

## Chapter 7

# Antecedents and Effects of Teachers' Emotional Experiences: An Integrated Perspective and Empirical Test

Anne C. Frenzel, Thomas Goetz, Elizabeth J. Stephens, and Barbara Jacob

**Abstract** In this chapter we focus on teacher emotions resulting from appraisals of success or failure (i.e., teachers' achievement emotions) with respect to achieving instructional goals. We present our theoretical assumptions and empirical findings regarding the antecedents and effects of achievement emotions more generally, and specify those for the context of teaching. Assuming that teachers' emotions impact their instructional behaviour and are affected by their appraisals regarding succeeding or failing during instruction, we propose a model depicting the interplay between teachers' emotions, their instructional behavior, and student outcomes. We present results from two quantitative studies testing assumptions brought forward by the model.

**Keywords** Classroom goals • Appraisals • Control-value theory

Emotions matter – this is the conviction and overarching theme of all of the contributions to this volume. First of all, emotions are considered important components of overall psychological well-being (Schimmack 2008), but also of psychological suffering (Posner et al. 2005). As such, emotions have been identified as important determinants of teacher burnout, early drop-out, and retirement rates in the teaching profession (Hughes 2001; Ingersoll 2002). From this perspective, teacher emotions necessitate empirical attention for the sake of teachers' well-being and health, and for political reasons, for example, in terms of societal costs involved in early retirement and health care for overtaxed teachers. Above and beyond the importance of emotions for teachers' own lives, emotions also serve as important factors guiding teachers' instructional behaviors. Teacher emotions thus have considerable implications for student learning, school climate, and the overall quality of education. From this perspective, teacher emotions demand empirical attention for the sake of student outcomes. This latter perspective predominantly guides our approach to research investigating teacher emotions. We seek to explore teacher emotions to

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A.C. Frenzel (✉)  
Department of Psychology, University of Munich, Munich, Germany  
e-mail: frenzel@psy.lmu.de

better understand classroom learning by linking teacher emotions, teaching behaviors, and student outcomes, which we consider to be more intricately intertwined than previously recognized in the literature on teacher emotions.

In the present contribution, we focus on the crucial teacher task of classroom instruction. In addition, we look at teacher emotions from an achievement perspective where the pursuit of success and avoidance of failure are central processes. That is, we focus on teachers' emotions resulting from their judgments of perceived success or failure with respect to their classroom goals (cf., Heckhausen 1989; Pekrun, 2000; 2006; Pekrun et al. 2007). We further focus on three important emotions, namely enjoyment, anger, and anxiety. These three emotions have been shown to be experienced most frequently in everyday life (Scherer et al. 2004) and there is preliminary empirical evidence that these three emotions play a prominent role in teaching (Sutton 2007; Sutton and Wheatley 2003).

In addressing teachers' enjoyment, anxiety, and anger related to classroom teaching, we divided the present chapter into two parts. To begin, we discuss our theoretical understanding of the antecedents and effects of emotional experiences and present corresponding empirical findings. In presenting the potential antecedents and effects of emotions, we first highlight the respective theoretical frameworks and then relate them to existing findings regarding teachers and the educational context. Integrating these perspectives on emotions in the classroom, we proffer a model of reciprocal causation between teacher emotions, teaching behaviors, and student outcomes. In the second part of the chapter, we present our own empirical data testing some of the assumptions of the proposed model and discuss related conclusions and implications for future research.

## **Antecedents of Teacher Emotions**

### ***An Appraisal – Theoretical Approach***

Human emotions are initiated and modulated in a number of different ways. For some emotions, there likely is an evolutionarily transmitted base (e.g., Cosmides and Tooby 2000), suggesting that emotional reactions to certain situations and events have proven adaptive over time. Similarly, focusing on immediate effects between situations and emotions, neurophysiological evidence implies that emotions may be the result of early conditioning which establishes direct links between situations, perceptions, and subcortical limbic emotional reactions (LeDoux 1995). However, it has also been argued that no direct link exists between situations and events and subsequent emotional experiences, rather these situations and events first have to be cognitively appraised in order to evoke specific emotions (Clore 1994; Lazarus 1991; Roseman 2001; Roseman and Smith 2001; Scherer et al. this volume). Our assumptions on the antecedents of emotional experiences is largely grounded in such an appraisal-theoretical approach to emotions.

Within the appraisal-theoretical framework, various appraisals have been proposed as potential antecedents of emotions. Among others, the most frequently referenced appraisals include *goal congruence* (also referred to as valence), *goal conduciveness*, *coping potential* (also referred to as control), *accountability* (also referred to as agency or locus of causation), and *goal significance* (e.g., Ellsworth and Scherer 2003; Roseman 2001; Scherer 2001).

Upon examination of this list of appraisals, it is apparent that goals play an important role in the appraisal process. If a situation is appraised as *congruent with and conducive to the attainment of one's goals*, one will tend to experience a pleasant emotion; if a situation or event is perceived as inconsistent with or an impediment to the attainment of one's goals, an unpleasant emotion will more likely be experienced.

The dimensions of coping potential and accountability play an important role in further specifying which discrete (as opposed to general pleasant vs. unpleasant) emotions are experienced. The appraisal of *coping potential* corresponds with the judgment of whether one has the personal resources to reach a desired goal or to avoid the non-attainment of a desired goal. This appraisal is particularly relevant for the formation of anxiety which is typically felt in the case of prospective goal-incongruence paired with low coping potential (Lazarus and Folkman 1984; Scherer 1993; Smith and Lazarus 1993).

The appraisal of *accountability* corresponds with a judgment regarding the assignment of responsibility to oneself or to another person should a desired goal be blocked. This appraisal is of particular relevance for the formation of anger, which is typically experienced in the case of goal-incongruence or goal-inconduciveness paired with other-accountability (Averill 1983; Kuppens et al. 2003; Parkinson 1999; Smith and Lazarus 1993; Weiner 2007).

Finally, regarding the appraisal dimension of *goal significance*, appraisal theory holds that the intensity of any emotional experience will be enhanced if a situation is appraised as significant or relevant to oneself. Situations and events relevant to us, and our attainment of subjectively important goals, involve us emotionally. In contrast, situations and events irrelevant to us "leave us cold", that is, we do not react emotionally.

### ***Classroom Goals and Their Appraisals as Antecedents of Teacher Emotions***

As stated above, our focus is on teachers' achievement emotions. In an achievement context, standards against which success and failure can be measured and corresponding goals that can be strived for are central themes; consequently, subjective appraisals of success (goal congruent) and failure (goal incongruent) can be considered crucial for the emergence of achievement emotions (Pekrun, 2000; 2006;

Pekrun, Frenzel et al. 2007; Weiner, 1985; 1986).<sup>1</sup> That is, to determine which emotions a person experiences in an achievement context, one needs to identify goals and resulting standards against which that person measures his or her success and failure.

For students, such achievement standards seem to be relatively well-defined, in addition students receive frequent formal assessments that serve as feedback regarding the degree to which they have reached these standards (e.g., grades). For teachers, however, achievement standards seem to be less evident and frequent or formal assessments and feedback are mostly lacking. This is particularly true for the German school system as opposed to the US system where recent policy has set relatively clear teacher standards in terms of student achievement on standardized tests (Peterson and West 2003). Therefore, we argue that defining success and failure for teachers is not so obvious. In order to be able to posit clear hypotheses about the antecedents and outcomes of teachers' emotions, we thus need to identify teaching *ideals*, that is, teachers' overarching visions of what they desire to accomplish through instruction, and infer the resulting *goals* (implying standards) teachers use to gauge their own success or failure.

