

Attitudes and Affect: Daily Emotions and Their Association with the Commitment and Burnout of Beginning Teachers

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Background/Context: *The increasing number of districts implementing mentoring and induction programs suggests that policymakers are aware of the need to increase the support available to new teachers. The argument underlying many of these programs is based, at least partly, on assumptions about beginning teachers' emotional responses to their work. Yet while considerable research has studied the effects of induction programs, few researchers have rigorously collected data on how beginning teachers' affective experiences seem to impact their career plans.*

Purpose of the Study: *We tested a framework developed in the organizational behavior literature known as affective events theory (AET), which proposes that emotional responses to work, coupled with abstract beliefs about one's job, can influence overall judgments about job satisfaction. Specifically, we drew on research from education and organizational behavior to test whether mean levels of positive affect, negative affect, skill, and fatigue are associated with intentions to remain in teaching (i.e., commitment to one's teaching assignment), commitment to one's school, and levels of burnout.*

Research Design: *Sources of data in this study include survey data collected at two time points (fall 2007 and spring 2008) from 42 beginning general and special education teachers in three districts in Michigan and Indiana, as well as data collected using the experience sampling method (ESM), a time sampling method for gaining information about individuals' immediate experiences. The inclusion of both data sources allowed us to capitalize on the richness of the ESM data—which accounts for variation in teachers' momentary affective states—while also supporting the data with more traditional survey measures.*

Conclusions/Recommendations: *We found that mean levels of positive affect and skill are positively associated with commitment, even when controlling for prior commitment. Similarly, negative affect and tiredness seem to be predictive of teacher burnout. These results suggest that, by taking account of teachers' emotional reactions to their work (in addition to features of their work environments), researchers, policymakers, and district administrators will be better positioned to support special and general educators during their early years of teaching.*

In addressing the high rates of attrition in the teaching workforce, researchers have increasingly looked to the loss of beginning teachers, or what Ingersoll (2001a, 2001b) referred to as the “revolving door” of teaching. As reported by Johnson and her colleagues, teachers frequently enter the profession with a “tentative commitment” to teaching. Whether they decide to pursue teaching as a long-term career is based partly on personal characteristics (such as age and teaching assignment) but is also likely to depend on experiences at school, such as administrative support, access to resources, and opportunities to collaborate with colleagues (e.g., Johnson, Kardos, Kauffman, Liu, & Donaldson, 2004; Peske, Liu, Johnson, Kauffman, & Kardos, 2001; Weiss, 1999).

A number of recent studies have investigated the effect of district policies aimed at reducing beginning teacher attrition on relevant outcomes such as teacher commitment, teacher retention, and student performance. In particular, considerable attention has been paid to the role of mentoring programs—which establish formal relationships between beginning teachers and experienced teachers—although empirical evidence regarding the programs' effectiveness has been mixed. Mentoring has been associated with increased teacher retention (Smith & Ingersoll, 2004) and student learning gains (Fletcher, Strong, & Villar, 2008). In a recent large-scale experimental study, Glazerman and colleagues (2010) found no significant effects of 2 years of comprehensive mentoring on teacher retention or teacher practices; however, while there was no impact on student achievement in the teachers' first 2 years, in the 3rd year, there was a positive and statistically significant impact on achievement in reading and math.

Glazerman et al.'s findings are in line with research suggesting that when induction programs rely on formal mentoring, they may not take account of the role that other school-based colleagues play in the socialization of teachers (Kapadia, Coka, & Easton, 2007). Kapadia and colleagues found that, compared to formal mentoring, informal support from colleagues had a stronger effect on novice teachers' career decisions. Meanwhile, research at the local level confirms the importance of informal support from colleagues (Johnson & Birkeland, 2003; Kardos, Johnson, Peske, Kauffman, & Liu, 2001). Johnson and Birkeland, for example, interviewed 1st- and 2nd-year teachers across 3 years of teaching, finding that schools that promoted frequent interactions between colleagues were more successful at retaining teachers.

In sum, existing research suggests that the organizational context can play a role in beginning teachers' retention decisions. However, lacking in the literature are data on how teachers *experience* these conditions, as well as how these experiences in turn seem to influence career decisions. It is possible, for example, that two teachers could react to the same set of organizational conditions in different ways; whereas colleague support

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may be the critical factor for one teacher, feelings of success related to student achievement may be more important for another. The question then becomes how do organizational features translate into judgments about staying in teaching (and, more specifically, within a particular school)? What is the process by which teachers interpret aspects of their job environment and then make decisions about whether to stay or leave?

This paper advances a framework for understanding how teachers' emotional responses to their daily work seem to be related to their perceptions of their jobs, drawing on Weiss and Cropanzano's (1996) affective events theory (AET). The AET model describes the process through which individuals' environments shape their momentary emotional responses to work, and how affect, in the aggregate, influences job attitudes and behaviors. Central to this framework is a definition of emotions as affective responses to specific events, implying that emotions are not static but are instead likely to change depending on a person's interactions with their environment (Frijda, 1993; Lazarus, 1991). We can apply this theory to novice teachers by asking whether their momentary emotional responses predict more global job attitudes such as burnout, motivation, and commitment, each of which is likely to influence teachers' quality of instruction and decisions related to retention. To test this framework, we investigated teachers' momentary affective responses to experiences in schools using a unique time sampling method known as the experiencing sampling method (ESM). These data were then used to test models predicting survey responses measuring teacher attitudes, including burnout and commitment to one's current teaching position and one's school.

LITERATURE REVIEW

Existing research investigating teachers' affective responses to their work has typically focused either on the feelings associated with specific aspects of teaching, such as how teachers respond to new school policies or interactions with students, or on teachers' attitudinal evaluations of their work (e.g., their reflections on job manageability, stress and burnout, and commitment to the job). These strands of research can be thought of as the short- and long-term expressions of teachers' affective states, or alternatively, as *local* and *global* dimensions of attitudes about teaching.

TEACHERS' EMOTIONAL RESPONSES TO WORK

In a recent review of research on teacher emotions, Sutton and Wheatley (2003) noted: "There is surprisingly little recent research about the emotional aspects of teachers' lives" (p. 327), an observation also made by Nias (1996). The authors partially attribute this to the recency of the study of emotions in psychology. As a field, psychology paid little attention to emotions until the early 1980s; thus, it is not surprising that it has taken some time for findings from psychology to be applied to educational research.

That being said, there is emerging evidence that teachers' emotional responses to work vary by career stage, teaching context, and other key factors (Day & Leitch, 2001; Dinham & Scott, 1998, 2000; Hargreaves, 2001; Hargreaves, Beatty, Lasky, Schmidt, & Wilson, 2006; Jeffrey & Woods, 1996; Little, 1996). Drawing on interviews with elementary and secondary school teachers in Canada, Hargreaves (2001) used the concept of "emotional geographies of teaching" to understand how teachers respond emotionally to the conditions and interactions of their work; he defined these emotional geographies as "the spatial and experiential patterns of closeness and/or distance in human interactions and relationships that help create, configure, and color the feelings and emotions we experience about ourselves, the world and each other" (2001, p. 1061). Thus, emotional geographies shape the kinds of interactions teachers have with other individuals at school and have important consequences for the nature of their work. For example, Hargreaves found that whether teachers and their students' parents were from similar cultural, linguistic, and/or socioeconomic backgrounds had important consequences for how teachers responded emotionally to interactions with parents, which in turn shaped the nature and frequency of future interactions.

