



Contents lists available at ScienceDirect

Journal of School Psychology

journal homepage: [www.elsevier.com/locate/jschpsyc](http://www.elsevier.com/locate/jschpsyc)

# Profiles of middle school teacher stress and coping: Concurrent and prospective correlates<sup>☆, ☆ ☆</sup>



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## ARTICLE INFO

Action Editor: Andy Garbacz

### Keywords:

Teacher stress  
Teacher coping  
Latent profile analysis  
Middle school

## ABSTRACT

This study examined the stress and coping patterns of middle school teachers. A final teacher sample of 102 and student sample of 1450 agreed to participate in the study. We conducted a latent profile analysis of the teachers' self-reported levels of stress and coping at the beginning of the school year and used the resulting profiles to predict teacher practices and student outcomes over time. Nearly all teachers were characterized by high stress and high coping (66%) or high stress and low coping (28%). Based on concurrent ratings and observations, the High Stress/Low Coping profile had higher burnout and lower self-efficacy, higher rates of observed reprimands, and higher student-reported depression in comparison to the other classes. The most adaptive profile, Low Stress/High Coping (6% of sample), had lower burnout, greater parent involvement and higher student prosocial skills in comparison to the other groups. Profiles also predicted the maintenance of most of these effects and the increase of some effects over the school year. Examining stress and coping in combination can inform efforts to improve teacher well-being and have a positive influence on student learning environments.

## 1. Introduction

Teachers commonly report high levels of occupational stress. Teacher stress combined with poor coping are associated with undesirable outcomes such as high burnout, low teaching self-efficacy, less effective classroom management practices, lower student learning outcomes, and higher depressive symptoms (Klassen, Usher, & Bong, 2010; Lauermann & König, 2016; Shin, Noh, Jang, Park, & Lee, 2013). A recent study found that nearly all early elementary school teachers reported moderate to high levels of work-related stress and varying levels of coping capacity (Herman, Hickmon-Rosa, & Reinke, 2018). The teachers' patterns of stress and coping were related to the teachers' classroom behaviors and student outcomes in predictable ways; that is, higher levels of stress and lower levels of coping were associated with maladaptive teacher behaviors and lowered student outcomes.

The present study attempted to examine these relations in a middle school sample using a person-centered technique, latent

\* The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A130143 to Dr. Keith Herman and the University of Missouri. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

\*\* This article is part of the special issue 'Advances in Understanding and Intervening in Teacher Stress and Coping; Edited by Dr. Keith Herman, Dr. Wendy Reinke, and Ms. Colleen Eddy'.

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<https://doi.org/10.1016/j.jsp.2019.11.003>

Received 26 June 2018; Received in revised form 4 November 2019; Accepted 24 November 2019

Available online 24 December 2019

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profile analysis (LPA), to identify the patterns and prevalence of teacher stress and coping and the associated correlates for the various stress and coping profiles. Middle school is a particularly important time in students' educational lives as they transition from elementary school and have many different teachers. While teachers across grade levels are known to experience stress, little is known about the specific stress profiles of middle school teachers or the relations of those stressors with teacher and student outcomes. The transactional theory of stress provides a foundation for understanding teachers' experiences with stress and coping (Lazarus & Folkman, 1984).

### 1.1. Teacher stress and coping

#### 1.1.1. Teacher stress

Teachers face multiple and interacting demands from students, parents, colleagues, and administrators, and all of these demands may contribute to teacher stress. Kyriacou (2001) described teacher stress as the “unpleasant, negative emotions, such as anger, anxiety, frustration, or depression,” associated with the work of teaching (p. 28). At the classroom-level, teacher stress can result from the challenge of attempting to meet the educational, behavioral, and social-emotional needs of all the youth in the classroom. Teachers report specific stressors of managing classroom disruptions, increasing student motivation, and differentiating instruction (Boyle, Borg, Falzon, & Baglioni, 1995; Herman & Reinke, 2015; Kyriacou, 2001). Beyond the classroom, school-level factors including interactions with colleagues, lack of resources and support, as well as evaluations from administration can contribute to teacher stress (Herman & Reinke, 2015; Kyriacou, 2001). Further, broader systemic working conditions like low salaries, changing academic requirements, and high workloads contribute to teacher stress and dissatisfaction. Teachers often report the occupation is “very or extremely stressful,” (Kyriacou, 2001), and teaching is ranked as one of the most stressful jobs in the helping professions (Johnson et al., 2005).

The transactional theory of stress (Lazarus and Folkman 1984) has been applied to describe the experience of teacher stress and conceptualize coping responses (Dick & Wagner, 2001; Kyriacou & Sutcliffe, 1978; McCarthy, Lambert, Lineback, Fitchett, & Baddouh, 2016; Montgomery & Rupp, 2005). In this theory, stress is determined by a balance between a teacher's perception of environmental demands in comparison with a teacher's perceptions of his or her capacity to meet those demands (McCarthy et al., 2016). For example, teacher demands may include managing challenging student behavior or completing excessive paperwork. Coping is defined as the behavioral and psychological responses to these environmental demands (Lazarus, 1993). Coping responses may include positive self-talk in the moment to try to calm down or taking action to address the demand such as creating a behavior plan to reduce student disruptions. In line with transactional stress theory, teachers experience stress when they perceive the demands of their environment to be beyond their capacity or personal resources to cope.

#### 1.1.2. Teacher coping

Thus, in the transactional theory, stress and coping are optimally considered simultaneously to understand their role in influencing health and well-being (Lapierre & Allen, 2006; Lazarus & Folkman, 1987). Successful coping can buffer against the negative effects of environmental stressors whereas poor coping may exacerbate these effects (Lazarus & Folkman, 1987). Coping strategies may directly address the source of stress or may help a person tolerate the experience of stress (Kyriacou, 2001; Montgomery & Rupp, 2005). Effective use of coping can lead to more positive emotional outcomes, and thus coping is important to understand along with stress from a theoretical as well as a preventative perspective. Interventions to support teachers with coping strategies such as relaxation skills and mindfulness have been found to have effects on reducing teacher burnout ( $d = -0.76$ ), anxiety symptoms ( $d = -0.71$ ), and depressive symptoms ( $d = -1.06$ ) (Roeser et al., 2013). Given the connection between stress and coping and the potential to improve teacher coping, examining both constructs is essential for understanding the stress experience and its impact on well-being and functioning (Lazarus, 2000).

### 1.2. Effects of stress and coping on teachers

Over time, patterns of chronic high stress and low coping can lead to burnout. Whereas stress and coping can be examined as momentary states that may fluctuate over time, burnout refers to chronic or persistent experiences of emotional exhaustion from working in a helping profession, along with depersonalization, and a diminished sense of accomplishment (Maslach, 1993). Aligning with the transactional theory of stress, both the stressors or demands in the environment and coping abilities to respond to the demands together contribute to predictions of burnout. In one study, stress ( $\beta = 0.19$ ), demands ( $\beta = 0.22$ ), and coping ( $\beta = -0.31$ ), uniquely predicted the emotional exhaustion dimension of burnout while controlling for teacher experience (McCarthy, Lambert, O'Donnell, & Melendres, 2009). High levels of stress and burnout over time are both physically and emotionally demanding and can increase the risk of negative health outcomes such as heart disease and respiratory illness (Salvagioni et al., 2017), as well as emotional outcomes including depression and anxiety (Shin et al., 2013; Steinhart, Smith Jaggars, Faulk, & Gloria, 2011). In addition to affecting teacher well-being, prolonged teacher stress can influence the broader profession as teachers who are experiencing dissatisfaction may decide to leave the field altogether (Macdonald, 1999). Skaalvik & Skaalvik (2011) used structural equation modeling in a sample of 2569 Norwegian teachers to examine the relations between school context variables, teacher factors and job satisfaction and motivation to leave the profession. They found that teacher emotional exhaustion predicted motivation to leave the profession and mediated the relationship between school context variables and intentions to leave (Skaalvik & Skaalvik, 2011). High teacher attrition and turnover is expensive for the educational system and reduces the social cohesion and sense of community within the school environment (Ingersoll, 2001; Watlington, Shockley, Guglielmino, & Felsher, 2010). Given the negative

outcomes associated with teacher attrition and teacher burnout, understanding specific patterns of stress and coping that potentially lead to burnout and attrition can inform efforts to intervene.

