

# Coping with boredom in school: An experience sampling perspective

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## ABSTRACT

The present study explored students' use of boredom related coping strategies at trait and state levels. Two trait based dimensions of coping relevant to boredom were considered, namely approach versus avoidance oriented and cognitively versus behaviorally oriented coping strategies. The two dimensions were assessed in a self report questionnaire administered to 537 grade 11 students (55.3% female,  $M_{age} = 17.15$  years). Additionally, 79 of these participants completed state based boredom related coping measures over a 2 week period using an experience sampling method. Analyses of the trait measures suggested that two contrasting, broad approaches characterized participants' strategies for coping with boredom, namely a cognitive approach orientation and a behavioral avoidance orientation. In both the trait and state based analyses, the cognitive approach orientation was associated with lower levels of boredom. Implications for interventions promoting the use of cognitive approach strategies for dealing with boredom in the classroom are discussed.

## 1. Introduction

*"A man who is master of himself can end a sorrow as easily as he can invent a pleasure. I don't want to be at the mercy of my emotions. I want to use them, to enjoy them, to dominate them"* (Wilde, 1890/2005).

The experience of boredom is typically described as an unpleasant and undesired emotion (e.g., Mikulas & Vodanovich, 1993) and found to correspond with detrimental behavioral outcomes (Barnett & Klitzing, 2006; Larson & Richards, 1991). In secondary education settings, students tend to report frequent episodes of boredom (Larson & Richards, 1991), with a common assumption being that teachers are responsible for creating stimulating lesson plans so as to minimize students' boredom. However, in light of the considerably heterogeneous nature of students' interests and perceptions of instruction, it is not possible to uniformly prevent all students from experiencing boredom through specific curriculum or teaching methods. Therefore, it stands to reason that students' experiences of boredom are likely to be also predicted by individual differences in students' own coping strategies for dealing with boredom. Despite agreement among students and teachers that this 'sorrow' is best minimized and ideally prevented, little is

known about the strategies and behaviors used by students to 'end' their boredom, or alternatively, 'invent' enthusiasm or interest in the classroom. Further, little systematic research exists in which the occurrence and efficiency of different strategies used by students to cope with boredom at school is systematically addressed.

The present study aimed to address this research deficit by exploring how students cope with boredom in the classroom by identifying and evaluating strategies for reducing boredom as a critical first step toward the development of interventions for equipping students with effective coping strategies. To this end, trait based self report measures were assessed to classify the types of coping strategies used by students in response to boredom and to identify the extent to which students' strategy use is dispositional or trait like in nature and corresponds with well established personality traits (e.g., extroversion, neuroticism). In addition, to further analyze the actual occurrence and effectiveness of the situational enactment of these coping strategies, state based self report measures of boredom related coping behavior were administered over a 2 week period (i.e., experience sampling method; Csikszentmihalyi & Larson, 1987; Hektner, Schmidt, & Csikszentmihalyi, 2007). To summarize, the use of trait and state based assessments in the present research allowed for an in depth analysis of study hypotheses concerning the classification of dispositional, boredom related coping strategies, validation and further exploration of their dispositional nature with other personality traits, their predictive utility with respect to actual, situated coping behaviors, as well as relations between situated coping

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behaviors and emotional as well as cognitive outcomes in a classroom setting.

### 1.1. Boredom in the classroom

As reflected in contemporary component process definitions of emotional experiences (Kleinginna & Kleinginna, 1981; Scherer, 2000), phenomenological accounts of boredom are assumed to reflect specific emotional components. Feelings of boredom are typically described as unpleasant in nature (affective component), feeling as if time has slowed down (cognitive component), and involving a desire to escape the boring situation (motivation component). Experiences of boredom are further demonstrated in facial and bodily expressions indicating a lack of eagerness (expressive component), low arousal, and overall fatigue (physiological component). Boredom is thus commonly understood by individuals and researchers alike as a unique emotional experience consisting of multiple components, rather than simply the opposite of enjoyment or interest (Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010).

#### 1.3.1. Research on boredom in the classroom

With respect to educational settings, Larson and Richards (1991) found middle school students to report feelings of boredom during 32% of the time spent in class, with findings from Goetz, Frenzel, Pekrun, and Hall (2006) further suggesting that boredom is more frequently experienced by students than is anxiety—the most commonly researched emotion in the education domain (Pekrun, Goetz, Titz, & Perry, 2002). As such, although boredom is frequently experienced in the classroom, it has received remarkably little theoretical or empirical attention (Pekrun et al., 2010). Among the few existing studies in which boredom is investigated, the primary focus is on the specific outcomes associated with this emotion. Educational research suggests that boredom in school settings, and even during leisure time, is positively related to drop out rates (Bearden, Spencer, & Moracco, 1989; Farrell, Peguero, Lindsey, & White, 1988; Tidwell, 1988; Wegner, Flisher, Chikobvu, Lombard, & King, 2008), truancy (Sommer, 1985), and deviant behavior (Wasson, 1981). These findings are consistent with studies showing boredom to be highly correlated with job dissatisfaction, absenteeism, and lack of loyalty in the workplace (e.g., Kass, Vodanovich, & Callender, 2001). Empirical evidence further suggests that boredom may also contribute to nicotine and alcohol consumption (Amos, Wiltshire, Haw, & McNeill, 2006) as well as substance abuse (Anshel, 1991), excessive gambling (Blaszczynski, McConaghy, & Frankova, 1990), distress (Barnett, 2005), and juvenile delinquency (Newberry & Duncan, 2001).

#### 1.3.2. Causal antecedents of academic boredom

To effectively counter the negative consequences of boredom, knowledge concerning the potential causes of this emotion is needed. To this end, there exist two dominant perspectives focusing on either situational or dispositional determinants of boredom experiences. First, such experiences are typically described in educational research as elicited by situational attributes (e.g., Kanevsky & Keighley, 2003), for example, by specific characteristics of the classroom setting. In contrast, personality research evaluates feelings of boredom predominantly as the result of an individual's predisposition to interpret a given situation as boring in nature (e.g., Farmer & Sundberg, 1986; Vodanovich, 2003).

