



## Does Gender Matter in Achievement Emotions?

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### Abstract

*The current study examines whether gender differences exist in general academic contexts within three achievement emotions domains: prospective outcome emotions, retrospective outcome emotions and activity emotions. One hundred and forty-five undergraduates from a southwest public university participated in the study. Participants were asked to complete twenty-four items assessing their experience of emotions in learning. Discriminant function analysis revealed that gender differences exist statistically and practically in prospective outcome emotions and activity emotions, but not in retrospective outcome emotions. Moreover, female participants scored higher on prospective outcome emotions, retrospective outcome emotions and activity emotions than male participants. This study fills in the gap of prior studies only focusing on investigating gender in selected individual emotions (e.g., anxiety). Future studies may explore if other factors (e.g., culture, age) interact with gender differences in achievement emotions. Since gender matters in achievement emotions, assisting female and male students to develop effective strategies of managing emotions in studying may improve their academic performance.*

**Keywords:** Gender, Achievement Emotions, Control-Value Theory, College Students

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Experiencing a variety of emotions while studying is common for students. An individual who is interested in the content may enjoy studying it, whereas if you are not interested in the content, studying becomes boring and you may sit there for hours without learning anything. Those emotions we experience in studying could largely affect our learning process in multiple ways: cognitive resources (Pekrun, 2006), motivation (Pekrun, 2006), learning strategies (Isen, 2000), self-regulated skills (Artino & Jones, 2012), and academic performance (Pekrun, 2006). We often hear about females are more emotional than males because our society encourages females to express emotions whereas not in favor of males showing their ‘vulnerability’ (Simon & Nath, 2004). We also hear about the statement claiming that girls are not good at math, which in turn becomes the main source of explaining differences between female students and male students in emotional experience in math (Goetz et al., 2013). So, it brings up the focus of this study: do female college students feel the same as their male counterparts in studying or do they feel differently?

### Conceptual Framework: Control-Value Theory

Built on the transactional stress model (Lazarus, 1984) and attribution theory (Weiner, 1985), Pekrun proposed control-value theory (2006) to explain emotions relate to academic activities (e.g., reviewing studying notes, taking an exam) and academic outcomes (e.g., passing a test, receiving a good grade) (Pekrun & Stephens, 2010). Three domains are included in the theory: prospective outcome emotions, retrospective outcome emotions and activity emotions. The first two domains focus on discussing emotions aligning with academic outcomes, for instance, feeling upset about failing the test, or being happy about getting a good grade. The major difference between prospective and retrospective is the former focuses on emotions that happen before an event (e.g., feeling anxious before taking an exam) and the latter focuses on emotions that happen after an event (e.g., feeling upset since I failed the test). Some common prospective outcome emotions are anticipatory joy, hope, anxiety, and hopelessness. Some common retrospective outcome emotions are pride, gratitude, sadness, anger, and shame. Unlike prospective and retrospective outcome emotions, activity emotions focus on discussing emotions we feel during some academic activities, for instance, feeling bored about what the teacher is teaching, or feeling frustrated about not being able to solve the task. Some common activity emotions are enjoyment, anger, frustration, and boredom. I applied these three achievement emotion domains in control-value theory to investigate if gender plays a role in individuals’ emotional experience in academic contexts.

## Gender and Achievement Emotions

As mentioned above, prior studies focused on discussing the impact of gender on students' emotional experience in a specific subject, for instance, math. Girls were found to report less enjoyment but more anxiety in math compared to boys (Frenzel & Pekrun & Goetz, 2007). The difference was explained by gender stereotypes, which usually revolve around 'girls are not good at math'. Besides math, Pekrun did other studies which tried to explain the impact of gender on students' emotional experience in multiple academic circumstances (Pekrun et al., 2011), for instance, when attending classes, female students reported experiencing more enjoyment and less anger than males; when taking exams, female students reported experiencing more anxiety and less hope than males. Even though Pekrun found significant gender differences in students' experience of enjoyment, anger, anxiety, and hope in multiple academic circumstances, no difference was found in their experience of hopelessness and boredom.

