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Investigating Academic Boredom in Canadian and Chinese Students

by

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Abstract

Recent research has shown that boredom has an adverse impact on students' learning and achievement (e.g., Mann & Robinson, 2009). Given the deleterious impact of boredom on learning, this study evaluated two boredom scales—a learning-related boredom scale and a boredom coping scale—with samples of college students from Canada and China. After establishing the validity of the two boredom scales, this study examined the impacts of boredom and coping strategies on achievement in the two settings. Results suggested that the learning-related boredom scale was invariant across groups, whereas the boredom coping scale showed partial measurement invariance. Findings also indicated that in the Western sample, academic boredom affected students' self-efficacy for self-regulated learning, which in turn influenced their performance. However, such a linkage was not evident in the Chinese sample. In terms of boredom coping strategies, the negative impact of endorsing avoidance approaches on achievement was not found.

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Chapter 1 Introduction

The primary purpose of the current study is to enhance our understanding of how academic boredom, through its impact on self-regulatory efficacy, influences achievement, and how endorsing different coping strategies affects students' boredom levels, their confidence to self-regulate and subsequently their academic performance. Although negative emotions such as anxiety and fear have been shown to be negatively related to school performance (e.g., Bartels & Magun-Jackson, 2009), the question of how academic boredom affects self-efficacy for self-regulated learning (SESRL) and performance has received far less attention. Only recently has the impact of academic boredom on achievement and students' boredom coping mechanisms been examined (e.g., Mann & Robinson, 2009; Nett, Goetz, & Daniels, 2010). Hence, the secondary objective of this study is to evaluate the impact of endorsing various types of boredom coping mechanisms on learning and achievement. The third objective is to explore the generalizability of academic boredom and coping strategies across cultures. Although Pekrun, Goetz, Daniels, Stupnisky, and Perry (2010) found that Canadian and German students respond to academic boredom in a similar fashion, academic boredom has not been otherwise well studied across cultures. Little is known about how it operates in non-Western and non-European contexts.

Alongside the recent findings from scholars on academic boredom, educators typically invest effort into making lectures interesting for students. In spite of this effort, students still frequently experience boredom in academic situations (Pekrun et al., 2010). Despite its prominence, boredom has received far less attention than

other emotions such as anxiety and joy (Pekrun et al., 2010). A quick search in PsycINFO reveals about 300 studies on boredom between 1987 and 2010. Most of the existing studies focus on boredom in industrial settings rather than in schools. Pekrun et al. explained that the lack of studies might be related to the silent manifestation of boredom. In contrast to angry or frustrated students who interrupt the class, students feeling bored are often non-disruptive, and may be labeled as lazy. Yet recent findings show the harmful impact of boredom on students' educational development (Pekrun et al., 2010), including distress (Barnett, 2005), juvenile delinquency (Newberry & Duncan, 2001), deviance (Wasson, 1981), truancy (Sommer, 1985), and dropping out of school (Wegner, Flisher, Chikobvu, Lombard, & King, 2008).

Pekrun's body of boredom research (e.g., 2006) provides an integrated framework to conceptualize boredom. He developed control-value theory to understand how various emotions are experienced in school settings. Based on his theoretical framework, academic boredom is induced because of a lack of subjective value in a learning situation, whereas other emotions such as anger, frustration, or joy are stimulated by an academic activity (Pekrun et al., 2010). Pekrun and colleagues elaborated that academic boredom is comprised of five key factors: affective, cognitive, expressive, motivational, and physiological components. The affective element reflects the negative and unsettling feeling of boredom; the cognitive part pertains to an inert mental state; the expressive component refers to the expression of a slumped posture and a flattened tone of voice; the motivational element reflects the inclination to leave the situation; and

the physiological component refers to a low level of arousal (Pekrun et al., 2010).

Given that students spend most of their time in classes, their perception of an academic activity and reaction in a boring situation should be of great interest to educators and researchers. Past literature shows that academic boredom may have an adverse impact on students' behaviors and achievement (e.g., Larson & Richards, 1991; Mann & Robinson, 2009; Nett, Goetz, & Daniels, 2010). About 58% of college students perceived more than half of their lectures as boring (Mann & Robinson, 2009), and academic boredom is highest when students learn abstract subjects in a passive way (Larson & Richards, 1991). Mann and Robinson (2009) found that when students feel bored, they are more likely to daydream in classes and skip future lectures. Recently, Nett et al. (2010) have found negative relationships between the preference for using avoidance boredom coping strategies and enjoyment of, effort in, and interest in mathematics among German students from Grades 5 to 10; yet, whether this preliminary finding can be generalized to the college population remains unknown.

Although a handful of studies have addressed academic boredom in detail, scholars have not yet considered the role of SESRL in affecting achievement when students feel bored in learning. Research shows that pervasive negative emotions affect self-efficacy (e.g., Thelwell, Lane, & Weston, 2007). In Bandura's (1986) social cognitive theory, self-efficacy beliefs reflect people's evaluation of their capabilities to perform successfully. In educational settings, efficacy beliefs play a crucial role in academic success (e.g., Thelwell et al., 2007). In particular, students' beliefs in their capabilities to monitor and regulate their learning process

are referred to as SESRL (Bandura, 1995). Self-regulatory skills are insufficient for academic success if students do not apply them in face of challenging situations (Bandura, 1995). As Bandura pointed out, it is the belief in one's capabilities and persistence in using self-regulated skills that keeps one moving ahead. Past literature has documented that students' beliefs in their SESRL are positively related to perceived academic efficacy (Zimmerman & Bandura, 1994), and negatively to procrastination (Klassen et al. 2009). In spite of the emphasis on efficacy beliefs, little attention has been given to SESRL, which plays a key role in students' academic careers.

Given the lack of studies of boredom in cross-cultural research, it is not surprising that although SESRL is important in learning, this critical concept and its relationship with academic boredom have not been well studied outside Western societies. The number of studies examining cross-cultural emotions, such as distress and joy, is increasing. For example, Frenzel, Thrash, Pekrun, and Goetz (2007) conducted a cross-cultural validation study of academic emotions in Germany and China. They found a significant negative relationship between negative emotions (i.e., anxiety and anger), and mathematics grades in both countries. Most studies on academic boredom have been conducted in Western societies (e.g., Daniels et al., 2008; Mann & Robinson, 2009, Pekrun, 2006). Although little is known about academic boredom outside Western cultural settings, there is a reason to believe that this construct operates in a similar pattern in Eastern cultures based on prior knowledge showing that academic emotions are invariant across countries (e.g., Frenzel et al., 2007).

Like academic boredom, SESRL has not been well addressed in cross-cultural studies. Bandura (2002) proposed that the functional values of efficacy are common across cultures, and Earley (1994) found that the functional values of the efficacy beliefs can be generalized across the United States and China. The finding provides support for the generalizability of the efficacy beliefs; however, because Earley's study was conducted in industrial settings, further research is needed in academic settings. Conducting a study in Canada and Singapore, Klassen et al. (2009) found that SESRL was strongly associated with procrastination. Given the limited understanding of SESRL across cultures, the present study aims to respond to this gap in knowledge.

In addition, few studies have explored boredom using a cross-cultural framework. Moreover, no studies have investigated whether SESRL mediates the relationship between academic boredom and achievement or how the preference for different coping strategies affects the experience of boredom and achievement across cultures. Recently, Pekrun et al. (2010) have found that academic boredom affects performance similarly in Canada and Germany. The current study extends Pekrun et al.'s study by exploring academic boredom and its relationship to SESRL, boredom coping strategies, and achievement, and by including samples from Canada and China. Based on Pekrun et al.'s findings of commonalities between Canadian and German students in academic boredom and its impact on achievement, I hypothesized that academic boredom would operate in a similar way in the two culturally distinctive settings of Canada and China.

Chapter 2 Literature Review

Boredom is commonly regarded as an unpleasant emotion characterized by a lack of stimulation or value in an activity (e.g., Fisher, 1998; Harris, 2000). Although boredom in educational settings may be universal and is related to juvenile delinquency (Newberry & Duncan, 2001), dropout rates (Wegner et al., 2008), and life dissatisfaction (Farmer & Sundberg, 1986), the construct has received modest attention in research (Mann & Robinson, 2009; Nett et al., 2010; Pekrun et al., 2010). Scholars have recently started investigating the impacts of academic boredom on performance, and its relationship with mediators, such as SESRL. Furthermore, the cross-cultural generalizability of boredom remains unknown, except in a few very limited settings. In the following sections, I summarize previous research on academic boredom, students' ways of coping with boredom, SESRL and its hypothesized relationship with boredom, and cross-cultural perspectives on these topics.

Boredom in Academic Settings

Pekrun (2006) proposes an integrative framework—control-value theory—to understand the antecedents and consequences of emotions in academic settings. He defines *achievement emotions* as "emotions tied directly to achievement activities or achievement outcomes" (p. 317). Any emotions induced when undergoing academic or achievement activities, such as attending a lecture or working on a learning task, are thus considered achievement emotions. The term achievement emotion, therefore, is used interchangeably with "academic emotion" in the present study. In Pekrun's framework, achievement emotions can

be divided into activity and outcome emotions. Activity emotions refer to the emotions experienced during an activity, whereas outcome emotions are related to the effects experienced as the result of an activity (p. 317). Thus, according to his classification, academic boredom is regarded as an unpleasant activity emotion.

Boredom in academic and general settings share the same unique characteristic: it is a deactivating emotion experienced due to not valuing a given task (Pekrun, 2006; Pekrun et al, 2010). However, what distinguishes academic boredom from general *ennui* is its specificity to academic-related activities and situations (Kass, Vodanovish, & Callender, 2001; Martin, Sadlo, & Stew, 2006; Thackray, 1981). According to control-value theory (Pekrun, 2006), when individuals lack control over academic activities that are either far beyond or below their capabilities, they experience academic boredom. Boredom is also induced if there is no subjective value placed on academic-related activities (Pekrun, 2006). Supporting Pekrun's theoretical definition of boredom, Goetz, Pekrun, Hall and Haag (2006) found a negative relationship between values placed on academic activities and boredom experiences. Similarly, Mann and Robinson (2009) stated that college students described a range of learning activities, including laboratory work and computer sessions, as boring. Regardless of how interesting a task may be, students still experience boredom when they perceive that it is meaningless to work on it.

In examining studies in academic boredom, the most frequently used scale is the Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986; Mann & Robinson, 2009; Newberry & Duncan, 2001). The BPS was developed to assess

individual differences in boredom generally instead of boredom specific to academic circumstances; therefore, the use of the BPS to assess students' boredom in academic activities may weaken its measurement validity. In order to avoid conceptual and measurement problems, it is important to use instruments which are congruent with the construct to be measured (i.e., construct validity). With this in mind, Pekrun, Goetz, Tiz, and Perry (2002), and Pekrun, Goetz, and Perry (2005) developed the Academic Emotions Questionnaire (AEQ). The learning-related boredom scale included in the AEQ is suitable for assessing academic boredom. The scale was conceptualized with one underlying construct – boredom during studying – including four components (i.e., affective, cognitive, motivational, and physiological). The affective component measures negative and unsettling feeling; the cognitive component assesses one's mental inertia; the motivational component evaluates the inclination not to work on a given activity; and the physiological component assesses the level of physical arousal. These components are consistent with the theoretical factors underlying boredom. In the original work, the boredom scale on the AEQ was shown to correlate negatively with motivation and learning strategies use. Recently, Pekrun et al. (2010) confirmed that boredom in learning negatively predicted college students' course performance. However, based on a thorough review of the literature, I found no validation studies of the scale beyond that undertaken in Germany. Therefore, the present study expands on Pekrun's et al. work to validate the learning-related boredom scale and evaluated its influence on students' academic performance in other populations.

Impact of Boredom on Self-Regulatory Efficacy, Coping Strategies, and Achievement

Pekrun's (2006) study provides an important theoretical framework for future research on academic boredom. Yet, in order to better understand this domain, scholars have to explore how boredom affects various learning factors. The present study explores the impact of academic boredom on SESRL and school performance, and it also examines the influence of endorsing particular boredom coping strategies on the perception of boredom frequency in class, on the levels of boredom in study time, and on achievement.