In addition to predicting teacher burnout, teachers' profiles of stress and coping may be associated with lower protective factors for teachers such as teaching self-efficacy; that is, teachers who experience high stress levels tend to have lower levels of teaching self-efficacy (Herman et al., 2018). Self-efficacy is the belief that one can succeed at a given challenge within a specific domain; thus teaching self-efficacy is teachers' self-belief that they can influence and control student outcomes regardless of students' backgrounds and behaviors (Bandura, 1993; Tschannen-Moran & Hoy, 2001). Teaching self-efficacy is associated with higher student achievement, engagement, and academic self-efficacy (Ashton, Webb, & Doda, 1983; Bandura, 1993; Tschannen-Moran & Hoy, 2001). When teachers reported higher levels of teaching self-efficacy they were also likely to report higher levels of confidence for setting challenging goals for their students, finding ways to help students accomplish those goals, and having the confidence to solve learning challenges (Tschannen-Moran & Hoy, 2001, 2007). Teachers who believe they are capable of managing their classrooms are more likely to engage in effective teaching practices that support positive student outcomes (Herman et al., 2018). Additionally, teacher self-efficacy is related to discrete and observable classroom management practices including higher rates of positive interactions with students and fewer harsh reprimands (Reinke, Stormont, Herman, & Newcomer, 2014).

### 1.3. Teacher stress and coping and student outcomes

Prior research has demonstrated how stress and coping over time can be associated with the development of teacher burnout and impact teacher's confidence and abilities in the classroom; however, less is known about the relations between teacher stress and coping and student outcomes. The prosocial classroom theory proposes that teachers' well-being and social emotional functioning influences the ability of teachers to effectively lead academic instruction and manage the classroom behaviors which in turn affect student outcomes (Jennings & Greenberg, 2009). When teachers struggle with high stress and low coping, they are more likely to have adversarial relations with their students, feel more annoyed with student behaviors, and view their students negatively (Grayson & Alvarez, 2008; Maslach, Schaufeli, & Leiter, 2001). Students who have teachers who are emotionally exhausted have lower student achievement scores and grades, lower school satisfaction, and low perceptions of teacher support (Arens & Morin, 2016). In turn, teachers at risk for burnout may respond to students in more punitive and harsh ways that exacerbate unwanted student behaviors (Jennings & Greenberg, 2009). Consistent with this theory, a meta-analysis of the relationship between teacher burnout and student behaviors found a positive association between disruptive behavior and emotional exhaustion ( $r = 0.44$ ) and depersonalization ( $r = 0.36$ ), and a negative association between disruptive behaviors and personal accomplishment ( $r = -0.31$ ) (Aloe, Shisler, Norris, Nickers, & Rinker, 2014). One recent study found that higher rates of negative interactions with students at the start of the school year predicted the escalation of disruptive behaviors and reduced prosocial behaviors at the end of the school (Reinke, Herman, & Newcomer, 2016). Further, teachers who are not coping well may be less effective in modeling important social emotional competencies for the students in their classrooms (Schonert-Reichl, 2017). Likewise, when teacher coping is low, they may not be able to provide important relational qualities or effectively structure their classrooms in ways that youth need for healthy development. In turn, students in poorly managed classrooms may have higher levels of depressive symptoms (Herman, Reinke, Parkin, Traylor, & Agarwal, 2009).

Finally, teacher stress can also interfere with teacher-parent relationships. Teacher perceptions of parents can have a major influence over parent involvement in education (Herman & Reinke, 2017; Thompson, Herman, Stormont, Reinke, & Webster-Stratton, 2017). By reducing teacher self-efficacy and fostering negative perceptions, teacher stress can serve to undermine parent participation and engagement in school. These considerations are important as those students who may have less family involvement and fewer coping strategies need higher levels of teacher social-emotional support and guidance (Jennings & Greenberg, 2009).

From a developmental perspective teachers may have a differential influence on student functioning depending on the grade level, as the developmental tasks vary based on students' ages. Though prior studies have found that stress, coping, and burnout levels in teachers do not vary significantly across grade levels, it is possible that the potential influence of teacher factors on students may vary based on the developmental stage of the students. Many studies of teacher stress and the influence on student outcomes have used samples of elementary school students samples (i.e., Oberle & Schonert-Reichl, 2016); however, as students move into adolescence and transition into middle school, the relationship and potential influence of the teacher changes. Shifting class schedules mean that students spend less time with one teacher during the day and instead may see multiple teachers, which may contribute to the developmental shift in the importance of relationships from adults, like teachers and parents, toward peers (Lynch & Cicchetti, 1997). While it is commonly assumed that teacher-student relations are less important in secondary schools, a recent meta-analysis found the associations between teacher-student relationships and student engagement and achievement were significantly stronger in middle school compared to elementary school (Roorda, Koomen, Spilt, & Oort, 2011). Thus, middle school teacher stress may be especially harmful to the extent it interferes with teacher-student relationships. The importance of student-teacher relationships and in turn teacher stress also takes on special significance in middle school because of the well-documented decline in student engagement during secondary school years (Marks, 2000; McDermott, Mordell, & Stoltzfus, 2001). Teachers in middle school can promote self-determination and motivation/engagement at this stage (Ryan & Patrick, 2001; Wentzel, 1998), and student engagement is predictive of long term outcomes like going to college. The classroom environment can also influence student risk for mental symptoms including anxiety and depression (Herman et al., 2009; Herman, Borden, Reinke, & Webster-Stratton, 2011; Webster-Stratton & Herman, 2008).

#### 1.4. The interaction of stress with environmental demands

It is important for studies of teacher stress and coping to examine prospective relations between teacher stress and coping on teacher and student outcomes. Although the prosocial classroom theory proposes that teachers' well-being directly influences their classroom management and interaction patterns with students which in turn leads to different student outcomes, it is likely that teacher stress and coping interact with environmental demands in a reciprocal manner over time. That said, limited experimental evidence is available to determine if teacher self-reported stress and coping precede and cause worsening of teacher practices and relationships which in turn cause negative student outcomes. Absent such evidence, it is also plausible that excessive environmental demands including extreme student misbehavior precede and cause increases in teacher stress and lower coping. Notably, however, the transactional theory suggests that regardless of the origin of stress, including a mismatch between person and environment fit, subjective appraisals of stress and coping influence health and well-being and can be directly altered to improve personal and social outcomes. Thus, even in challenging environmental circumstances, individuals vary in their self-reported coping skills and can be taught to cope more effectively.