With respect to situational factors, descriptions of situations that provoke student boredom focus primarily on a lack of stimulation (e.g., Moneta & Csikszentmihalyi, 1996; Reid, 1986; Vodanovich, 2003). According to Kanevsky and Keighley (2003), only a stimulating classroom environment that is not boredom inducing can be considered a true learning situation. However, despite the diligence of educators in providing learning environments

that maintain students' attention, the effects of such efforts are often mitigated by individual differences among students with respect to individual interests, abilities, as well as dispositions to perceive academic activities as boring in nature.

The idea that experiences of boredom are the result of dispositional personality traits in addition to environmental influences (Farmer & Sundberg, 1986; Vodanovich, 2003) is supported by empirical results showing students with high levels of academic boredom to also consistently report greater boredom in leisure settings (Larson & Richards, 1991). Findings further demonstrate strong relationships between boredom propensity and other dispositional constructs such as extroversion and intrinsic motivation (Barnett & Klitzing, 2006), aggressiveness (Rupp & Vodanovich, 1997), depression, hopelessness, loneliness, and life satisfaction, as well as amotivational and autonomy orientations (Farmer & Sundberg, 1986).

### 1.4. Boredom related coping strategies

One of the first validated measures of boredom related coping strategies was developed by Hamilton, Haier, and Buchsbaum (Boredom Coping Scale; 1984) which, according to Vodanovich (2003), was somewhat lacking in theoretical sophistication. However, subsequent theoretical and empirical research in which students' strategies for coping with boredom is explored has, until recently, remained virtually nonexistent (Vodanovich, 2003). In contrast, considerable research has been conducted toward the development of classificatory frameworks for strategies used to cope with stress. Most notably, a conceptual model proposed by Holahan, Moos, and Schaefer (1996) has received significant empirical attention (Davis, DiStefano, & Schutz, 2008; Moos & Holahan, 2003) and may be adapted as a framework for understanding how students cope with boredom.

#### 1.4.1. Classification of coping strategies

According to Holahan et al. (1996), there exist two critical dimensions underlying the various coping strategies available: (1) having an approach versus avoidance focus, and (2) being cognitive or behavioral in nature. Individuals who adopt approach strategies attempt to address the problem directly, whereas those who endorse avoidance oriented strategies focus instead on withdrawal from an aversive situation. Concerning the second dimension, coping strategies are also assumed to involve changes in cognitions with respect to altering one's thinking in response to the situation, or alternatively, changes in observable behaviors aimed at changing one's environment.

When considered in combination, these underlying dimensions result in four categories of stress related coping strategies. *Cognitive approach* strategies involve changing one's perception of the situation, for example, by increasing one's focus on the potentially valuable aspects of the situation. In contrast, *behavioral approach* strategies refer to changing the situation itself, such as efforts to directly reduce the aversive nature of the offending stimuli. With respect to avoidance strategies, *cognitive avoidance* strategies refer to distracting oneself by focusing on less aversive thoughts not related to the situation. Finally, *behavioral avoidance* coping involves distracting oneself from the situation by engaging in behaviors unrelated to the situation (Holahan et al., 1996).

This conceptual framework for classifying stress related coping strategies is supported by theoretical assumptions and empirical findings in the research literatures on emotion and affect regulation. For example, research by Parkinson and Totterdell (1999) on affect regulation provides empirical evidence for the distinctions between the cognitive and behavioral strategies, and engagement (approach) as opposed diversion strategies (avoidance; see also Totterdell & Parkinson, 1999). Similarly, a process model proposed

by Gross (1998) outlines emotion regulation as involving four key elements paralleling those of Holahan, Moos, Holahan, Brennan, and Schutte (2005) including *situation selection* (approaching or avoiding certain situations), *situation modification* (behavioral strategies), *attentional deployment* (cognitive avoidance), and *cognitive change* (cognitive approach).

In recent research in Nett, Goetz, and Daniels (2010), the conceptual model proposed by Holahan et al. (1996) was adapted to account for how individuals cope with experiences of boredom. More specifically, four reliable coping measures specific to boredom as experienced by students in the classroom (grades 5–10) were evaluated including one representative scale of five items each for each of the four categories, such as cognitive approach (e.g., focusing on the importance of a boring class), behavioral approach (e.g., asking the teacher for alternate activities), cognitive avoidance (e.g., thinking about another class), and behavioral avoidance (e.g., chatting with classmates). The two dimensions of approach versus avoidance and cognition versus behavior were thus adapted to provide a descriptive classification of boredom related coping strategies without additional assumptions concerning their motivational or social antecedents, correlates, or potential consequences. The assumed structure of the four categories was evaluated through confirmatory factor analysis, providing evidence that four separate coping strategies existed. Exploratory latent profile analyses further distinguished between three groups of students demonstrating differential patterns of relative endorsement of the four types of boredom related coping strategies.

The first group, referred to as *Reappraisers*, scored the highest of all three groups on the cognitive approach scale, indicating a marked tendency to respond to boring activities by increasing their focus on their potentially valuable aspects of the activity. The second group, labeled *Criticizers*, instead preferred to cope with boredom through behavioral approach strategies aimed at actively changing the situation by expressing their frustration to the instructor and asking for alternative activities. Finally, a third group of students classified as *Evaders* more strongly endorsed both types of avoidance strategies, particularly behavioral avoidance strategies such as chatting with classmates when bored. To summarize, recent empirical research suggests that the stress related coping model proposed by Holahan et al. (1996) can be effectively adapted to classify the strategies used by students to cope with boredom in the classroom, and further, that meaningful clusters of students can be identified on the basis of student's preferred boredom related coping strategies (Nett et al., 2010).

#### 1.4.2. Effectiveness of boredom related coping strategies

Concerning the potential benefits of boredom related coping strategies, the question arises as to which of these groups is indeed most effective in minimizing feelings of boredom in an actual classroom setting. Furthermore, there are potential benefits of students' strategies for coping with boredom in the broader context of self regulation. According to research on self regulated learning, two critical challenges for optimizing the learning process involve minimizing internal and external distractions (Boekaerts, 1999) as well as regulating one's motivation (Sansone & Thoman, 2005; Wolters, 2003) and emotions (Parkinson & Totterdell, 1999). Successful strategies for coping with boredom thus should not only prevent students from experiencing this negative emotion, but also serve to facilitate effective learning.