Hargreaves and colleagues have extended the study of teachers' emotions to other aspects of teachers' work lives, including their emotional responses to interactions with students (Hargreaves, 2000) and to serving as department chairs (heads) in secondary schools (Schmidt, 2000). In addition, researchers have investigated secondary school teachers' responses to comprehensive school reforms (Lasky, 2005; Little, 1996); Lasky, for example, found that these reforms frequently constrained teachers' sense of agency. These studies advance research on teachers' emotions by acknowledging that teachers' affective responses are likely to vary depending on their (a) schooling level; (b) work context (e.g., interacting with students versus interacting with parents); (c) role (e.g., teacher, department chair, etc.); and (d) reform context.

Closely related to the literature on teachers' emotions is the study of teacher self-efficacy, or teachers' belief that they have the skill required to produce outcomes in a given situation (Bandura, 1977). Bandura has suggested that individuals' affective states are closely tied to their self-efficacy; positive emotional states are predicted to

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increase individuals' levels of self-efficacy, while negative emotional states are predicted to have inverse effects. Related to teachers, Tschannen-Moran, Hoy, and Hoy (1998) defined self-efficacy as their ability to "execute a course of action" in order to complete a specific task in a specific context; they make determinations of their own abilities given the current situation at hand. For example, a teacher may have a strong belief in his or her ability to teach math, but given his or her students' backgrounds or school-level constraints, the teacher may not be able to achieve optimum results.

Drawing on this research, Ashton and Webb (1986) have demonstrated that a teacher's sense of self-efficacy influences his or her willingness to put forth effort in his or her instruction, as well as how the teacher structures his or her instructional time. Studies in educational research have used the idea of self-efficacy in explaining student achievement (Ashton & Webb, 1986; Ross, 1992) and student motivation (Midgley, Feldlaufer, & Eccles, 1989). And, although self-efficacy has been applied to the study of new teachers (Chester & Beaudin, 1996) and the commitment of teachers to their schools (Chan, Lau, Nie, Lim, & Hogan, 2008; Coladarci, 1992), the relationship between new teachers' self-efficacy and commitment has gone relatively ignored. One can imagine that teachers who feel more efficacious in their daily work are likely to experience greater levels of satisfaction with their jobs and to be more committed to their positions, but greater work needs to be done in this area.

Teaching and Teacher Education. Recent publications have appeared in *Teachers College Record*, *Educational Administration Quarterly*, and *Journal of Education Policy*.

TEACHERS' ATTITUDES ABOUT WORK

Separate from research on teachers' emotions, several studies have attempted to tease out the causes and consequences of teachers' summative attitudes about their work. A common response to overwhelming or negative job circumstances is a high level of stress, which, when unaddressed over a long period, can undermine teachers' satisfaction with their work. The term *burnout* has been used to describe the results of this process.

According to Maslach and Jackson (1981), burnout can be defined along three dimensions: *emotional exhaustion*, *depersonalization*, and *reduced personal accomplishment*.² Their Maslach Burnout Inventory has been a useful tool for analyzing how a negative work experience affects teachers, and allows researchers to place teachers on a continuum of burnout. Research confirms that stress and burnout are problematic for the physical and psychological health of teachers (Cherniss, 1995; Gold, Roth, Wright, & Michael, 1991; Guglielmi & Tatrow, 1998). Additionally, recent studies confirm that for both experienced (Weisberg & Sagie, 1999) and beginning general education teachers (Goddard & Goddard, 2006), burnout is associated with intentions to leave the profession. Similarly, for special education teachers, burnout is also predictive of attrition (Miller, Brownell, & Smith, 1999; Singer, 1993).

A second relevant attitudinal outcome in educational research is *commitment*—both to one's instructional assignment and to the school organization. Ingersoll (2001b) argued that commitment is a more relevant outcome variable for policymakers than retention itself because commitment more closely reflects attitudes about one's job; retention decisions, meanwhile, may result from circumstances not having to do with work itself (e.g., the desire to move out of the area, start a family, or pursue additional schooling). That being said, commitment has been shown to be predictive of career decisions (Weisberg & Sagie, 1999; Weiss, 1999). Commitment also has been a useful construct for understanding how characteristics of individuals' work environments predict intentions to stay in the profession. Ebmeier (2003) has tied teacher commitment to teacher effort and effectiveness, and his findings suggest that commitment is predicted by relationships with teacher colleagues, a finding supported in other research (Bryk & Schneider, 2002; Desimone, Porter, Garet, Yoon, & Birman, 2002).

THEORETICAL FRAMEWORK

To better understand the processes by which daily experiences seem to affect novice teachers' attitudes about teaching, we draw on literature from the field of organizational behavior. Researchers in this area have paid close attention to the definition of job satisfaction, particularly its causes and consequences. Emerging from this research is agreement that in explaining individuals' job satisfaction, it is not sufficient to look only at their cognitive evaluations of their work environments. There is an affective, or emotional, dimension of the evaluation process that is also important. As Weiss and Cropanzano (1996) suggested, "satisfaction is an evaluative judgment about one's job that partly, but not entirely, results from emotional experiences at work. It also partly results from more abstract beliefs about one's job" (p. 2). Similar explanations for how individuals make evaluations about their jobs are offered elsewhere in this literature (Crites, Fabrigar, & Petty, 1994; Eagly & Chaiken, 1993; Petty, Wegener, & Fabrigar, 1997).

In affective events theory (AET), Weiss and Cropanzano argued that a primary determinant of job satisfaction is an individual's real-time affective reactions to events at work. Over time, these daily emotional responses become just as critical for evaluations about work as an individual's perception of their work environment. The central construct in their theory is "affective reactions," which are triggered by specific work events. Drawing on

research by Frijda (1993) and Morris (1989), Weiss and Cropanzano differentiated between two forms of affective reactions: emotions and moods. Emotions, the authors suggested, are responses to specific events and are thus likely to be intense but short-lived, while moods reflect general affective states and are more likely to be detached from specific work events. Despite this distinction, the two affective reactions are frequently related to one another: a mood may predispose someone to have a certain emotional response to a situation, while certain emotional responses may carry over and affect one's mood. Finally, AET suggests that emotions and moods are influenced by experiences at work, and are thought to have direct consequences for work attitudes.

Weiss and Cropanzano (1996) also argued that work environments influence job attitudes by making affect-producing events more or less likely. Research confirms the important role of characteristics of the work environment. LeFevre (1988) concluded that emotional well-being at work varied by position, with managers and engineers reporting higher levels of motivation, concentration, and creativity than clerical workers and assembly-line workers. Studies by Larson and Richards (1994) and Basch and Fisher (2000) have documented that emotional experiences at work depend on the activities in which individuals engage. Further, Basch and Fisher found that the same types of events do not always produce the same emotions across participants, suggesting that "event-emotion connections" are individual-specific.

Finally, affective events theory suggests that emotional responses to work, coupled with abstract beliefs about one's job, influence overall judgments about job satisfaction. Individuals make evaluations based not only on beliefs about characteristics of their jobs (e.g., the degree to which the job fosters independent decision-making) but also on their recall of experiences. Weiss and Cropanzano suggested that individuals are likely to rely on these events because they are *concrete* and *tangible* (p. 50). This viewpoint is supported by organizational research comparing affect-based and belief-based evaluations of work, which finds that both are important components of attitudes (Breckler & Wiggins, 1989; Edwards, 1990).