We propose that teachers strive for three overarching instructional ideals. Specifically, via their instruction, teachers aspire to influence students' (a) cognitive growth (i.e., the acquisition of declarative and procedural knowledge in academic domains), (b) motivation (i.e. topic interest, the willingness to invest academic effort, self-regulation and goal setting), and (c) social-emotional skills (i.e., empathy and thoughtfulness towards classmates and the teacher, and student compliance with classroom and school rules, i.e., discipline). Such a threefold conceptualization of higher-order instructional ideals that define successful teaching is in line with existing models of teaching effectiveness (Seidel and Shavelson 2007; Zins et al. 2004). It also corresponds with Tschannen-Moran and Hoy's (2001) threefold conceptualization of teaching efficacy (comprising efficacy for instruction, student involvement, and classroom management).

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<sup>1</sup>More specifically, Pekrun suggests in his control-value theory of achievement emotions that control and value appraisals are central antecedents of emotional experiences in the context of learning and achievement (Pekrun, 2000; 2006; Pekrun, Frenzel et al., 2007). In this theory, control appraisals are defined as the amount of perceived control one has over achievement activities and outcomes (i.e., success and failure), which closely corresponds to what we call coping potential in the present contribution. Value appraisals, according to Pekrun's theory, pertain to judgments of the valence of an achievement outcome (success=positive; failure=negative), and to the personal relevance of such an outcome in a certain situation. When mapping Pekrun's appraisal terms onto the terms used in this contribution, Pekrun's term "value appraisals" imply both the aspect of goal congruence (success=goal congruent; failure=goal incongruent) and the aspect of goal significance (personal relevance of both success and failure). Despite the alternate vocabulary used in the present context, Pekrun's theory forms a central basis for our considerations regarding the formation of teachers' emotions since we focus on teachers' achievement emotions in the present contribution.

We further propose that teachers' ideals precipitate specific behavioral goals related to student achievement behavior, motivation, and social-emotional behavior. A key appraisal then involves teachers continually gauging the correspondence between these specific behavioral goals and the perceived behaviors students display within the classroom. We postulate that important appraisal dimensions for the correspondence between teachers' goals and actual student behaviors concern goal consistency, goal conduciveness, accountability, coping potential, and goal significance. For example, one specific behavioral goal based on the overarching ideal of cognitive growth may be that all students should be able to correctly set up and solve a specific set of subtraction word problems. If a student cannot set up and solve the word problems by the end of the corresponding mathematics unit, a teacher may likely appraise this behavior as goal-inconsistent. Another example, based on the overarching ideal of social-emotional skills, may be that students should remain silent while the teacher is talking. If a student is disruptive, the teacher likely appraises this behavior as both inconsistent with the goal of adequate social skills, as well as an impediment to the goal of cognitive growth (both for the disruptive student and for the class as a whole). Furthermore, the teacher will appraise who (e.g., teacher or student) was accountable for these goal-inconsistencies and goal-impediments, and will ask himself whether he has the coping potential to overcome these situations (i.e. whether he is capable of enabling the student to correctly set up and solve these types of word problems or whether he is capable of getting the students to follow classroom rules, respectively).

These appraisals of student behavior relative to classroom goals are considered to be predictive of subsequent teacher emotions. Appraisals of goal congruence and goal conduciveness should influence the pleasantness of a teacher's emotional experience. For example, a teacher should experience enjoyment if student behaviors are in line with the specific behavioral goals set for a particular lesson or unit. Furthermore, the appraisal dimensions of accountability and coping potential should be particularly important in predicting anxiety and anger. That is, teachers' emotional experiences should be dominated by *anxiety* when they doubt their ability to attain certain classroom goals through their own effort or competence, and thus feel incapable of avoiding the non-attainment of these goals (Lazarus and Folkman 1984; Scherer 1993; Smith and Lazarus 1993). Conversely, teachers should react with *anger* if a desired goal is not realized and non-attainment is appraised as other-caused (Averill 1983; Kuppens et al. 2003; Parkinson 1999; Smith and Lazarus 1993; Weiner 2007).

Finally, any teacher emotion should be affected by the appraisal of goal significance. That is, achieved or unachieved goals equated with more personal significance should result in more intense (both pleasant and unpleasant) emotional reactions. For example, a teacher should experience more intense enjoyment upon a students' success at setting up and solving a specific equation, inasmuch as he attaches personal relevance to the students' ability to solve this problem. Conversely, he should react with more anxiety and anger, inasmuch as he attaches personal relevance to a goal that is not attained.

### ***Empirical Evidence of the Link Between Appraisals and Teacher Emotions***

There are scattered empirical findings supporting our assumptions concerning the relation between teachers' attainment of behavioral goals for the classroom and teachers' emotional experiences. Interview studies support the notion that the perception of student cognitive gains causes joy in teachers. In his synopsis of interviews with a sample of 60 teachers focusing on emotions, Hargreaves (2000) quotes teachers who reported sources of pleasant emotions as, "being perceptive enough to identify a student with a learning disability and then successfully modifying their learning for them", "making a kindergarten child stick at learning to write his name", or "motivating an insecure less able child to achieve in mathematics" (all p. 818). In cases where learning gains are not made and this is appraised as caused by intentional or at least potentially changeable behavior on the part of the students, there is evidence that teachers react with anger. In this context, an important theoretical framework and rich empirical resource is Weiner's work on attribution-dependent arousal of anger and pity (Weiner 1986). Within the educational context, Graham and Weiner (1986) and Reyna and Weiner (2001) have shown that teachers' anger is caused by an attribution of students' academic failures to insufficient effort on the part of the students.

In line with our assumption that the perception of high motivational engagement among students should contribute to teachers' experience of pleasant emotions, Zembylas (2002) quotes a teacher saying, "What really makes an experience so wonderful is how fascinating it is to see kids being engaged" (p. 92). With respect to the goal of student social-emotional skills, there is also evidence that teachers' pleasant emotions are fueled by student compliance with classroom rules. For example, Winograd (2003) describes in his diary study on the emotional experiences of teaching: "When the room is quiet and I have the impression of attentiveness, I feel (...) at ease and able to use humor" (p. 1656). Typically, students are made accountable for low levels of rule compliance, which is why misbehavior constitutes one of the most frequently mentioned sources of teacher anger. Consistent with our assumptions regarding the arousal of anger, Sutton (2007) summarized in her comprehensive work on teacher frustration and anger that teachers "most commonly get angry and frustrated when their academic goals are blocked by the misbehavior, inattention, or lack of motivation of students" (p. 263).

In sum, these findings provide empirical support for our assumptions regarding appraisals related to the achievement of classroom goals and teachers' emotions. However, we lack research that has investigated the size of relationships between student behaviors as perceived by teachers on the one hand, and teacher emotions, on the other. Overall, little is known regarding the potential predictors of teacher emotions (Schutz et al., this volume).

## **Consequences of Teacher Emotions: Influences of Emotions on Cognition and Behavior**

### ***Influences of Emotions on Cognition and Behavior***

Emotions strongly impact our behaviors and thoughts (e.g., Dagleish and Power 1999). These behavioral and cognitive consequences of emotions likely have an evolutionary basis: According to evolution theorists, emotions serve the purpose of initiating actions which over time have proven to be adaptive (i.e., they increase chances of survival, Cosmides and Tooby 2000; Dillard 1998). In that respect, emotions can be defined as reactions to perceived environmental conditions that prepare and mobilize us to manage situations in an adaptive manner (Frijda 1986; Lazarus 1991). Specifically, unpleasant emotions are typically related to avoidance behaviors, whereas pleasant emotions tend to be related to approach tendencies which allow for exploration of the unknown.

Going beyond the mere association between positive emotions and general approach tendencies, Fredrickson (2001) postulates in her broaden-and-build theory of positive emotions that the experience of joy broadens one's action repertoire. According to her theory, positive emotions not only indicate success, but they also produce or promote success by broadening thinking and easing the generation of ideas in the presence of obstacles.