#### 1.5. Measures of teacher stress

Although multiple methods have been developed to measure teacher stress, single-item ratings have been commonly used for the past several decades (for a detailed review, please see Eddy et al., 2019; Boyle et al., 1995; Elo, Leppanen, & Jahkola, 2003; Kyriacou, 2001; Kyriacou & Sutcliffe, 1978). While stress may be conceptualized as a multidimensional construct consisting of common sources and responses to stress, a single-item measure provides a valuable global summary of the overall experience of occupational stress. Single-item measures of stress have the advantage of brevity, particular given the paperwork burden presented to teachers in their daily routines and as part of larger surveys they are often asked to complete. They also are similar to a commonly used clinically proven strategy for quickly assessing distress over time called the Subjective Units of Distress scale (SUDS; e.g., a self-report measure of distress ranging from 0 (no distress) to 10 (extremely high distress)) (Wolpe, 1990). Although single-item scales are discouraged by classical psychometric theory which cautions that single-items are inherently unreliable, it could be argued that the caution is merely an artifact of how reliability is defined in the Spearman Brown formula which rewards longer surveys by increasing reliability for each item on a scale. Moreover, evidence suggests that single-item ratings can predict related constructs often as well as much longer surveys and are also used in measuring general occupational stress outside of teacher populations. For instance, Elo Leppanen, & Jahkola, (2003) found that a single stress item accurately discriminated employment groups and predicted related constructs rated on much longer scales including the emotional exhaustion scale on the Maslach Burnout Inventory. In an education context, across a series of studies, Stormont and colleagues have found that teacher single-item ratings of student academic and behavior readiness predicted short and long-term academic and behavior outcomes in kindergarten and in middle school as well or nearly as well as much longer measures, including academic achievement tests (Lewis et al., 2017; Stormont, Herman, Reinke, King, & Owens, 2015; Stormont, Thompson, Herman, & Reinke, 2017). Most recently, Eddy et al., 2019 found that single-item ratings of teacher stress and coping were associated with concurrent and prospective ratings of teacher burnout and self-efficacy as well as teacher practices. Notably, the single-item coping measure was also sensitive to change in response to intervention.

#### 1.6. Purpose

The purpose of the study was to examine the patterns of stress and coping in middle school teachers and the association of these profiles with concurrent and prospective teacher and student level outcomes. We used the transactional theory of stress (Lazarus & Folkman, 1984) as a foundation to examine teachers' patterns of responding to stress and coping items using LPA, which identifies subgroups of teachers based on their shared patterns of self-reports of stress and coping levels. LPA provides an optimal approach for examining the transactional theory because levels of stress and coping are considered simultaneously as person-centered effects. That is, LPA identifies subtypes of individuals based on their combined levels of stress and coping rather than examining the distinct effect of each variable on covariates as occurs in traditional variable-centered analyses (such as factor analysis, multiple regression). Our research questions were:

- 1) What profiles of stress and coping emerge for middle school teachers? We hypothesized that three or more profiles of stress and coping would emerge from the LPA. In line with a prior study in elementary schools, we expected to find that many teachers would be in profiles characterized by high levels of stress (Herman et al., 2018). Consistent with the transactional theory of stress, we predicted at least two high stress profiles would be differentiated by levels of teacher reported satisfaction with coping, ranging from high to low. In turn, we hypothesized one subtype of teachers to be characterized by high levels of effective coping and low levels of stress, and like the prior elementary school study, we expected this to represent a minority of teachers.
- 2) What teacher and student outcomes are associated with the profiles of stress and coping? We hypothesized that these profiles of stress and coping would be associated with teacher and student covariates in line with the prosocial classroom theory (Jennings & Greenberg, 2009). In particular, we expected the least adaptive profile(s) characterized by high stress and lower coping to be associated with negative concurrent and prospective teacher functioning (burnout, specifically emotional exhaustion, and self-efficacy), teacher behaviors (use of reprimands), and student and family outcomes (disruptive and prosocial behaviors, parent involvement, and youth depressive symptoms). Likewise, we expected teachers in an adaptive profile with high levels of coping to have the most favorable teacher, family and youth outcomes.

## 2. Methods

### 2.1. Participants

Student and teacher participants were recruited from all nine middle schools in two neighboring urban school districts in the Midwest. The demographic characteristics of the communities served by these districts mirror one another. In District A, 54% of residents identify as Black, 38% White, 2% Hispanic, 2% Asian, and 4% more than one race. Seventeen percent of households have income levels below the federal poverty guidelines, and the community has an 11% unemployment rate. Additionally, 47% of households are headed by a single mother. In District B, 57% of residents identify as Black, 36% White, 3% Hispanic, 1% Asian, 4% more than one race, and 1% Other. The annual income for 18% of the residents falls below the federal poverty line, with an unemployment rate of 10%, and 47% of households headed by single mothers.

Participants were recruited as part of a randomized control trial of a behavior management and coaching program. Eligible teacher participants included sixth- to eighth-grade English language arts or math teachers who consented to participate. Assenting student participants were recruited from classrooms of participating teachers and their parents provided informed consent to participate in the study. The study had high rates of participation; 91% of eligible teachers agreed to participate in the study, and 75% of students in participating classrooms provided parent consent and student assent.

A final teacher sample of 102 and student sample of 1450 agreed to participate in the present study. Teacher participants were recruited and randomized across four cohorts [year 1: 26 teachers (13 intervention), 437 students; year 2: 36 teachers (18 intervention), 453 students; year 3: 24 teachers (12 intervention), 337 students; year 4: 16 teachers (8 intervention), 223 students]. Teacher participants were 79.1% female and 70.9% White, 25.6% African American, 2.3% Asian, and 1.2% other. Teachers' ages ranged from 23 to 63 years ( $M = 37.8$ ,  $SD = 8.8$ ), whereas teaching experience ranged from 1.0 to 23.0 years ( $M = 10.4$ ,  $SD = 6.3$ ). Student participants were 50.8% female and 78.2% African American, 17.8% White, 2.1% Hispanic/Latino(a), and 1.0% Asian, and 0.7% other. The percentage of students in sixth, seventh, and eighth grade was equal to 35.4%, 38.7%, and 25.9%, respectively. Overall, 69.7% of students qualified for free/reduced-priced lunch.

### 2.2. Procedures

Approval of all study procedures was granted from the University of Missouri Institutional Review Board. Each school year in October, baseline student, teacher, and observation data were obtained and then end-of-year data were collected each following May. Observation fidelity checks on teacher practices were collected at four time points, October, December, February, and May. Teachers were randomly assigned to receive the classroom management training program called CHAMPS or to a business as usual condition (Sprick, Garrison, & Howard, 1998). CHAMPS includes components of direct instruction and ongoing coaching that focuses on developing clear expectations, routines, and behavioral plans for critical aspects of classroom functioning such as student participation, movement and conversation levels (Sprick et al., 1998). Through the CHAMPS program teachers follow a structured method for implementing classroom changes that includes teaching expectations, monitoring progress and praising students' efforts.

The training consisted of three full day workshops, the first two conducted in late-October/early-November, after baseline data were collected and before the first fidelity observation check. The third training occurred in late November/early December. An implementation coach worked with each teacher to apply intervention practices; each teacher received a minimum of four coaching visits after the first workshop and before the end of the school year. These visits focused on helping the teacher set individual goals related to the program and providing feedback about progress toward goals.