Self-efficacy for self-regulated learning. SESRL has shown a positive influence on students' achievement in Western societies and in some non-Western countries (e.g., Klassen et al., 2009). In broad term, the concept of self-efficacy, a contextual evaluation of one's confidence in completing a particular course of action, originated in Bandura's social cognitive theory (Bandura, 1986; 1995). Self-efficacy beliefs, Bandura argued, are formed from four sources of information: mastery experience, vicarious experience, verbal persuasion, and physical and emotional states. First, in terms of mastery experience, an individual builds a sense of efficacy when he or she is able to overcome an obstacle. As Bandura (1994) stated, mastery experience is an effective means to create a strong sense of efficacy. Second, regarding vicarious experience, an observation of others who successfully complete a given challenging task enhances observers' confidence to overcome similar obstacles. Third, Bandura argued that individuals also have a stronger sense of efficacy if other people persuade them that they have

capabilities. Fourth, an accurate interpretation of one's physical and emotional states raises confidence to overcome an obstacle. Bandura proposed that the self-efficacy beliefs are the key determinants in human motivation and persistence in action (Bandura, 1977). The idea is that in addition to task-specific knowledge and skills, individuals need to have a sense of efficacy to perform successfully (Klassen, 2004).

Researchers have applied self-efficacy theory to understand a number of student issues, including students' career choices (Zeldin & Pajares, 2000), goal-setting (Locke & Latham, 1990), persistence (Chemers, Hu, & Garcia, 2001), and academic performance (e.g., Bouffard-Bouchard, Parent, & Larivèe, 1991; Klassen, 2004; Zimmerman, 2002). In relation to academic performance, self-efficacy is defined as "personal judgments of one's capabilities to organize and execute courses of action to attend designated types of educational performance" (Zimmerman, 1995, p. 203), and it has been well studied for its influence on students' persistence and perseverance in overcoming challenging circumstances (e.g., Bandura, 1993). These beliefs influence students' performance through both cognitive and metacognitive strategies used in learning: approaching challenging learning activities, devoting more effort in the face of difficulties, and using more self-regulatory strategies (Pajares, 1996; Pajares & Schunk, 2001; Williams & Williams, 2010).

In examining the benefits of SESRL, researchers have found that SESRL is positively related to overall academic self-efficacy (confidence to attain desired results), and the use of self-regulated strategies and performance (i.e., Feldmann,

Martinez-Pons, & Shaham, 1995; Joo, Bong, & Choi, 2000). In particular, SESRL plays a crucial role in students' academic careers (Zimmerman, 1995). Being equipped with regulatory skills in learning is insufficient to succeed (Zimmerman, Bandura, & Martinez-Pons, 1992); students also need to have efficacy beliefs to monitor and evaluate their progress, put effort into accomplishing the task, and apply appropriate strategies to attain their goals (Bandura, 1986).

Students' academic self-regulation is related to their academic-related emotions (e.g., Bartels & Magun-Jackson, 2009; Pekrun et al., 2010). Throughout their academic careers, students experience different emotions including positive affect (e.g., enjoyment), negative affect (e.g., anger and frustration), and affect that is neither positive nor negative (e.g., boredom). Empirical studies suggest an inverse relationship between negative emotions (e.g., anger, fear, and depression) and the use of self-regulated strategies in achievement (e.g., Bartels & Magun-Jackson, 2009). This implies that negative emotions might be associated with a lower sense of SESRL. When experiencing academic boredom and considering their learning tasks to be of low value, students may have a lower level of academic motivation (Pekrun et al., 2010). Pekrun (2006) elaborates the process by which academic boredom affects an individual's learning and achievement. When students feel bored, it triggers a deactivating mechanism. The perception of learning activities as meaningless lowers the motivation to learn and reduces the sense of SESRL, which in turns results in superficial learning and a lower level of achievement (Pekrun, 2006). It is, therefore, anticipated that academic boredom is negatively related to SESRL and achievement. Given the

limited attention devoted to this area, the present study aims at shedding light on how SESRL mediates the relationship between academic boredom and achievement.

Boredom coping strategies. On one hand, scholars have explored the impact of boredom on students' confidence to self-regulate their learning; on the other hand, it is also important to examine how students cope with boredom. Pekrun et al. (2010) noted that boredom is related to deviant behaviors including illegal drug use (e.g., Wallance, Vodanovich, & Restino, 2003; Watt & Blanchard, 1994), use of nicotine and alcohol (Amos, Wiltshire, Haw, & McNeill, 2006), pathological gambling (Blaszcynski, McConaghy, & Frankova, 1990), and substance abuse (Anshel, 1991). These findings, Man and Robinson (2009) argued, lead to the conclusion that coping with boredom may lead to deviant behaviors. However, the focus of many boredom coping studies is varied (e.g., adults' gambling) and so the findings may not be applicable to academic situations.

Specific to student's boredom in school settings, Pekrun et al.'s (2010) study found that academic boredom reduces students' attention in learning, and that boring schoolwork might be inevitable. In school settings, students cope with boredom using a variety of strategies, and the way that students' use strategies to deal with academic boredom could result in a wide range of outcomes (Mann & Robinson, 2009; Nett et al., 2010). Mann and Robinson (2009) conducted a study to investigate how university students cope with boring lectures. Twelve coping strategies (e.g., text-messaging, making shopping lists, switching off, doodling, and daydreaming) were identified. In particular, the authors found that

daydreaming (75.4%) and doodling (66.4%) were the most frequently used coping strategies among university students during boring lectures. Moreover, the higher students rated their lecture time as boring, the more likely it was that they would skip the subsequent lecture. The result thus sheds light on how students cope with boredom at the college level. The authors' use of interviews and questionnaires explored boredom coping strategies among university students, but they did not identify whether or not those strategies are effective in helping students cope with boredom.

To better understand boredom coping strategies among students, Nett et al. (2010) developed a boredom coping scale (BCS) based on coping strategies with stress (Holahan, Moos, & Schaefer, 1996). The BCS consists of two dimensions. In the first dimension, the scale measures either active (approach) or passive (avoidance) problem-solving strategies; in the second dimension, it constitutes either cognitive or behavioral coping strategies. Nett et al. used a confirmatory factor analysis to analyze the latent variables of the boredom coping scale, and identified four factors: (a) cognitive-approach, (b) behavioral-approach, (c) cognitive-avoidance, and (d) behavioral-avoidance coping strategies. After validating the scale with the German sample, the authors used a latent class analysis to identify homogeneous group of students who use similar boredom copings strategies. They identified three boredom coping groups: reappraisers, criticizers and evaders. Reappraisers predominately preferred cognitive-approach boredom coping strategies; criticizers mainly adopted behavioral-approach strategies; evaders primarily chose both cognitive- and behavioral-avoidance

strategies to cope with boredom (Nett et al., 2010). Nett et al.'s work provided a systematic approach for understanding boredom coping strategies; however, more studies are needed to determine whether or not the framework can be generalized to other settings.

From a practical perspective, it is important to understand the effectiveness of boredom coping strategies in terms of academic attainment. Mann and Robinson (2009) surveyed college students about their boredom coping strategies in lectures, and they found that students used numerous strategies; however, the authors did not unpack the relationship between boredom coping strategies used and students' course performance.

Nett et al. (2010) investigated the relationship between the strength of endorsing a particular boredom coping approach and the level of mathematics achievement among Grade 5 to 10 students in Germany. The authors found a medium effect size on achievement in mathematics between reappraisers and evaders. Given that reappraisers preferred using cognitive-approach strategies, such an approach may be considered an adaptive means to cope with academic boredom. Nett et al.'s study provided an initial work on understanding the effectiveness of different boredom coping strategies; however, it is still uncertain whether a similar pattern will be found outside German population and among college students. Additionally, the boredom coping scale was a newly developed measure in Germany. There is a need to validate the scale in other populations (e.g., North American and Asian). Only if a scale is proven to be valid and reliable, can it be a useful measurement tool. Thus, the present study evaluates the factor

structure of the scale, factor loading and variance using confirmatory factor analysis (CFA) and examines the effect of boredom coping preference on the frequency of boredom in class, on the perception of boredom during studying, and on course performance.

Academic performance. Understanding the impact of boredom on achievement is at least as important as knowing how students react in a perceived boring situation. Researchers (Barnett, 2005; Newberry & Duncan, 2001; Sommer, 1985; Thackray, 1981; Wegner et al., 2008) have documented the influence of boredom on students' behaviors such as juvenile delinquency and truancy, but less work has connected boredom with achievement. Therefore, it is crucial to understand academic boredom's effect on achievement. Pekrun et al. (2010) conducted a series of studies in Canada and Germany to examine the relationships between academic boredom and performance outcomes. After controlling for students' prior academic performance, they found that academic boredom hampers achievement due to reduced attention, motivation and self-regulated strategies used in learning. The findings suggest that experiencing academic boredom is associated with poorer achievement.

From an educational perspective, effective learning is the core of students' academic careers. Despite the non-disruptive nature of academic boredom, its negative impacts on students' learning and achievement cannot be ignored. Researchers and educators, therefore, have to put their effort into understanding this phenomenon in order to facilitate students' learning.

Cross-Cultural Commonality in Boredom and Self-Regulatory Efficacy

Recognizing its negative effects on learning and achievement, scholars have started to examine academic boredom in different cultural contexts, including Germany (e.g., Breidenstein, 2007; Nett et al., 2010), North America (e.g., Daniels et al., 2008; Larson & Richards, 1991; Pekrun, 2006; Rupp & Vodanovich, 1997; Ruthig et al. 2008), and the United Kingdom (e.g., Mann & Robinson, 2009). Studies exploring academic boredom in different countries will provide a better understanding of how this construct operates across varying social contexts. However, most studies have been conducted in single, culturally-western countries, and so findings are difficult to compare with each other, and difficult to extrapolate to other regions of the world. Although Pekrun and colleagues (2010) recently conducted a series of studies in Canada and Germany and found that academic boredom had a substantial adverse effect on students' course performance in both samples, little is known about how boredom would affect students' learning and achievement in non-Western and non-European school settings.

Boredom in cross-cultural perspective. Sundberg, Latkin, Farmer, and Saoud's (1991) study provided one illustration of the experience of boredom in diverse locations. They found that Americans and Australians reported less boredom than Lebanese and Hong Kong students. The authors explained that Asian students experience boredom to a greater extent, probably due to a lack of prospective lifestyle and entertainment opportunities, and uncertainties about the future. The study, however, only measured boredom in general situations. Little is

known about how boredom operates in school settings across cultures.

Cultural difference in teaching styles. In order to evaluate boredom across culturally diverse school settings, it is important to review teaching styles in western and non-western universities. Huang (2009) conducted an interview with Chinese students attending North American universities and found several key differences in perceptions of teaching styles. In western universities, teachers were perceived as facilitators who encouraged active learning and engaged students in critical thinking, whereas in Chinese universities, teachers were perceived as knowledge-givers, and students were expected to "just listen to the teacher" (p.338, Huang, 2009). Putting this into Pekrun's (2006) control-value framework, given a lack of control over academic activities in passive learning, higher levels of boredom may be induced compared to active learning contexts. In another words, Chinese students, who learn in a passive way, may experience boredom more frequently in class than Western students.

Individualism versus collectivism. In addition to the difference in teaching styles, which may contribute to the experience of boredom across educational settings, the question of how cultures as-a-whole may affect students' perception of and reaction to boredom deserves our attention. Given that few studies examine the effect of culture on students' experience of boredom, I investigated the literature that examines cultural influences on emotions, especially among Canadian and Chinese students. As Hofstede (2001) and Safdar et al. (2009) argued, North American culture emphasizes individual fulfillment. By contrast, Eastern cultures (e.g., Japanese and Chinese) place a greater value on social

harmony. In particular, Hofstede found that of the 53 countries he analyzed, Canada ranked 4 on the individualism index, whereas Hong Kong and Taiwan ranked 37 and 44 respectively. The analysis suggested that Chinese culture is relatively collectivistic. The difference in the degree of individualism/collectivism may affect individuals in a particular culture on their experience, expression of, and reaction to emotions, including boredom.