Apart from the initiation of action (approach vs. avoid), emotions also influence information processing. Findings from mood research show that positive mood is closely linked to creative, holistic ways of thinking, while negative mood is accompanied by detail-oriented and rigid ways of thinking (Clore et al. 1994; Isen 2008; Mitchell and Phillips 2007; Sinclair and Mark 1992).

Finally, emotions have a deeply rooted communicative function (Anderson and Guerrero 1998; Lazarus 1991). They are related to characteristic facial features and postures that convey messages to interaction partners. For example, joyful expressions tend to serve as an invitation for interaction. While experiencing anxiety, one may express inferiority, whereas expressions associated with anger may signify a willingness to attack. Due to these expressive components of emotions, emotions can have strong effects not only on the actors, but also on their interaction partners.

### ***Teacher Emotions and their Effects on Teaching Behavior***

Drawing on the cognitive and behavioral effects of emotions, we suggest that the emotions teachers experience have effects on their teaching behavior. Due to the described emotionally induced action tendencies, *recurrent* pleasant and unpleasant emotional experiences during teaching should influence teachers' behavioral tendencies pertaining to teaching. Depending on the pleasantness of their emotions,

teacher behaviors should either be characterized by general approach or avoidance tendencies. In addition, the broadening effects of pleasant emotions on thinking and information processing should provide teachers who recurrently experience pleasant emotions with a broad, easily retrievable repertoire of teaching strategies. On the one hand, this might lead to a high level of creativity and variation during lessons. On the other hand, these teachers might be able to react flexibly to concrete situations during lessons, even in the face of obstacles or difficulties. However, teachers who recurrently experience anxiety and anger in the classroom might have problems deviating from previously planned lesson scripts and might be prone to predominantly use rigid teaching strategies, including repetitive exercises.

Finally, teacher emotions may also influence the quality of teaching as a result of the expressive consequences of emotions, particularly because of their influences on enthusiasm expressed during teaching. A teaching approach characterized by enthusiasm (i.e. vivid gesture, varied tone, maintaining eye contact, humor and vivid examples) has been shown to be highly effective (Babad 2007; Gage and Berliner 1998). While it can be assumed that teachers who experience joy during teaching will exhibit increased enthusiasm, the emotions of anxiety and anger should be incompatible with an enthusiastic teaching approach.

### ***Empirical Evidence of the Link Between Teacher Emotions and Behavior***

There is a conspicuous lack of empirical findings regarding possible effects of teachers' emotional experiences on their teaching behaviors. Exceptions are Sutton (2004; 2007) who reports that teachers convey their belief that the expression of pleasant emotions makes their teaching more effective, and at the same time, that teachers are convinced that reducing their unpleasant emotions aides their effectiveness. Similarly, Witcher, Onwuegbuzie, and Minor (2001) report that American teacher candidates rated enthusiasm for and enjoyment of the profession as highly important factors influencing instructional quality. One potential shortcoming of these studies is that they only explored subjective teacher reports of the potential effects of emotions on teaching behaviors; hardly any study to date appears to have explored the relationship between teacher emotional experiences and their teaching behaviors as assessed by external observers. Exceptions are early studies from the 1950s to 1970s that documented detrimental effects of teacher anxiety on teaching effectiveness as rated by supervisors and students (Coates and Thoresen 1976). Another exception is a recent study by Kunter et al. (2008) who conducted a study examining the relationship between teachers' self-reported enthusiasm and student-reported facets of teacher behaviors. These authors confirmed that teacher-reported enthusiasm for teaching was positively related to student reports of cognitive challenge, social support, and discipline levels during instruction. Furthermore,

providing support for the hypothesis that teachers' emotional experiences are related to their expressiveness and resulting enthusiasm in their teaching style, in one of our own recent studies, we could show that teachers' own ratings of enjoyment during teaching were positively related to teacher enthusiasm as rated by the students (Frenzel et al. in press).

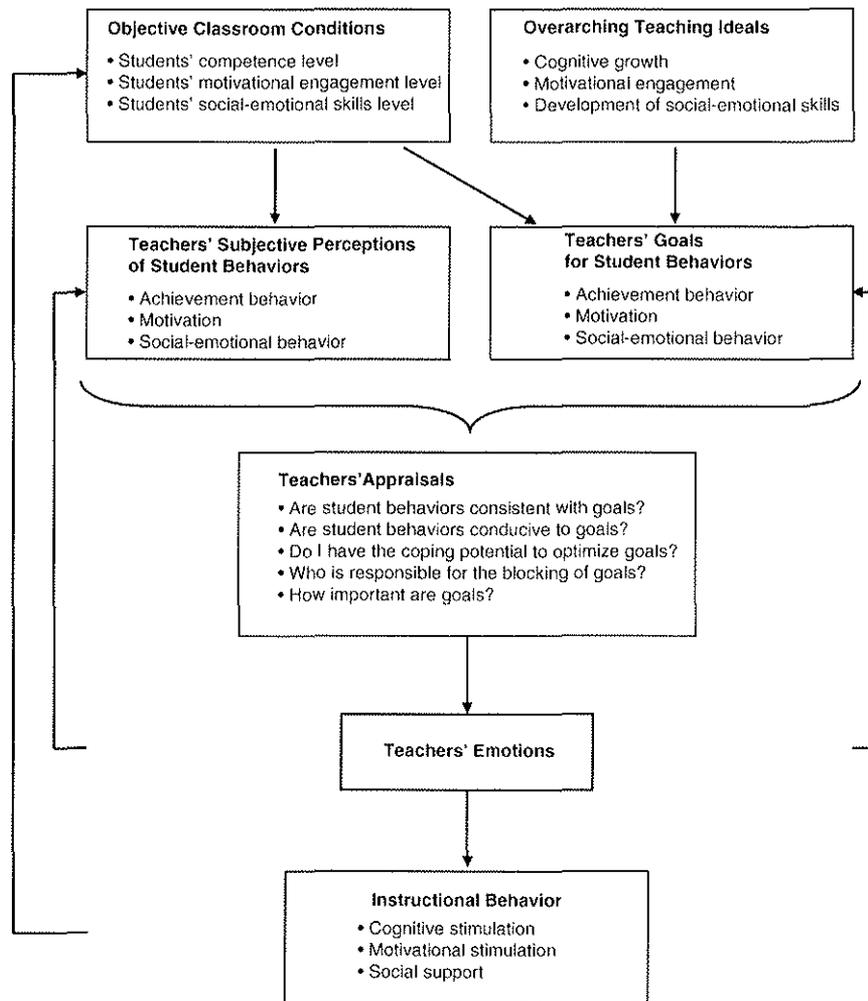
Overall, the theoretical deliberations and empirical findings presented above point to the idea that the emotions teachers experience during teaching have important cognitive and behavioral consequences and therefore seem to be of crucial importance for teachers' instructional behavior. Consequently, they may have effects on student outcomes. At the same time, we have argued that student outcomes and the corresponding appraisals by the teachers seem to be important for the formation of teacher emotions. In that respect, we propose that teacher emotions and student outcomes are more intricately intertwined than has been recognized in the literature on teacher emotions so far. In order to depict the processes underlying the interrelations between teacher emotions and student outcomes, we propose a model, which we describe in more detail below.

## **A Reciprocal Model**

To summarize our postulations of the antecedents and effects of teacher emotions, we propose a reciprocal model linking teacher appraisals with respect to the correspondence among perceived and desired student behaviors, teacher emotions, instructional behavior, and student outcomes. The model is displayed in Fig. 7.1.