Empirical data from outside the field of education support Weiss and Cropanzano's assertion that affective responses are associated with overall job satisfaction (Fisher, 2000, 2002; Weiss, Nicholas, & Daus, 1999). Fisher (2000) considered the relationship between real-time emotions during the workday and overall job satisfaction, using the ESM. She found that momentary reports of positive and negative emotions at work were associated with overall job satisfaction, and she reported that the frequency of positive emotions was a better predictor of satisfaction than the intensity of emotions. Weiss and colleagues (1999), meanwhile, collected data on 24 managerial workers four times a day over 16 days; their results suggest that average levels of pleasantness are correlated with overall job satisfaction.

Despite the prominence of this line of research in organizational behavior, studies in education have rarely investigated how teachers' emotional experiences in the workplace shape their intentions to remain in teaching. Too frequently, in linking organizational context to teacher outcomes such as commitment and retention, the role of teachers' affective responses has been assumed without being directly studied. This paper, therefore, represents an attempt to better estimate the role of affect in the work of teachers; in particular, this paper tests the association between beginning teachers' daily affective experiences and their global attitudes about their work.

Note that this investigation does not focus on all relationships within affective events theory, but instead tests its central concept—whether momentary affect, in an aggregate state, appears to influence summative attitudes about teaching.

Drawing on research from education and organizational science, four teacher emotions were measured in this study—positive affect, negative affect, skill, and tiredness (fatigue). In prior research testing affective events theory, positive affect and negative affect at work have been shown to consistently predict job satisfaction (e.g., Fisher, 2000, 2002; Weiss et al., 1999). We anticipated that higher levels of positive affect in day-to-day experience would increase teacher commitment, while high levels of negative affect would have the opposite effect. We further theorized that positive affect would protect against burnout (and that negative affect would intensify these attitudes). In addition, our decision to include "feeling skilled" was based on evidence supporting the idea that teachers' levels of self-efficacy predict their commitment to teaching (Chan et al., 2008; Coladarci, 1992). With literature suggesting that burnout is the result of accumulated exhaustion (Maslach, 1982), we lastly included a measure for tiredness, which we predicted would undermine commitment attitudes.

Two conceptual definitions of affective reactions were tested to determine which was a stronger aggregation strategy: person-level means were used to represent average emotions across the work week, while individuals' "peak" emotions were used to investigate the impact of event-specific emotions on teacher attitudes (i.e., individuals' most intense experiences of the emotion, relative to their person-level averages). While Weiss and Cropanzano used the concept of job satisfaction to summarize individuals' attitudes about work, this study

utilized two attitudinal outcomes from the literature on factors influencing teacher attrition: burnout and commitment. Specifically, the study was designed to address the following research questions:

(a) Are beginning teachers' affective responses to work (i.e., their reported levels of positive affect, negative affect, tiredness, and skill) associated with levels of burnout, controlling for their prior levels of burnout? (b) Are beginning teachers' affective responses to work associated with their levels of commitment, controlling for teachers' prior levels of commitment? (c) Which ESM-based measure of teachers' emotions is more strongly associated with global measures of teacher attitudes—aggregated means of participants' emotions or aggregate measures based on teachers' maximum reported levels of emotions?

METHOD

SAMPLE

The sample consisted of 42 first-, second-, and third-year teachers in grades 1–8 from three school districts in Michigan and Indiana. The teachers in this sample were all participants in a larger 3-year study of beginning teachers in several urban districts in the two states; the sample of the larger study was approximately 240 novice general education and special education teachers.³ In selecting districts in our sample, our goal was to recruit districts that were medium to large and were hiring large numbers of beginning teachers. Given the tight fiscal climate in both states, the number of districts hiring new teachers was limited. As a result, the districts in the sample look different from one another in terms of size, percentage of low-income students, and percentage of minority students. The three districts—Daus, Kaline, and Engram⁴—ranged in enrollment from about 9,000 students to approximately 19,000 students in grades K–12, with Daus the largest of the three. The districts were fairly similar in the percentage of their students eligible for free or reduced-price lunch, ranging from 42% to 59%. Finally, the districts varied in the percentage of their students who were racial minorities, ranging from 12% in Daus⁵ to 50% in Kaline.

In selecting teachers to participate in this study, we recruited general and special education teachers who met the following criteria: they were teaching full-time, they had earned a standard teaching certificate, and they had completed university-based teacher preparation programs. Additionally, only teachers who provided instruction in the core content areas in grades 1–8 were invited to participate, which for the general education teachers in our sample meant that they either provided instruction at the elementary school level (grades 1–5) or taught at the middle-school level in language arts, history/social studies, mathematics, and science. Of the special education teachers, we included only teachers who provided academic instruction in language arts and/or mathematics in grades 1–8 (i.e., we excluded individuals who did not provide instruction, such as school psychologists and speech pathologists).

In total, in the three sampled districts, 92 teachers completed fall and spring surveys. Fifty-one of these teachers agreed to participate in the ESM study; however, only 42 teachers were included in the final ESM sample because some met the criteria for inclusion in the larger study but not the ESM study. To address concerns that participants in the ESM study differed in important ways from other beginning teachers in their districts, comparisons were made between (a) the ESM participants in this study and (b) non-ESM participants who completed surveys for the larger study. With respect to key demographic characteristics, the sample of ESM teachers was largely representative of the full sample of teachers from the three districts participating in the larger study. Further, when the survey responses regarding their intentions of staying in their current positions were compared, there were no significant differences between ESM and non-ESM participants. The two groups were similar with regard to their commitment, and they did not differ in their average levels of stress and burnout.

The 42 teachers in the resulting sample varied in their years of experience, with a larger number of 2nd-year teachers (22) than either 1st-year (11) or 3rd-year teachers (9). Thirty-nine of the teachers in the sample were White, and 35 of the 42 teachers were female; however, both numbers are in line with national averages. Our final sample consisted of 26 general education teachers and 16 special education teachers. Although there were differences among the special education teachers with respect to their teaching assignments (i.e., 4 taught in resource classes, 3 were in coteaching arrangements, and 9 taught in self-contained classrooms), they did not differ significantly from one another in their levels of commitment or their levels of burnout. The same is true for the distinction between elementary teachers ($n = 27$) and middle school teachers ($n = 15$); i.e., there were no significant differences in the outcome variables between the two groups. Finally, the sample included a disproportionate percentage of teachers (64%) from the Indiana district, Engram.

DATA AND MEASURES

This study used data from two different sources, including survey data collected at two time points—in fall 2007 and spring 2008—and data from a signal-contingent time sampling method known as the ESM. The surveys included questions related to the teachers' backgrounds, professional preparation, instructional practices, and the nature and frequency of their interactions with mentors and colleagues, and experiences in their schools. Of particular interest to the current study were the questions that asked beginning teachers about the degree to which their work had made them feel burned out, as well as questions about their commitment to teaching. These questions were asked on both the fall and spring surveys, allowing us to track change across the school year.

The ESM is a week-long data collection activity in which participants respond to signaling devices (such as beepers, watches, or personal digital assistants) that are preprogrammed to beep eight times a day for 7 days, randomly within 2-hour time intervals (Csikszentmihalyi, 1997; Csikszentmihalyi & Larson, 1987; Prescott, Csikszentmihalyi, & Graef, 1981).⁶ When beeped, respondents complete brief questionnaires asking about their primary and secondary activities, their thoughts, their location, and their affective experiences at the time they were signaled. Because the data were collected at random, and because participants provide multiple responses to the same measures, the ESM can limit the recall error associated with other survey methods; further, the ESM has been shown to have high levels of reliability and validity (Csikszentmihalyi & Larson, 1984; Hektner, Schmidt, & Csikszentmihalyi, 2007; Robinson, 1985).