As part of the study design, teachers chose a class period at baseline based on their perceived need for classroom management support. Thus, each teacher had a target classroom which became the focus of student recruitment and subsequent data collection. All students in the targeted classroom were approached for study participation. Participating students in each targeted classroom completed student ratings at baseline and follow-up. Trained research assistants read the surveys to students in their classroom without the teacher present, and students completed self-assessments using paper and pencil. These same research assistants were also direct observers who were blinded to intervention condition (see observer training details below). Observations were conducted in the same targeted classroom across the school year.

### 2.3. Measures

#### 2.3.1. LPA indicators

2.3.1.1. *Teacher Stress and Coping Scale* (Herman & Reinke, 2012). At baseline, the teachers were asked to rate their overall stress and coping using single-item measures of each construct. The stress question asked "How stressful do you find being a teacher?" and the coping question asked "How well are you coping with the stress of your job?" The questions stand-alone and no other instructions or details are given. The item scale ranged from 0 to 10 with 0 indicating "not stressful" and 10 indicating "very stressful" for the stress item and 0 indicating "not well" and 10 indicating "very well" for the coping item. As previously reviewed, prior studies in teacher stress have used similar overall single-item measures of teacher stress (Chaplain, 2008; Klassen & Chiu, 2010; Kyriacou, 2001; Kyriacou & Sutcliffe, 1978). This scale included an item about coping following the transactional theory of stress (Lazarus, 2000). A recent study found that these single-items predicted concurrent and prospective teacher burnout and self-efficacy and teacher practices (Eddy et al., 2019). Additionally, the items were used in a prior study to examine patterns of stress and coping in elementary school teachers and yielded strong profile fit that were associated with student academic and behavior outcomes as predicted

(Herman et al., 2018).

### 2.3.2. Teacher functioning

**2.3.2.1. Maslach Burnout Inventory (MBI; Maslach, Jackson, & Leiter, 1986).** The burnout measure was derived from the Maslach Burnout Inventory and included four items from the emotional exhaustion subscale (Pas, Bradshaw, Hershfeldt, & Leaf, 2010). Mean scores were computed based on these four items and were used in all analyses. While burnout is a multidimensional construct, as in previous studies of teacher stress, this study examined only the emotional exhaustion dimension of burnout. Emotional exhaustion is the primary experience of burnout most closely related to stress and coping and is defined by the experience of extended stress and low or ineffective coping over time (Maslach et al., 2001; Pas et al., 2010). The internal consistency of the abbreviated scale for the current study was calculated using Cronbach's alpha; the alpha values in the study ranged from 0.82 to 0.95 (an average alpha of 0.91). Example items include, "Feel emotionally drained from work," and "Feel like at the end of the rope." Teachers completed this measure at baseline and at the end of the school year.

**2.3.2.2. Teacher's Sense of Efficacy Scale (TSES; Tschannen-Moran & Hoy, 2001).** Teachers completed a self-report measure of classroom management self-efficacy from the long version of the Teacher's Sense of Self Efficacy Scale. The classroom management subscale included eight items related to teachers' reports of their effectiveness to manage and influence classroom behaviors; mean scores were computed based on these eight items and used in all analyses. The items were rated on a 9 point Likert scale with response options of "Nothing", "Very Little", "Some Influence", "Quite a Bit", and a "Great Deal" relating to teachers' perceptions of their abilities to influence or manage student behaviors. An example item is "How much can you do to control disruptive behavior in the classroom?" The internal consistencies of this measure for each year of the study ranged from 0.80 to 0.96 (an average alpha of 0.89). Teachers completed this measure at baseline and at the end of the school year.

### 2.3.3. Observed teacher behavior

Independent observers conducted direct observations of teacher implementation using the Multi-Option Observation System for Experimental Studies (MOOSES; Tapp, 2004) interface for handheld computers to gather real-time data using the Brief Classroom Interaction Observation Revised observation code (BCIO-R; Reinke & Newcomer, 2010). The BCIO-R is a validated 20-minute classroom observation (Reinke, Stormont, Herman, Wachsmuth, & Newcomer, 2015). The frequency of teacher use of reactive strategies (i.e., use of reprimands and harsh reprimands), were gathered simultaneously during each observation. We focused on reprimands and harsh reprimands given that reactive and negative interaction patterns are most likely to occur under stress. Rates of reprimands on single BCIO-R observations are associated with lower self-efficacy in classroom management ( $\beta = -0.37$ ) and higher levels of burnout ( $\beta = 0.29$ ) (Reinke et al., 2015); additionally, reprimands predicted observed disruptions ( $\beta = 0.56$ ) and, when combined to form a positive to negative ratio, predicted the escalation of end-of-year student prosocial behaviors, disruptive behaviors, and concentration problems (Reinke et al., 2016). The BCIO-R operationalizes reprimands as, "Verbal comments or gestures by teacher to indicate disapproval of behavior; reprimand is concise (brief) in a normal speaking tone," and harsh reprimands as, "Verbal comments or gestures indicate disapproval of behavior using a voice louder than typical for setting or harsh, critical or sarcastic tone." The code includes examples and non-examples of each. Research assistants completed annual training and field practice prior to completing observations for the project. Observers were required to have inter-observer agreement of 80% or above in order to conduct observations for the study.

Observations were conducted across the academic year at 4 time points. The first observation occurred in October prior to receiving training or coaching. The three post-intervention observations occurred in December, February, and April/May. The observations occurred during the targeted classroom time (e.g., at baseline, each teacher selected one class as the target class for the study based on challenging classroom behaviors and observations throughout the year occurred in this class).

The MOOSES program calculates reliability for each variable by determining a match between observers within a 5-s window. If a match was found, then an agreement for that variable was tallied. Variables that were not matched were tallied as disagreements. An agreement ratio was then reported for each variable (agreements divided by the sum of agreements plus disagreements). The mean percentage agreement is reported as well as the range of reliability for each variable. Ongoing reliability checks were conducted for between 31.5% to 42% of the observations across time points. The mean percentage agreement across time points on the BCIO-R was 92.3, ranging from 90 to 95% for the four time points; the mean agreement on the Reprimand and Harsh Reprimand ratings was 91.5% and 80%, respectively. MOOSES utilizes second-by-second comparison of raters to determine reliability, and an overall reliability of 80% is considered acceptable (Tapp, 2004).

### 2.3.4. Teacher ratings of family and student behavior

**2.3.4.1. Teacher Observation of Classroom Adaptation Checklist (TOCA-C; Koth, Bradshaw, & Leaf, 2009).** Teachers completed pre- and post-ratings, via an online survey, regarding student behaviors in the TOCA-C, a checklist version of the TOCA-Revised interview (Werthamer-Larsson, Kellam, & Ovesen-McGregor, 1990). These ratings, including 55 items on a 6-point Likert-type scale (never, rarely, sometimes, often, very often, almost always), were completed in October and May of the school year. We used the teacher ratings of parent involvement, student disruptive behavior, and student prosocial skills subscales. In the current study, internal consistency for these subscales, computed using Cronbach's alpha, ranged from 0.76 to 0.96. In addition, prior studies support the TOCA's internal consistency, consistent factor structure over time, predictive and current validity, and sensitivity to change across elementary and secondary school samples (Bradshaw, Waasdorp, & Leaf, 2012; Koth et al., 2009; Petras, Masyn, & Ialongo, 2011; Stormshak, Bierman, Bruschi, Dodge, & Coie, 1999). Teachers completed the TOCA-C on each participating student in their classroom

at the beginning of the year and at the end of the year.