To explain the model, we begin with given conditions in a classroom, implying certain (pre)existing levels of students' competence, motivational engagement, and social-emotional skills (i.e., student outcomes). Teachers may directly infer some of these objective conditions from formal circumstances – such as grade level or socio-economic makeup of the classes. In many respects, though, these inferences stem from observing the students and their achievement behavior, motivation, and social behavior. We thus ascribe particular importance to teachers' subjective perceptions of these student behaviors in class. In addition, as described earlier, we propose that teachers bring with them to a classroom three overarching teaching ideals, namely student cognitive growth, motivational engagement, and the development of social-emotional skills. In each lesson, these overarching ideals, adapted to the current conditions, are translated into specific behavioral goals, implying standards for students' achievement behavior, motivation, and social-emotional behavior.

We further postulate, as described earlier, that the cognitive appraisals concerning goal congruence, conduciveness, and significance of the behavioral goals, as well as appraisals of coping potential and personal accountability represent core antecedents of teachers' emotional experiences. Finally we assume, as described above, that recurring emotional experiences should influence teaching approaches and the use of teaching strategies. Recurring pleasant emotions should be associated



**Fig. 7.1** A model of reciprocal causation between teacher emotions, instructional behavior and student outcomes

with flexible use of cognitively activating teaching strategies and a motivationally stimulating teaching approach, whereas unpleasant emotions should debilitate such flexibility and creativity during teaching. These instructional behaviors, in turn, should affect student outcomes, closing the cycle as proposed by our reciprocal model. In addition to these processes, it is conceivable that the emotions experienced in class also affect both the teachers' perceptions of the student behaviors and might lead to an adaption of their classroom goals; this is indicated by two further feedback loops in the model.

## Two Empirical Studies

In the following section, we present two studies, which were designed to test certain assumptions regarding potential causes and effects of teacher emotions as depicted in our model. Specifically, these studies were aimed at exploring how teachers' enjoyment, anger, and anxiety were related to their perceptions of student behaviors and to their instructional behaviors.

### *Study 1: "I was anxious during this lesson" – Frequencies of Enjoyment, Anger, and Anxiety and the Link to Teacher Perceptions of Student Behavior*

This study was designed to explore teacher experiences of enjoyment, anger, and anxiety in relation to teaching. In addition, we aimed to test the hypothesis that teacher perceptions of student behaviors (i.e., achievement behavior [specifically, academic performance], motivation, and social-emotional behavior [specifically, disciplined behavior]) in class should be related to their emotional experiences during teaching. The underlying assumption for this hypothesis was that the more positively teachers judge students' behaviors, the more likely teachers are appraising the situation as consistent with and conducive to their classroom behavioral goals regarding student achievement behavior, motivation, and social-emotional behavior. Consequently, teachers should report more pleasant and less unpleasant emotions. We thus expected that perceived levels of these student behaviors should be positively related to pleasant teacher emotions (including enjoyment), and negatively related to unpleasant emotions (including anxiety and anger).

We used two different methodological approaches to assess the study variables. On the one hand, we assessed teachers' general impressions of their classes' academic performance, motivation, and discipline levels. On the other hand, perceptions of student academic performance, motivation, and discipline were assessed using diaries, which the teachers filled out directly after several lessons in these classes. Likewise, teachers' emotions were assessed in a trait-like approach, asking them how they generally feel when teaching these classes, with multi-item scales assessing enjoyment, anger, and anxiety during teaching. In addition, we assessed emotions in a state-like approach, asking teachers in the diaries to indicate the degree to which they had experienced enjoyment, anger, and anxiety during the previous lesson.

This multimethod approach allowed us to explore teachers' experiences of enjoyment, anger and anxiety in detail. The trait-like approach tends to capture teachers' overall emotional experiences during teaching, and provides more reliable indicators of these emotional experiences based on multi-item scales. The state-like approach, despite its susceptibility to unreliability due to single-items, provides real-time, in vitro experiences, which are less prone to memory biases. Additionally, as a result of our multimethod approach, we could explore relationships between classroom

characteristics of academic performance, motivation, and discipline on the one hand, and teacher emotions, on the other, both across and within teachers. Using the questionnaire data (trait assessments), we could explore *across teachers* whether teachers with classes they generally perceived as high performing, motivated, and disciplined report generally experiencing more enjoyment, and less anger, and anxiety than other teachers who generally perceive their classes as low performing, unmotivated and undisciplined. Using the diary data (state assessments), we can additionally explore *within teachers* how they feel during lessons in which they perceive their students as performing well, being motivated, and disciplined, compared to lessons which the teachers experience as less goal congruent in these respects.

### Sample and Measures

A total of  $N=237$  teachers participated in this study. The sample was comprised of teachers from primary school ( $n=99$ ; 95% female<sup>2</sup>) and secondary school ( $n=138$ ; 54% female). German primary school includes grades 1 through 4. Thereafter students are streamed into three secondary school tracks based on prior achievement. The secondary school teachers from our study all taught at "Hauptschule" which is the school track with the lowest academic demands in the German three-tiered secondary school system.

The multimethod design of the study involved two assessment phases. Teachers first completed a questionnaire assessing their general judgments of the academic performance, motivation, and discipline level among the respective groups of students with a single item each ("Overall, how do you rate the level of academic performance/motivation/discipline in this class?"). They rated these items along a three-point scale, ranging from 1 (*rather low*), to 3 (*high*). Next, teachers' enjoyment, anger, and anxiety were assessed with four items each. Items for these scales were adapted from the "Achievement Emotions Questionnaire" which was originally developed for school age and university age students (Pekrun et al. 2005; Pekrun et al. 2005). Sample items are, "I really enjoy teaching this class" for enjoyment, "Teaching this class gives me many reasons to get angry" for anger, and "When teaching this class, I am tense and nervous" for anxiety. Items were answered on a four-point Likert scale ranging from 1 (*strongly disagree*), to 4 (*strongly agree*). Each of these multi-item scales proved to be internally consistent, with Cronbach's  $\alpha$  of .92 for enjoyment, .89 for anger, and .86 for anxiety.

The second assessment phase consisted of lesson diaries. Over the course of two weeks, teachers were asked to fill in a diary after each lesson they taught in the major subjects: German, mathematics, and science in primary school, and German, mathematics, science, and English in secondary school. In these diaries, three items assessed teachers' perceptions of students' behaviors, namely, "Students understood

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<sup>2</sup>The high percentage of females is typical in primary schools in Bavaria (Bavarian State Office for Statistics and Data Processing 2008)

the material during this lesson", "Students were motivated during this lesson", and "Students were disciplined during this lesson". In addition, teachers rated the items "I enjoyed this lesson", "I was angry during this lesson", and "I was tense and nervous during this lesson". Each of these six items used a four-point Likert agreement scale.

## Results

To gain a picture of the salience of the emotions of enjoyment, anger, and anxiety for teachers during teaching, we explored three indicators based on our multimethod assessment approach. First, we looked at mean values of the trait-like multi-item scales of enjoyment, anger, and anxiety. Second, we inspected mean values of all the state-level assessments of teacher emotions across the two weeks. Third, to explore the frequency of these three state-level emotions across several lessons, we calculated the proportion of lessons in which the teachers indicated a score of 3 or 4 on the four-point Likert answer scales (i.e., they agreed or strongly agreed to having experienced the corresponding emotions in that lesson). For each of these indicators, we also analyzed potential differences between primary and secondary school.

Regarding the salience of enjoyment, anger, and anxiety for teachers during teaching, each of the three indicators provided a similar picture. Table 7.1 provides mean and standard deviations separately for primary and secondary school teachers. The overall means both for trait-level and for state-level teaching enjoyment were well above the mid-point of the scale (2.5) for all teachers, but primary school teachers scored systematically higher than secondary school teachers on each of the enjoyment indicators (*t*-tests for the comparison of the trait scale mean/state mean and frequency scores revealed *t*-values of 2.76/4.22/3.24, *ps* < .01 each; effect sizes of the differences in terms of Cohen's *d* were .37/.59/.46, respectively).