The ESM questionnaire and response procedures were adopted from Schneider and Waite's *500 Family Study* (2005). All ESM participants participated in the ESM process during the same school week in May of 2008, beginning on a Sunday and continuing through the following Saturday. Upon entering the raw data into a data file, two trained coders, using coding schemes adopted from previous ESM studies, coded each of the open-ended questions about participants' activities, locations, and thoughts; interrater reliability for the coding of ESM activities ranged from .75 to .90. To focus specifically on times when teachers were at work, two steps were taken to restrict the total number of teachers' responses. First, data collected on Saturday and Sunday were excluded, resulting in responses only during the 5-day workweek (Monday–Friday). Second, teachers' responses were included only when they were at school, which resulted in using 773 of the 1,233 observations across all teachers.

Teachers' Emotions at School

The ESM data provide a rich and informative picture of individuals' daily experiences, allowing a variety of emotions across multiple contexts to be measured. The current analysis focused on teachers' emotions at work, employing four emotion variables—positive affect, negative affect, skill, and being tired (fatigue). The composite variable for positive affect was constructed from the mean of the scale variables for happy, cheerful, friendly, and relaxed; negative affect was the mean of the scale variables for angry, frustrated, irritated, lonely, nervous, worried. Both composite variables had an internal consistency (Cronbach's alpha) of higher than .80. The remaining emotions included in the analysis—skill and fatigue—come from single scale measures of emotion. Responses on these single items ranged from 0 (*not at all*) to 3 (*very much*). Table A1 in Appendix A provides information on the descriptive statistics for these variables, as well as information about their construction.

To allow for regression analyses, it was necessary to develop person-level aggregates of the four ESM emotion variables. In correlations with job satisfaction, such aggregates of mood and emotion have been shown to provide comparable results to multilevel models (see Fisher, 2000). Two definitions of affect were therefore developed, a person-level mean and a person-level maximum. Person-level means and maximums were created using only teachers' responses when they were at school. For the person-level maximums, beep-level z scores were first calculated, representing how far from their average emotional states participants varied when beeped at a given time point. Then, for every participant, maximum z scores when at work were calculated.⁷

Teachers' Work Attitudes

To measure teachers' evaluations of their jobs, composite variables were created for two concepts frequently employed in literature on the predictors of teacher attrition: burnout and commitment; separate composites were made for the fall survey and for the spring survey. The burnout variable was based on the Maslach Burnout Inventory and consisted of the following items: I feel emotionally drained from my work, I feel used up at the end of the workday, I feel fatigued when I have to get up in the morning and face another day on the job, I feel burned out from my work, I feel frustrated by my work, I feel I'm working too hard on my job. Responses on these single measures ranged from 1 (*strongly disagree*) to 4 (*strongly agree*) $\alpha = .91$; the fall composite variable for burnout had a mean of 2.52 and a standard deviation of .74, while the spring composite variable for burnout had a mean of 2.53 and a standard deviation of .75. While it appears that average levels of burnout did

not change from fall to spring, when prior burnout was regressed on spring burnout, the residuals for the sample did not violate assumptions of normality.

To reflect the various ways in which teachers might conceptualize their future career plans, two measures of commitment were developed: commitment to school and commitment to teaching assignment. We expect that the former more closely reflects a teacher's perception of his or her current teaching situation, namely his or her investment in relationships with colleagues and the school organization, while the latter provides a more abstract sense of a teacher's commitment to his or her grade or subject area, irrespective of his or her current school. For the commitment to teaching assignment variable, elementary school teachers were asked about their commitment to their grade, and middle school teachers were asked about their commitment to their subject area. While it is likely true that these two concepts are not synonymous (e.g., changing grade assignments for elementary school teachers is likely easier than changing subject assignments for middle school teachers), we did not see any significant differences in the results when running the models separately for the two categories of teachers. Further, there are challenges related to changing one's teaching assignment that are likely common across elementary and middle school teachers, such as learning a new curriculum. Composite variables for each definition of commitment were created by calculating the mean values of teachers' plans for the upcoming school year and their plans for 5 years from now (see Table A1 in Appendix A for means and standard deviations for each commitment measure).

Of the two measures of commitment, only commitment to teaching assignment was correlated with the emotion variables of interest, once controlling for prior levels of commitment; the correlations between each of the emotion variables and the study's dependent variables can be found in Table A2 in Appendix A. Consequently, this was the only definition of commitment included in the final analyses. One could argue that the commitment to assignment variable may not fully encompass the ways that teachers think about their career plans. However, of the two definitions, commitment to assignment most likely reflects a strong overall measure of commitment to the profession, as it asks teachers to comment on their career plans irrespective of their current school and district. Responses on the commitment to assignment variable ranged from 1 (*strongly disagree*) to 5 (*strongly agree*); the mean for fall commitment was 4.14 with a standard deviation of 1.14, while the mean for spring commitment was 4.08 with a standard deviation of 1.02.

Teacher Demographics

The models also included a series of variables indicating characteristics about the teachers in the sample, including whether they taught general education or special education, whether they were in middle school or in elementary school, and their years of teaching experience. Teaching experience was classified as a binary variable, with 2nd- and 3rd-year teachers being collapsed into one category; this step accounted for the unique factors facing 1st-year teachers, including negotiating new relationships with colleagues and students, and implementing curriculum for the first time. Finally, teacher race and gender were included in the models, although the majority of the teachers in the sample were White females.

ANALYTIC APPROACH

This study investigates associations between in-the-moment emotional responses to teaching and attitudinal evaluations of work, in the form of teachers' reported levels of burnout and commitment. Analyses were conducted separately for each emotional predictor of interest; multiple emotions could have been included in the same model, yet many of the predictors were moderately correlated with one another. Thus, for every emotion, its relationships with burnout and commitment were investigated independently. We also included prior measures of the attitudinal outcomes, which allowed us to account for many differences among teachers that were manifest at the time the prior measure was obtained (Allison, 1990).⁸ In addition, each model controlled for several demographic characteristics (i.e., whether the teacher taught special education, whether he or she was in elementary school or middle school, and whether he or she was a 1st-year teacher); race and gender were also included in the regression models. The two aggregates of affective responses (*mean* and *max*) were also compared to determine which served as a better predictor of teacher attitudes.

Quantifying the Robustness of the Inference

To address potential concerns about omitted confounding variables, we attempted to quantify the robustness of our inferences using indices developed by Frank and colleagues (Frank, 2000; Frank & Min, 2007; Pan & Frank, 2003). That is, we quantified the robustness of our inferences with respect to concerns about omitted confounding variables using Frank's (2000) impact threshold. We then put the omitted variable concern into context by comparing the threshold to the impacts of measured covariates. The steps taken in this sensitivity analysis are discussed in greater length in the Results section.

RESULTS

COMPARING MEAN AND MAX CONSTRUCTS OF TEACHER EMOTIONS

One of the goals of this study was to determine whether teacher emotions were better estimated using mean variables (the average of teachers' responses across the ESM data collection) or max variables (the maximum value that teachers reported during the week, relative to their overall means). Thus, for each of the four emotional predictors (positive affect, negative affect, fatigue, and skill), separate regression models were run using both the mean and max constructs. In all models, the mean aggregates were stronger predictors of both burnout and commitment than the max aggregates; no max predictor was significant at $p \leq .10$ for burnout or commitment. Further, in some cases, the coefficients changed direction when using maximum values, often in ways that did not make intuitive sense. For example, while mean negative affect was positively associated with spring burnout, the association between maximum negative affect and spring burnout was negative but not significant. These results suggest that average emotional states across the week were more salient for teachers' job attitudes than peak emotions at single time points. In addition, given the relatively weak correlations between the mean and maximum aggregates, this would seem to indicate that estimates of emotions at any one time point were unlikely to represent teachers' overall moods. Consequently, the final models in Table 1 and Table 2 include only the mean constructs of positive affect, negative affect, skill, and fatigue.