### 2.3.5. Student report of depressive symptoms

**2.3.5.1. Patient Health Questionnaire-8 Adolescent Version (PHQ-8; Johnson, Harris, Spitzer, & Williams, 2002).** Students completed the PHQ-8 at baseline and again at the end of the school year; mean scores were computed and used in all analyses. The PHQ-8 is a widely used measure of depressive symptoms that was adapted from the PHQ-9 (Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001). Prior studies have found the PHQ-8 and the PHQ-9 Adult and Adolescent versions demonstrate concurrent and criterion validity in community and clinical samples including with adolescents (Johnson et al., 2002; Kroenke et al., 2001; Kroenke et al., 2009; Kroenke & Spitzer, 2002; Spitzer & Johnson, 1995). The 8 items map onto the diagnostic criteria for Major Depressive Disorder. The scale includes 4-point Likert responses (0-“not at all”, 1-“several day”, 2-“more than half the days” 3-“nearly every day”). An example item is, “Feeling down, depressed, irritable, or hopeless?” Internal consistencies for fall and spring of each study year ranged from 0.79 to 0.88.

**2.3.5.2. Intervention.** The CHAMPS program intervention was not the focus of the current study. Because of the potential intervention effects on prospective teacher and student outcomes, we included a dummy code for control and intervention groups in order to account for any potential unique contribution from CHAMPS training. The intervention included a multi-day training in the CHAMPS program as well as on-going consultation and coaching in behavior management techniques. Additionally, we controlled for intervention condition in all regression analyses to account for any potential contribution of intervention status on the unique relations among study variables.

## 2.4. Analytic plan

All analyses were conducted using MPlus 7.4 (Muthén and Muthén, 2010). We first ran a latent profile analysis (LPA) to identify patterns of teacher profiles using the stress and the coping items as indicators. LPA identifies the best fitting subgroups of teachers that have similar patterns of responses on the stress and coping indicators. To determine the best fitting solution we used the Bayesian information criterion (BIC; Schwarz, 1978) and the sample-size adjusted Bayesian information criterion (aBIC; Sclove, 1987). Lower BIC scores indicate a better fitting model. We also used the Vuong-Lo-Mendall-Rubin (VLMR; Vuong, 1989; Lo, Mendall, & Rubin, 2001), a likelihood ratio test (LRT) test; lower p-values indicate significantly better fit for the tested solution compared to a model with one fewer class. In addition, classification precision was determined by estimated posterior class probabilities, summarized by an entropy value (Ramaswamy, DeSarbo, Reibstein, & Robinson, 1993). Entropy values close to 1.0 indicate higher classification precision (Muthén, 2004). Finally, a bootstrapped parametric likelihood ratio test (BLRT) procedure confirmed the best model (see McLachlan, 1987; Nylund, Asparouhov, & Muthen, 2007). In final model determination more weight was given to the BIC, LRT, and BLRT because simulation studies have suggested these provide the most reliable fit indicators (Nylund & Masyn, 2016). Additionally, class prevalence, interpretability, and substantive theory were also considered.

After determining the best fitting solution, we then conducted equality of mean tests to determine if baseline and prospective covariates significantly differed by class membership using the BCH Auxiliary command in MPlus (Muthén & Muthén, 1998–2010); the equality of mean analysis is a Wald test based on draws of class posterior probabilities (for technical details please see <https://www.statmodel.com/download/meantest2.pdf>). These analyses were an attempt to validate the final class solutions by determining if each class was uniquely associated with other criterion.

Finally, to examine whether stress and coping profiles predicted future teacher and student outcomes controlling for baseline levels of these outcomes, we further analyzed any significant differences on prospective variables with multiple regressions. These regression analyses allowed us to account for clustering of students within classrooms using the Cluster command in MPlus and also to control for any intervention effects on prospective teacher and student outcomes (Guo et al., 2006). Given the small subsample size within one identified profile groups ( $n = 6$ ) and the resulting low power for these prospective regressions, we opted to report any significant effects at an uncorrected p-value of 0.05. Additionally, we also calculated Cohen's  $d$  effect sizes for differences between the most and least adaptive classes (i.e., dividing the differences in these class mean scores by the pooled standard deviations) for descriptive purposes (Cohen, 1988).

Missing data were negligible. Full data were collected from all recruited teachers and students at baseline and thus analyses focused on baseline LPA and concurrent relations had no missingness. One teacher left the district at mid-year and thus her data were not available at follow-up.

## 3. Results

### 3.1. Descriptive statistics and correlations

Table 1 summarizes the means, standard deviations, range for all key study variables at baseline. Tables 2 and 3 depict the intercorrelations among the stress and coping items and other study variables. The stress and coping items were correlated  $-0.39$ . The stress item had significant relations with burnout at both Time 1 and 4. The coping item had significant intercorrelations with nearly all other study variables ranging from small to medium effects.

**Table 1**  
Descriptive statistics of baseline variables.

Variable name	M	SD	Range
Stress	7.82	1.99	2–10
Coping	6.39	2.49	0–10
Efficacy	7.05	1.14	4–9
Emotional exhaustion	3.31	1.37	0.50–6
Reprimands <sup>a</sup>	0.38	0.36	0–1.96
Harsh reprimands <sup>a</sup>	0.003	0.01	0–0.07
Parent involvement	3.35	0.35	2.42–4.00
Student disruptive behavior	1.89	0.43	1–2.80
Student prosocial behavior	4.47	0.55	3.30–5.82
Student depression	5.70	1.41	2.71–8.80

<sup>a</sup> Rate per minute.

**Table 2**  
Intercorrelations among stress and coping and teacher and student variables, Time 1 and 4.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Stress	–													
2. Coping	–0.39**	–												
3. T1 Efficacy	–0.10	0.49**	–											
4. T4 Efficacy	–0.04	0.30**	0.59**	–										
5. T1 Burnout	0.50**	–0.45**	0.27**	–0.18	–									
6. T4 Burnout	0.42**	–0.33**	0.18	–0.18	0.62**	–								
7. T1 Involvement	–0.23*	0.20*	0.18	0.16	–0.07	–0.17	–							
8. T4 Involvement	–0.12	0.19	0.21	0.37**	–0.10	–0.26**	0.69**	–						
9. T1 Disruption	0.15	–0.20*	–0.19	–0.11	0.18	0.16	–0.24*	–0.30**	–					
10. T4 Disruption	0.14	–0.14	–0.15	–0.17	0.18	0.36**	–0.24*	–0.52**	0.79**	–				
11. T1 Prosocial	–0.17	0.25**	0.22*	0.19	0.12	0.23*	0.55**	0.52**	–0.66**	–0.59**	–			
12. T4 Prosocial	–0.15	0.24**	0.23*	0.24*	–0.14	0.26*	0.48**	0.62**	–0.58**	–0.77**	0.81**	–		
13. T1 Depression	0.04	–0.16	–0.08	–0.21*	0.06	0.09	–0.07	–0.05	0.09	0.06	–0.11	–0.06	–	
14. T4 Depression	0.02	–0.19	–0.07	–0.09	–0.04**	0.09	–0.17	–0.35**	0.11**	0.22**	–0.19	–0.29**	–0.30**	–

\*\* p < .01.

\* p < .05.