**Table 7.1** Means and standard deviations of primary and secondary teachers' reports of enjoyment, anger, and anxiety during teaching

Emotion	Assessment	Primary School Teachers		Secondary School Teachers	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Enjoyment	Mean trait sum scale	3.60	0.41	3.44	0.45
	Mean of all state items	3.23	0.35	3.02	0.35
	Lesson frequency	83%		76%	
Anger	Mean trait sum scale	1.94	0.51	2.03	0.56
	Mean of all state items	1.56	0.36	1.63	0.41
	Lesson frequency	12%		15%	
Anxiety	Mean trait sum scale	1.45	0.43	1.45	0.44
	Mean of all state items	1.30	0.30	1.31	0.35
	Lesson frequency	7%		7%	

*Note.* Trait and state means were calculated as the sum of answers to all items divided by item number, resulting in a possible range of 1–4. Lesson frequency was calculated as the percentage of lessons in which teachers agreed or strongly agreed to have experienced the respective emotion

\*\* *p* < .01

Anger, despite considerably lower mean levels relative to the mid-point of the scale and also lower lesson frequency as compared to enjoyment, can also be considered salient for teachers. Finally, anxiety played a comparably subordinate role in teachers' emotional experiences. However, considering the frequency of anxiety across all lessons, this emotion is not completely negligible. Both among primary and among secondary school teachers, 7% of lessons were filled with feelings of nervousness and tension.

We further proposed that teacher experiences of enjoyment, anger, and anxiety during teaching should be related to their perceptions of student performance, motivation, and discipline. To test this hypothesis, we ran a series of multiple regressions, with teacher perceptions of students' behavior as independent variables, and emotions as dependent variables. For the analyses of the trait-level scales on teaching emotions we used classical multiple regression. However, the analysis of the diary data required a multilevel approach, since diary entries were nested within teachers<sup>3</sup>.

Table 7.2 provides the standardized weights for the regression of trait-level teacher enjoyment, anger, and anxiety on general perceived levels of student performance, motivation, and discipline in their classes. Contrary to our predictions, teachers' perceptions of students' performance level was unrelated to all three of the teacher emotion scales. However, as expected, the general perceived level of student motivation was highly predictive of teachers' trait-level emotional experiences, with positive relationships for enjoyment, and negative relationships for anger and anxiety. In addition, general perceived discipline level proved to be a strong predictor for all three trait-level emotions. The higher teachers rated the discipline levels among their students, the more enjoyment and the less anger and anxiety they reported generally experiencing when teaching these students. Overall, these models

**Table 7.2** Predicting teacher enjoyment, anger, and anxiety (trait assessments): standardized regression weights from multiple regression

Teacher perception of general student behaviors <sup>a</sup>	Teacher self-report of emotional experience		
	Enjoyment	Anger	Anxiety
Performance	0.04	-0.10	-0.10
Motivation	0.38**	-0.28**	-0.20**
Discipline	0.42**	-0.51**	-0.46**
R <sup>2</sup>	0.49	0.54	0.40

\*\*  $p < .01$

<sup>a</sup> assessed e.g. as, "Overall, how do you rate the level of performance in this class?"

<sup>3</sup>Neglecting the nested data structure would have resulted in an underestimation of standard errors since scores within teachers are dependent and similar (Raudenbush & Bryk 2002; Snijders & Bosker, 1999). We used the software package HLM 6.04 (Raudenbush, Bryk, & Congdon, 2007) to analyze the within-teacher regression weights for the regression of enjoyment, anger, and anxiety on perceived student behaviors during the lesson. In addition to taking the nested data structure into account, HLM also provides an efficient and elegant way of handling missing data by applying the full information maximum likelihood approach (Schafer and Graham, 2002).

**Table 7.3** Predicting teacher enjoyment, anger, and anxiety (state assessments): Within-person standardized regression weights from multiple two-level regression

Teacher perception of student behavior in the lesson <sup>a</sup>	Teacher self-report of emotional experience		
	Enjoyment	Anger	Anxiety
Performance	0.30**	-0.16**	-0.09**
Motivation	0.42**	-0.15**	-0.09**
Discipline	0.25**	-0.42**	-0.22**
R <sup>2</sup> <sub>within</sub>	0.58	0.50	0.49

\*\*  $p < .01$ <sup>a</sup> assessed e.g. as, "Students were motivated during this lesson"

explained 49%, 54%, and 40% of the between-teacher variance of enjoyment, anger, and anxiety respectively.

Table 7.3 displays the results of the two-level regressions as performed with HLM. In contrast to the results from the multiple regressions presented above, these analyses pertain to within-teacher variations of emotions. In line with our hypotheses, each of the three facets of perceived student behaviors contributed to the prediction of enjoyment, anger, and anxiety during the lessons. Whereas teacher perceptions of student performance, motivation, and discipline during the lessons were positively related to enjoyment, perceptions of these student behaviors were negatively related to anger and anxiety during teaching. Overall, across lessons, these models could explain 58%, 50%, and 49% of the within-teacher variability of enjoyment, anger, and anxiety, respectively. School type (primary vs. secondary) did not moderate the relationship between teacher perceptions of student characteristics and teacher emotional experiences in either of the two sets of regression analyses.

### Summary and Discussion

A first important finding of this study was that enjoyment was the emotion most frequently reported by both primary and secondary school teachers in our study. This supports Hargreaves' notion that classroom teaching is "charged with positive emotion" (1998, p. 835). Comparing the teachers from primary vs. secondary schools further revealed that the primary school teachers reported higher mean levels and higher frequencies of enjoyment during teaching than secondary school teachers. This might in part be explained by closer and more intense relationships among teachers and students in primary school as compared to secondary school (Hargreaves 2000; Lortie 1975). However, in contrast to Hargreaves' assertion that these closer relationships imply generally higher emotional intensity, that is both for pleasant and unpleasant emotions, in our data there were no mean or frequency differences in anger and anxiety between primary and secondary school teachers. An explanation for the similarly (low) levels of reported anger among all teachers might be internalized

display rules which imply that experiencing and showing anger as a teacher is inappropriate (Sutton 2004; Winograd 2003). Similarly, teachers may not consider it socially appropriate to admit that they are anxious during teaching.

Overall, the means and frequencies of anger and anxiety were comparably low. Nevertheless, both of these unpleasant emotions do seem to play a relevant role in teacher's emotional lives, given that teachers reported experiencing anger in about 13% and anxiety in about 7% of all their lessons. Even higher frequencies might have been reported for feelings of frustration, which can be considered to be closely related, but not identical, with the emotion of anger (Schutz et al., this volume). Teachers seem to be rather open about reporting feelings of frustration (Sutton 2007).

Moreover, our data largely supported our assumption that teacher perceptions of student performance, motivation, and discipline are related to their emotional experiences. One exception was that primary and secondary school teachers' general perceptions of their classes' performance levels were unrelated to their general levels of self-reported emotional experiences. However, these teachers' perceptions of student performance within actual lessons were indeed significantly positively related to their enjoyment in these lessons, and negatively related to their experience of anger and anxiety in these lessons.

Furthermore, general judgments of the classes' motivation and discipline levels could explain between-teacher variance in the experience of teacher enjoyment, anger, and anxiety. Those teachers who rated their classes as generally highly motivated and disciplined reported less anger and anxiety than their colleagues who generally rated their classes as unmotivated and undisciplined. Likewise, within teachers, lessons in which students were judged to be motivated and attentive provoked less anger and anxiety than lessons in which students were rated less motivated and disciplined. For the emotion of enjoyment, student motivation seemed to be the most important predictor, whereas for anger and anxiety, student discipline was most relevant.