In summary, even though some prior studies tried to investigate gender differences in achievement emotions, none of them have examined if gender differences exist in prospective outcome emotions, retrospective outcome emotions and activity emotions. Moreover, most prior studies focused on investigating gender differences in students' experience of a few specific achievement emotions (i.e., enjoyment, anxiety) in a specific subject (i.e., math) whereas ignored how gender affects students' experience of other achievement emotions (e.g., hope, hopelessness, anger, shame) in a more general academic context (i.e., learning, studying). To fill out the gap, I connected the control-value theory of achievement emotions to gender variables in this study to investigate how gender affects students' experience of multiple achievement emotions in general academic contexts.

### Research Questions

The purpose of this study is to investigate if gender differences exist in college students' emotional experience in general academic contexts. Given the purpose of this current study, three research questions are proposed in the study are:

**RQ1:** Are there gender differences in students' experience of prospective outcome emotions (i.e., hope, hopelessness, anxiety) in studying/learning?

**RQ2:** Are there gender differences in students' experience of retrospective outcome emotions (i.e., pride, shame, anger) in studying/learning?

**RQ3:** Are there gender differences in students' experience of activity emotions (i.e., enjoyment, anger, boredom) in studying/learning?

### Methodology

#### *Participants*

The sample population comprised of 145 undergraduates from a southwest public university. In terms of gender, 26.2% identified as males ( $n = 38$ ) and 71.7% identified as females ( $n = 104$ ), with two participants identified as non-binary (1.4%) and one participant did not respond to the question. All participants were enrolled in one of two general education courses and were from varying class years and majors. In terms of class years, 37.2% identified as freshmen ( $n = 54$ ), 30.3% identified as sophomores ( $n = 44$ ), 20.7% identified as juniors ( $n = 30$ ), and 9.7% identified as seniors ( $n = 14$ ). The majority came from the majors such as pre-nursing, psychology, public health, and undecided. Unfortunately, due to the small sample sizes of the non-binary and missing gender groups, these groups were excluded from analyses.

#### *Measures*

A shortened version of the Achievement Emotions Questionnaire (Pekrun & Goetz & Perry, 2005) was used to assess participants' achievement emotions. The Achievement Emotions Questionnaire is a self-report measurement meant to assess students' achievement emotions in three domains: class-related emotions (emotion experienced when students attend the class), learning-related emotions (emotion experienced when students are learning), and test-related emotions (emotion experienced when students are taking the exam). The questionnaire also measures students' emotional experience in three periods: before studying, during studying, and after studying. Prior studies have routinely used a shortened version of the Achievement Emotions Questionnaire. For instance, only using selected items to measure students' anxiety (Goetz et al., 2013) or using selected subscales to measure students' emotional experience (Artino & Jones, 2012). Therefore, the current study selected 24 items in the learning-related emotions subscale of the Achievement Emotions Questionnaire to measure participants' emotional experience in general academic contexts (i.e., learning, studying). In order to inform this decision, I consulted item-total correlations ( $rit$ ), which represent the correlations between scores on the item and sum scores across all items on the same emotion subscale. If an item has a higher  $rit$  that means the item is more similar to the other items (Everitt &

Wolf, 2002) and thus may better represent the emotion or construct being measured. Based on this standard, I chose the three items with the highest fit for each of the eight achievement emotions (i.e., enjoyment, hope, pride, anger, anxiety, shame, hopelessness, boredom). Participants were presented with a series of statements (e.g., I enjoy the challenge of learning the material) and rated their agreement on a 5-item Likert scale (1 = strongly disagree, 5 = strongly agree). The Cronbach's alpha of prospective outcome, retrospective outcome and activity emotions were: .65, .66, .88, respectively, which means the scores are reliable enough to analyze.

### **Procedure**

Participants completed 24 survey items online as part of a large survey conducted by the College of Education at the university. Participants enrolled in one of two general education courses and received partial course credit for participating in the study. Completing these 24 survey items took approximately 10 minutes in length.