**Table 3**  
Intercorrelations among stress and coping and observed variables, Time 1–4.

	1	2	3	4	5	6	7	8	9	10
1. Stress	–									
2. Coping	–0.39**	–								
3. T1 Reprimands	0.07	–0.03	–							
4. T2 Reprimands	0.15	–0.03	0.66**	–						
5. T3 Reprimands	0.16	–0.25*	0.27**	0.48**	–					
6. T4 Reprimands	0.05	–0.07	0.42**	0.39**	0.44**	–				
7. T1 Harsh	0.03	–0.09	0.35**	0.19	0.04	0.06	–			
8. T2 Harsh	0.10	–0.28**	0.22*	0.30**	0.11	0.16	0.01	–		
9. T3 Harsh	0.19	–0.26*	0.03	0.03	0.28**	0.30**	0.08	0.03	–	
10. T4 Harsh	0.01	–0.03	0.11	0.11	0.12	0.32**	0.07	0.01	0.20	–

\*\* p < .01.

\* p < .05.

### 3.2. Teacher stress and coping profiles

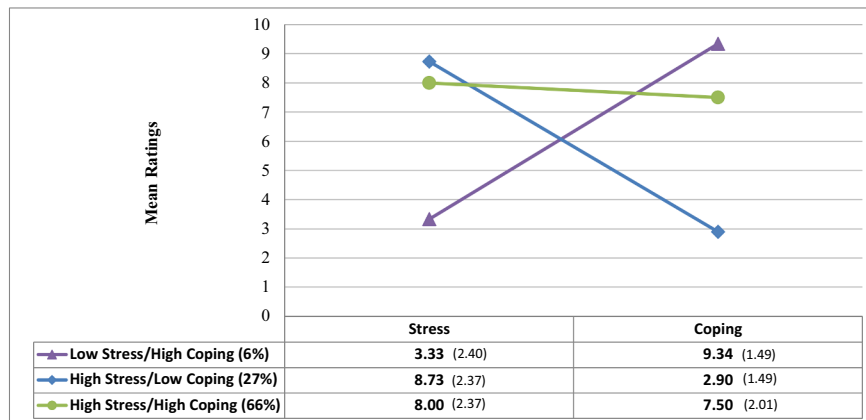
Based on the fit indices (e.g., BIC, adj BIC, entropy, and VLMR; see Table 4), the LPA revealed that a three class solution best described the profiles of teachers' self-reported stress levels and coping. The three class solution had the lowest BIC value. Additionally, the VLMR test indicated that the three class solution was significantly better than the two class solution and that the four class solution did not improve upon it. Fig. 1 summarizes the prevalence and characteristics of the three profiles. The majority of teachers (66%) fell into a normative, “high stress/high coping” class. The second highest class (28%) was characterized as a maladaptive, “high stress/low coping” class. The smallest group (6%) was adaptive, “low stress/high coping” profile (see Fig. 1).



**Table 4**  
Latent profile analysis fit indices.

LC	AIC	BIC	Adj BIC	VLMR LRT	Entropy
2 class solution	880.85	899.22	877.11	0.00	0.88
<b>3 class solution</b>	<b>867.52</b>	<b>893.77</b>	<b>862.18</b>	<b>0.04</b>	<b>0.90</b>
4 class solution	865.30	899.42	858.36	0.27	0.86

Note. LC = latent class; AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = adjusted Bayesian information criterion; VLMR = Vuong-Lo-Mendall-Rubin; LRT-likelihood ratio test. **Bold** indicates best fit: The three-class solution had the lowest BIC and the VLMR LRT and the Bootstrap LRT indicated the 3-class solution provided a better fit than the 4-class solution. Entropy summarizes the posterior probabilities. Entropy values close to 1.0 indicate higher classification precision.



**Fig. 1.** Teachers' profiles of stress and coping with mean scores and standard deviations.

3.3. Validating profiles with baseline and prospective covariates

We next conducted simple equality of means tests to see if the three stress and coping profile types differed in their mean levels of teacher-reported efficacy and burnout; observed teacher use of reprimands; teacher ratings of parent involvement and student disruptive behaviors and prosocial skills; and student-reported depressive symptoms (see Tables 5 and 6). At baseline, the High Stress/

**Table 5**  
Baseline covariate means, standard errors, & equality of means comparison across teacher profiles of stress and coping.

	Class 1: High Stress/Low Coping	Class 2: Low Stress/High Coping	Class 3: High Stress/High Coping	Significant class comparisons
<i>Teacher functioning</i>				
Self-efficacy T1	6.21 (0.23)	7.75 (0.26)	7.32 (0.13)	Class 1 vs 2*** Class 1 vs 3***
Burnout T1	4.16 (0.32)	1.59 (0.20)	3.14 (0.14)	Class 1 vs 2*** Class 1 vs 3** Class 2 vs 3***
<i>Observed teacher behavior</i>				
Reprimands T1	0.42 (0.06)	0.36 (0.19)	0.40 (0.10)	–
Harsh reprimands T1	0.004 (0.003)	0.00 (0.00)	0.002 (0.001)	Class 2 vs 3*
<i>Teacher ratings</i>				
Parent involvement T1	3.29 (0.09)	3.72 (0.07)	3.34 (0.04)	Class 1 vs 2*** Class 2 vs 3***
Disruptive T1	1.95 (0.09)	1.63 (0.18)	1.90 (0.05)	–
Prosocial skills T1	4.33 (0.11)	5.04 (0.19)	4.47 (0.07)	Class 1 vs 2** Class 2 vs 3**
<i>Student report</i>				
Depression T1	6.19 (0.30)	5.92 (0.62)	5.48 (0.17)	Class 1 vs 3*

Note. T1 = Time 1 or baseline.

- \* p < .05.
- \*\* p < .01.
- \*\*\* p < .001.

**Table 6**  
Prospective variable means, standard errors, & latent class regression comparison across teacher profiles of stress and coping.

	Class 1: High Stress/ Low Coping	Class 2: Low Stress/ High Coping	Class 3: High Stress/ High Coping	Equality of means test	Regression analyses <sup>a</sup>	<i>d</i> <sup>b</sup>	<i>B</i> <sup>c</sup>
<i>Teacher functioning</i>							
Self-efficacy T4	6.97 (0.30)	7.72 (0.21)	7.51 (0.15)	Class 1 vs 2*	–	0.51	–0.21
Burnout T4	4.13 (0.32)	2.35 (0.59)	2.94 (0.34)	Class 1 vs 2** Class 1 vs 3**	Class 1 vs 3*	1.08	–0.11
<i>Observed behavior</i>							
Reprimands T2	0.37 (0.07)	0.34 (0.14)	0.48 (0.05)	–	–	–	–0.12
Reprimands T3	0.44 (0.09)	0.22 (0.09)	0.36 (0.04)	–	Class 1 vs 2*	0.52	–0.53
Reprimands T4	0.31 (0.05)	0.20 (0.09)	0.31 (0.04)	–	–	0.48	–0.40
Harsh reprimands T2	0.02 (0.01)	0.00	0.00	Class 1 vs 2**	Class 1 vs 2*** Class 2 vs 3*	0.50	–0.73
Harsh reprimands T3	0.01 (0.01)	0.00	0.01	Class 2 vs 3*	Class 1 vs 2**	0.30	–0.54
Harsh reprimands T4	0.002 (0.002)	0.009 (0.008)	0.004 (0.002)	–	–	–	–0.49
<i>Teacher ratings</i>							
Parent involvement T4	3.42 (0.08)	3.75 (0.07)	3.48 (0.05)	Class 1 vs 2** Class 2 vs 3**	–	0.89	0.02
Disruptive T4	2.02 (0.09)	1.62 (0.15)	2.02 (0.07)	Class 1 vs 2* Class 2 vs 3*	–	0.91	–0.24
Prosocial skills T4	4.39 (0.10)	5.20 (0.13)	4.50 (0.08)	Class 1 vs 2*** Class 2 vs 3***	Class 1 vs 2*	1.69	0.36
<i>Student report</i>							
Depression T4	6.87 (0.27)	4.90 (0.75)	5.51 (0.21)	–	–	1.41	–0.53

Note. T1 = Time 1, baseline, October; T2 = Time 2, December; T3 = Time 3, February; T4 = Time 4, April/May.