In Nett et al. (2010), Reappraisers who relied primarily on cognitive approach strategies involving cognitive reconstructions of boring mathematics classes (e.g., focusing on utility value) were found to experience less boredom than students who coped with boredom through behavioral approach strategies (Criticizers) or avoidance strategies (Evaders). This finding is consistent with theoretical assumptions (Pekrun et al., 2010) and empirical research (Goetz,

Frenzel, Stoeger, & Hall, 2010) suggesting that boredom is greater in learning situations perceived as low in value, in contrast to other learning related emotions that correlate positively with value perceptions. The link between boredom and value is further highlighted in related research by Rana (2007), suggesting that boredom may be reduced by finding meaning in a given task, as well as studies showing value enhancing teaching techniques to foster motivation and reduce boredom levels (e.g., Green Demers, Pelletier, Stewart, & Gushue, 1998).

According to Sansone, Wiebe, and Morgan (1999), the use of interest enhancing strategies is critical to regulating one's motivation and predicts greater effort and persistence during boring yet required activities (see also Sansone, Weir, Harpster, & Morgan, 1992). Findings from Gross and John (2003) also demonstrate significant benefits of cognitive reappraisal (i.e., cognitive approach) emotion regulation strategies on positive emotions and psychological well being. Wolters (1998) further showed motivation strategies involving intrinsic regulation, such as enhancing task value or interest, to be positively related to elaboration, critical thinking, as well as the use of metacognitive strategies.

On the other hand, avoidance strategies appear to be significantly less effective for dealing with learning related boredom. More specifically, findings from Nett et al. (2010) revealed that students who more frequently engaged in cognitive and behavioral avoidance strategies, referred to as Evaders, reported the highest levels of boredom and the most worrisome pattern of achievement related emotions (e.g., low enjoyment), motivation (e.g., low effort, interest, value), as well as cognitions (e.g., low self concept) relative to other students. This pattern of results is consistent with those of Holahan et al. (2005) in which stress avoidance strategies are consistently positively correlated with symptoms of stress and depression.

#### 1.5. Boredom related coping: trait versus state assessments

As discussed above, students' experiences of boredom and use of boredom related coping strategies may be influenced by situational as well as dispositional factors. Therefore, in order to most accurately assess the different ways in which students cope with boredom, it is important to consider both factors as potential antecedents of a student's classroom experiences and behaviors. To this end, the conceptual distinction between traits and states describes two sources of variability in psychological attributes, namely inter individual differences due to dispositional factors and intra individual differences caused by situational aspects (Steyer, Ferring, & Schmitt, 1992). In the coping literature, traditional approaches to conceptualizing and measuring coping behaviors typically operationalize coping strategy use as a stable and dispositional trait (for a review, see Stone, Greenberg, Kennedy Moore, & Newman, 1991). Consequently, the most commonly utilized coping assessment methods consist of trait questionnaires and structured interviews (Stone et al., 1991) in which participants are asked about their general coping preferences in the form of hypothetical scenarios (Carver & Scheier, 1994).

As a compliment to the trait approach that is well suited for evaluating the overall structure and personality correlates of coping strategies, more recent assessment methods also incorporate situational aspects of coping behavior (Stone et al., 1991). This measurement approach evaluates both between person variability with respect to individual differences in coping behavior (trait assessment) as well as within person variability across multiple assessments in how the individual copes with different situations (state assessment; Schwartz, Neale, Marco, Stone, & Shiffman, 1999). Thus, whereas trait methods are of considerable importance, state based assessments allow for the role of situational factors to be more fully addressed and may serve as a valuable

complimentary approach for evaluating students' demonstrated use of strategies for coping with boredom in an actual classroom setting.

## 2. Research aims, questions, and hypotheses

The primary aim of this study was to evaluate both trait and state measures of boredom related coping strategies in order to determine the most effective techniques used by students to cope with boredom in academic settings. More specifically, the first aim of the present study was to analyze the interrelations between specific trait boredom related coping strategies, as well as relations between trait based coping group membership and other personality traits (e.g., extroversion). Given the partly trait based nature of the coping group classification measure, it was expected to correspond with well known personality traits as measured by the Big Five. Correspondence with personality characteristics was also assessed to provide a more in depth perspective on the overall dispositions of our trait based coping strategy groups. The second aim of this study was to further investigate the frequency of state assessed boredom and coping behaviors, as well as relations between coping behaviors and other state assessed constructs (emotions, value) to explore the effectiveness of these coping behaviors. Finally, the third study aim was to explore the relations between trait and state assessments of boredom related coping to assess the predictive utility of the trait coping measures.

Our study thus replicated with an independent sample and extended upon a trait based investigation by Nett et al. (2010) in examining trait endorsements of boredom related coping strategies in relation to *actual coping behavior* in real life academic settings using the experience sampling method, as well the effectiveness of these behaviors with respect to state assessments of emotions and cognitions. Following from previous educational research showing students' emotional experiences to be largely domain specific in nature (Goetz, Frenzel, Pekrun, Hall, & Luedtke, 2007), the trait and state measures employed in the present study were evaluated specifically in regards to mathematics classes. This academic domain was selected based on previous research showing a moderate degree of student boredom in this domain (Goetz et al., 2006) and preliminary findings in support of the reliability of mathematics specific measures of boredom related coping strategies (Nett et al., 2010).

### 2.1. Question 1: trait assessment

Can the results of Nett et al. (2010) be replicated and extended concerning students' dispositional tendency to cope with boredom and their personality characteristics?

**Hypothesis 1a.** We hypothesized that the four factor structure of the trait coping measures based on two coping dimensions (approach/avoidance, cognitive/behavioral) that was previously found in Nett et al. (2010) would be observed in the present confirmatory factor analyses.

**Hypothesis 1b.** We further hypothesized that the three coping profiles found in Nett et al. (2010), namely Reappraisers (cognitive approach focus), Criticizers (behavioral approach focus), and Evaders (avoidance focus), would also emerge in the present latent profile analysis.

