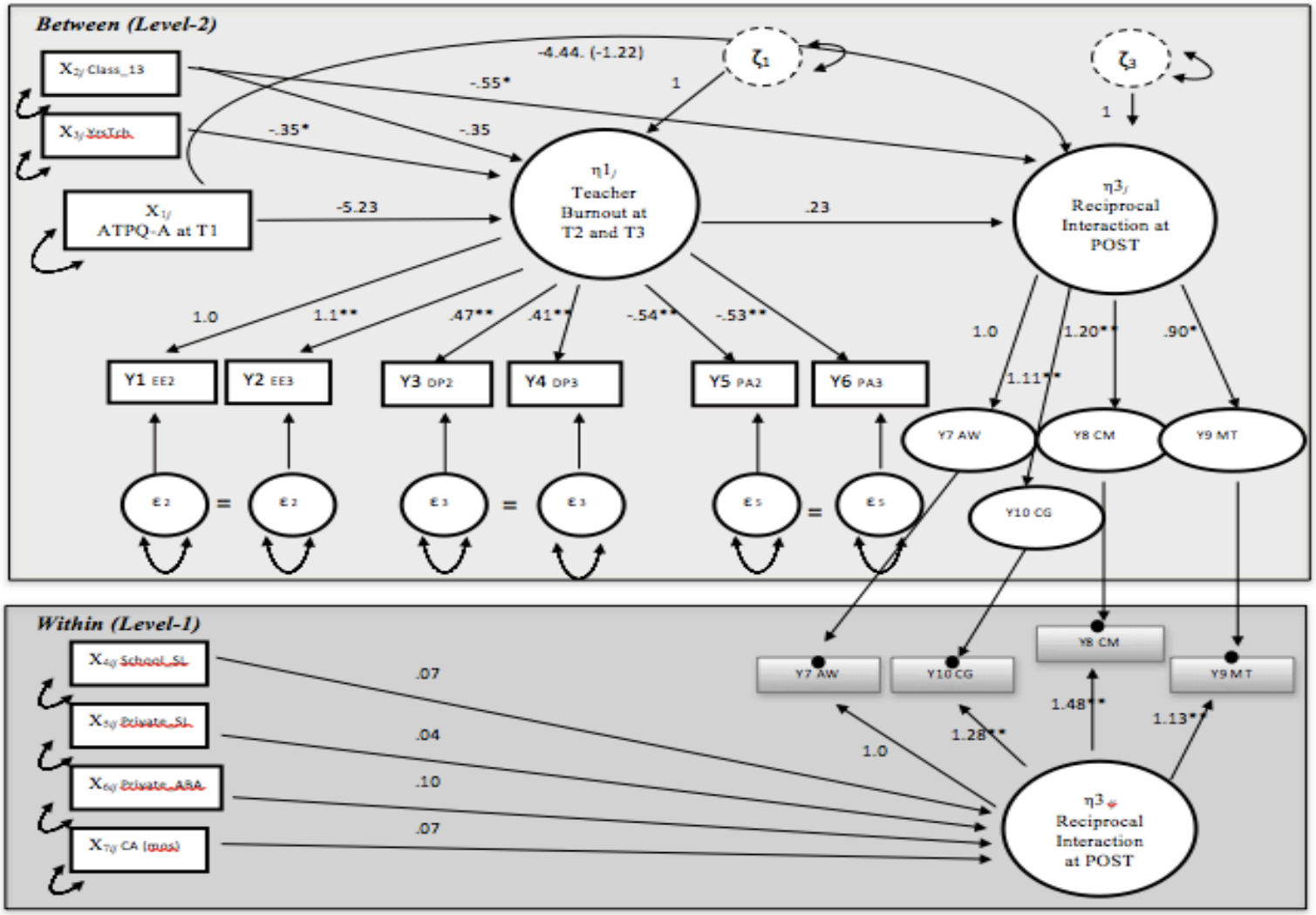

Figure 14. Final mediation model of hypothesized relationship between teacher commitment at T1, burnout at T2 and T3, and *Parent Reported Reciprocal Social Interaction* at POST. ATPQ-A with YrsTch and Class_13, and YrsTch with Class_13 were set to zero. Unstandardized path coefficients and factor loadings are presented. * $p < .01$ ** $p < .001$