<sup>a</sup> Analyses account for clustering and control baseline score of targeted outcome, cohort, school, and intervention status.

<sup>b</sup> Unadjusted *d* for Class 1 vs Class 2.

<sup>c</sup>  $\beta$  for Class 1 vs Class 2 controlling for baseline score and intervention status.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

Low Coping class had significantly lower levels of self-efficacy and higher levels of burnout compared to the other two classes ( $d > 1.0$  for all comparisons). Additionally, the most adaptive class (low stress and high coping) had significantly lower levels of burnout than the High Stress/High Coping class ( $d = 1.41$ ). Although there were no significant differences at baseline on teacher use of reprimands between classes, the Low Stress/High Coping class had significantly lower levels of *harsh* reprimands than the High Stress/High Coping class. Additionally, this adaptive class had significantly higher parent involvement ratings from teacher report ( $d = 1.05$  and  $1.23$ , respectively) and student prosocial skills ( $d = 1.29$  and  $1.01$ , respectively) at baseline compared to both other classes. Although the comparison of disruptive behaviors was not significant between classes, the effect sizes favoring the most adaptive class were in the moderate range (0.66–0.70) suggesting low power may explain the lack of significance. Finally, students of teachers in the least adaptive class (High Stress/Low Coping) had significantly higher levels of depression than students in the High Stress/High Coping class ( $d = 0.49$ ). Many of these findings using a simple equality of means test persisted over time (see Equality of Mean column results in Table 6).

### 3.4. Prospective outcomes: multiple regression analyses

A more rigorous analysis of prospective outcomes involved using multiple regression to account for clustering of students within classrooms (for student level outcomes) and to control baseline scores on each targeted outcome and for intervention status, school, and cohort (see Table 6). Specifically, in these analyses, we regressed each outcome on class membership, intervention status, school, cohort, and baseline scores (on outcome variable of interest). Analyses focused on predicting observed harsh reprimands and reprimands each included three separate outcome timepoints, Times 2–4. Analyses with harsh reprimands as the outcome revealed that the High Stress/Low Coping class had significantly higher levels of harsh reprimands at Time 2 compared to the High Stress/High Coping class ( $\beta = -0.55$ ) and the Low Stress/High Coping class ( $\beta = -0.73$ ); and at Time 3 compared to the Low Stress/High Coping class ( $\beta = -0.54$ ). Class membership did not predict harsh reprimands at Time 4.

In analyses focused on predicting Time 2–4 reprimands, the High Stress/Low Coping class had significantly higher levels of reprimands at Time 3 compared to the Low Stress/High Coping class ( $\beta = -0.53$ ). Class membership did not predict reprimands at other time points.

Analyses on other outcomes including student prosocial behavior, disruptive behavior, depression, family involvement, and teacher burnout and efficacy focused on Time 4 scores as these were the only prospective timepoint for these variables. With Time 4 prosocial skills at the outcome, students in the Low Stress/High Coping class were rated as having significantly higher levels of

prosocial skills at the end of the year compared to those in the High Stress/Low Coping class ( $\beta = 0.36$ ). For Time 4 burnout, The High Stress/Low Coping class had significantly higher levels of burnout at the end of the year compared to the High Stress/High Coping class ( $\beta = -0.34$ ). Although comparisons of student disruptive behaviors and depression were not statistically different, the unadjusted effect sizes (Cohen's  $d$ ) for the differences between the Low Stress/High Coping class and the High Stress/Low Coping class were large (0.91–1.41) and the  $B$ 's for comparisons controlling for baseline scores represented small ( $-0.24$ ) and moderate ( $-0.53$ ) effects. Class membership did not predict Time 4 teacher efficacy or family involvement.

#### 4. Discussion

Consistent with study hypotheses, we found three profiles of stress and coping in a middle school sample of teachers. These profiles were uniquely associated with nearly all of the concurrent measures of teacher functioning and behavior as well as with measures of parent and student functioning. In particular, the least adaptive class, characterized by high levels of stress and low coping, had consistently lower levels of self-efficacy and higher levels of burnout. The most adaptive class, characterized by low stress and high coping, had the lowest levels of harsh reprimands and the highest levels of teacher reported parent involvement and student prosocial skills. Finally, the most common class, characterized by high stress and high coping, had students with the lowest levels of depression at baseline. Several of these comparisons persisted over time.

The present findings replicate and extend a prior study, which had found differing teacher profiles of stress and coping in an elementary sample. In both studies, the adaptive class of high coping and low stress was the least common; only 6% fell into this profile type in the present study versus 7% in the elementary sample. One difference between the two studies was that the elementary sample had a four profile pattern with the added profile being a variation of the high stress and high coping class found in the present study. Additionally, perhaps because this “in between” class did not emerge in our middle school sample, the least adaptive class was much larger in the present study (27% versus 3%). It is not clear if these differing subtypes and prevalences are due to differences between elementary and middle school teacher experiences or simply an artifact of two different samples. It is worth noting that both studies occurred in the same school districts, so geographical or district level differences would not explain these findings.

Regardless, in both studies the subgroup characterized by high stress and low coping had the most negative present and future correlates. In the present study, this teacher profile type was associated with higher levels of concurrent and prospective burnout. Additionally, effect sizes of direct observations suggested they were more likely to use reprimands and harsh reprimands at the beginning of the year and at midyear follow-ups (Time 3). Although the end of year observations yielded moderate adjusted and unadjusted effects sizes, these comparisons were not statistically significant. This least adaptive coping class of teachers also had low levels of teacher reported parent involvement and student prosocial skills as baseline and follow-up, and students in their classrooms were more likely to have disruptive behaviors and report depressive symptoms. Notably not all prospective analyses were significant. For instance, although class membership had significant concurrent and prospective relations with family involvement, and student disruptive behaviors, it did not predict unique variance of either of these outcomes when controlling for baseline levels of the outcome. Of student-level outcomes, only student prosocial skills differed between classes at follow-up when controlling for baseline scores, however, suggesting that class membership covaries with and predicts the maintenance of existing student problems in these other student level factors (disruptive behaviors, depressive symptoms, and parent involvement). Similarly, although class membership had significant concurrent and prospective relations with teacher-level variables including reprimands, harsh reprimands, efficacy and burnout, it only uniquely predicted burnout at Time 4 and harsh reprimands at Times 2 and 3 after controlling for baseline levels of these outcomes. A similar interpretation is warranted for these teacher-level results (e.g., class membership predicted the emergence of new levels of burnout and harsh reprimands at these timepoints and predicts that maintenance of teacher level effects for the other variables).

These findings are largely consistent with the theories guiding our work (Jennings & Greenberg, 2009; Lazarus & Folkman, 1984) which suggests that low levels of teacher reported coping in the context of their stressful jobs affects their self-perceptions, their interactions with and perceptions of parents and students, and ultimately students' emotional and behavioral wellness. However, that class membership predicted the worsening of only certain problems (e.g., mid-year reprimands, harsh reprimands, and end of year prosocial skills and teacher burnout) suggests a reciprocal relation between teacher stress and coping and these other outcomes. The worsening of teacher interactions (as evidenced by increasing reprimands), student prosocial skills, and teacher burnout is consistent with the idea that teacher stress leads to worse outcomes over time. However, teacher stress and coping had sustained relations, not worsening, with many other outcomes here including disruptive behaviors, student depression, parent involvement, and teacher self-efficacy. Thus, temporal sequence (e.g., did teacher stress precede student and teacher problems or vice versa) cannot be established by these findings.