**Hypothesis 1c.** Concerning the external validity of these boredom related coping profiles, we hypothesized that coping group membership would predict trait self reports of academic boredom, with Reappraisers reporting the lowest boredom levels (cf., Nett et al.,

2010). Given the trait oriented nature of this boredom related coping measure, we further assumed that coping group membership would correspond to the Big Five personality traits. Assuming support for Hypothesis 1b, we expect Reappraisers to score most highly on agreeableness and conscientiousness, as investing effort in value appraisals implies being agreeable with the instructor's intentions and the perceived importance of being a conscientious student. Criticizers were expected to score higher on neuroticism than the other groups based on this group having the highest anxiety levels in Nett et al. (2010). Criticizers and Evaders were hypothesized to score relatively higher in extraversion, as they prefer to express their boredom to their teacher or classmates, respectively. No hypothesis concerning openness to experiences was proposed.

### 2.2. Question 2: state assessment

How often and to what extent do students engage in boredom related coping behaviors and experience of boredom in response to real life classroom activities?

**Hypothesis 2a.** It was anticipated that the frequency of students' experiences of boredom in class would be similar to that found in previous studies (e.g., 32%, Larson & Richards, 1991).

**Hypothesis 2b.** We hypothesized that the four coping strategies previously found for the trait measure (Nett et al., 2010) would also be observed for the state measure of boredom related coping.

**Hypothesis 2c.** Concerning the external validity of the four coping measures, we hypothesized that each state coping behavior would correspond to state assessed boredom levels as was found for the trait based measures (Nett et al., 2010). It was further anticipated that the four coping behaviors would correlate more significantly with boredom than other academic emotions (anxiety, enjoyment) thus underscoring their boredom specific focus.

### 2.3. Question 3: trait and state assessment relations

How strong is the predictive validity of trait assessments of boredom and coping strategies in terms of their respective state assessments?

**Hypothesis 3a.** We hypothesized a direct correspondence between students' trait assessed reports of boredom frequency and the frequency of state assessed boredom reports.

**Hypothesis 3b.** We hypothesized that the four trait based coping strategies would positively predict their respective state based coping behaviors (variable centered approach).

**Hypothesis 3c.** We further hypothesized that students' boredom related coping group membership, as derived from the trait measures, would significantly predict actual coping behaviors as assessed using state based measures (person centered approach).

## 3. Method

### 3.1. Participants and data collection

Two complimentary methods of data collection were employed. Trait data was collected via questionnaires that were group administered to students during regular classroom periods by trained research assistants. State data was collected for 14 days

from November 2008 to March 2009 using the experience sampling method (Csikszentmihalyi & Larson, 1987; Hektner et al., 2007) involving personal digital assistant (PDA) devices programmed with PMat software (Weiss, Beal, Lucy, & MacDermid, 2004). For the trait assessment, participants were recruited from 25 classes of grade 11 students across 9 schools, with a total of 537 students completing the trait questionnaire (55.3% female). Of this initial cohort, two to four students from each class were randomly selected (i.e., names were drawn from entries submitted by each study participant) to complete the state assessment during mathematics classes (total  $N = 79$ ; 58.2% female). The average age for trait study participants was 17.15 years ( $SD = .68$ ), and for state study participants was 17.08 years ( $SD = .54$ ). Study participation was voluntary and all responses were anonymous. All schools recruited for this study were in the top track of the German education system (Gymnasium), thus minimizing the variability in mathematics ability level for state study participants.

The trait data collection occurred immediately before providing the randomly selected students from each class with PDA devices. Students were instructed to register their device when they attended a mathematics class (i.e., selecting the option to activate the study), with each class lasting 45 min. The device then signaled at a randomly selected time within the next 40 min and displayed a digital questionnaire that students were asked to immediately complete. The device stopped signaling after the first question was completed and after five minutes without a response, stopped signaling and removed the questionnaire. The questionnaire displayed one question at a time, the items were partly randomized, and required in total approximately 1–3 min to complete. Teachers were informed of the experimental protocol and agreed to student participation. The state assessment only took place during regular mathematics classes and did not interrupt class exams. Each student completed at least one and at most 11 state questionnaires ( $M = 6.11$ ,  $SD = 3.45$ ).

## 3.2. Variables and study measures

### 3.2.1. Trait assessment

All items on the trait based questionnaire were evaluated on a five point Likert type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The coping scales consisted of five items each (Nett et al., 2010) and assessed four coping strategies: (1) *cognitive approach* (e.g., “When I am bored in mathematics classes, I remind myself that the material is important”;  $\alpha = .90$ ,  $M = 16.43$ ,  $SD = 4.70$ ), (2) *behavioral approach* (e.g., “...I ask my teacher if we can do something else”;  $\alpha = .80$ ,  $M = 8.34$ ,  $SD = 3.50$ ), (3) *cognitive avoidance* (e.g., “...I study for another subject”;  $\alpha = .69$ ,  $M = 12.54$ ,  $SD = 5.46$ ), and (4) *behavioral avoidance* (e.g., “...I talk to my classmates”;  $\alpha = .95$ ,  $M = 17.95$ ,  $SD = 5.76$ ).

Frequency of boredom experiences (e.g., “I am often bored during mathematics classes”;  $\alpha = .93$ ,  $M = 6.00$ ,  $SD = 2.31$ ) was measured using two items. The NEO Five Factor Inventory was also administered (German version, NEO FFI; Costa & McCrae, 1992) to assess the Big Five personality traits (Borkenau & Ostendorf, 1993). Each of the five scales consisted of 12 items and evaluated neuroticism ( $\alpha = .80$ ,  $M = 33.43$ ,  $SD = 7.17$ ), extraversion ( $\alpha = .78$ ,  $M = 42.30$ ,  $SD = 6.49$ ), openness to experience ( $\alpha = .72$ ,  $M = 39.85$ ,  $SD = 6.69$ ), agreeableness ( $\alpha = .69$ ,  $M = 42.18$ ,  $SD = 5.94$ ), and conscientiousness ( $\alpha = .86$ ,  $M = 39.90$ ,  $SD = 7.77$ ).