### **Results**

All statistical analyses were done with the R program. A significance level of  $p < .05$  was set for all the statistical analyses that were conducted. Linear discriminant function analysis (LDFA) was used to analyze the data. Linear discriminant function analysis is a method to determine whether a set of variables discriminates between two or more groups (Cohen et al., 2003). In this study, the dependent variable is gender (females vs males) and the independent variables are three achievement emotion domains: prospective outcome emotions (i.e., anxiety, hope, hopelessness), retrospective outcome emotions (i.e., pride, anger, shame), and activity emotions (i.e., anger, enjoyment, boredom).

The first step in linear discriminant function analysis is to specify the null and alternative hypotheses for the following tests. The null hypothesis is there is no weighted sum of independent variables (prospective outcome emotions, retrospective outcome emotions, activity emotions) that differentiates between male and female groups, which means the two groups come from populations with equal centroids (equal means on all emotions analyzed). The alternative hypothesis is there is at least one weighted sum of independent variables that differentiates between male and female groups, which means the two groups come from populations with unequal centroids. Then, I ran statistical significance tests and explored the resulting weighted sums to examine whether gender groups differed on each of the three domains of achievement emotions. Note, because there are two gender groups, I can only test for one weight sum for each set of emotions. Results of the significance tests are listed in Table 1. Besides, linear discriminant function analysis provides weights for each achievement emotion that allow construction of an axis or dimension of prospective outcome emotions, retrospective outcome emotions, and activity emotions. Coefficients, standardized coefficients and the correlations between each achievement emotion score and scores on the new axis are listed in Table 2. For instance, in prospective outcome emotions, the correlation between anxiety and the new axis is 0.82. The last step in linear discriminant function analysis is to describe gender differences in these three achievement emotion domains by referring to the means on raw composites. Composite scores of each achievement emotion domain are listed in Table 3.

#### ***RQ1: Gender Differences in Prospective Outcome Emotions***

The null hypothesis is rejected because  $p < .001$ , which means male and female groups statistically significantly differed on the sets of prospective outcome emotions. 19.3% of the variance between groups was explained by the weighted sum of anxiety, hope, and hopelessness, which means male and female groups practically significantly differed on prospective outcome emotions.

**The new axis is : Prospective Outcome Emotions = 0.55 \* Anxiety - 0.10 \* Hope - 0.29 \* Hopelessness.**

Females had higher mean scores than males (females = 1.52, males = 0.42) in prospective outcome emotions, which means on average, females reported high anxiety, low hope, and low hopelessness. In contrast, males, on average, reported low anxiety, high hope, and high hopelessness.

#### ***RQ2: Gender Differences in Retrospective Outcome Emotions***

The null hypothesis cannot be rejected because  $p = .556 > .05$ , which means male and female groups did not statistically significantly differ on the sets of retrospective outcome emotions. 1.5% of the variance between groups was explained by the weighted sum of pride, anger, and shame, which means male and female groups did practically significantly differ on retrospective outcome emotions.

**The new axis is : Retrospective Outcome Emotions = -0.33 \* Pride + 0.14 \* Anger - 0.33 \* Shame.**

Females had higher mean scores than males (females = -5.11, males = -5.39) in retrospective outcome emotions, which means on average, females reported low pride, low shame, and high anger, whereas males, on average, reported high pride, high shame, and low anger.

**RQ3: Gender Differences in Activity Emotions**

The null hypothesis is rejected because  $p = .003 < .05$ . which means male and female groups statistically significantly differed on the sets of activity emotions. 9.5% of the variance between groups was explained by the weighted sum of anger, enjoyment, and boredom, which means male and female groups partially practically significantly differed on activity emotions.

**The new axis is: Activity Emotions = -0.27 \* Anger - 0.41 \* Enjoyment + 0.18 \* Boredom.**

Females had higher mean scores than males (females = -1.93, males = -2.66) in activity emotions, which means females reported low anger, low enjoyment, and high boredom. However, males, on average, reported high anger, high enjoyment, and low boredom.