Experience and expression of boredom. Collectivistic cultures emphasize group values and harmony, and emotions are considered an "interactive experience" instead of a reflection of one's inner state (p. 2, Safdar et al. 2009). Given the importance of maintaining social order and harmony, the levels of emotional expression is relatively low in collectivistic cultures (Potter, 1988; Soto, Levenson, & Ebling, 2005). This suggests that Chinese students who are relatively more collectivistic according to Hofstede's analysis (2001) may experience and display lower levels of boredom.

On the other hand, emotions are considered personal experiences in individualistic cultures and expression of emotions reflects how an individual feels (Safdar et al., 2009). Contrasting to those in collectivistic cultures, in individualistic cultures, people are encouraged to express their feelings and emotions (Matsumoto, Takeuchi, Andayani, Kouznetsova, & Krupp, 1998). Given that Canada ranks high on the individualism index (Hofstede, 2001), this implies that Canadian students may experience and express boredom to a greater extent than Chinese students.

Response to boredom. In the face of a boring lecture, students' reactions

toward such a situation may be influenced by cultural values and social norms (Matsumoto et al., 2008). Emphasizing social harmony in collectivistic culture, individuals may moderate their reactions to emotions and tend to use more emotion regulation strategies (Potter, 1988). By contrast, since individualistic cultures emphasize inner qualities and experiences, people in individualist cultures may be inclined toward emotion expression instead of moderation (Safdar et al., 2009). This implies that Chinese students may prefer using boredom coping strategies to maintain harmony in lectures to a greater extent than Canadian students.

Self-Efficacy for Self-Regulated Learning Across Cultures

Like studies on boredom, research on SESRL has received little attention despite its aforementioned importance in learning. Past literature has shown that cultural values and social contexts have significant impacts on an individual's adoption of psychological construal of self (Markus & Kitayama, 1991). Researchers (e.g., Gardner, Gabriel, & Lee, 1999; Markus & Kitayama, 1991) have identified two divergent types of self-construal: the independent and interdependent self. An independent view of self is characterized by the belief of an individual's uniqueness, and therefore people's behaviors are organized by referencing to their internal thoughts and feelings and focusing on their own attributes (Eid & Diener, 2001). The crux of this view of self is that individual is an independent person (Markus & Kitayama, 1991). Most individualist Western cultures (e.g., Canada and United States) emphasize this independent conception of self to a greater extent than collectivist Eastern cultures (e.g., China and Japan).

The *interdependent* view of self, on the other hand, takes the larger social context into consideration. This view is also emphasized in non-Western cultures. People with an interdependent self-construal focus on the affects, thoughts, and actions of others in the relationship, and they are motivated to find ways to become part of the larger relationship (Eid & Diener, 2001; Markus & Kitayama. 1991). This view is therefore to create and maintain a harmonious relationship in the social environment.

Given that Canada ranked high on individualistic index (Hofstede, 2001), it may be that Canadian students are more oriented towards the independent view of self and place greater value on individuality (Safdar et al. 2009). By contrast, Chinese student are more influenced by Confucian thought (Potter, 1988) and emphasis social cohesion as suggested by Hofstede's (2001) analysis. In light of the different view of self in Western and non-western cultures, the present study aims at exploring relationships between boredom and self-regulatory efficacy in the two culturally contrasting settings — Canada and China.

Despite varying social and cultural contexts, empirical studies support the commonality of self-regulatory efficacy across cultures. Since Bandura (2002) proposed the generalizability of social cognitive theory, a considerable number of studies have been conducted examining general and academic self-efficacy across cultures (e.g., Camgoz, Tektas, & Metin, 2008; Kim & Omizo, 2005; Klassen, 2004; Williams & Williams, 2010). Klassen et al. (2009) examined Canadian and Singaporean adolescents' perceived SESRL. They found a negative relationship between efficacy beliefs and procrastination in both groups. Similarly, Pastorelli

et al. (2001) investigated children's perceived self-efficacy, including perceived academic self-efficacy, social efficacy, and self-efficacy to regulate one's learning activities in Italy, Poland and Hungary. Although these countries differ in their social contexts, Pastorelli et al. found a similar pattern of efficacy factor structure for children in three different countries, and there was no significant difference in the perceived self-regulatory efficacy across the three samples. Given the past literature showing a commonality in SESRL across cultures, there is reason to believe that the same pattern would be found in Western and Asian countries.

Summary

Although boredom is related to negative consequences among children and adolescents, it has received little attention from researchers. The available studies primarily focus on the level of boredom experienced and its adverse impacts on achievement. Schoolwork is undeniably often dull. It is important to identify how students' self-efficacy to regulate their learning processes is related to boredom and the boredom coping strategies they choose. In addition, recently-investigated scales on academic boredom and coping strategies were developed in Germany (e.g., Nett et al., 2010; Pekrun et al., 2002, 2005) and have not been widely investigated in other contexts. The generalizability of these measures to other Western societies and Eastern populations remains unknown. The main research hypotheses, therefore, are:

Hypothesis 1: Internal Consistency and Invariance of the Boredom Scales

Hypothesis 1a. Researchers (e.g., Elfenbein & Ambady, 2002) have shown that emotions are universally recognized, suggesting that academic boredom could

be a universal emotion. This also implies that a valid scale measuring boredom in academic settings should be invariant across educational and cultural boundaries. Hence, I hypothesized that the learning-related boredom scale, which was validated using a German sample, would be an internally consistent and invariant measure across Canadian and Chinese settings.

Hypothesis 1b. Scholars have identified universal emotion coping strategies, such as active-avoidance coping with stress (Liu, Tien, & Zhao, 2003) and reappraisal-suppression emotional regulation (Matsumoto et al., 2008). Thus, I hypothesized that the boredom coping scale would also be an internally consistent and invariant measure across culturally diverse settings.

Hypothesis 1c. In mind with the cultural differences in the experience of and response to emotions, it is reasonable to hypothesize differences in means of boredom across Canadian and Chinese settings. In light of teacher-centered approach used in Chinese universities, I hypothesized that Chinese students would experience higher levels of boredom frequency in lectures than Canadian students.

Hypothesis 1d. When students study alone, the influence of teaching styles on the experience of boredom becomes minimal. The effect of cultures would be more prominent. Given the importance of social harmony, collectivistic culture may thus discourage open experience of emotions, resulting in lower levels of boredom experienced during studying, whereas, emphasizing individual uniqueness, individualistic culture is more inclined towards open experience of emotions, which may result in higher levels of boredom experienced during studying. Hence, I hypothesized that Canadian students would experience higher

levels of boredom during studying than Chinese students.

Hypothesis 2: Construct Validity of the Boredom Scales

Hypothesis 2a. Based on Pekrun et al.'s (2010) finding a negative relationship between boredom during studying and intrinsic motivation, I hypothesized that the learning-related boredom scale would be positively related to frequency of boredom in lectures and be negatively associated with other motivation variables in both Canadian and Chinese samples.

Hypothesis 2b. Nett and colleagues (2010) found a positive relationship between cognitive-approach coping strategies and interest in mathematics, a positive association between behavioral-approach coping strategies and frequency of boredom, and negative relationships between avoidance coping strategies. Based on their findings, I hypothesized that the approach boredom coping strategies (i.e., cognitive-approach and behavioral-approach coping) would be negatively related to frequency of boredom in class and positively related to other motivation variables. By contrast, the avoidance boredom coping strategies (i.e., cognitive-avoidance and behavioral-avoidance coping) would be positively associated with frequency of boredom and negatively related to motivation variables.

Hypothesis 3: Clusters of Boredom Coping Strategies

Nett and colleagues (2010) used the latent class analysis to identified homogeneous groups of students who used similar boredom coping strategies. They found three latent groups (i.e., reappraisers, criticizers, and evaders). Reappraisers predominantly preferred cognitive-approach coping strategies;

criticizers primarily adopted behavioral-approach coping strategies; evaders focused on using cognitive-avoidance and behavioral-avoidance coping strategies. Based on their findings, I hypothesized that these three boredom coping clusters would be identified in Canadian and Chinese samples.

Hypothesis 4: Relationships Between Boredom Frequency, Boredom During Studying, and Boredom Coping Strategies

Based on Nett et al.'s (2010) finding of negative relationships between avoidance coping strategies, interest and effort in mathematics, it is reasonable to conceptualize the impact of endorsing avoidance coping strategies in lectures on the experience of boredom during studying, given a reciprocal linkages between learning and emotions as suggested by Pekrun (2006). Hence, approach boredom coping strategies was expected to relate negatively with frequency of boredom and boredom during studying, whereas positive relationships would be expected between avoidance boredom coping strategies, frequency of boredom, and boredom during studying.

Hypothesis 5: Predictability of Boredom During Studying

As Pekrun (2006) proposed, academic emotions affect learning motivation, such as self-regulation of learning, which in turns influences achievement. Based on his control-value framework on academic emotions, I hypothesized that SESRL would play a mediating role in attenuating the negative impact of boredom on achievement.

Hypothesis 6: Predictability of the Four Boredom Coping Strategies

Building on Nett et al.'s (2010) findings of negative relationships between

avoidance coping strategies and interest in, value of, and effort in mathematics, I hypothesized that avoidance coping (i.e., cognitive-avoidance and behavioral-avoidance) would negatively related to students' SESRL and their academic performance. One the other hand, both cognitive-approach and behavioral-approach coping strategies was expected to be positively correlated with SESRL and yet correlated with achievement, as found in Nett et al.

Chapter 3 Method

Participants

A total of 405 participants were recruited in undergraduate education courses at the University of Alberta in Western Canada (n = 151) and at South China Normal University in the Guangdong province of China (n = 254). Participants from Canada were 82% female, with a mean age of 23.29 (SD = 4.55) years old; those from China were 90% female, with a mean age of 21.03 (SD = .77) years old. I included participants from Canada in order to replicate the results of academic boredom research that has been predominately conducted in Western societies, and in China, in order to compare the Western sample with students with a different cultural background. Data were purposefully collected in the middle of fall term 2010. Research participants volunteered to complete the questionnaire. Demographic information collected included age, gender, and current GPA.

The study used convenience sampling to recruit students in public university settings. In the Canadian sample, the recruitment was made through announcements in lectures, and students who were interested in the study completed a questionnaire in class. In the Chinese sample, students who had participated in a longitudinal study were invited to participate in the present study by filling out the questionnaire.

Translation

The translation was guided by a meaning-based approach, as suggested by Larson (1984). Changes in sentence structure were allowed in the Chinese version in order to reflect syntactical differences between the original and translated

version of the measures (Larson, 1984). I translated the questionnaire into the Chinese version, which was reviewed by a certified Chinese teacher to check for linguistic and cultural validity. Some of the written instructions were changed to enhance clarity. The instrument was independently back-translated by a bilingual researcher who was fluent in English and Chinese. A pilot study was undertaken with 30 Canadian students and 19 Chinese students in which measures were trialed. Data in the pilot test were not included in the results of the study.

Instruments

Academic boredom. The 11-item learning-related boredom scale (AEQ, Pekrun et al., 2002, 2005) was used to measure students' levels of boredom during studying (e.g., "Studying for my courses bores me"), and participants responded on a 5-point scale (1 [*strongly disagree*] to 5 [*strongly agree*]). Developed under the control-value framework (Pekrun et al., 2002, 2005), the learning-related boredom scale was comprised of four components: affective, cognitive, motivational, and physiological. The affective component reflects the fact that boredom is a pervasive negative and unsettling feeling; the cognitive component pertains to an inert mental state; the motivational component reflects the inclination to discontinue working on a given activity; and the physiological component refers to a low level of arousal. Three items were related to each of the three components (i.e., affective, cognitive, and physiological), and two items were related to the motivational component. Past studies has shown that the scale demonstrated good internal reliability and part-whole item total correlations (e.g., Pekrun et al., 2010).