TEACHER EMOTIONS AND BURNOUT

As shown in Table 1, the results of this analysis indicate that even when controlling for prior levels of burnout, there is a moderate association between two of the four emotional variables and burnout. Mean negative affect (the composite of the degree to which participants felt angry, frustrated, irritated, lonely, nervous, stressed, and worried) had a standardized coefficient of .46, and was significant at $p \leq .01$, while mean tiredness was statistically significant at $p \leq .05$ and had a standardized coefficient of .35; the R^2 for the two models were .53 and .47, respectively. Further, although they were not included in the final models, interaction terms between each of these emotions and prior burnout were not associated with spring levels of burnout. This suggests that the association between negative emotions and levels of burnout was strong, regardless of whether teachers felt burned out at the prior time point.

Table 1. Affective Models for Predicting Teacher Burnout – Spring

Independent variable	(1)		(2)		(3)		(4)	
	OLS regression (SE)	Standardized coefficient	OLS regression (SE)	Standard. coefficient	OLS regression (SE)	Standard. coefficient	OLS regression (SE)	Standard. coefficient
Burnout – Fall	.50** (.19)	.49	.37** (.14)	.37	.55** (.15)	.53	.52** (.14)	.51
<i>Teacher emotions</i>								
Positive affect	-.12 (.19)	-.12						
Negative affect			1.07** (.33)	.46				
Skill					-.13 (.20)	-.09		
Tiredness							.48* (.20)	.35
<i>Teacher characteristics</i>								
Elem. school teacher	.04 (.24)	.02	-.01 (.21)	.00	.00 (.24)	.00	-.17 (.23)	-.11
Special ed. teacher	.40^ (.24)	.26	.36^ (.21)	.23	.42^ (.24)	.27	.34 (.22)	.22
First-year teacher	-.18 (.26)	-.10	-.09 (.23)	-.05	-.17 (.27)	-.10	-.03 (.25)	-.02
White	.15 (.43)	.05	.03 (.37)	.01	.11 (.43)	.04	-.04 (.42)	-.01
Female	-.14 (.42)	-.06	-.33 (.30)	-.14	-.27 (.35)	-.12	-.13 (.34)	-.06
Intercept	1.63 (1.04)		1.18 (.53)		1.42^ (.80)		.80 (.58)	
<i>R-squared</i>	.38		.53		.38		.47	

Note. ^ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$ (two-tailed).

The remaining two mean emotion variables, positive affect (the mean of teachers' levels of feeling happy, cheerful, friendly, and relaxed) and skilled had negative coefficients of -.12 and -.13, respectively, but neither was significant at $p \leq .10$; each model had an R^2 of .38. Despite the relatively small coefficients in each model, the direction of these relationships is suggestive of a potential mediating role of positive emotional experiences

in reducing teacher levels of burnout. Overall, the data indicate that the mean negative emotions contributed to burnout more than either mean positive affect or mean levels of feeling skilled contributed to reducing burnout.

Of the variables representing teachers' demographic characteristics, special education was the only one associated with teacher burnout independent of the mean emotional variables and prior burnout. In the model with the skilled variable, special education status was significant at $p \leq .10$; in each of the other models, the standardized coefficient for teaching special education was at least .20. Interaction terms between special education and the four mean emotion measures were nonsignificant when included in each of the models, however, suggesting that the mean emotions did not have a differential impact on burnout across the two groups of teachers. These results are in line with previous research by researchers in special education who have indicated that a high level of burnout is a primary cause of special education teacher attrition (Miller, Brownell, & Smith, 1999; Singer, 1993). Neither year of teaching nor the elementary/middle school distinction was associated with burnout emotions and prior burnout were controlled for.

TEACHER EMOTIONS AND COMMITMENT TO ASSIGNMENT

The results from the regressions predicting teacher commitment to assignment are shown in Table 2. In each of the four models, prior commitment had standardized coefficients ranging from .47 to .51, all of which were significant at $p \leq .01$. Of the four mean emotion variables, positive affect and feeling skilled both had moderate associations with teachers' levels of spring commitment, with standardized coefficients of .34 and .30; both relationships were significant at $p \leq .05$. The R^2 for positive affect (.44) was slightly higher than the R^2 of skilled (.42)—yet both values were smaller than the R^2 values for the relationships between emotions and burnout. The relationship between mean negative affect and spring commitment was significant at $p \leq .10$, with a standardized coefficient of -.16, suggesting that when teachers experience feelings of negative affect, it may reduce their commitment throughout the school year.

As in the models predicting burnout, there was a negative association between teaching special education and commitment to assignment—independent of teacher emotions and prior commitment—with standardized coefficients in the four models ranging from -.29 to -.31. In addition, interaction terms were again created to test the joint effects of teaching special education and having high average values for each of four mean emotion variables, yet none of these variables were significant. The results are also suggestive of a negative association between 1st-year teachers and level of commitment, as well as a small positive association between elementary school teachers and level of commitment; however, given the size of the standard errors of these variables (relative to special education), these findings should be interpreted with caution.

ROBUSTNESS OF INFERENCE

Although our models included controls for prior levels of the two outcome variables (i.e., commitment and burnout), the observational nature of these data limit our ability to make causal claims regarding our findings. Specifically, our estimates may be biased due to one or more unobserved confounding variables (Rosenbaum, 2002; Shadish, Cook, & Campbell, 2002).

Therefore, we used Frank's (2000) method of calculating an impact threshold to determine how large the impact of an unobserved confound would need to be to invalidate the inference that mean levels of daily emotions are related to teachers' attitudes about teaching; for applications of this approach, see Crosnoe (2009), Frank et al. (2008), and Maroulis and Gomez (2009). By quantifying the robustness of our inferences, we are not eliminating the threat of omitted variable bias. We recognize that no matter how many statistical controls we employ, there will be inevitable concerns about missing covariates. Instead, the method provides context for our findings by moving us away from a discussion of whether a confound exists and instead focusing on how large a confound's effect would need to be to invalidate our findings.

For ease of interpretation, we present findings from only one model: the association between negative affect and teacher burnout (Model 2 in Table 2); this represented the strongest association between an emotion variable and one of the attitudinal outcomes. The description of this method and the steps taken in this analysis are described in greater detail in Appendix B. With a sample size of 39 and six covariates, the threshold for statistical significance, $r^{\#}$, is 0.337. Our observed t ratio of |3.28| translates to a correlation between mean negative affect and burnout of $r = .48$. From Equation 2 in Appendix B, the *impact threshold* = $(r - r^{\#}) / (1 - |r^{\#}|) = (.48 - .34) / (1 - .34) = .24$; adjusting for the presence of other covariates in the model, the impact of an unmeasured confound would have to be greater than 0.195 to invalidate our inference. Put another way, the confounding variable would have to be correlated with mean negative affect at .46 and with teacher burnout at

.42 to invalidate our inference. These are zero-order correlations, which assumes that the unmeasured confound is uncorrelated with the measured covariates (Frank, 2000). This is a conservative estimate; correlations that were partialled for other variables would likely be smaller.