### 3.2.2. State assessment

To avoid overly intrusive state questionnaires, state constructs were assessed using single item measures. This practice is consistent with findings from Wanous, Reichers, and Hudy (1997) showing single item measures of job satisfaction to correlate highly with multi item scales, as well as previous experience sampling

studies on academic emotions (Goetz et al., 2010). Four types of boredom related coping strategies were assessed in a manner consistent with the trait based coping scales: (1) *cognitive approach* (“I am reminding myself that the material is important”;  $M = 3.25$ ,  $SD = .91$ ); (2) *behavioral approach* (“I am asking the teacher if we can do something else”;  $M = 1.12$ ,  $SD = .32$ ); (3) *cognitive avoidance* (“I am studying silently for another subject”;  $M = 1.93$ ,  $SD = .93$ ), and (4) *behavioral avoidance* (“I am talking to a nearby classmate”;  $M = 2.16$ ,  $SD = .90$ ). Participants responded to these items on a five point Likert type scale ranging from 1 (*not true at all*) to 5 (*absolutely true*).

The intensity of students' present experiences of boredom, anxiety, and enjoyment was also assessed using state measures (“During this activity, how strongly do you experience boredom?”;  $M = 2.33$ ,  $SD = .90$ ; “...anxiety?”;  $M = 1.63$ ,  $SD = .69$ ; “...enjoyment?”;  $M = 1.98$ ,  $SD = .75$ ). Participants responded to these items on a five point Likert scale ranging from 1 (*not at all*) to 5 (*very strongly*). Perceptions of academic utility value were also assessed (“The outcome of my current activity is important to me”;  $M = 3.38$ ,  $SD = .85$ ) on a Likert scale ranging from 1 (*not true at all*) to 5 (*absolutely true*).

## 3.3. Statistical analysis

The trait assessment data represents a two level structure in which students (Level 1;  $N = 532$ ) are nested within classes (Level 2;  $N = 25$ ). The data from the state assessment represents a three level structure in which measures at certain assessment points (Level 1;  $N = 483$ ) are nested within persons (Level 2;  $N = 79$ ) that are nested within classes (Level 3;  $N = 25$ ). For the sake of parsimony, we refer to the measures within persons as Level 1, to persons within classes as Level 2, and to the classes as Level 3 even when analyzing only Levels 2 and 3. Analyses were conducted via multi level statistics using Mplus 5.1 software (Muthén & Muthén, 1998–2007). Despite no hypotheses concerning class composition (Level 3), we accounted for the stratification and non independence of students due to cluster sampling by computing adjusted standard errors (Muthén & Muthén, 1998–2007). Regarding Levels 1 and 2, two level models were used to analyze the relationships between variables within a specific level as well as to evaluate relations between variables on two different levels.

## 4. Results

### 4.1. Trait assessment

#### 4.1.1. Structural validity of the trait measures

To evaluate Hypothesis 1a, confirmatory factor analysis (CFA) was conducted with the aim of replicating the four factor structure of the coping measures found in Nett et al. (2010). Consistent with the recommendations of Beauducel and Wittmann (2005), the CFI, SRMR, and RMSEA were evaluated as fit indices. The model assessed reflected a four factor structure in which the five item scales loaded on four latent variables. Although each latent variable represented a different coping strategy, correlations were included between all latent factors to account for potential covariance. The five items for each scale were allowed to load only on the corresponding latent factor.

In line with Hypothesis 1a, this model showed very strong fit indices:  $\chi^2/df = 1.80$ ,  $p \leq .00$ ; CFI = 0.972, SRMR = 0.052, RMSEA = 0.039. The significance of the chi square statistic can be attributed to the large sample size at the student level to which this statistic is overly sensitive (Marsh, Balla, & McDonald, 1988). The fit indices obtained are thus consistent with the rule of thumb recommending a  $\chi^2/df$  ratio below three (Ullman, 2007), as well as criteria

for satisfactory goodness of fit recommended by Hu and Bentler (1999). The estimated correlation matrix for the latent strategy variables is presented in Table 1.

#### 4.1.2. Identification of trait coping groups

To identify students with similar patterns of coping strategies based on their factor scores (Hypothesis 1b), latent profile analysis (LPA; Muthén & Muthén, 2000) was conducted using MPlus software (Muthén & Muthén, 1998–2007). To decide on the number of classes, we considered the Bayesian Information Criterion (BIC; Schwarz, 1978), the Lo Mendell Rubin test (LMRT; Lo, Mendell, & Rubin, 2001), as well as theoretical assumptions as recommended by Nylund, Asparouhov, and Muthén (2007). LPA findings indicated a two class solution (Table 2) as opposed to the anticipated three class solution. Although the BIC was more favorable (i.e., lower) for the three class relative to the two class solution, the LMRT showed the more complex three class model to not fit significantly better than the more parsimonious two class model.

The two groups identified in the LPA results are consistent with two of the three hypothesized groups, namely Reappraisers having above average cognitive approach and below average avoidance factor scores ( $M_{\text{cognitive-approach}} = 0.27$ ;  $M_{\text{behavioral-approach}} = -0.04$ ;  $M_{\text{cognitive-avoidance}} = -0.56$ ;  $M_{\text{behavioral-avoidance}} = -1.38$ ;  $N = 171$ ) and Evaders having below average cognitive approach and above average avoidance factor scores ( $M_{\text{cognitive-approach}} = -0.13$ ;  $M_{\text{behavioral-approach}} = 0.02$ ;  $M_{\text{cognitive-avoidance}} = 0.27$ ;  $M_{\text{behavioral-avoidance}} = 0.66$ ;  $N = 361$ ). No third group corresponding to the Criticizers in Nett et al. (2010) was detected (i.e., above average factor scores for behavioral approach strategies). The mean factor scores of the two groups are shown in Fig. 1. The average Latent Class Probabilities for most likely class membership showed Reappraisers and Evaders to be classified in a reliable manner (.91 and .95 probabilities of correct class allocation, respectively). The assessment of entropy as a measure of classification certainty in Mplus (Muthén & Muthén, 1998–2007) provided further support for the two class model, with a value of .79 indicating acceptable certainty (possible range: 0–1; higher values indicate greater certainty; Celeux & Soromenho, 1996). No classroom or gender effects on the coping group membership were observed.