It should be noted that these effects were rather strong for the emotion of enjoyment, with almost 60% of the within-teacher variability and 50% of the between-teacher variability of enjoyment explained by these perceived student behaviors. Effects were a little smaller (about 50/40% explained within-/between-teacher variance, respectively) for the emotion of anxiety.

### ***Study 2: "Our teacher explains things really well" – The Link Between Teacher Emotions and Instructional Behavior***

The data reported here are taken from a large-scale longitudinal project analyzing students' mathematics learning and related personal and context variables across grades 5 to 9 ("Project for the Analysis of Learning and Achievement in Mathematics" PALMA, see Pekrun, vom Hofe et al., 2007).

For the present analyses, data from student and teacher questionnaires at one time point (grade 8) are reported. With these analyses, we test our hypothesis that

teachers' emotional experiences during teaching are related to their teaching behaviors. The design of the study allowed us to link teachers' subjective experiences with a rather objective indicator of their teaching behavior, namely aggregated student perceptions. Several studies have documented the value of student reports, aggregated to class means, to assess instructional variables (Aleamoni 1999; De Jong and Westerhof 2001; Trautwein et al. 2006).

### Sample and Scales

The student sample consisted of  $N=1,762$  grade-8 students (52% female) from 71 classes. The average class size was 24.8 students. The teacher sample consisted of these classes'  $N=71$  mathematics teachers (29% female). Within the three-tiered German tracking system in secondary school,  $n=27/19/25$  classes and teachers were from the low/medium/high track.

Teacher enjoyment, anger, and anxiety were assessed with self-report scales comparable to the ones used in Study 1. In this study, items were answered on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scales were again highly internally consistent, with Cronbach's  $\alpha$  coefficients of .87 for enjoyment, .89 for anger, and .86 for anxiety.

Students were asked to rate their mathematics teachers' instructional behavior in terms of cognitive quality, motivational quality, and social-emotional support. Cognitive quality was assessed with two sets of items, elaboration and comprehensibility. *Elaboration*, in terms of how teachers connect mathematics classroom instruction to the "real world", was assessed with five items, including "Our mathematics teacher explains many things by giving examples from everyday life". *Comprehensibility* was assessed with four items such as "Our teacher makes math so easy to understand that you can even grasp difficult concepts". Motivational quality was also assessed with two sets of items, *teacher enthusiasm* (4 items, e.g., "Our mathematics teacher tries to get students excited about the subject of mathematics") and *autonomy support* (5 items, e.g., "Our mathematics teacher allows us to try and discover our own solutions to problems"). Finally, student ratings of teacher social-emotional support, operationalized as *support after failure*, were assessed with four items (e.g., "After a bad grade, my mathematics teacher encourages me for next time"). All of these scales were highly internally consistent at the individual level, as indicated by high Cronbach  $\alpha$  coefficients ranging between .75 and .86.

To determine whether aggregated individual-level ratings of students on these scales were reliable indicators of the respective class-level constructs, we used the intraclass correlations (ICC) Type 1 and 2 (Bliese 2000; Raudenbush 2002). Classes systematically differed in their perceptions of their mathematics teachers' behaviors, as indicated by high values of ICC(1), which ranged between .17 and .30. The corresponding high ICC(2) documented the reliability of the aggregated student ratings; they ranged between .84 and .91 (for the use of ICC(2) as a reliability indicator of class-aggregated values see e.g. Lüdtke et al. 2006).

**Table 7.4** Pearson Correlations between teachers' self-reported emotions and instructional behaviors as observed by students

Aggregated student perceptions of teacher behavior	Teacher self-reported emotional experiences		
	Enjoyment	Anger	Anxiety
Elaboration	0.37*	-0.29*	-0.39**
Comprehensibility	0.30*	-0.27*	-0.41**
Autonomy support	0.28*	-0.25*	-0.34**
Teacher enthusiasm	0.34**	-0.23	-0.35**
Support after failure	0.51**	-0.29**	-0.33**

\*  $p < .05$ ; \*\*  $p < .01$ 

## Results

Table 7.4 shows Pearson correlations between teachers' self-reported levels of enjoyment, anger, and anxiety when teaching the respective classes, and students' aggregated ratings of their teachers' instructional behaviors. In line with our hypotheses, teacher enjoyment was positively related to student ratings of elaboration, comprehensibility, autonomy support, teacher enthusiasm, and support after failure. Interestingly, teachers' experience of enjoyment was most strongly (positively) related to students' perceptions of social-emotional support. Conversely, there were negative relationships between teachers' reported anger and students' perceptions of teacher instructional behavior. Anxiety also proved to be rather strongly negatively related to the perceived teacher behaviors.

## Summary and Discussion

In this study, we could provide evidence suggesting that teachers' self-reported enjoyment, anger, and anxiety are systematically related to students' perceptions of teaching quality. Teacher enjoyment is positively related to teaching quality. Specifically, teachers who report feeling enjoyment deliver not only cognitively challenging and coherent lessons, but they are also more motivationally supportive by providing enthusiastic lectures and opportunities for autonomous student behaviors. In addition, students of "joyful" teachers reported receiving more support after failure from their teachers. Conversely, the more anger teachers experience during teaching, the lower their students rate the quality of teaching. Additionally, students rated the cognitive quality of instruction as lower and felt less socially supported by angry teachers.

Teacher anxiety, despite overall low levels, shows even stronger negative relationships with student-perceived teaching quality. Students of teachers who report being tense and nervous during teaching perceive their teachers' explanations as less elaborated and less coherent than students of less anxious teachers. Teacher anxiety is also negatively related to student ratings of teaching enthusiasm and social support. These findings underline the notion that anxiety, despite low mean levels and comparably low frequency as documented in Study 1, has important effects on teaching quality, even more so than anger.

## Conclusions and Implications for Future Research

Each of the three emotions considered in the present chapter – enjoyment, anger, and anxiety – clearly are prominent, discrete emotions for teachers when they are engaged in their most important duty, namely classroom teaching. Teachers not only reported experiencing these emotions with considerable frequency, but each emotion was also systematically related to important facets of teaching quality. Specifically, the relatively low mean ratings for anxiety in no way imply that this emotion is inconsequential for teachers. Given that teachers report experiencing anxiety in approximately 7% of lessons and given its relatively strong relationship to teacher behavior as found in our study, this emotion deserves further research efforts. Future studies might also explore other emotions not considered in this study, even if their occurrences are comparably rare. For example, pride, shame, frustration, or contempt might play an important role for teachers' overall emotional well-being (e.g., Eid and Diener 2004; Grant and Higgins 2003) and might also have strong motivational impacts and thus determine teaching behaviors.

Regarding potential antecedents of teacher emotions, it is important to note that our data thus far only provide evidence regarding the relationship between teacher perceptions of student performance, motivation, and discipline on the one hand, and teacher emotions, on the other. We propose that one underlying process for these relationships is the appraisal of goal consistency and goal conduciveness provided students' achievement behavior, motivation, and social-emotional behavior is judged positively. However, these goal consistency and goal conduciveness appraisals have not directly been assessed in our study. Furthermore, in line with existing appraisal theories of emotions, we suggest that appraisals of coping potential, accountability, and goal significance may play an additional role in shaping emotional experiences, particularly in determining more precisely which discrete emotions are experienced (e.g., anger vs. anxiety). Future studies should explore the specific role of appraisals for teachers' emotional experiences. For example, the appraisal of coping potential could be explored by incorporating teacher self-efficacy beliefs. For students, the importance of self-efficacy beliefs for the experience of enjoyment and anxiety has been well documented in research (e.g., Frenzel et al. 2007; Pekrun et al. 2002; Zeidner 1998), but the relationship between self-efficacy and emotions so far does not seem to have been explored for teachers.