To put the size of this impact threshold into context, we can compare this value to the impact of a measured covariate. In Model 2 (in Table 2), the variable for teaching special education was positively associated with teacher burnout. To calculate the impact of special education on the association between negative affect and burnout, we can calculate the product of the correlation of special education with negative affect (.06) and the correlation of special education with burnout (.28); the resulting impact (.02) is far less than our impact threshold of .20. Even the impact of prior burnout on the association between negative affect and burnout (.16) is less than the impact threshold. Taken together, these results suggest that while an unmeasured confound could exist, it would need to have a larger impact than any of our measured covariates and would require a strong theoretical claim for its basis.

DISCUSSION

The purpose of this study was to investigate the possible influence of teachers' in-the-moment responses to their work on overall job attitudes—namely their stated levels of burnout and their future career plans with respect to teaching in their grade or subject. In doing so, the analysis tested a framework developed in organizational behavior known as affective events theory (AET), which proposes that emotional responses to work, coupled with abstract beliefs about one's job, influence overall judgments about job satisfaction. Further, AET posits that emotions provide a theoretical link between workplace conditions and work attitudes; it is by influencing the kinds of events that individuals experience (and respond emotionally to) that work context potentially affects job satisfaction. Studies in organizational behavior have empirically tested these relationships and shown that emotional responses play an important role in evaluations of work (Fisher, 2000, 2002; Weiss et al., 1999). However, despite the potential contribution of this theory in predicting teacher's attitudes about their jobs (as well as their future career decisions), no studies have made use of this framework in educational research. This study, therefore, represented an initial application of affective events theory in predicting beginning teachers' levels of commitment and burnout.

Three questions were proposed to investigate these relationships. First, the study analyzed the degree to which four categories of emotional responses to work—teachers' levels of positive affect, negative affect, skill, and tiredness—seemed to predict burnout in spring 2008, controlling for prior burnout and several teacher demographic characteristics. Second, the same set of emotional items was analyzed to determine how well they predicted teacher commitment. Finally, two different conceptualizations of teacher affect were compared—one based on peak levels of emotion at school and the other based on average levels of emotion at school over the work week.

In line with Weiss and Cropanzano's affective events theory, our results support the hypothesis that daily emotional experiences, when taken in the aggregate, are an apparent predictor of attitudes about work. Our regression analyses provide evidence of a moderate association between teachers' average levels of emotions at work—namely, their mean levels of "negative affect" and "tiredness"—and their stated levels of burnout. Mean negative affect was also shown to be negatively associated with teachers' career plans. The results also indicate that positive emotional experiences (i.e., mean positive affect and mean skill) are associated with teachers' plans to stay in teaching. And, although the data in the current study do not speak to teachers' actual career decisions (only their stated career plans), the association between teacher emotions and commitment is important given studies that have linked commitment to retention (Weisberg & Sagie, 1999; Weiss, 1999).

Our findings complement previous research in and outside education. In studies of workers across occupations, Fisher (2000, 2002) and Weiss and colleagues (1999) have demonstrated that positive affect and negative affect make unique contributions to job satisfaction. We find a similar result when predicting teacher commitment, but we also show that the teachers in our sample who have higher levels of commitment also seem to exhibit higher average levels of feeling skilled. Our findings also suggest that burnout, a concept used less frequently in organizational science, is worthwhile to include when information on attrition is not available. In educational literature, considerable attention has been paid to burnout as a predictor of teacher turnover (e.g., Cherniss, 1995; Gold et al., 1991; Guglielmi & Tatrow, 1998), but our findings point to specific daily affective reactions, including feelings of tiredness and negative affect, that are associated with feeling burned out. Finally, with regard to teacher commitment, our findings add to a growing body of research identifying characteristics of teachers' work experiences that shape their intentions to leave teaching (e.g., Ebmeier, 2003; Ingersoll, 2001b; Weiss, 1999). A recent study by Chan and colleagues (2008) most closely mirrors our results; they showed that personal factors such as teacher self-efficacy can play a mediating role in the relationship between work conditions and teacher commitment. Our results suggest a similar association between teachers' perceptions of their skill and their intentions to stay in teaching, further emphasizing the need to be mindful of teachers' environments, as well as their responses to these environments.

A secondary goal in this study was to distinguish between two competing definitions of affective responses. Based on comparisons of models that separately tested the association of these variables with teacher attitudinal outcomes, it appears that—in comparison to the max variables—the mean variables seemed to more strongly predict both burnout and commitment. While it is likely true that teachers consider particularly salient experiences when assessing future career plans, our results provide initial evidence that teachers' levels of commitment are based less on specific moments than on average emotions over time. It could also be the case that two teachers would respond differently to the same affective experience, which would have also have consequences for their global attitudes about work. For example, individual teachers likely vary in how they respond to a negative interaction with a colleague; some may compartmentalize the experience while others may linger on the interaction, which may then be reflected in their work attitudes.

Of the teacher characteristics that were controlled for in the analysis, only the distinction between special education and general education teachers was significant when predicting commitment. The lower levels of commitment among special education teachers in our sample echoes the results of Smith and Ingersoll (2004), who found that beginning special education teachers were more than 2.5 times as likely to leave the profession as teachers in other disciplines. We know from previous literature that a primary determinant of attrition for special educators is a difficult work environment, including inadequate time to complete tasks, limited instructional guidance, and an abundance of administrative paperwork (Billingsley, Carlson, & Klein, 2004; Gersten, Keating, Yovanoff, & Harniss, 2001; Mastropieri, 2001; Miller et al., 1999). As a result of these challenging conditions, special educators have frequently reported experiencing increased levels of role ambiguity, professional isolation, and exhaustion (Billingsley & Cross, 1992; Kilgore, Griffin, Otis-Wilborn, & Winn, 2003; McLeskey, Tyler, & Flippin, 2004). Although the reasons for commitment differences between special education and general education teachers were not the focus of this study, our findings suggest that even when controlling for teachers' daily affective responses to teaching, these differences remain.

LIMITATIONS

We acknowledge that our small sample size and the correlational nature of our data limit the generalizability of our findings in some ways. However, while the nature of this study is exploratory, we have taken steps to strengthen our design. First, we included prior measures of our outcomes (i.e., burnout and commitment), which allowed us to account for many of the differences among teachers that were present when the prior measure was obtained (Allison, 1990). Second, in addition to using the same survey instrument at two points across the school year, we also incorporated data from a second instrument, drawing on the affective variables provided by the ESM data. Finally, we attempted to quantify the robustness of our inferences by employing Frank's (2000) impact threshold. The goal of this analysis was to answer the question of how large a confounding variable would have to be to invalidate our inferences regarding the association between our affect measures and attitudinal outcomes. As the results of our analysis reveal (of the robustness of our finding related to the association between negative affect and burnout), it would require a large unmeasured covariate to invalidate our findings. That being said, despite these analytic strategies, we recognize that further work on teacher emotions and their effect on job attitudes is still warranted.

A second concern is that the surveys from which our outcome variables (commitment and burnout) were drawn were administered relatively close to the collection of the ESM data (the data collection was separated by approximately 1 month). Thus, although we theorize that momentary affective responses (i.e., local measures of emotions and mood) become aggregated into attitudinal evaluations of individuals' work (i.e., global measures of job satisfaction), an argument could also be made that equally important is the impact of the global on the local, or how job attitudes influence individuals' daily affective states. To disentangle these associations, extensions of this research could address these concerns by collecting ESM data at multiple time points throughout the year, incorporating data on teachers' actual retention decisions, and following Fisher's (2002) approach of using structural equation modeling to estimate antecedents and consequences of affective experiences at work. Structural equation modeling has the additional advantage of allowing the researcher to investigate the direction of relationships, which would more clearly address the interplay between workplace emotions and workplace attitudes. Despite this limitation in our data, our findings suggest that affective variables are an important (and underutilized) predictor of teachers' retention plans.