#### 4.1.3. Trait coping groups and personality relations

The most likely class membership calculated by the LPA is not an exact observed measurement but rather a probability based score. Analyses based solely on this measure thus do not account for the possibility that individuals belonging to the same class may markedly differ in their probabilities of class membership (Clark & Muthén, 2009). To account for such differences, an Mplus feature allowing for mean comparisons on the basis of pseudo class draws was employed (Wang, Brown, & Bandeen Roche, 2005). In this analysis, several random draws are made from each individual's posterior probability distribution to determine class membership, resulting in different pseudo groups between which mean comparisons regarding auxiliary aspects can be computed (Clark & Muthén, 2009). This approach is recommended by Clark

**Table 1**  
Estimated correlations among latent trait coping measures.

	(1)	(2)	(3)	(4)
Trait cognitive-approach	–			
Trait behavioral-approach	.09	–		
Trait cognitive-avoidance	–.17***	.18***	–	
Trait behavioral-avoidance	–.34***	.02	.37***	–

Note:  $N = 532$ .  
\*\*\*  $p < .001$ .

**Table 2**  
Information criteria values of class solutions for boredom coping groups.

No. of classes	1	2	3	4
No. of free parameters	8	13	18	23
Log likelihood	–2644.10	–2539.23	–2501.86	–2470.27
BIC	5338.42	5160.05	5116.69	5084.89
$p_{LMR}$	–	.00	.14	.48

Note: BIC = Bayesian information criteria;  $p_{LMR}$  =  $p$ -value of Lo-Mendell-Rubin test;  $N = 532$ .

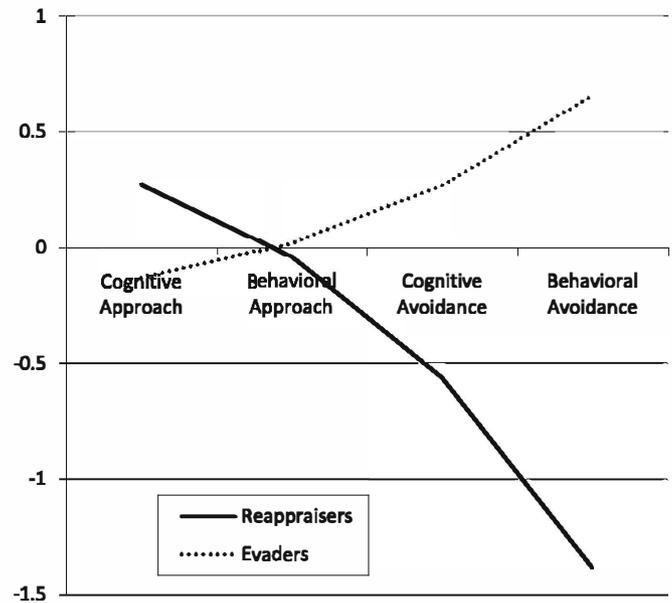


Fig. 1. Mean factor scores on trait boredom coping measures by group membership.

and Muthén (2009) as an acceptable compromise between group probabilities and dichotomies.

To address Hypothesis 1c, the preceding procedure was used to compare the boredom coping groups with respect to students' perceived frequency of boredom experiences, as well as the five personality traits assessed in the NEO FFI. Table 3 outlines the results of the means comparisons tests across boredom coping groups based on posterior probability based multiple imputations ( $df = 1$ ), in addition to the observed means, standard errors,  $\chi^2$ , and  $p$  values. In line with our assumptions and the findings of Nett et al. (2010), Reappraisers reported significantly lower levels of boredom relative to Evaders. As hypothesized, Reappraisers were also significantly more conscientious and less extroverted than Evaders. Findings based on a less conservative  $p < .05$  criterion further showed Reappraisers to be more agreeable than the Evaders. No

**Table 3**  
Boredom group mean differences.

	Reappraisers $N = 171$		Evaders $N = 361$		$\chi^2$	$p$
	$M$	$SE$	$M$	$SE$		
Boredom frequency	2.59	.09	3.15	.06	24.35	.000
Neuroticism	2.82	.05	2.78	.03	0.37	.543
Extraversion	3.39	.04	3.59	.03	12.63	.000
Openness to experience	3.35	.05	3.32	.03	0.26	.609
Agreeableness	3.58	.04	3.48	.03	4.13	.042
Conscientiousness	3.48	.06	3.24	.04	12.61	.000

Note: Equality tests of means across boredom coping groups using posterior probability-based multiple imputations with 1 degree of freedom.

group differences on neuroticism or openness to experiences were observed.

## 4.2. State assessment

### 4.2.1. Frequency of boredom experiences

Descriptive analyses were conducted to determine how often experiences of boredom were reported by students during mathematics classes (Hypothesis 2a). Of the 79 state assessment participants, only five never reported feeling bored (always selected 1 = *not at all*). Conversely, 16 students indicated having always felt some degree of boredom during mathematics classes (always selected 2 or higher). On average, students reported some degree of boredom during 58% of the state assessments and very strong feelings of boredom during 9% of state assessments. Due to the PDA devices signaling at random intervals during the mathematics classes, the percentage of participants' answers can be interpreted as the percentage of time during class during which boredom was experienced. On average, students reported moderate boredom intensity ( $M = 2.33$ ,  $SD = .90$ ). The intraclass correlation for boredom levels, referring to Level 1 (measurement points) and Level 2 (students), was  $ICC = .26$ . In multi level modeling, the intraclass correlations evaluate the variability within Level 2 in relation to the total variability of the construct. A value of .26 thus suggests that 26% of the variability of the boredom measure is due to dispositional features, or alternatively, that 74% of the variability in this measure was due to the situational context.