In addition, in light of a close relationship between boredom frequency and boredom during studying, frequency of boredom in class should be associated with levels of learning-related boredom. Frequency of boredom was measured by two items (e.g., "I am often bored in my classes", Nett et al., 2010) on a 5-point scale (1 [*strongly disagree*] to 5 [*strongly agree*]).

Boredom coping strategies. Coping with boredom scales were used to measure participants' inclination to adopt various coping strategies (Nett et al., 2010). The scales consisted of four categories of coping: cognitive-approach (COAP), behavioral-approach (BEAP), cognitive-avoidance (COAV) and behavioral-avoidance (BEAV). Each category contained five items. Each item began with a common statement (i.e., "When I am bored in class…") and was followed by a coping strategy (e.g., "I make myself aware of the importance of the issue"). Participants responded on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale, and scores were summed up for each of the boredom coping categories.

Self-efficacy for self-regulated learning. Self-efficacy for self-regulated learning (SESRL) - "personal judgments of one's capabilities to organize and execute courses of action to attend designated types of educational performance" (Zimmerman, 1995, p. 203) – is associated with higher levels of academic performance (e.g., Bouffard-Bouchard, Parent, & Larivèe, 1991; Klassen, 2004a; Zimmerman, 2002), and is associated with perseverance in overcoming difficult circumstances (e.g., Bandura, 1993). Pekrun et al. (2010) addressed the association between boredom and SESRL. Given that SESRL affects students' use of cognitive and metacognitive strategies in learning (Pajares, 1996; Pajares &

Schunk, 2001; Williams & Williams, 2010), levels of SESRL are thought to be associated with levels of boredom. SESRL was measured using a 6-point scale (1 [*not well at all*] to 6 [*very well*]) with seven items from Usher and Pajares's (2008) study (e.g., "How well can you finish your homework on time?"). The measure has shown adequate reliability and validity in previous studies (e.g., Usher & Pajares, 2008).

Intrinsic motivation. Academic motivation (i.e., intrinsic motivation toward accomplishment) was measured using a 7-point scale (1 [*does not correspond at all*] to 7 [*corresponds exactly*]) with four items from Vallerand et al.'s (1992) academic motivation scale (e.g., "Why do you go to college?" – "for the pleasure I experience while surpassing myself in my studies"). Given a strong negative relationship between academic value and boredom, as noted in Pekrun et al.'s (2010) study, high levels of learning-related boredom should be associated with low levels of intrinsic motivation.

Collectivism. In addition to participants' geographical location, cultural dimension was measured with the six-item collectivism scale emphasizing family obligation (Lukwago et al., 2001). Each item began with a common stem "In your opinion, how important is it that you and your family…." followed by responses such as "let relatives stay with you for a short time when they need some help?" Participants responded on a 9-point scale, 1 (*not at all important*) and 9 (*very important*).

Achievement performance. Final course GPAs were used to assess academic achievement. In the Canadian sample, GPAs ranged from 0 (failed) to 4

(excellent). In the Chinese sample, GPAs were ranged from 0 (failed) to 5 (excellent). Given the use of different point scale across educational settings, I converted the Chinese samples' GPAs from 5-point to 4-point scale for the comparison purpose. Current GPAs were used an indicator of prior academic performance.

Plan for Analysis

Before examining the relationships between academic boredom, coping strategies, SESRL and course performance, the validity and reliability of the two boredom scales had to be evaluated. Therefore, the first step was to examine the descriptive statistics – means and standard deviations – and reliability of the study variables.

Second, a multi-group confirmatory factor analysis (MGCFA, AMOS 18.0; Arbuckle, 2009) was used to test whether the factor structure, item loadings and variance of the two boredom scales were equivalent across groups. Baseline models would be established for the two groups to evaluate for the basic factor structure of the boredom scales, and the models only allowed error covariance to differ across group. To test invariance, a conventional index, χ^2/df, can be used. The smaller the values are, the better is the model fit. Also, the change in χ^2 ($\Delta\chi^2$) was used to evaluate hierarchical goodness-of-fit, whereby a non-significant $\Delta\chi^2$ after imposing constraints indicates invariance. The $\Delta\chi^2$ index, however, can be affected by sample size and therefore the change in the Comparative Fit Index (ΔCFI), which does not have such a constraint, is considered a better index to evaluate invariance (Cheung & Rensvold, 2002). If constraints are imposed and

result in ΔCFI less than or equal to 0.01, invariance is thus suggested. The construct validity of the two boredom scales was then tested using bivariate correlations with frequency of boredom, SESRL, and intrinsic motivation. Next, a hierarchical cluster analysis was employed to identify homogeneous groups of students who used similar coping strategies.

Third, after evaluating the validity of the two boredom scales, the relationships between academic boredom, coping strategies, SESRL, intrinsic motivation and course performance were evaluated. Direct effects of academic boredom and the four types of coping strategies on academic performance were first examined and the mediating effect of SESRL was then tested across groups.

Chapter 4 Results

Descriptive Statistics

Table 1 shows the means and standard deviations (*SD*s) of study variables in both Canadian and Chinese samples. The reliability coefficients (i.e., Cronbach's alpha) of the learning-related boredom scale across the two settings were consistent with those reported in AEQ (α = .92 in AEQ; α = .90 for Canada; α = .89 for China). Hence, the results suggested that the learning-related boredom scale was internally consistent. The two groups showed a statistically significant difference on this measure. The difference in the levels of boredom during studying supported the claim that Chinese students experience lower levels of boredom during studying than Canadian students.

Table 1. Descriptive Statistics of Study Variables

	Canada			China				
	α	*M*	*SD*	α	*M*	*SD*	*t*	Cohen's *d*
Bfreq	.90	5.46	1.85	.87	6.25	2.24	-3.63 **	-0.38
LRB	.90	30.65	8.57	.89	28.80	8.29	2.12 *	0.22
BCS	.81	49.23	10.04	.78	62.60	8.99	-13.51 **	-1.42
COAP	.81	16.93	3.81	.85	19.92	3.41	-8.15 **	-0.84
BEAP	.90	6.91	3.55	.85	12.09	4.07	-12.96 **	-1.33
COAV	.82	13.78	4.62	.66	16.75	3.52	-7.22 **	-0.75
BEAV	.96	11.66	5.69	.89	14.10	4.65	-4.62 **	-0.48
SESRL	.73	29.68	5.41	.78	30.78	4.91	-2.07 *	-0.21
IM	.88	18.19	5.19	.90	19.85	5.07	- 3.14 *	-0.32

Collectivism	.87	44.53	8.40	.81	47.11	6.46	-3.45 *	-0.36
Current GPA		3.20	.42		2.72	.22	14.59 **	1.57
Course GPA		3.25	.62		3.15	.37	1.86	0.21

Note. Bfreq = frequency of boredom, LRB = learning-related boredom, BCS = boredom coping scale, COAP = cognitive-approach, BEAP = behavioral-approach, COAV = cognitive-avoidance, BEAV = behavioral-avoidance, SESRL = self-efficacy for self-regulated learning, IM = intrinsic motivation

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

Similarly, the boredom coping scale showed moderate internal consistency across settings ($\alpha = .81$ for Canada; $\alpha = .78$ for China), and means and *SD*s of the four types of boredom coping scores were generally comparable to those in Nett et al.'s study (i.e., COAP's $M = 15.46$, $SD = 5.34$; BEAP's $M = 8.04$, $SD = 3.91$; COAV's $M = 11.75$, $SD = 5.09$; BEAV's $M = 16.39$, $SD = 6.32$). The results indicated that the boredom coping scale was an internally consistent measure in both samples. Significant differences were found between the Canadian and Chinese samples on the four boredom coping strategies. The results indicated that Canadian students preferred using boredom coping strategies to a lesser extent than Chinese students. Differences in the strength of endorsing boredom coping strategies supported the notion that Chinese students preferred using strategies to regulate their experience of boredom to a greater extent than Canadian students.

Additionally, a significant difference in frequency of boredom was found between the two groups. The results supported the claim that direct teaching style might contribute to higher levels of boredom frequency in lectures.

In terms of motivation variables, a significant difference in SESRL was found between the two groups, indicating that Chinese students reported higher levels of confidence to engage in self-regulated learning than Canadian students. Similarly, Canadian students reported a significantly lower level of intrinsic motivation than Chinese students.

For collectivism, consistent with previous investigation of this construct in different nations (e.g., Hofstede, 2001), Chinese students demonstrated higher levels of collectivism than Canadian students. Results thus supported the notion that Chinese were relatively more collectivistic than Canadian.

Validation of the Learning-Related Boredom Scale

Factor structure. Based on previous findings and the theoretical framework of boredom in learning, the scale could be conceptualized as one-factor or four-factor (i.e., affective, cognitive, motivational, and physiological). Hence, initial models were established accordingly in both groups and in the combined group (i.e., consisting of both Canadian and Chinese samples). Three goodness-of-fit measures (i.e., χ^2/df ratio, CFI, and root mean square error of approximation [RMSEA]) were included. A χ^2/df ratio less than 3.0 indicates a good fit; a CFI index larger than .90 suggests a good fit; a RMSEA index less than .10 indicates a good fit (e.g., Arbuckle, 2009; Blunch, 2008; Byrne, 2001). The one-factor model showed a poor fit ($\chi^2/df = 4.81$, CFI = .812), whereas the four-factor model demonstrated a good fit ($\chi^2/df = 2.28$, CFI = .946). Given that the four-factor model provided the strongest fit of the data and was supported by the theoretical framework (Pekrun et al., 2002, 2005), subsequent analysis was

focused on the four-factor model.

Table 2. Model fit: Initial CFA models of Learning-Related Boredom Scale across Canadian and Chinese groups

	χ^2	*df*	*p*	χ^2/df	CFI	RMSEA
One-factor initial model						
Canada	168.73	44	<.001	3.84	.788	.15
China	254.76	44	<.001	5.79	.824	.15
Combined	423.57	88	<.001	4.81	.812	.11
Four-factor initial model						
Canada	68.80	38	.002	1.81	.948	.08
China	104.22	38	<.001	2.74	.945	.09
Combined	173.06	76	<.001	2.28	.946	.06

Note. CFI, comparative fit index; RMSEA, root-mean-square error of approximation. * $p < .05$, ** $p < .001$

Tests of invariance and item loadings. In order to test invariance, an unconstrained model, which consisted of the four-factor baseline models, was established. A good fitting unconstrained model indicates a common factor structure across the Canadian and Chinese settings (see Table 3). The model was then constrained by the factor loadings, resulting in a drop in fit $\Delta\chi^2$ of 31.19 (Δdf = 7), $p < .001$, but it was within an acceptable change in the change of CFI (ΔCFI = .01; Cheung & Rensvold, 2002). The results suggested that factor weights were largely invariant across the two settings.

Table 3. Model Fit: Test of Invariance of the Four-Factor Model of Learning-Related Boredom Scale Across Canadian and Chinese Samples

	χ^2	df	*p*	χ^2/df	CFI	RMSEA	$\Delta\chi^2$
Factor structure equal (Unconstrained)	173.06	76	0	2.28	.946	.06	
Factor loadings equal	204.24	83	0	2.46	.932	.07	31.19 (7)**
Factor loadings and variances equal	215.53	87	0	2.48	.928	.07	11.29 (4)*
Factor variances and covariance (and loadings) equal	229.14	93	0	2.46	.924	.07	13.61 (6)*

Note. CFI, comparative fit index; RMSEA, root-mean-square error of approximation.

Factor variances were then constrained in addition to factor loadings. This resulted in a significant drop in the fit index, $\Delta\chi^2$ of 11.29 (Δdf = 4), p =.02, and minimal change in CFI (ΔCFI = .004), providing evidence of invariance in structural variance across the two settings. Constraining the factor covariances resulted in a further drop in the fit index, $\Delta\chi^2$ of 13.61 (Δdf = 6), p = .03, but within an acceptable change of CFI (ΔCFI = .004). These results suggested that the 11-item learning-related boredom scale shows measurement invariance across Canadian and Chinese groups, with invariance in form, factor loadings and factor variances.