Our study included teachers with varying instructional assignments, yet comparisons between categories of teachers were difficult to detect given the limitations of our sample size. Other than teaching special education, neither year of teaching nor level of teaching (i.e., elementary vs. middle school) was significantly associated with burnout or commitment. While this speaks to the predictive strength of the special education/general education distinction (even with a sample that included only 16 special education teachers), it also suggests that the sample was too small to distinguish between other differences in teacher characteristics. For example, while the results for teaching special education were rather straightforward (i.e., special education teachers felt more burned out and less committed than general education teachers), the association between being a 1st-year teacher and the two outcomes was less easily interpretable: the 1st-year teacher variable was consistently

negative in predicting commitment to assignment but was also consistently associated with lower levels of burnout. Perhaps with a larger sample, the nature of these relationships would become more evident.

Another shortcoming of the current analysis was that it focused on only one relationship within Weiss and Cropanzano's theory. Although the main argument of AET is that emotions at work aggregate into attitudes about work, the authors also use affective responses as a way to bridge the relationship between work conditions and job satisfaction. We expect that specific contexts at work—such as instruction, meetings with colleagues, or even something as minor as bus duty—would result in a variety of affective reactions. In prior analyses of the current sample of teachers (Jones & Youngs, 2009), we found that when engaged in instruction, the teachers in the sample experienced significantly higher than average levels of skill, challenge, engagement, self-esteem, and activation. Meanwhile, when doing activities such as planning, paperwork, or grading, the teachers in the sample reported lower-than-average levels of positive affect, enjoyment, and challenge. We suspect that if a similar approach were used to investigate how, for example, beginning teachers responded to a district's induction policies or to in-depth professional development, it would provide us with a better understanding of the aspects of teachers' work environments that are likely to motivate their decisions to either stay in or leave teaching.

IMPLICATIONS

This study supports previous literature on the beginning years of teaching, a period which researchers have referred to as "sink or swim" or "trial by fire" (Gold, 1996; Ingersoll & Kralik, 2004; Lortie, 1975). From the onset, the novice teacher often faces the same duties and expectations as a veteran teacher but must simultaneously navigate the unfamiliar terrain of teaching without experience or practical knowledge to fall back on. A new teacher's success depends on his or her ability to achieve multiple goals: the teacher must acquire instructional and classroom management skills, become familiar with district curricula, and adapt to the professional norms and procedures of his or her individual school. And, the learning curve is steep—teachers are to acquire their knowledge through experience, learning what does and does not work through practice. From this perspective, this study's findings—that teachers' daily emotions predict their burnout as well as their commitment to teaching—are what we might expect: navigating their multiple roles and responsibilities can take an emotional toll on beginning teachers.

The increasing number of districts implementing mentoring and induction programs suggests that policymakers are aware of the need to increase the support available to new teachers. The argument underlying many of these programs is based, at least partly, on assumptions about teachers' emotional responses to work. It is presumed that, in the face of undesirable work conditions, teachers will feel less attached to their jobs, and will be more inclined to leave their position. And research confirms this to be the case; teachers in challenging positions, such as teaching special education or teaching in an urban school, are more likely to leave their positions than other teachers (Billingsley, Carlson, & Klein, 2004; Lankford, Loeb, & Wykhoff, 2002; Miller, Brownell, & Smith, 1999).

Yet while considerable research on beginning teachers has studied the effects of teacher induction programs, few studies have rigorously collected data on how teachers' actual experiences affect their career plans. By connecting the fine-grained emotion data of the ESM to longitudinal survey responses on teachers' attitudes about their jobs, this study has presented some initial evidence that teachers' affective responses to their work play an important role in teachers' judgment about their jobs. While the size of our sample precluded us from focusing specifically on teachers' emotional responses to aspects of induction (e.g., professional development, formal mentor meetings, observations with principals), the findings on teachers' general emotional states are potentially significant for the training of new teachers. In particular, our findings suggest that two categories of emotions—positive affect and perceptions of skill—may increase beginning teachers' commitment levels. While districts may not be able to influence teachers' affective states directly, the districts can modify teachers' work environment to increase the likelihood that teachers experience positive emotions or, conversely, to limit the teaching conditions that are likely to produce negative affective responses.

Although our study focused on novice teachers, one could expect similar results for *any* group of teachers facing new uncertainties in their work, whether it is taking on a new math curriculum, or beginning a coteaching arrangement as a result of inclusion of students with disabilities, or becoming accountable for student performance on standardized tests. Research on policy implementation has long noted the importance of accounting for local actors' responses to reform. For example, McLaughlin (1987, 1990) has suggested that it is essential to understand how individuals' "incentives and beliefs" shape their responses to policy. More recently, Coburn (2001, 2005) and Spillane, Reiser, and Relmer (2002) have suggested that a key aspect of policy implementation is teacher cognition and sense making. Our study would seem to hold promise for further informing this line of research; we suggest that, in addition to cognition, there is an affective element to implementation to which policymakers should attend.

Finally, although the results presented here focus on teacher outcomes, it is also likely that teachers' emotional states have consequences for students. Sutton and Wheatley (2000) speculated that there are numerous ways in which students are directly influenced by teachers' emotions; citing studies such as Patrick, Alderman, Ryan, Edelin, and Midgley (2001), they suggest that students respond positively to teachers' expressions of positive emotions, such as enthusiasm and care. There is also some evidence from special education research suggesting that teachers' expressions of anger and pity are likely to be based on student ability levels—i.e., teachers expressed pity when interacting with students who they presumed to be low in ability, versus anger toward students who they thought were not exerting effort (Clark & Artiles, 2000). We expect that teachers' emotions would also have consequences for the quality of their instruction. This is in line with Buchmann's (1986) argument suggesting that teachers are likely to choose instructional activities in which they feel successful. Future research is necessary, however, to more closely examine the processes by which teachers' emotions influence their instruction.

Authors' Note

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Notes

1. Recent work by Winograd (2003) and Oplatka (2007) has investigated the function of emotion in teachers' classrooms, specifically how teachers can use emotion effectively in motivating students and in bringing about social change. Although these studies on the effects of teachers' emotions are important, they are beyond the scope of the current study.
2. In the context of teaching, emotional exhaustion exists when a teacher feels as if he or she does not have the emotional resources left to continue his or her work. Depersonalization involves feeling detached from work and from interactions with their students. When teachers feel a sense of reduced personal accomplishment, they do not feel like their efforts at work are worthwhile.
3. The larger study is funded by the Carnegie Corporation of New York and examines how mentoring, social networks, and district policies are associated with beginning teachers' commitment, retention, and instructional practices, as well as student learning gains. This study began in 2006–2007 and continued through the 2008–2009 school year.
4. Pseudonyms were used to protect the districts' identities.
5. In Daus, almost 90% of the students in 2007–2008 were classified as White, although this included a large number of English-language learners.
6. Beep schedules vary by study design. Our approach was signal-contingent sampling, in which signaling devices are programmed to emit signals eight times randomly across a 16-hour period (from 7:00 a.m. to 11:00 p.m.), with no two beeps occurring less than 30 minutes apart.
7. For the *maximum* variable, z scores were used rather than raw scores because, across the sample, participants made full use of the response categories. As a result, when person maximums were calculated using the raw scores, there was little variation between individuals. In contrast, the z scores produce a more accurate reflection of deviation from person averages.
8. As described by Allison (1990), an alternative approach for controlling for the dependent variable at a prior time point is a change model where the dependent variable is represented as $Y_2 - Y_1$. As a result, all of the models in this analysis were also run using change scores as outcomes. In most cases, the coefficients for the significant predictors were similar across models. However, unlike in the models that controlled for prior commitment, the models using change scores produced higher coefficients for "skilled" in predicting spring commitment.
9. We are aware that statistical significance is not sufficient for causal inference (Wilkinson et al., 1999). However, statistical significance is often the first threshold in a two-step procedure for making causal inferences, "where first the likelihood of an effect (small *p* value) is established before discussing how impressive it is" (Wainer & Robinson, 2003, p. 25). That is, most social scientists are uncomfortable making causal inferences if their estimated effect (or something more extreme) could have occurred more than a small percentage (e.g., 5%) of the time by the chance of sampling when in fact the null hypothesis is true.
10. The expressions can be easily adapted to focus on one component correlation when researchers have specific prior beliefs about the strength of the other correlation. The expressions can also be modified to account for the presence of other covariates in the model. See Frank (2000).