### 4.2.2. Frequency of coping behavior

To investigate Hypothesis 2b, we evaluated how often the four types of coping behavior, corresponding to the four trait measures of boredom related coping, were reported in the state assessments. To reiterate, items concerning the coping behaviors were asked during each assessment period regardless of the level of boredom reported by the participant at that time. The percentage data revealed that, on average, some degree of cognitive approach behavior (i.e., reminding oneself of the materials' importance) was reported by participants 78% of the time ( $M = 3.25$ ,  $SD = .91$ ), as compared to behavioral approach actions that were reported on average only 6% of the time (i.e., asking the teacher to assign alternate activities;  $M = 1.12$ ,  $SD = .32$ ). Concerning avoidance behaviors, participants reported some level of cognitive avoidance behaviors during an average of 36% of the time spent in class (i.e., studying for an unrelated subject;  $M = 1.93$ ,  $SD = .93$ ), whereas behavioral avoidance actions were reported 46% of the time on average (i.e., talking to a nearby classmate;  $M = 2.16$ ,  $SD = .90$ ). These percentages suggest that students' boredom related coping strategies most often focus on value appraisals, and to a lesser extent, distracting behaviors unrelated to class content. In contrast, students were found to less frequently engage in cognitive distractions and very seldom attempted to persuade their teacher to assign more stimulating classroom exercises. The intraclass correlations for these four variables were  $ICC_{\text{cognitive-approach}} = .20$ ;  $ICC_{\text{behavioral-approach}} = .003$ ;  $ICC_{\text{cognitive-avoidance}} = .24$ ;  $ICC_{\text{behavioral-avoidance}} = .16$ . These correlations indicate that while cognitive approach, cognitive avoidance, and behavioral avoidance behaviors are to some degree influenced by dispositional aspects, behavioral approach behaviors in particular appear to be predicted predominantly by the situational context.

### 4.2.3. Coping behavior and boredom relations

To address Hypothesis 2c, correlations between coping behaviors and reported experiences of boredom as well as state measures of academic emotions (anxiety, enjoyment) and cognition (perceived value) were assessed (Table 4). The correlations were calculated only at Level 1 with the non independence of

**Table 4**  
Correlations among state measures.

	Cognitive-approach	Behavioral-approach	Cognitive-avoidance	Behavioral-avoidance
Boredom	-.17**	.12*	.14*	.26***
Anxiety	.12	.16*	.04	.13
Enjoyment	-.05	.06	-.03	.10*
Value	.50**	-.07	.25**	-.13*

Note: A total of 483 state assessments of boredom-related coping behavior were obtained from 79 students.

$N = 532$ .

\*  $p < .05$ .

\*\*  $p < .01$ .

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

observations on Levels 2 and 3 taken into account. As hypothesized, whereas all four coping behaviors were significantly related to experiences of boredom, they were not uniformly related to anxiety (only behavioral approach strategies) and enjoyment (only behavioral avoidance strategies). In contrast to the positive relations found between boredom and behavioral as well as cognitive avoidance approaches, cognitive approach behaviors were correlated negatively with boredom. This approach was also much more highly correlated with perceived value than were the other coping behaviors.

## 4.3. State and trait assessment relations

### 4.3.1. Predictions of boredom frequency

In the trait assessment, students were asked how often they experienced boredom during mathematics classes. To investigate Hypothesis 3a, the correlations between students' trait self reports and the observed frequency of boredom experiences on state assessments completed during mathematics classes were conducted. These analyses revealed a significant correlation between the trait and state based self reports of boredom ( $r = .39$ ,  $p \leq .001$ ) suggesting that students could, to a considerable extent, reliably predict their frequency of boredom experiences in mathematics classes.

### 4.3.2. Trait predicting state assessments

To investigate Hypothesis 3b, two level regressions were conducted in which state assessments of coping behaviors (Level 1) were regressed on their respective factor scores for the four trait assessments (Level 2). To account for the boredom contingent phrasing of the trait coping items (i.e., "When I am bored in mathematics class..."), the first set of regressions included only state assessments of coping behaviors in which students had reported some degree of boredom. For comparison purposes, a second set of regressions including only state assessments in which students did not experience boredom were also conducted. The results of the regression analyses showed only the trait assessments of cognitive approach strategies (boredom indicated:  $b = 0.45$ ,  $p < .05$ ; boredom not indicated:  $b = 1.08$ ,  $p < .01$ ) and behavioral avoidance strategies (boredom indicated:  $b = 0.42$ ,  $p < .01$ ; boredom not indicated:  $b = 0.10$ ,  $p > .05$ ) to significantly predict their respective state assessments. In other words, the only dispositional measures of boredom related coping strategies found to predict corresponding behaviors in an academic setting were those related to changing one's perceptions of subject value, or alternatively, engaging in distracting behaviors (talking to friends). Further, the trait cognitive approach scale was also the only coping measure to significantly predict their respective state assessment regardless of boredom being reported, suggesting that this approach may be used by students to cope with as well as prevent boredom experiences.

#### 4.3.3. Trait group membership predicting state assessments

To evaluate Hypothesis 3c, a person centered approach was adopted to explore the extent to which probability of group membership (see Clark & Muthén, 2009), as identified through LPAs of trait strategy measures (i.e., Reappraisers versus Evaders, see Clark & Muthén, 2009), predicted state assessments of associated coping behaviors. As probability scores range from 0 to 1, they were logit transformed into a logistic scale (see Clark & Muthén, 2009) before inclusion in a two level regression analysis. Due to only two groups having been identified in the present study, the two probability scores for a given individual add up to 1 and the logit transformed scores add up to zero, resulting in regression weights for the two variables that are of equal magnitude but opposite in valence. As hypothesized, our results indicated that the more likely a student was to be classified as a Reappraiser, the more likely that student was to also report cognitive approach behaviors in response to experiences of boredom (boredom indicated:  $b = 0.03, p < .05$ ; boredom not indicated:  $b = 0.02, p > .05$ ). A higher probability of being classified as a Reappraiser also predicted fewer behavioral avoidance responses to feelings of boredom (boredom indicated:  $b = -0.06, p < .01$ ; boredom not indicated:  $b = -0.01, p > .05$ ), but did not predict any coping behavior if boredom was not reported. Conversely, the likelihood of a student being classified as an Evader positively predicted behavioral avoidant responses to boredom (boredom indicated:  $b = 0.06, p < .01$ ; boredom not indicated:  $b = 0.01, p > .05$ ), and negatively predicted cognitive approach behaviors if the student reported experiencing boredom (boredom indicated:  $b = -0.03, p < .05$ ; boredom not indicated:  $b = -0.02, p > .05$ ; same regression coefficients as above with opposite valence). It should be noted that these regression weights are not standardized, thus allowing for comparisons of significance values only.