Achievement Emotions	Wilk's Lambda	p	Canonical R <sup>2</sup>
Prospective Outcome	.807	<.001	.193
Retrospective Outcome	.985	.556	.015
Activity	.905	.003	.095

**Table 1: Canonical Discriminant Analysis for Achievement Emotions**

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Achievement Emotions		Raw Coefficients	Standardized Coefficients	Structure Coefficients
Prospective Outcome	Anxiety	0.55	1.26	0.82
	Hope	-0.10	-0.25	-0.43
	Hopelessness	-0.29	-0.87	0.13
Retrospective Outcome	Pride	-0.33	-0.83	-0.68
	Anger	0.14	0.43	-0.34
	Shame	-0.33	-0.91	-0.33
Activity	Anger	-0.27	-0.83	0.13
	Enjoyment	-0.41	-1.02	-0.79
	Boredom	0.18	0.71	0.47

**Table 2: Linear Combinations of Achievement Emotions**

Achievement Emotions	High Scores Indicate	Low Scores Indicate	Group Means
Prospective Outcome	High Anxiety Low Hope Low Hopelessness	Low Anxiety High Hope High Hopelessness	Female have higher mean scores than male (1.52>0.42)
Retrospective Outcome	Low Pride High Anger Low Shame	High Pride Low Anger High Shame	Female have higher mean scores than male (-5.11>-5.39)
Activity	Low Anger Low Enjoyment High Boredom	High Anger High Enjoyment Low Boredom	Female have higher mean scores than male (-1.93>-2.66)

**Table 3: Composite Scores of Achievement Emotions**

**Discussion**

In this study, I investigated whether there are gender differences in prospective outcome emotions, retrospective outcome emotions, and activity emotions in general domains (participants came from different majors like nursing, engineering and psychology). I hypothesized males and females would self-report differences in prospective outcome emotions, retrospective outcome emotions, and activity emotions. Results revealed partial support for my hypothesis: male and female participants reported statistically and practically significant different levels of prospective outcome emotions (i.e., hope, hopelessness, anxiety) and activity emotions (i.e., enjoyment, anger, boredom). However, participants' self-report was not significantly different in retrospective outcome emotions (i.e., pride, shame, anger). Moreover, based on the scores of males and females, I found females had higher scores on the weighted sum scores of all three sets of achievement emotions: prospective outcome, retrospective outcome, and activity emotions than males. Note, this does not indicate that females are higher on all emotions. Rather, this indicates females are higher on emotions that had positive coefficients in the discriminant analysis and lower on emotions that had negative coefficients compared to males. The finding that females reported less enjoyment and more anxiety than males revealed in the current study is consistent with prior studies (Pekrun, 2006), whereas a few findings revealed in the current study are inconsistent with prior studies, for instance, females reported more boredom and less hope than males in this study, which researchers have not documented in prior studies.

This current study is the first to my knowledge to combine a control-value framework (Pekrun, 2006) with the Achievement Emotions Questionnaire (Pekrun & Goetz & Perry, 2005) to examine gender differences in three dimensions of achievement emotions: prospective outcome emotions, retrospective outcome emotions, and activity emotions. Therefore, adding to the existing literature of not examining gender differences in prospective outcome emotions, retrospective outcome emotions and activity emotions. Second, the current study widened the research of exploring gender differences in achievement emotions from domain-specific (Frenzel & Pekrun & Goetz, 2007) to domain-general. The last strength of this study is the unique and effective analysis method: linear discriminant function analysis. By using this analysis method, I could determine if female and male participants were different on three sets of achievement emotions rather than on individual emotions in isolation.

One implication for future studies is they could balance the gender ratio of participants to examine whether similar results to those reported in the current study would emerge. The other implication for future studies is to consider other variables (e.g., age, culture, and race) which might influence gender differences in achievement emotions (Simon & Nath, 2004).

Given the findings that emotions students experience in studying could largely affect their academic performance (Pekrun, 2006), and since this current study found that there are gender differences in achievement emotions, specifically in prospective outcome emotions and activity emotions, helping female college students and male college students find and develop effective strategies of managing emotions in studying may benefit their academic performance.

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