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APPENDIX A

SUPPLEMENTAL TABLES

Table A1

Description of Variables

	Description		Mean	SD
I. Dependent variables				
Burnout	Composite measure taken from the survey questionnaire, consisting of 6 questions: I feel emotionally drained from my work, I feel used up at the end of the workday, I feel fatigued when I have to get up in the morning and face another day on the job, I feel burned out from my work, I feel frustrated by my work, I feel I'm working too hard on my job. Responses on single measures ranged from 1 (<i>strongly disagree</i>) to 4 (<i>strongly agree</i>). ($\alpha = .91$)	Spring	2.53	.75
		Fall	2.52	.74
Commitment to assignment	Composite measure taken from the survey questionnaire, consisting of two questions: I would prefer to continue teaching in this assignment next year, I could see myself teaching in this assignment in 5 years. Responses on individual measures ranged from 1 (<i>strongly disagree</i>) to 5 (<i>strongly agree</i>). ($\alpha = .87$)	Spring	4.08	1.05
		Fall	4.14	1.14
Commitment to school	Composite measure taken from the survey questionnaire, consisting of two questions: I would prefer to continue teaching in this school next year, I could see myself teaching at this school in 5 years. Responses on individual measures ranged from 1 (<i>strongly disagree</i>) to 5 (<i>strongly agree</i>). ($\alpha = .84$)	Spring	3.81	1.31
		Fall	3.95	1.22
II. Independent variables				
Positive affect	Taken from the ESM questionnaire. Beep-level composite variable including the following scale variables: strong, happy, cheerful, relaxed. ($\alpha = .84$)	Aggregate (person raw-score mean)	4.18	.75
		Aggregate (person z score max)	1.48	.51

Negative affect	Taken from the ESM questionnaire. Beep-level composite variable including the following scale variables: angry, frustrated, irritated, lonely, nervous, stressed, worried. ($\alpha = .86$)	Aggregate	4.17	1.22
		(person raw-score mean)		
		Aggregate	2.72	.83
		(person z score max)		
Skill	Taken from the ESM questionnaire. Beep-level response to the question: "As you were beeped, were you feeling skilled?" Responses ranged from 0 (<i>not at all</i>) to 3 (<i>very much</i>).	Aggregate	2.17	.56
		(person raw-score mean)		
		Aggregate	1.12	.81
		(person z score max)		
Tiredness	Taken from the ESM questionnaire. Beep-level response to the question: "As you were beeped, were you feeling tired?" Responses ranged from 0 (<i>not at all</i>) to 3 (<i>very much</i>).	Aggregate	1.14	.55
		(person raw-score mean)		
		Aggregate	1.28	.56
		(person z score max)		
III. Control variables				
Special education	Dummy variable where 0 = general education teacher and 1 = special education teacher			
Elementary school	Dummy variable where 0 = middle school teacher and 1 = elementary school teacher			
First-year teacher	Dummy variable where 0 = not a first year teacher and 1 = first year teacher			
Gender	Dummy variable where 0 = male and 1 = female			
Race	Dummy variable where 0 = non-White and 1 = White			

Table A2

Correlations for Variables Used in the Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Burnout	1.00											
Commitment (Assignment)	-0.52*	1.00										
Commitment (School)	-0.24	0.43*	1.00									
Positive affect (Mean)	-0.37^	0.36^	-0.04	1.00								
Positive affect (Max)	-0.32^	0.18	0.22	-0.10	1.00							
Negative affect (Mean)	0.62*	-0.21	-0.08	-0.20	-0.07	1.00						
Negative affect (Max)	-0.20	-0.01	-0.21	0.26	-0.10	-0.45	1.00					
Skill (Mean)	-0.22	0.27	-0.11	0.33*	0.04	-0.05	-0.03	1.00				
Skill (Max)	-0.02	-0.17	0.13	-0.30^	0.12	-0.13	0.00	-0.20	1.00			
Tiredness (Mean)	0.45*	-0.01	0.29	-0.27	-0.08	0.66*	-0.33^	-0.29	-0.01	1.00		
Tiredness (Max)	0.01	-0.09	-0.16	0.01	-0.35^	0.02	0.24	-0.38*	-0.11	-0.06	1.00	

Note. ^ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$ (two-tailed).

APPENDIX B

METHOD FOR CALCULATING AN IMPACT THRESHOLD

We quantified the robustness of our inferences with respect to concerns about omitted confounding variables using Frank's (2000) impact threshold for a confounding variable. Frank (2000) begins by defining the *impact* of a confounding variable on an estimated regression coefficient as $r_{v \cdot y} \times r_{v \cdot x}$, where $r_{v \cdot y}$ is the correlation between a covariate, v , and the outcome, y ; and $r_{v \cdot x}$ is the correlation between v and x , a predictor of interest (e.g., x is an indicator of negative affect). Critically, the product $r_{v \cdot y} \times r_{v \cdot x}$ captures both the relationship between the confounding variable and the outcome and between the confounding variable and the predictor of interest.

Moreover, it is through the *impact* that multiple regression adjusts for covariates as in the following expression for a correlation between x and y , partialling for v :

$$r_{x \cdot y|v} = (r_{x \cdot y} - r_{v \cdot y} r_{v \cdot x}) / ((1 - r_{v \cdot y}^2)(1 - r_{v \cdot x}^2))^{1/2}.$$

(1)

Equation 1 shows that any reduction in the partial correlation must be attributed to $r_{v \cdot y} \times r_{v \cdot x}$ because the correlations in the denominator will serve only to increase $r_{x \cdot y|v}$ relative to $r_{x \cdot y}$.

To obtain the impact of an omitted confounding variable necessary to invalidate an inference, define $r^\#$ as a quantitative threshold for making inferences from a correlation; i.e., $r^\#$ can be defined by a correlation of a specific magnitude (e.g., an effect size). Here, $r^\#$ is defined by statistical significance.⁹ Given the definition of $r^\#$, Frank (2000) shows that the inference would be invalidated if

$$impact > (r_{x \cdot y} - r^\#) / (1 - |r^\#|).$$

(2)

Thus, the quantity $(r_{x \cdot y} - r^\#) / (1 - |r^\#|)$ defines the impact threshold for a confounding variable; if there is a confounding variable with *impact* greater than $(r_{x \cdot y} - r^\#) / (1 - |r^\#|)$, then the relationship between the predictor and outcome, given the confound ($r_{x \cdot y|v}$), would fall below the threshold ($r^\#$) for making a causal inference.¹⁰ Thus, the impact threshold helps us quantify the robustness of our inferences to possible misspecification of our models.