Table 4 shows standardized factor pattern coefficients (λs) of the boredom scale and the correlation coefficients between the four factors (Φs). All pattern coefficients displayed moderate to high factor loadings. In the Canadian sample, λs ranged from .53 to .89; in the Chinese sample, λs ranged from .62 to .90. All interfactor correlations were significant, suggesting that the factors measured a common underlying construct.

Table 4. Standardized Factor Pattern Coefficients (λs) and Interfactor Correlations (Φs) for the Learning-Related Boredom Scale

	Canada	China
Item content		
The material bores me to death.	0.63	0.76
Studying for my courses bores me.	0.85	0.86
Studying is dull and monotonous.	0.87	0.62

While studying this boring material, I spend my time thinking of how time stands still.	0.53	0.66
The material is so boring that I find myself daydreaming.	0.89	0.81
I find my mind wandering while I study.	0.82	0.65
Because I'm bored I have no desire to learn.	0.61	0.85
I would rather put off this boring work till tomorrow.	0.63	0.76
Because I'm bored I get tired sitting at my desk.	0.70	0.74
The material bores me so much that I feel depleted.	0.65	0.90
While studying I seem to drift off because it's so boring.	0.80	0.78
Interfactor Correlations (Φs)		
Affective-Physiological	0.30	0.43
Affective-Motivational	0.23	0.36
Affective-Cognitive	0.21	0.39
Cognitive-Motivational	0.21	0.52
Cognitive-Physiological	0.36	0.48
Motivational-Physiological	0.42	0.61

Note. All coefficients were significant at $p < .001$

Construct validity. The construct validity of the learning-related boredom scale was examined by evaluating its relationship with frequency of boredom and with motivation variables, namely SESRL and intrinsic motivation. Not surprisingly, the learning-related boredom was positively associated with frequency of boredom in the combined group ($r = .45$, $p < .01$). The direction and

magnitude of the relationships were similar in individual groups (r = .40 for Canada; r = .53 for China, ps < .01; z = -1.57, p =.12). Significant positive relationships between the four components and frequency of boredom were also found (see Table 5).

In addition, the learning-related boredom was negatively correlated with SESRL in the overall sample (r = -.42, p < .01), and in the individual samples (i.e., r = -.39 for Canada, r = -.43 for China ps <.01; z = -.045, p = .65). The component factors were also negatively related to SESRL across settings (see Table 5). Similarly, in the overall sample, there was a significant negative relationship between boredom in learning and intrinsic motivation. The direction and magnitude of relationships were the same in each individual setting (r = -.19 for Canada, r = -.12 for China; z = -.074, p =.47). Regarding the subscales, all the four components showed similar relationships with intrinsic motivation. Despite finding significant relationships between the learning-related boredom and intrinsic motivation in the combined settings, non-significant patterns were found in individual samples, except that the motivational component showed significant inverse relationship with intrinsic motivation in the Chinese sample and the affective component showed significant negative relationship with intrinsic motivation in the Canadian sample. Overall, the learning-related boredom scale showed adequate convergent and divergent validity with other motivational variables.

Table 5. Correlations Between Learning-Related Boredom, Boredom Coping, Frequency of Boredom, Intrinsic Motivation, and SESRL

	Frequency of Boredom			Intrinsic Motivation			SESRL		
	Canada	China	Combine	Canada	China	Combine	Canada	China	Combine
Learning-related boredom composite	0.40**	0.53**	0.45**	-0.19*	-0.12	-0.16**	-0.39**	-0.43**	-0.42**
Affective component	0.36**	0.53**	0.46**	-0.33**	-0.12	-0.20**	-0.29**	-0.26**	-0.27**
Cognitive component	0.33**	0.37**	0.31**	-0.08	-0.07	-0.10*	-0.24**	-0.34**	-0.31**
Motivational component	0.27**	0.38**	0.32**	-0.10	-0.14*	-0.14**	-0.36**	-0.48**	-0.43**
Physiological component	0.33**	0.45**	0.39**	-0.08	-0.10	-0.10*	-0.39**	-0.39**	-0.39**
Boredom coping composite	0.06	0.08	0.17**	0.21*	0.27**	0.29**	-0.06	0.20**	0.12*
Cognitive-approach	-0.22**	-0.23**	-0.13**	0.32**	0.38**	0.39**	0.05	0.37**	0.25**
Behavioral-approach	0.04	-0.10	0.05	0.03	0.23**	0.22**	-0.09	0.24**	0.15**
Cognitive-avoidance	0.13	-0.01	0.11*	0.08	0.21**	0.20**	-0.13	0.18**	0.07
Behavioral-avoidance	0.09	0.39**	0.30**	0.10	-0.12	0.01	0.00	-0.23**	-0.10*

Note. SESRL = Self-efficacy for self-regulated learning. * $p < .05$, ** $p < .01$

Validation of the Boredom Coping Scale

Factor structure. Similar to the learning-related boredom scale, the boredom coping scale can be conceptualized as a one-factor or four-factor model. In Nett et al.'s (2010) study, the four-factor model showed better fit to data than the one-factor model. Hence, both the one-factor and four-factor models in Canadian and Chinese samples were tested. The procedure to test factor structure was similar to that mentioned in the previous subsection.

Consistent with Nett et al.'s finding, the four-factor model fit the data well across groups ($\chi^2/df = 2.33$; CFI = .89) compared to the one-factor initial model ($\chi^2/df = 8.10$; CFI = .39). Consequently, baseline models were established and group-specific correlated errors were added. Given the adjacency of items 19 and 20, errors in measuring those items might be correlated in both samples. Furthermore, in the English version, there were some similarities in the content and wordings of items (i.e., items 9 and 10: "I try to get the instructor off topic so that we discuss an issue that interests me." and "I bring up an issue that I think the class is more interested in."; items 16 and 17: "I talk to the person sitting next to me." and "I start talking to my classmate sitting next to me."). Thus, errors in measuring these items might be correlated. Similarly, in the Chinese version, similar wordings in items 4 and 5 (find the importance of class) and items 6 and 7 (ask instructor for other things to do) might lead to correlated error measurement on those items. As Table 6 indicates, the four-factor baseline models showed good fit for both Canadian and Chinese data ($\chi^2/df = 1.52$, RMSEA = .07, CFI = .95 for Canada; $\chi^2/df = 1.87$, RMSEA = .06, CFI = .94 for China) and in the combined

setting (χ^2/df = 1.70, RMSEA = .05, CFI = .94). By contrast, the one-factor baseline models showed poor fit for both Canadian and Chinese data (χ^2/df = 4.40, RMSEA = .17, CFI = .68 for Canada; χ^2/df = 6.93, RMSEA = .16, CFI = .54 for China) and for the combined group (χ^2/df = 5.67, RMSEA = .12, CFI = .60). Hence, the results suggested that the four-factor structure of the boredom coping scale fit the data well in both Canadian and Chinese settings.

Table 6. Model Fit: Initial CFA Basic Model and Baseline Models of Boredom Coping Scale Across Groups

Model	χ^2	*df*	*p*	χ^2/df	CFI	RMSEA	$\Delta\chi^2$
One-Factor Initial Model							
Canada	1170.55	170	<.001	6.89	.436	.220	
China	1722.89	170	<.001	10.14	.283	.201	
Combined Groups	2754.58	340	<.001	8.10	.387	.143	
Four-Factor Initial Model							
Canada	399.79	164	<.001	2.44	.867	.109	
China	364.39	164	<.001	2.22	.907	.074	
Combined Groups	764.68	328	<.001	2.33	.889	.062	
One-Factor Baseline Model							
Canada ($\delta_{6,7}$, $\delta_{9,10}$, $\delta_{12,13}$)	735.46	167	<.001	4.40	.679	.167	435.09(3)**
China ($\delta_{1,2,}$ $\delta_{16,19}$, $\delta_{17,18}$)	1156.67	167	<.001	6.93	.543	.162	566.22(3)**
Combined Groups	1892.40	334	<.001	5.67	.604	.116	862.18(6)**

Four-Factor Baseline Model							
Canada ($\delta_{9,10}$, $\delta_{16,17}$, $\delta_{19,20}$)	244.60	161	<.001	1.52	.953	.065	155.19 (3)**
China ($\delta_{4,5}$, $\delta_{6,7}$, $\delta_{19,20}$)	300.86	161	<.001	1.87	.935	.062	63.53(3)**
Combined Groups	545.66	322	<.001	1.70	.943	.045	219.02(6)**

Note. CFI, comparative fit index; RMSEA, root-mean-square error of approximation. * $p < .01$, ** $p < .001$

Table 7. Model Fit: Test of Invariance of the Four-Factor Model of Boredom Coping Scale Across Canadian and Chinese Samples

	χ^2	*df*	*p*	χ^2/df	CFI	RMSEA	$\Delta\chi^2$
Four-factor model							
Factor structure equal (Unconstrained)	545.66	322	<.001	1.70	.943	.045	
Factor loadings equal	674.13	338	<.001	1.99	.915	.053	128.44(16)**
Factor variances (and loadings) equal	694.54	342	<.001	2.03	.911	.054	20.41(4)**
Factor variances and covariances (and loading) equal	707.29	348	<.001	2.03	.909	.054	12.75(6)
Post-hoc four-factor model							
Factor structure equal (Unconstrained)	545.66	322	<.001	1.70	.943	.045	
Factor loadings equal	581.01	332	<.001	1.75	.937	.046	35.35 (10) **
Factor variances (and loadings) equal	586.10	336	<.001	1.74	.937	.046	5.09 (4)
Factor variances and covariances (and loading) equal	597.10	342	<.001	1.75	.935	.046	11.00 (6)

* $p < .01$, ** $p < .001$

Tests of invariance. Given that the four-factor model showed the strongest fit with the data, the subsequent analysis of invariance was based on this model. The unconstrained model fit the data well (χ^2/df = 1.7, CFI = .94, RMSEA = .05), suggesting a common factor structure across the Canadian and Chinese settings. The factor loadings were subsequently constrained, which resulted in a drop in fit, $\Delta\chi^2$ of 128.44 (Δdf =16), $p < .001$, ΔCFI = .03, suggesting that factor weights were non-invariant across the two settings. The non-invariant test results indicate that the four-factor boredom coping strategies operate differently in the two contrasting samples.

Measurement of partial invariance. Despite the non-invariant results, it was still important to identify the source of difference, and the partial invariant factor loadings. Following Byrne, Shavelson and Muthén's (1989) suggestion, the analysis proceeded to the identification of partial structural invariance by dropping constraints that differed significantly. First, item-by-item comparative analyses were conducted to identify the source of specific difference between the two groups (Supple, Ghazarian, Peterson, & Bush, 2009), and six items (2 items on BEAP, COAV, and BEAV strategies) were found statistically different across samples when comparing item loadings, $\Delta\chi^2$(BEAP) = 17.34, $\Delta\chi^2$(COAV) = 25.34, $\Delta\chi^2$ (BEAV) = 48.00, $\Delta df = 2$, all ps $< .05$. After the constraints on those six items were free, the structure was tested for invariance, and it was intended to identify a reasonably stable model that fit the data well across groups.

Factor loadings were constrained across the two settings on the post-hoc model. A drop of fit indices resulted, $\Delta\chi^2(10) = 35.35$, $p < .001$, but it was within

an acceptable range, Δ CFI = .006 as suggested by Cheung and Rensvold (2002). The results suggested that the factor loadings of the post-hoc model were generally invariant across settings. The model was then further constrained with the factor variances. A non-significant drop in fit, $\Delta\chi^2$ (4) = 5.90, p = .28 and no change in CFI, suggested structural invariance across groups. Constraining the factor covariances resulted in a non-significant change of χ^2 and minimal change in CFI (see Table 7).

The results suggested that the boredom coping scale showed invariance in factor structure but was non-invariant in terms of factor loadings. A post-hoc model was tested consequently by freeing constraints on those group-specific items. Results suggested that the post-hoc model was largely invariant in factor loadings, variances and covariances across Canadian and Chinese settings. The non-invariant original model pointed to some cultural specificity items in terms of coping with boredom. By freeing constraints on those items and testing the post-hoc model, an invariant model of boredom coping was identified that allowed researchers and educators to use this fairly stable scale to assess types of coping strategies students used across culturally diverse settings.