## 5. Discussion

Despite the common, aversive, and problematic nature of boredom in the classroom (e.g., Larson & Richards, 1991; Tidwell, 1988; Wegner et al., 2008), little research to date has explored students' experiences of boredom or the influence of dispositional and situational factors on how students' cope with this deleterious emotion. The present study aimed to contribute to this research gap by supplementing trait evaluations of boredom related coping strategies with state assessments conducted in real life classroom settings.

### 5.1. Trait assessments of coping strategies

With respect to the first study hypothesis, our findings replicate Nett et al. (2010) in confirming a four factor model of coping strategy endorsement specific to boredom experiences. As hypothesized, two boredom related coping profiles similar to those identified by Nett et al. (2010) were observed, with these groups referred to as Reappraisers (high cognitive approach, low avoidance) and Evaders (low cognitive approach, high avoidance). However, a third group previously referred to as Criticizers was not supported by the study data. In contrast to the other groups, Criticizers were previously characterized by their emphasis on behavioral approach strategies, and in Nett et al. (2010), scored between the other two groups on achievement, motivation, and emotions. As to why this group was not detected, it is possible that the present smaller sample size ( $N = 537$ ) as compared to Nett et al. (2010;  $N = 936$ ) allowed for only the most disparate coping groups to be identified. Nevertheless, these findings provide additional empirical support for the utility of this classification in accounting for boredom related coping profiles. As hypothesized, students

classified as Reappraisers reported lower levels of trait boredom in mathematics classes than Evaders. This suggests that the former group may respond to experiences of boredom more effectively than the latter, or alternatively, are less often initially bored due to their preexisting disposition to respond adaptively to this emotion. Regardless of the reason, these findings concerning boredom levels provide empirical support for the proposed mechanism underlying the potential effectiveness of boredom related coping strategies in showing a greater relative emphasis on cognitive approach strategies to correspond with lower boredom as assessed using trait measures.

Finally, evaluations of the relations between the trait coping measures and well established personality variables revealed further group differences showing Reappraisers to be less extraverted and more conscientious than Evaders. In addition to underscoring the trait like nature of the coping strategy measures, these results are consistent with the strategy profile of each group. Whereas Reappraisers demonstrated a greater focus on self regulation (i.e., anticipating the future value of otherwise boring mathematics content), Evaders were instead shown to prefer seeking stimulation through interactions with others.

### 5.2. State assessments of boredom and coping behavior

In Larson and Richards (1991), students, on average, reported feelings of boredom during 32% of the time spent in class. Our results are even more worrisome in showing students to experience some level of boredom during 58% of the time spent in mathematics classes. Whereas this discrepancy in boredom frequency may be attributable to differing methods of assessment (e.g., measure sensitivity to students' boredom experiences), these results are nonetheless indicative of the highly prevalent nature of students' experiences of boredom in the classroom. With respect to our second hypothesis, our aim was to assess whether or not the relational structure observed for students' generalized reports of coping strategies would be observed when evaluating coping behaviors in real life classroom settings. An initial analysis revealed an encouraging finding showing cognitive approach strategies to be frequently reported during class, irrespective of whether or not boredom was indicated. In contrast, behavioral approach behaviors were not frequently reported, perhaps due to a lack of opportunity (e.g., unresponsive teacher), resulting in a lack of variance that may have contributed to subsequent nonsignificant findings. Cognitive avoidance strategies were also infrequently reported, likely due to students finding it easier to distract themselves by chatting with a classmate as is suggested by a positive correlation between the trait cognitive and behavioral avoidance measures. Analyses of behavioral avoidance behaviors support this interpretation in showing behavioral distractions to be commonly reported by students during mathematics classes.

The intraclass correlations for each of these strategies further revealed that the variability in students' coping behavior was to a considerable extent explained by situational as opposed to dispositional factors. This shows that the classroom environment is indeed a critical determinant of students' boredom experiences and thus could potentially be modified to significantly reduce this deleterious emotion. As the present sample is quite homogenous with respect to mathematics ability levels and instruction methods, with all students having been selected from grade 11 classrooms in the top track of the German education system, further research is needed to determine the extent to which differences in instructional activities and ability levels elicits differential patterns of boredom related coping behaviors. Nevertheless, the present study findings highlight the importance of contextual variables despite the largely homogenous nature of the learning situation assessed.

By addressing the issue of boredom rather than ignoring it, it may be possible for teachers and students to work together reduce this deleterious emotion, and in turn, facilitate academic motivation and achievement. More specifically, our results suggest that by informing students of the potential benefits, as well as risks of specific boredom related coping strategies (e.g., focusing on value as opposed to talking with friends), teachers are more likely to facilitate student appreciation of the course material (i.e., perceived value). For example, by teaching students how to find value in otherwise boring academic content, and subsequently allowing students to practice this coping strategy as a classroom exercise (e.g., benefits lists), students may come to better understand their role in minimizing boredom experiences and thereby maximize their learning potential.

Finally, it is anticipated that continued research on boredom and related coping efforts in a classroom setting can lead to the development of intervention programs aimed at helping students cope with boredom more effectively. For example, existing research on motivational interventions for students highlights the potential emotional and achievement benefits of programs encouraging greater personal responsibility for academic failure experiences (e.g., attributional retraining; Hall et al., 2007) or greater personal reflection on the perceived value of academic endeavors (e.g., Cohen, Garcia, Apfel, & Master, 2006). Considering the independent effectiveness of these programs, it is possible that an intervention encouraging students to assume personal responsibility for feelings of boredom by focusing on the utility value of what they are learning (i.e., cognitive approach strategies) could help to minimize boredom experiences, enhance students' motivation and achievement, and thereby contribute to a more enjoyable classroom experience for students and teachers alike.

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