Regarding the appraisal of goal significance, our research thus far has implicitly assumed that each of the three overarching classroom ideals and resulting goals for student behaviors is equally important for teachers' emotional experiences. However, it is conceivable that teachers attach varying importance to these ideals. For example, some teachers may attach the highest importance to reaching high cognitive standards in their classroom, whereas others may place more importance on motivation or social-emotional growth. As a result, teachers will attach varying importance to the behavioral goals they set for their students to achieve in specific lessons. According to appraisal theory, the appraisal of goal significance should be positively related to the intensity of any emotion, both pleasant and unpleasant.

We would thus expect the attainment or nonattainment of a subjectively significant (vs. nonsignificant) goal to have stronger effects on the experienced intensity of emotions. Future studies could explore potential interaction effects between appraisals of goal significance and goal consistency with respect to classroom goals on the quality and intensity of teacher emotions.

Furthermore, it should be noted that the data presented here are correlative, thus interpretations in terms of cause-effect relationships should be made cautiously. For example, even though it is plausible, and in line with an appraisal-theoretical approach to emotions, that teachers appraisals of the attainment of their classroom goals affect their emotional experiences, it is also conceivable that the emotions teachers experiences shape their perceptions of classroom events. That is, a teacher experiencing pleasant emotions may tend to perceive his class as better performing and more motivated, and might therefore be more tolerant of minor disruptions in class than a teacher who experiences unpleasant emotions. Furthermore, just as it is plausible that teacher emotions influence the quality of their teaching, it could also be the case that certain objective classroom conditions directly influence teaching behavior. Some classes may provide a conducive environment for the implementation of certain desirable teaching strategies, e.g. high competence level among students may be conducive to the implementation of independent problem solving activities. Additionally, appraisals regarding discrepancies between desired and actual student behaviors might directly affect teachers' instructional behavior, irrespective of emotions. However, we argue that emotions are immediate and inevitable consequences of appraisals and, consequently, we propose that teacher emotions are important "catalysts" for teaching behavior.

For these reasons, we are convinced that attending to teachers' emotional experiences offers great promise for further understanding and optimizing classroom interaction processes. Emotionally positive classrooms are likely successful classrooms. Pleasant emotions enable teachers to best fulfill their teaching responsibilities and to maintain their emotional well-being and health. Additionally, enhancing *students'* pleasant emotions in the classroom should be one important goal of instruction, because these emotions are important for students' learning and achievement, and because they are an important educational goal, in and of themselves (Pekrun 2006; Pekrun et al. 2002). Classrooms, which are characterized by enjoyment of teaching *and* learning likely provide optimal grounds for overcoming obstacles and promoting positive development and achievement.

## References

- Aleamoni LM (1999) Student rating myths versus research facts from 1924 to 1998. *Journal of Personnel Evaluation in Education* 13:153–166
- Anderson PA, Guerrero LK (1998) Handbook of communication and emotion. Academic Press, San Diego
- Averill JR (1983) Studies on anger and aggression. *Am. Psychol.* 38:1145–1160

- Babad E (2007) Teachers' nonverbal behaviors and its effects on students. In: Perry RP, Smart JC (eds) *The scholarship of teaching and learning in Higher Education: An evidence-based perspective*. Springer, New York, pp 201–261
- Bavarian State Office for Statistics and Data Processing (2008) *Bayerische Schulen im Schuljahr 2007/08 [Bavarian Schools in the year 2007/08]*. Bavarian State Office for Statistics and Data Processing, Munich, Germany
- Bliese PD (2000) Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In: Klein KJ, Kozlowski SW (eds) *Multilevel Theory, Research, and Methods in Organizations*. Jossey-Bass, San Francisco, CA, pp 349–381
- Clore GL (1994) Why emotions require cognition. In: Ekman P, Davidson RJ (eds) *The nature of emotion*. Oxford University Press, New York, pp 181–191
- Clore GL, Schwarz N, Conway M (1994) Affective causes and consequences of social information processing. In: Wyer RS, Srull TK (eds) *Handbook of social cognition*, 2nd edn. Lawrence Erlbaum, Hillsdale, NJ, pp 323–417
- Coates TJ, Thoresen CE (1976) Teacher anxiety: A review with recommendations. *Rev. Edu. Res.* 46:159–184
- Cosmides L, Tooby H (2000) Evolutionary psychology and the emotions. In: Lewis M, Haviland-Jones JM (eds) *Handbook of emotions*, 2nd edn. The Guilford Press, New York, pp 91–115
- Dagleish T, Power M (eds) (1999) *Handbook of cognition and emotion*. Wiley, Chichester, England
- De Jong R, Westerhof KJ (2001) The quality of student ratings of teacher behaviour. *Learning Environ. Res.* 4:51–85
- Dillard, JP (1998). Foreword: The role of affect in communication, biology, and social relationships. In P. A. Anderson & L. K. Guerrero (Eds.), *Handbook of communication and emotion*. Academic, San Diego, pp. xvii-xxxii.
- Eid M, Diener E (2004) Global judgments of subjective well-being: Situational variability and long-term stability. *Soc. Indic. Res.* 65:245–277
- Ellsworth PC, Scherer KR (2003) Appraisal processes in emotion. In: Davidson RJ, Scherer KR, Goldsmith HH (eds) *Handbook of affective sciences*. Oxford University Press, Oxford, pp 572–595
- Fredrickson BL (2001) The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *Am. Psychol.* 56:218–226
- Frenzel, A. C, Pekrun R, Goetz T (2007) Girls and mathematics - a "hopeless" issue? A control-value approach to gender differences in emotions towards mathematics. *Eur. J. Psychol. Educ.* 22:497–514
- Frenzel, A. C, Goetz, T, Lüdtke, O, Pekrun, R, & Sutton, R (in press). Emotional transmission in the classroom: Exploring the relationship between teacher and student enjoyment. *Journal of Educ Psychol.*
- Frijda N (1986) *The emotions*. Cambridge University Press, Cambridge, UK
- Gage NL, Berliner DC (1998) *Educational psychology*, 6th edn. Houghten Mifflin, New York
- Graham S, Weiner B (1986) From an attributional theory of emotion to developmental psychology: A round-trip ticket? *Soc. Cogn.* 4(2):152–179
- Grant H, Higgins ET (2003) Optimism, promotion pride, and prevention pride as predictors of quality of life. *Pers. Soc. Psychol. Bull.* 29:1521–1532
- Hargreaves A (1998) The emotional practice of teaching. *Teaching and Teacher Educ.* 14:835–854
- Hargreaves A (2000) Mixed emotions: Teachers' perceptions of their interactions with students. *Teac. Teac. Educ.* 16:811–826
- Heckhausen H (1989) *Motivation und Handeln [Motivation and action]*, 2nd edn. Springer, Berlin
- Hughes E (2001) Deciding to leave, but staying: Teacher burnout, precursors and turnover. *Int. J. Hum. Resour. Manage.* 12:288–298
- Ingersoll RM (2002) The teacher shortage: a case of wrong diagnosis and wrong prescription. *NASSP Bull.* 86:16–31