Item loadings. Table 8 presented the standardized factor pattern coefficients (λs) and interfactor correlations (Φs). The 20-item boredom coping scale showed adequate to high levels of loading. In the Canadian sample, λs ranged from .40 to .99, and in the Chinese sample, λs ranged from .28 to .92. Given that the four coping strategies were conceptually distinct, the magnitude of correlations was mostly in the small range.

Table 8. Standardized Pattern Coefficients(λs) and Interfactor Correlations (Φs) for Boredom Coping Across Settings

	Canada	**China**
Item Content		
COAP		
I try to pay attention to the lesson more.	.61 **	.86 **
I tell myself to concentrate again.	.70 **	.89 **
I make myself aware of the importance of the issue.	.63 **	.69 **
I try to make myself aware that this class is important.	.77 **	.59 **
I make myself focus again because the issue is important.	.69 **	.57 **
BEAP		
(I ask my instructor if we can do something else.)	.92 **	.65 **
I ask my instructor for more interesting tasks.	.96 **	.83 **
I suggest that the instructor adds variety to the lessons	.83 **	.88 **
(I try to get the instructor off topic so that we discuss an issue that interests me.)	.60 **	83 **
I bring up an issue that I think the class is more interested in.	.55 **	.51 **
COAV		

(I prepare for my next class.)	.82 **	.28 **
(I do my homework.)	.83 **	.59 **
I study for another subject.	.88 **	.75 **
I think about my homework or something I have to study.	.48 **	.68 **
I copy the homework for my next class.	.40 **	.52 **
BEAV		
I talk to the person sitting next to me.	.85 **	.86 **
I start talking to my classmate sitting next to me.	.91 **	.92 **
I distract myself by interacting with my classmate.	.99 **	.89 **
(I try to contact other classmates who are feeling also bored.)	.82 **	.73 **
(I occupy myself with my classroom neighbor or someone who is sitting close to me)	.91 **	.48 **
Interfactor Correlations (Φs)		
COAP-BEAP	-.05	.10 *
COAP-COAV	-.04	.08 *
COAP-BEAV	-.11	-.08
BEAP-COAV	.13	.08 *
BEAP-BEAV	.19 *	-.04
BEAV-COAV	.30 *	.16 *

Note. Items in parentheses were free from imposing constrains in MGCFA.

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

Construct validity. In order to establishing the construct validity, the bivariate correlations between the boredom coping strategies and other motivational indicators, namely frequency of boredom, intrinsic motivation, and SESRL, were explored (see Table 5). The boredom coping composite was statistically and positively correlated with frequency of boredom (r = .17) and with intrinsic motivation (r = .29) in the combined group. Of the four factors, COAP strategies were positively associated with intrinsic motivation across settings (r = .32 for Canada; r = .38 for China). Group differences were observed in the other three coping strategies. BEAP and COAV strategies were positively correlated with both intrinsic motivation and SESRL in the Chinese sample, whereas no significant correlation was found in the Canadian sample. Similarly, BEAV strategies were positively associated with frequency of boredom and negatively related to SESRL in the Chinese sample; however, such relationships could not be established in the Canadian sample. The results thus suggested that COAP strategies were predictably and significantly related to intrinsic motivation, whereas the predictability of other strategies was more context-specific.

Cluster Analysis of Coping Strategies

In order to identify subgroups of students using a similar combination of boredom strategies from a heterogeneous student group, hierarchical cluster analysis (HCA) was used. Every participant was treated as a single case, and HCA was used whereby similar cases were merged into clusters. The analysis ended when no further useful cluster was identified. Students were clustered based on their use of the four types of coping strategies. In contrast to Nett's findings of

three latent boredom coping groups, the results of this study suggested one cluster, given that each additional cluster only consisted of less than 6% of the participants. In addition to clustering based on the four coping strategies, this study examined whether students differed on their use of coping approaches based on their previous achievement, intrinsic motivation and gender. Regardless of difference in the aforementioned areas, results found non-significant differences in using the four coping strategies among college students. Therefore, the subsequent analysis did not disaggregate and regroup students into the different coping categories that were used in Nett's study.

Prediction of Boredom in Learning

Boredom during studying and the preference for adopting different boredom coping strategies in class were designed to evaluate the potential influence of boredom on students' learning. In particular, successful coping with boredom in class (e.g., identifying meaning in learning) may have alleviated the carry-over impact of boredom into studying. The relationships between the four types of coping strategies and boredom during studying were examined using Pearson Product Moment Correlations (see Table 9). Significant positive relationships were found between BEAV strategies and boredom during studying across settings. In the Chinese setting, a statistically significant and negative relationship was found between boredom during studying and COAP strategies, whereas such a relationship could not be established in the Canadian sample. Neither BEAP nor COAV strategies were significantly related to boredom during studying across settings.

Table 9. Correlations Between Boredom Coping Strategies, Boredom Frequency and Boredom During Studying

	Frequency of Boredom		Boredom during studying	
	Canada	China	Canada	China
Boredom Coping Strategies				
Cognitive-approach	-.22**	-.23**	-.09	-.13*
Behavioral-approach	.04	-.10	.08	.06
Cognitive-avoidance	.13	-.01	.16	-.01
Behavioral-avoidance	.09	.39**	.19*	.40**

Table 10. Hierarchical Multiple Regression Predicting Boredom in Class and Boredom During Studying

	Standardized Coefficient (β)			
	Canada		China	
	Bfreq	LRB	Bfreq	LRB
Model 1 (R^2)	.09*	.17**	.07**	.20**
Age	-.13	.04	-.05	.03
CGPA	.20	.06	.00	-.12
SESRL	-.24*	-.39**	-.21*	-.41**
IM	-.07	-.12	-.10	-.01
Mode1 2 (R^2)	.10	.22**	.20**	.32**
Age	-.12	.07	-.09	.00
CGPA	.19	.09	.00	-.12
SESRL	-.23*	-.39**	-.10	-.38**
IM	-.04	-.16	-.05	-.03
BCS				
COAP	-.09	.06	-.09	.06
BEAP	-.05	.04	-.03	.13*
COAV	.05	.08	.00	-.01
BEAV	.05	.17	.36**	.32**

Note. CGPA = current grade point average; Bfreq = frequency of boredom; LRB = learning-related boredom; SEARL = self-efficacy for self-regulated learning; IM = intrinsic motivation; BCS = boredom coping strategies; COAP =

cognitive-approach; BEAP = behavioral-approach; COAV = cognitive-avoidance; BEAV = behavioral-avoidance.

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

Relationships Among Boredom Coping Strategies, Frequency of Boredom, and SESRL

Prediction of boredom frequency. Multiple regression analysis was used to determine whether types of coping strategies predicted the frequency of boredom experienced in class, controlling for age, current GPA, SESRL, and intrinsic motivation. The aforementioned variables were entered in Step 1, which resulted in a significant R^2 of .09 ($p < .05$) in the Canadian sample and .07 ($p < .01$) in the Chinese sample. The entry of the four types of coping strategies in Step 2 resulted in a significant ΔR^2 of .13 ($p < .01$) in the Chinese sample but not in the Canadian sample ($\Delta R^2 = .01$, p = n.s.). Surprisingly, none of the four coping strategies significantly predicted the levels of boredom frequency in the Canadian sample, and only the behavioral-avoidance strategies significantly predicted the frequency of boredom in the Chinese sample (see Table 10). The results suggested that the greater extent of endorsing behavioral-avoidance strategies to cope with boredom, the higher the boredom frequency was in the Chinese sample. Such adverse impact, however, was not evident in the Canadian sample.

Prediction of boredom in study. Given that boredom is theoretically conceptualized as one construct, the four factor scores were aggregated. Additional analysis on a higher-order model showed adequate goodness of fit results (CFI = .940, $\chi^2/df = 2.34$, RMSEA = .06), thereby supporting the aggregation.

Multiple regression analysis was then used to evaluate whether types of coping strategies predicted levels of boredom during studying, controlling for age,

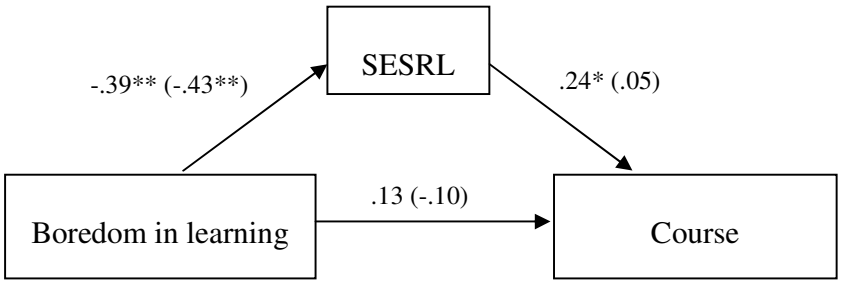
current GPA, SESRL, and intrinsic motivation. These control variables were entered in Step 1 and resulted in a significant R^2 of .17 ($p < .01$) in the Canadian sample and .20 ($p < .01$) in the Chinese sample. Table 10 presents the results of the hierarchical regression analysis. The entry of the four types of coping strategies in Step 2 resulted in a significant ΔR^2 of .12 ($p < .01$) in the Chinese and a non-significant ΔR^2 of .04 ($p = .17$) in the Canadian sample. Furthermore, only behavioral-approach and behavioral-avoidance strategies predicted the level of boredom during studying in the Chinese sample. The findings suggested that the greater extent of endorsing either behavior-approach or avoidance strategies aggravate the level of boredom during studying among Chinese students. Such an adverse impact, however, was not found among Canadian students. In addition, cognitive coping strategies did not predict the level of boredom during studying in either setting.

Prediction of Academic Performance

Levels of boredom during studying. Boredom in learning has been shown to have an adverse impact on achievement (Pekrun et al., 2010). Thus, this study evaluated how boredom during studying would affect students' course performance and then examined potential mediation effects of SESRL. Path analysis was used to analyze the direct and indirect effects (via SESRL) of boredom on achievement scores. Figure 1 presents these effects on achievement. As Preacher and Hayes (2004) argued, an assumption of a significant direct effect is not required to test for indirect effects. In the Canadian sample, despite an insignificant direct effect of boredom in learning on course performance, an

indirect effect was found. Boredom during studying negatively predicted the level of SESRL (β = -.39, p < .001), which in turn positively predicted course grades (β = .24, p = .022). The results indicated that the indirect effect of boredom during studying on course performance was statistically significant, p = .029. By contrast, in the Chinese sample, boredom during studying only predicted the level of SESRL (β = -.43, p <.001), and no mediation effect was found.

Figure 1. Direct and indirect effect of boredom in learning on course performance

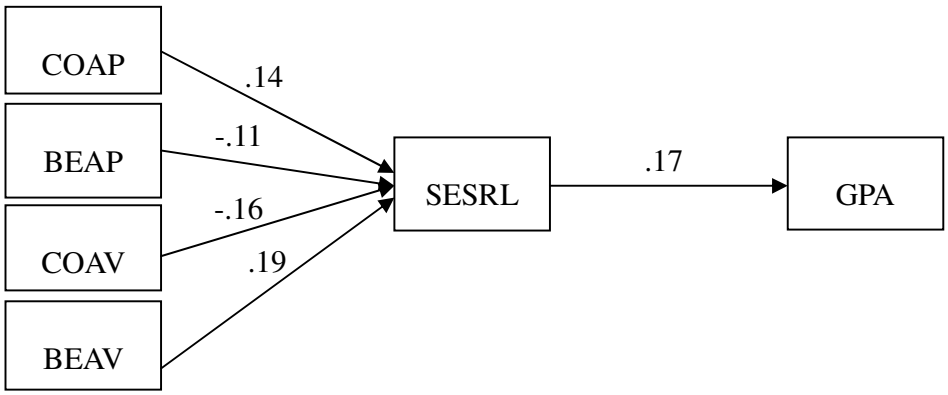


Note. Values in parentheses represent the coefficients of the Chinese sample. Non-parentheses values represent the coefficients in the Canadian sample.