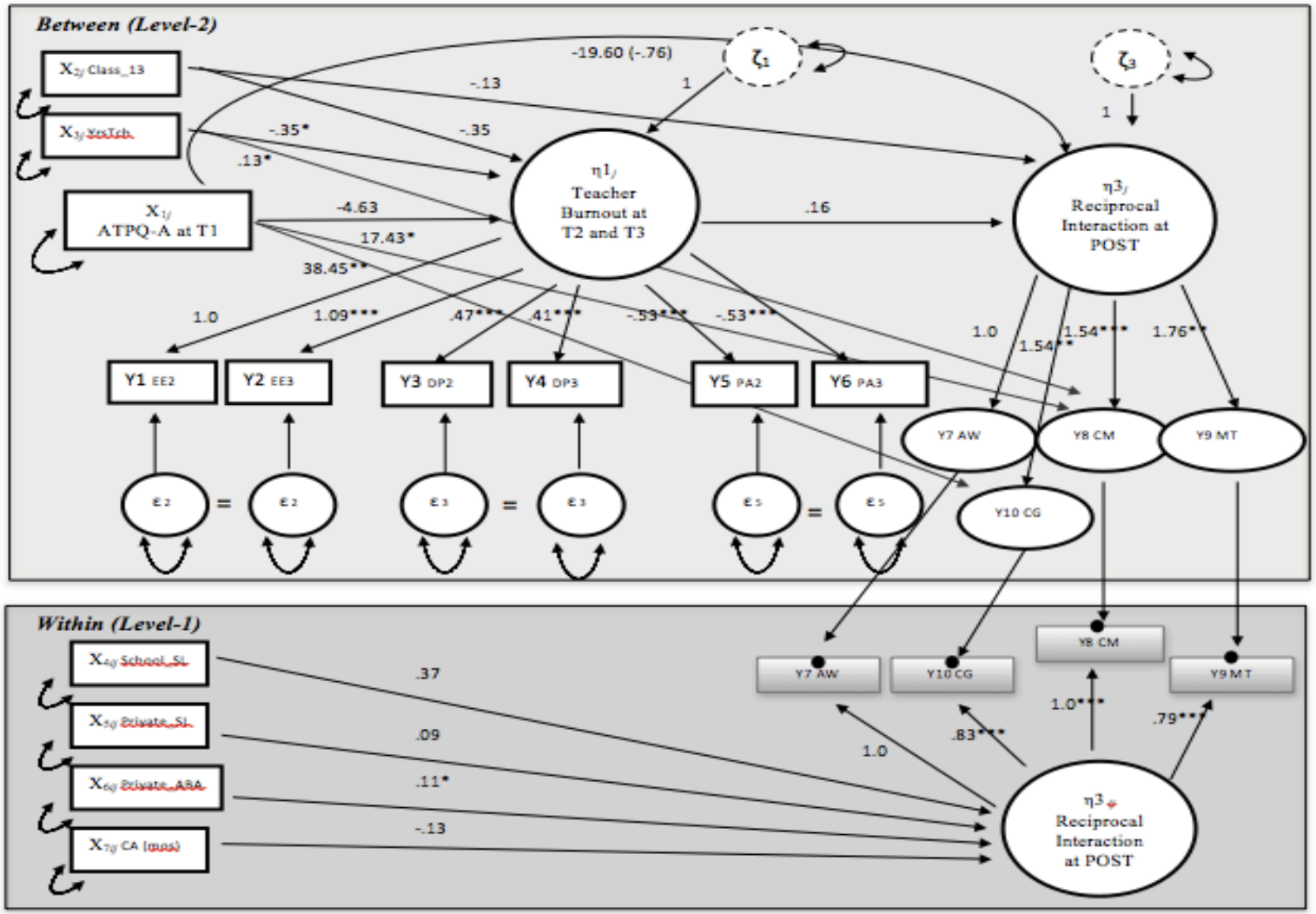

Figure 15. Final mediation model of hypothesized relationship between teacher commitment at T1, burnout at T2 and T3, and *Teacher Reported Reciprocal Social Interaction* at POST. ATPQ-A with YrsTch and Class_13, and YrsTch with Class_13 were set to zero. Unstandardized path coefficients and factor loadings are presented. * $p < .05$ ** $p < .01$ *** $p < .001$

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