- Isen AM (2008) Some ways in which positive affect influences decision making and problem solving. In: Lewis M, Haviland-Jones JM, Feldman Barrett L (eds) *Handbook of emotions*, 3rd edn. Guilford Press, New York, pp 548–573
- Kunter M, Tsai Y-M, Klusmann U, Brunner M, Krauss S, Baumert J (2008) Students' and mathematics teachers' perceptions of teacher enthusiasm and instruction. *Learn. Instr.* 18:468–482
- Kuppens P, Van Mechelen I, Smits DJM, De Boeck P (2003) The appraisal basis of anger: Specificity, necessity, and sufficiency of components. *Emotion* 3:254–269
- Lazarus RS (1991) *Emotion and adaptation*. Oxford University Press, New York
- Lazarus RS, Folkman S (1984) *Stress, appraisal, and coping*. Springer, New York
- LeDoux JE (1995) Emotions: Cues from the brain. *Ann. Rev. Psychol.* 46:209–235
- Lortie DC (1975) *Schoolteacher*. University of Chicago Press, Chicago, IL
- Lüdtke O, Trautwein U, Kunter M, Baumert J (2006) Reliability and agreement of student ratings of the classroom environment – a reanalysis of TIMSS data. *Learn. Environ. Res.* 9:215–230
- Mitchell RLC, Phillips LH (2007) The psychological, neurochemical and functional neuroanatomical mediators of the effects of positive and negative mood on executive functions. *Neuropsychologia* 45:617–629
- Parkinson B (1999) Relations and dissociations between the appraisal and emotion ratings of reasonable and unreasonable anger and guilt. *Cogn. Emotion* 13:347–385
- Pekrun R (2000) A social-cognitive, control-value theory of achievement emotions. In: Heckhausen J (ed) *Motivational Psychology of Human Development*. Elsevier, Oxford, UK, pp 143–163
- Pekrun R (2006) The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educ. Psychol. Rev.* 18:315–341
- Pekrun R, Goetz T, Titz W, Perry RP (2002) Academic emotions in students' self-regulated learning and achievement: a program of qualitative and quantitative research. *Educ. Psychol.* 37:91–105
- Pekrun R, Goetz T, Frenzel AC (2005a) *Achievement Emotions Questionnaire – Mathematics (AEQ-M) - User's manual*. Department of Psychology, University of Munich, Germany
- Pekrun R, Goetz T, Perry RP (2005b) *Achievement Emotions Questionnaire (AEQ) – User's manual*. Department of Psychology, University of Munich, Munich, Germany
- Pekrun R, Frenzel AC, Goetz T, Perry RP (2007a) The control-value theory of achievement emotions: an integrative approach to emotions in education. In: Schutz PA, Pekrun R (eds) *Emotion in education*. Academic Press, San Diego, pp 13–36
- Pekrun R, vom Hofe R, Blum W, Frenzel AC, Goetz T, & Wartha S. (2007b). Development of mathematical competencies in adolescence: The PALMA longitudinal study. In: M. Prenzel (ed) *Studies on the educational quality of schools. The final report on the DFG Priority Programme Münster, Germany*: Waxmann, pp. 17–37.
- Peterson PE, West MR (2003) *No child left behind? The politics and practice of school accountability*. Brookings Institution Press, Washington, DC
- Posner J, Russell JA, Peterson BS (2005) The circumplex model of affect: an integrative approach to affective neuroscience, cognitive development, and psychopathology. *Dev. Psychopathol.* 17:715–734
- Raudenbush SW (2002) Alternative covariance structures for polynomial models of individual growth and change. In: Moskowitz DS, Hershberger SL (eds) *Modeling intraindividual variability with repeated measures data: Methods and applications*. Lawrence Erlbaum, Mahwah, NJ
- Raudenbush SW, Bryk AS (2002) *Hierarchical linear models. Applications and data analysis methods*, 2nd edn. Sage, Thousand Oaks
- Raudenbush SW, Bryk A, & Congdon R (2007). *Hierarchical linear and nonlinear modeling (HLM) (Version 6.04) [Computer Software]*. Scientific Software International, Lincolnwood IL.
- Reyna C, Weiner B (2001) Justice and utility in the classroom: an attributional analysis of the goals of teachers' punishment and intervention strategies. *J. Educ. Psychol.* 93:309–319
- Roseman JJ (2001). A model of appraisal in the emotion system: Integrating theory, research and applications. In: Scherer KR Schorr A & Johnstone T (eds) *Appraisal processes in emotion* Oxford, Oxford University Press, UK. pp. 68–91.

- Roseman JF, Smith CA (2001) Appraisal theory. Overview, Assumptions, Varieties, Controversies. In: Scherer KR, Schorr A, Johnstone T (eds) *Appraisal processes in emotion*, Oxford University Press, Oxford UK pp. 3–19.
- Schafer JL, Graham JW (2002) Missing data: Our view of the state of the art. *Psychological Methods* 7(2):147–177
- Scherer KR (1993) Studying the emotion-antecedent appraisal process: an expert system approach. *Cogn Emotion* 7:325–355
- Scherer KR (2001) Appraisal considered as a process of multilevel sequential checking. In: Scherer KR, Schorr A, Johnstone T (eds) *Appraisal processes in emotion*. Oxford University Press, Oxford, UK, pp 92–120
- Scherer KR, Schorr A, Johnstone T (eds) (2001) *Appraisal processes in emotion*. Oxford University Press, Oxford, UK
- Scherer KR, Wraniak T, Sangsue J, Tran V, Scherer U (2004) Emotions in everyday life: Probability of risk factors, appraisal and reaction patterns. *Social Science Information* 43:499–570
- Schimmack U (2008) The structure of subjective well-being. In: Eid M, Larsen RJ (eds) *The Science of Subjective Well-Being*. Guilford, New York
- Seidel T, Shavelson RJ (2007) Teaching effectiveness research in the past decade: the role of theory and research design in disentangling meta-analysis results. *Rev. Educ. Res.* 77:454–499
- Sinclair RC, Mark MM (1992) The influence of mood state on judgment and action: effects on persuasion, categorization, social justice, person perception, and judgmental accuracy. In: Martin LL, Tesser A (eds) *The construction of social judgments*. Lawrence Erlbaum, Hillsdale, NJ, pp 165–193
- Smith CA, Lazarus RS (1993) Appraisal components, core relational themes, and the emotions. *Cogn. Emotion* 7(3/4):233–269
- Snijders TAB, Bosker RJ (1999) *Multilevel analysis: an introduction to basic and advanced multilevel modeling*. Sage, London
- Sutton RE (2004) Emotional regulation goals and strategies of teachers. *Soc. Psychol. Educ.* 7:379–398
- Sutton RE (2007) Teachers' anger, frustration, and self-regulation. In: Schutz PA, Pekrun R (eds) *Emotion in education*. Academic, San Diego, pp 251–266
- Sutton RE, Wheatley KF (2003) Teachers' emotions and teaching: a review of the literature and directions for future research. *Educ. Psychol. Rev.* 15:327–358
- Trautwein U, Lüdtke O, Schnyder I, Niggli A (2006) Predicting homework effort: Support for a domain-specific, multilevel homework model. *J. Educ. Psychol.* 98:438–456
- Tschannen-Moran M, Hoy AW (2001) Teacher efficacy: capturing an elusive construct. *Teach. Teac. Educ.* 17:783–805
- Weiner B (1985) An attributional theory of achievement motivation and emotion. *Psychol. Rev.* 92:548–573
- Weiner B (1986) *An attributional theory of motivation and emotion*. Springer, New York
- Weiner B (2007) Examining emotional diversity in the classroom: an attribution theorist considers the moral emotions. In: Schutz PA, Pekrun R (eds) *Emotions in education*. Academic Press, San Diego, pp 75–88
- Winograd K (2003) The functions of teacher emotions: the good, the bad, and the ugly. *Teac. Coll. Record* 105:1641–1673
- Witcher AE, Onwuegbuzie AJ, Minor LC (2001) Characteristics of effective teachers: Perceptions of preservice teachers. *Res. Sch.* 8:45–57
- Zeidner M (1998) *Test anxiety: the state of the art*. Plenum, New York
- Zembylas M (2002) Constructing genealogies of teacher's emotions in science teaching. *J. Res. Sci. Teach.* 39:79–103
- Zins JE, Weissberg RP, Wang MC, Walberg HJ (eds) (2004) *Building academic success on social and emotional learning: what does research say?* Teacher College Press, New York