** $p < .01$, * $p < .05$

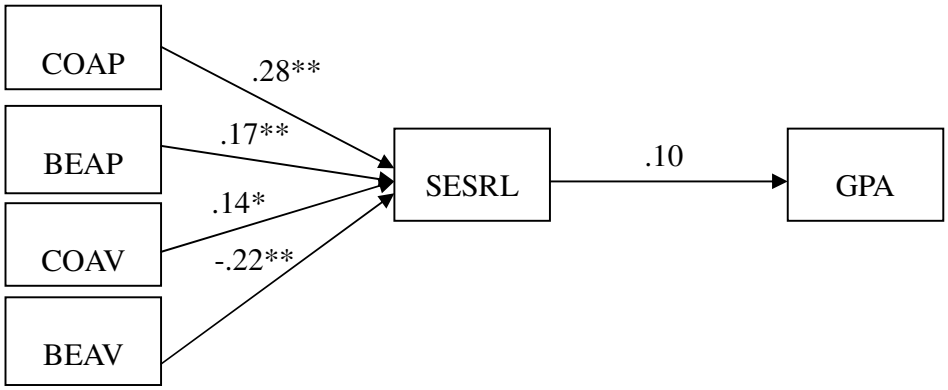
Preference for coping strategies. Direct effects and indirect effects of the four coping strategies on SESRL and academic achievement were examined. In the Chinese sample, statistically significant positive effects of cognitive-approach ($\beta = .28$, $p = .001$), behavioral-approach ($\beta = .17$, $p = .006$) and cognitive-avoidance strategies ($\beta = .14$, $p = .019$), and a negative effect of behavioral-avoidance strategies ($\beta = -.22$, $p = .001$) on SESRL were found. However, the results revealed that neither the direct effect of coping strategies on GPA, nor the relationship between SESRL and GPA was significant. Similarly, in the Canadian sample, no significant direct or indirect effect of coping strategies on academic performance was found.

Figure 2 (a). Conceptualized effect of coping strategies on achievement in the Canadian sample.



Note. The values were non-significant.

Figure 2 (b). Conceptualized effect of coping strategies on achievement in the Chinese sample.



* $p < .05$, ** $p < .01$

Chapter 5 Discussion

The purpose of this study was to evaluate the influence of academic boredom on college student learning and performance. Two boredom scales, namely the learning-related boredom scale and the boredom coping scale, were used. This study expanded on Pekrun et al.'s (2010) and Nett et al.'s (2010) research by (a) validating the two scales in a cross-cultural framework; (b) examining the relationships between the two boredom scales, and (c) evaluating their impact on academic motivation and performance.

Scale Validation in a Cross-Cultural Framework

Boredom in learning. Studying learning-related boredom is important because students who are less bored are more likely to engage in learning and achieve better in academics (Pekrun et al., 2010). Furthermore, studying students' learning-related boredom across cultural boundaries is worthwhile because it allows researchers to investigate how learning-related boredom operates in a different context and how it subsequently influences student learning and performance. To understand how academic boredom operates across cultures, I borrowed literature on emotions to conceptualize the operational mechanism across boundaries. Elfenbein and Ambady's (2002) meta-analytic work suggested that emotions could be universally recognized across nations and cultures, suggesting the universality of emotions. Thus, it was reasonable to speculate that academic boredom is a universal emotion. In addition, a recent validation study (Frenzel et al., 2007) on academic enjoyment, pride, anxiety, anger, and shame found an invariant model between German and Chinese students, suggesting that

boredom, as a academic emotion, would also operate similarly across cultural and educational contexts. This study thus aimed at evaluating the validity of this scale with samples of students from Canada and China.

The 11-item learning-related boredom scale showed good internal consistency and factor structure when the scale was constituted as a four-factor, consistent with the theoretical framework on boredom (Pekrun, 2006). Results showed that the learning-related boredom scale demonstrated convincing evidence of invariance in factor structure, loadings, variances, and covariance across groups of students from culturally and geographically different settings. Although the learning-related boredom scale has been translated into an English version, an evaluation of its psychometric properties has not been conducted. In addition, little is known about how the scale operates in culturally diverse settings. Thus, the results from this study revealed that items on the learning-related boredom scale showed strong internal consistency not only in German settings, but also in Canadian and Chinese settings. In particular, the learning-related boredom scale showed strong measurement invariance in Canadian and Chinese samples, supporting the usefulness of the scale in cross-cultural research on boredom. As expected, there was non-significant difference in learning-related boredom factor structure between Canadian and Chinese students, suggesting that learning-related boredom, as a construct, operates similarly outside of German school settings. In response to H_{1a} (i.e., the learning-related boredom scale is a consistent and invariant measure across Western and Asian settings), and the results supported

the hypothesis that the learning-related boredom scale is internally consistent and invariant across settings.

In addition to the similar levels of internal reliability across groups, and the invariance of factor structure and loading across groups, the correlations between the learning-related boredom scale and other motivation variables showed similar patterns across the two groups, supporting H_{2a} (i.e., the learning-related boredom scale would be positively related to frequency of boredom in lectures and negatively associated with other motivation variables in both Canadian and Chinese samples). Previous studies have shown that students with high levels of boredom usually have lower academic motivation and use self-regulated strategies less frequently (Pekrun et al., 2010), and the results of this study also showed this pattern of relationships. Although learning-related boredom and frequency of boredom in class are not the same, they are highly correlated, and the data suggest that students who report high levels of boredom in learning also report higher frequency of boredom in both western and non-western settings. As in Pekrun et al.'s (2010) study, students who experienced higher levels of boredom during studying were more likely to report lower levels of academic motivation and efficacy in self-regulated learning across culturally diverse samples. Overall, results suggest that the learning-related boredom scale is not only an invariant measure but it also shows construct validity in both Canadian and Chinese samples. .

Coping with boredom. Mann and Robinson (2009) found that more than 50% of college students reported that their lectures were boring, which suggests

that the experience of boredom in class is not an uncommon feeling and points to the importance of evaluating students' boredom coping strategies. This study thus validated a newly developed boredom coping scale (Nett et al., 2010) in a cross-cultural framework and evaluated its usefulness in culturally different contexts. Given that Nett et al.'s boredom coping scale was developed in Grades 5-10, this study expanded the work by examining its applicability among college students who are believed to be high achieving and motivated and the related motivation variables of self-regulated learning efficacy and intrinsic motivation to succeed.

The 20-item boredom coping scale showed a moderate to high degree of internal consistency in individual settings. Consistent with Nett et al.'s findings, results indicated that the four-factor structure, instead of the one-factor model, provided a good fit with the data in both Canadian and Chinese settings. However, the results indicated some variations in item loadings, which led to non-invariance in factor loadings across settings. In particular, those variations could be related to cultural differences in attitudes and behaviors. As discussed in Markus and Kitayama's (1991) article, Eastern cultures (e.g., Chinese) put greater emphasis on social context (i.e., relatively collectivistic), whereas most Western cultures emphasize individual uniqueness (i.e., relatively individualistic). Given cultural differences in individualism-collectivism, Chinese students would be inclined to employ boredom strategies (e.g., an attempt to get the lecturer discuss other topics instead of asking the lecturer to do something else) that could maintain social order and harmony. By contrast, Canadian students, who are relatively less

collectivistic (e.g., Hofstede, 2001) and as supported by results in the current study, would prefer using boredom coping strategies that expressed their needs. A close examination of the six cultural specific items revealed that most of them are oriented towards individualistic attitudes and behaviors (e.g., "I occupy myself with my classroom neighbor or someone who is sitting close to me"). Thus, it is not surprising that those items were loaded relatively more weakly on the three factors in the Chinese sample than in the Canadian sample.

Although the 20-item boredom coping scale did not show cross-cultural invariance, a further exploration of partial measurement invariance provided valuable information on how to adapt the scale for cross-cultural research. After removing the constraints on the six group-specific items, the boredom coping scale showed invariance in factor structure, loadings, variance and covariance, suggesting the usefulness of this post-hoc scale in cross-cultural research in boredom coping.

As concerns the H_{1b} (i.e., the boredom coping scale would also be an internal consistent and invariant measure across culturally diverse settings), results showed that the scales have a moderate to high internal consistency across settings, and the data provided evidence of invariance of the four-factor structure. However, results showed variance in item loading across settings, which could be due to cultural differences in attitudes and behaviors. Exploration of an ad-hoc model demonstrated test invariance, suggesting the potential usefulness of the scale in cross-cultural research.

To answer the question whether the boredom coping scale shows sufficient construct validity (H_{2b}), correlations between the four types of coping and motivation variables were examined. Previous study has shown that students using cognitive-approach strategies usually value achievement more (Nett et al., 2010). Results showed that students' cognitive-approach coping strategies were related to their intrinsic motivation to achieve across settings. Perhaps, students who prefer adaptive coping with boredom are more likely to report their intention to succeed in academics.

Results of this study also suggested that behavioral-approach and cognitive-avoidance coping were related to intrinsic motivation in the Chinese group, but not in the Canadian group. The difference could be related to differences in attitudes toward coping with boredom. In particular, a greater extent of endorsing either BEAP or COAV strategies resulted in higher intrinsic motivation among relatively collectivistic Chinese students, whereas Canadian students, who are relatively individualistic, may be more likely to internally attribute their qualities and thus may not perceive that their preference for adopting behavioral strategies and cognitive avoidance coping strategies affect their motivational beliefs. An even more surprising finding may be the lack of relationship between BEAV strategies and intrinsic motivation. The non-significant relationship may reflect that university students generally embrace certain achieving qualities. For example, college students have higher levels of academic motivation than high school students (Tüysüz, Ysysüz, & Demirci, 2010). Thus, the greater extent of endorsing maladaptive strategies to cope with

boredom does not adversely affect their intrinsic motivation. Finally, SESRL was inversely related to BEAV strategies for Chinese sample, showing that avoidance coping has impacted students' efficacy in self-regulated learning.

Relationships Between Boredom and Coping Strategies

As reported in Nett et al.'s (2010) study, the authors found a negative relationship between COAP strategies and frequency of boredom, and positive relationships were found between the other three strategies and boredom frequency. In addition, Nett et al. found positive relationships between COAP strategies and effort and interests in mathematics, and negative relationships between COAV strategies, BEAV strategies and those motivational variables. Thus, it is reasonable to expect that the strength of preference for coping strategies affects the perception of boredom in study, given that such boredom is negatively related to effort and motivation (Pekrun et al., 2010). This study evaluated how endorsing a particular coping approach in class might impact students' boredom frequency in class and their levels of boredom during studying outside of the European school setting in which it has previously been studied.

Boredom frequency in class. Consistent with Nett et al.'s (2010) findings, results revealed negative correlations between COAP strategies and boredom frequency in class across the two settings, and a positive correlation between BEAV strategies and boredom frequency in the Chinese setting. Despite the significant correlations, results suggested that the strength of endorsing the four coping strategies did not predict the frequency of boredom among Canadian students, and only BEAV strategies predicted the frequency of boredom in the

Chinese sample. The non-significant prediction could be related to sample characteristics. Participants included in the current study were college students who might have developed qualities (e.g., putting high value on academic achievement), and thus their perception of boredom was not easily affected by their preference for particular types of coping strategies.

Boredom during studying. The current study expands on Nett et al.'s (2010) work to evaluate how the strength of endorsing various coping strategies in class might affect the perception of boredom during studying. Differences in the impact of coping strategies across educational settings were revealed. As expected, cognitive-approach and behavioral-avoidance strategies correlated with boredom during studying in an opposite direction among Chinese students; however, the same relationship was not observed in the Canadian sample. After controlling the demographic variables, only behavioral-approach and behavioral-avoidance strategies predicted Chinese students' levels of boredom in study time.