##### 4.1. Implications

The results of our study support previous research that has shown that teaching is very demanding and stressful (Johnson et al., 2005). In our study, the two latent classes with the majority of teachers (94% of the teachers in the study) reported high stress. While teaching may be highly stressful, negative outcomes of prolonged stress can be mitigated with effective coping capabilities and resources. In line with the transactional theory, our findings indicate that stress alone is not associated with negative outcomes. Two latent classes had comparably high levels of stress and yet negative concurrent and prospective outcomes were only associated with the class with low levels of coping. That is, despite the majority of teachers reporting high stress, the latent class with the majority of teachers (66%) also reported high coping levels and comparable outcomes as the most adaptive class with lower stress levels. The

smaller class of teachers who reported high stress and low coping (28%) may be the teachers who would benefit the most from an intervention to promote the use of effective coping strategies.

The LPA results illustrated that the teachers who were in the profile with the highest risk factors (high stress and low coping) were also the most likely to report that they experienced feelings of burnout and lowered teaching self-efficacy. There are a few promising interventions to equip teachers with coping skills. Programs to reduce teachers' stress can target the sources of stress, like reducing disruptive child behaviors, or also target teacher perceptions or reactions to stressors, for example by increasing the use of mindfulness techniques (Herman & Reinke, 2015; Jennings et al., 2017). Our study suggests that programs to reduce teacher stress could be more efficiently used by first identifying teachers who are experiencing high stress and also not coping well with their stress and targeting these teachers for intervention. By using both stress and coping indicators, we can better pinpoint those teachers who need support, resources, and interventions so they feel more agency to cope in their high-demand profession.

The findings also may have implications for prior studies showing that student engagement declines during middle school (Marks, 2000) and that teacher-student relationships are especially potent predictors of student outcomes at this age (Roorda et al., 2011). Here we found evidence showing that stress and coping patterns of middle school teachers are associated with their reports of emotional exhaustion and their observed interaction patterns with students in the classroom. To the extent teachers using more punitive strategies in their classroom interactions harms student perceptions of their relationships with the teacher, it likely contributes to student disengagement and lower academic performance. Thus, interventions to support teacher coping and reduce stress holds promise for altering this cycle of interaction during this critical period of youth transition and development.

The study provides further support for the use of single-item measures to screen and identify teachers who may be at risk for problems with stress and coping and ultimately for burnout (see also, Boyle et al., 1995; Elo et al., 2003; Kyriacou, 2001; Kyriacou & Sutcliffe, 1978). The items readily distinguished teachers into subtypes with a high degree of certainty as suggested by the high entropy value. Moreover, these subtypes were uniquely associated with many of the hypothesized covariates of teacher stress and coping. Continued use of these items in research and in practice holds promise for supporting teacher development and wellness. More work is needed to understand aspects of stress and coping that are tapped by single-item measures versus longer scales that assess more nuanced aspects of stress and coping. It is apparent from two studies (the present study and Herman et al., 2018) that single-item ratings of stress yield large subgroups of teachers (over 90% in both studies) who report high levels of stress; and that longer stress measures tend to identify a lower, though still high, prevalence of stress among teachers. Future studies are needed to examine these differences and how teachers are conceptualizing single, global items versus more detailed stress scales.

#### 4.2. Limitations

It is important to note that causal inferences are not warranted from the present findings given the longitudinal correlation design. An experimental design would be needed to test whether altering teacher stress and coping levels (for instance, by randomly assigning teachers to receive a stress and coping intervention) causes changes in teacher perceptions and behaviors and/or in student outcomes. Additionally, the present study occurred in the context of a large group randomized trial that involved an intervention for half the teachers. We controlled for intervention status in the prospective analyses; although this was not ideal, the strength of effect sizes noted for these prospective findings suggest baseline profiles of stress and coping may independently relate to several teacher outcomes even in the context of intervention. These findings alone suggest the promise of replicating these findings in a larger naturalistic and longitudinal sample.

As noted many of the subsequent analyses were underpowered given the small subsamples that resulted from parsing the overall sample into three subgroups. We opted not to adjust for multiple comparisons given power concerns and the reporting of effect sizes as indicators of promise. Thus, some of the significant findings linking stress and coping profiles to future teaching practices and student outcomes should be interpreted with caution given the higher possibility of false positive errors in this study. Future studies are needed to replicate these findings in another middle school sample of teachers. Additionally, future research should examine the growth patterns of observed teaching practices and determine if stress and coping patterns might predict the slope of these practices over multiple timepoints versus the singular timepoints examined in this study. Although we had originally planned to examine student performance on standardized achievement tests, the study design made these comparisons challenging, especially given the small sample size of the adaptive class. The original design randomly assigned math and reading teachers together to the intervention and control conditions. Thus, the target academic outcome of interest would split the already small sample size in half (e.g., we would only expect a math teacher's stress and coping levels to impact their students' performance on a math related exam). For example, post hoc analyses revealed that only two reading teachers appeared in the adaptive class; thus, mean scores for such a small subsample were not particularly meaningful. Future research is needed to examine the longitudinal relations between teacher stress and coping and student achievement. Of potentially most interest, experimental designs are needed to determine if teacher stress and coping patterns are causally related to student achievement.

Given that the family involvement measure and some of the student outcomes were given by teacher report, we cannot rule out the possibility of teacher bias in these reports influenced by response set. That is, teacher stress and coping may influence their ratings of students and parents beyond objective measures of these constructs. Regardless, teacher ratings of parent and student behavior predict objective youth outcomes over time. Whether or not these influences are rooted in teacher bias or objective behaviors, or likely a combination of both, that teacher stress and coping profiles are linked to teacher ratings of youth behaviors and outcomes provides support for the importance of intervening at the level of teacher stress. Additionally, the findings that indicated teachers may have differed in their objective use of reprimands and that students in less adaptive teacher classrooms reported higher levels of depressive symptoms suggest the effects of teacher stress on teacher ratings is more than simply due to teacher response set.

One further caveat that warrants attention is that the focus of this study was on teacher experiences of stress and coping. The single-item measures of stress and coping are limited in that they do not assess for the various stressors contributing to distress or specific coping strategies, which together may suggest areas of intervention to improve teacher outcomes. Given that nearly all teachers reported moderate to high levels of stress in this study, it is important to consider also the socio-contextual factors that contribute to these experiences of teachers. Supporting teacher coping in such contexts can only be one part of the solution. The small number of teachers in the adaptive class also raises the question of whether, aside from individual coping and personal qualities, these teachers were experiencing unique organizational support and had access to more positive work environments that we did not assess in this study. Much more work is needed to find ways for school administrators and policymakers to make schools more conducive places for adults to work and to reduce the number of teachers who feel high levels of work-related stress.

## 5. Conclusion

Teacher stress management is an important area of inquiry because of its implications for teacher health, well-being, and persistence in the profession. Additionally, supporting teacher coping is important because of its relation to youth outcomes. Supporting adaptive coping in teachers has the potential to reduce teacher attrition and improve youth social and behavioral health particularly when combined with efforts to improve school environments by reducing the burden and challenges experienced by so many teachers.

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