Literature has shown differences in conforming parents' academic expectations between Western and Chinese students (e.g., Chen & William, 2006). Given that there may be less of a social norm to fulfill familial expectations in academics in Western cultures, it is not surprising to find a non-significant relationships between coping strategies and levels of boredom during studying among Canadian students. In another words, with lower pressure to fulfill parents' academic expectations, students' preference for using a particular coping approach in class does not affect their experience of boredom during studying. In Chinese culture, students are expected to fulfill their parents' expectations to a greater

extent, and hence a greater extent of adopting maladaptive coping strategies may result in a carry-over effect to the levels of boredom during studying.

In addition, putting the findings into the context of individualism-collectivism (Markus & Kitayama, 1991), the difference could be due in part to cultural differences in the view of the self. Collectivistic cultures put greater emphasis on interdependent view of self and hence difference selves are interrelated. On the other hand, individualistic cultures foster independent view of self, which encourages individuality (e.g., unique and autonomous). It could be the case that Canadian students would attribute boredom during studying to internal thoughts and feelings, whereas they might consider boredom coping more likely to be associated with their response to external situations (e.g., Safdar et al., 2009). Thus, the strength of endorsing coping strategies did not relate to their subjective experience during studying. In contrast, the consideration of how they responded to a boring class situation might have affected Chinese students' interpretation of boredom when they studied. Overall, the results suggested a cultural difference in how coping strategies might influence students' subjective evaluation of boredom outside the classroom.

In terms of the fourth hypothesis (i.e., the relationships between boredom during studying, frequency of boredom in class and boredom coping strategies), results suggested that the boredom coping scales and learning-related boredom scale measure distinct constructs. In particular, the extent of adopting the four coping approaches did not predict the boredom frequency and boredom during studying in the Canadian sample, whereas only the behavioral-avoidance

strategies predicted Chinese students' frequency of boredom, and the two behavioral approaches predicted their boredom during studying.

Predictability of Boredom on Achievement

Although Pekrun et al. (2010) found a direct adverse impact of boredom in learning on achievement among college students, this current study showed that the impact of feeling bored might not be as detrimental as originally thought. First, no direct effect was observed between academic boredom and course performance across settings. Second, despite an indirect effect of boredom on achievement in the Canadian sample, students equipped with high levels of SESRL might still perform adequately even thought they are bored. In addition, the direct negative impact of boredom identified by Pekrun et al. was not observed among Chinese college students. As concerns the fifth hypothesis, the results provide partial support to the mediating role of SESRL in attenuating the negative effect of boredom on achievement. The non-significant result found in the Chinese sample may be related to their relatively higher intrinsic motivation in learning. Hence, despite the experience of boredom, high levels of motivation may serve as a buffer to attenuate the effect of boredom on achievement.

Feelings of boredom during studying can be considered a universal academic emotion; however, based on previous findings on emotional regulation (e.g., Safdar et al., 2009), the impact of boredom can be moderated, especially in Chinese culture that emphasizes social order and cohesion. Given that students are expected to fulfill parents' academic expectations in Chinese cultures (e.g., Chen & William, 2006), Chinese students may display higher levels of motivation and

SESRL that are crucial to academic achievement. Hence, the impact of boredom during studying is not obvious in the Chinese sample.

This study also extended the investigation of boredom into its coping strategies as concerns the third hypothesis. In contrast to Nett et al.'s finding that the evader group, which preferred using avoidance strategies more often than average, scored significantly lower on the achievement test, results provided evidence that the extent of endorsing various coping strategies did not affect students' course performance. Consistent with the findings of boredom on achievement, the non-significant results were not surprising. In particular, the college participants in this study most likely have learned how to achieve in spite of using avoidance strategies in class. As concerns the sixth hypotheses, results suggested that boredom coping strategies did not directly affect college students' achievement. The non-significant findings could be related to high intrinsic motivation in college population, which in turns might lead to placing greater values on learning and subsequently achieved academically despite endorsing potential maladaptive boredom coping strategies in class. In particular, learning at post-secondary level emphasizes self-discovery and self-regulated learning (i.e., reading assigned chapters) outside classroom. Hence, a greater extent of endorsing adaptive or maladaptive coping strategies in class may not have a direct relationship with achievement as long as students keep up with the pace of learning outside classroom.

Limitations and Future Research

This study was purposefully conducted in the middle of the term; however, it was still limited by the use of single data collection, which might not be the best estimate of participants' experience of boredom. Further research may consider using longitudinal design to keep track of students' experience of boredom over a longer period of time in order to study the trajectory of the construct. Second, the samples chosen in this study were self-selected, which might not be representative of the college population. In particular, the students were recruited in lectures, and those attending lectures might have a higher motivation to achieve and might feel less bored than those who skipped class.

Although Chinese students' course performance was converted to 4-point scale in an attempt to compare with Canadian students' achievement, it was limited by the uncertainty of equivalence of grading systems across the two cultures. In light of the difference in the ranking of the two universities, the grading criteria could be different. Hence, despite getting a same score on the 4-point scale, students' achievement might be not be comparable across the two settings.

The data collection might also be limited by the self-reported cumulative GPA (CGPA) among Canadian students. Students might report their CGPA in the last year or in the last three years. Future research may consider collecting students' prior achievement results from the university registrar.

Finally, samples were chosen from culturally and geographically diverse settings in an attempt to test the universality of boredom across settings. However,

the sample in this study only represents a particular group and thus generalization to other populations, such as Chinese elementary students, should be interpreted with caution. Future research may consider replicate the study in Grade 1 to 12 in non-Western school settings to evaluate whether students' performance is more susceptible to the negative effects of boredom.

Conclusion and Implications

Boredom is a deactivating emotion that is often neglected in classrooms due to its non-disruptive nature. Recently, scholars have started examining how boredom may affect students' learning and what types of boredom coping strategies relate to better learning outcomes. This study investigated the impact of academic boredom on SESRL and achievement and the influence of endorsing different coping strategies on academic performance. Given that the sample consisted of college students from two culturally and geographically different universities, this allowed the examination of validity and generalizability of boredom scales and impacts of boredom and coping strategies.

The findings support that the boredom-learning scale is an invariant measure and that the boredom coping scale demonstrates partial invariance across Canada and China. Despite the previous significant findings of direct adverse impacts of boredom on achievement, this study suggested that boredom provides an indirect negative effect, via lower levels of SESRL, on academic performance in the Western sample, whereas boredom did not have a negative impact on achievement in the non-Western sample. Although college students did report the experience of

boredom in class and during studying, they might have developed skills throughout their formal schooling to motivate themselves to achieve academically.

The current study also presents practical implications. First, the findings suggest that the experience of boredom during studying relates to achievement motivation and SESRL in the Western sample. Hence, this implies the importance of developing students' value of acquisition of knowledge through studying to counter the negative impacts of boredom on learning, and eventually on achievement. Second, the validated scale on boredom in learning provides a useful tool for cross-cultural researchers to investigate this emotion in other settings (e.g., among Chinese elementary and secondary students). Overall, boredom is undeniably frequently experienced; however, given high levels of SESRL and intrinsic motivation, college students in both Western and non-Western universities may overcome the adverse influence of the emotion on their academic functioning.

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Appendix

This questionnaire is designed to improve understanding about some of the things that influence students in their learning. Your answers to this survey are confidential.

Section A

1) Student ID	Student ID number _____
2) Which year are you in? (circle one)	1st, 2nd, 3rd, 4th, other: _____(please specific)
3) What university/college are you in?	
4) What is your major area of study?	
5) What is your age?	
6) What is your current GPA?	
7) What is your high school GPA?	
8) Gender (circle one)	Female Male
9) What is your country of birth?	
10) What grade will you expect that you can achieve in this course?	A+ A A- B+ B B- C+ C C- D+ D F

Section B

Please circle the number that best describes you.

Strongly Disagree				**Strongly Agree**
1	**2**	**3**	**4**	**5**

1) I am frequently bored in my classes.	1	2	3	4	5
2) I am often bored in my classes.	1	2	3	4	5

When I am bored in my class…

Strongly Disagree				**Strongly Agree**
1	**2**	**3**	**4**	**5**

1) I try to pay attention to the lesson more.	1	2	3	4	5
2) I tell myself to concentrate again.	1	2	3	4	5
3) I make myself aware of the importance of the issue.	1	2	3	4	5
4) I try to make myself aware that this class is important.	1	2	3	4	5
5) I make myself focus again because the issue is important.	1	2	3	4	5
6) I ask my instructor if we can do something else.	1	2	3	4	5
7) I ask my instructor for more interesting tasks.	1	2	3	4	5
8) I suggest that the instructor adds variety to the lessons.	1	2	3	4	5
9) I try to get the instructor off topic so that we discuss an issue that interests me.	1	2	3	4	5
10) I bring up an issue that I think the class is more interested in.	1	2	3	4	5
11) I prepare for my next class.	1	2	3	4	5
12) I do my homework.	1	2	3	4	5
13) I study for another subject.	1	2	3	4	5
14) I think about my homework or something I have to study.	1	2	3	4	5
15) I copy the homework for my next class.	1	2	3	4	5
16) I talk to the person sitting next to me.	1	2	3	4	5
17) I start talking to my classmate sitting next to me.	1	2	3	4	5
18) I distract myself by interacting with my classmate.	1	2	3	4	5
19) I try to contact other classmates who are feeling also bored.	1	2	3	4	5

20) I occupy myself with my classroom neighbor or someone who is sitting close to me.	1	2	3	4	5

The following questions pertain to feelings you may experience **DURING studying**. Please indicate how you feel, typically, during studying.

Strongly Disagree				**Strongly Agree**
1	**2**	**3**	**4**	**5**

1) The material bores me to death.	1	2	3	4	5
2) Studying for my courses bores me.	1	2	3	4	5
3) Studying is dull and monotonous.	1	2	3	4	5
4) While studying this boring material, I spend my time thinking of how time stands still.	1	2	3	4	5
5) The material is so boring that I find myself daydreaming.	1	2	3	4	5
6) I find my mind wandering while I study.	1	2	3	4	5
7) Because I'm bored I have no desire to learn.	1	2	3	4	5
8) I would rather put off this boring work till tomorrow.	1	2	3	4	5
9) Because I'm bored I get tired sitting at my desk.	1	2	3	4	5
10) The material bores me so much that I feel depleted.	1	2	3	4	5
11) While studying I seem to drift off because it's so boring.	1	2	3	4	5

Section D

Read each statement and respond as honestly as you can.

Not well at all					**Very well**
1	**2**	**3**	**4**	**5**	**6**

1) How well can you finish your homework on time?	1	2	3	4	5	6
2) How well can you study when there are other interesting things to do?	1	2	3	4	5	6
3) How well can you concentrate on your school work?	1	2	3	4	5	6
4) How well can you remember information presented in class and in your school books?	1	2	3	4	5	6
5) How well can you arrange a place to study at home where you won't get distracted?	1	2	3	4	5	6
6) How well can you motivate yourself to do schoolwork?	1	2	3	4	5	6
7) How well can you participate in class discussions?	1	2	3	4	5	6

Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to college.

Does not correspond at all	**Corresponds a little**		**Corresponds moderately**	**Corresponds a lot**		**Corresponds exactly**
1	**2**	**3**	**4**	**5**	**6**	**7**

WHY DO YOU GO TO COLLEGE?

1) For the pleasure I experience while surpassing myself in my studies.	1	2	3	4	5	6	7

2) For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.	1	2	3	4	5	6	7
3) For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.	1	2	3	4	5	6	7
4) Because college allows me to experience a personal satisfaction in my quest for excellence in my studies.	1	2	3	4	5	6	7

Section E

In your opinion, how important is it that you and your family …….

Not at all important								**Very important**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

1) let relatives stay with you for a short time when they need some help?	1	2	3	4	5	6	7	8	9
2) turn to each other in times of trouble?	1	2	3	4	5	6	7	8	9
3) raise each other's children whenever there is a need?	1	2	3	4	5	6	7	8	9
4) do everything you can to help each other move ahead in life?	1	2	3	4	5	6	7	8	9
5) take responsibility for caring for older family members?	1	2	3	4	5	6	7	8	9
6) call, write, or see each other often?	1	2	3	4	5	6	7	8	9