

# MEASURING THE EFFECTS OF ANXIETY AND SELF-EFFICACY ON FINANCE STUDENTS

**Robert Jozkowski, Eckerd College, St. Petersburg, FL**  
**Steve Sizoo, Eckerd College, St. Petersburg, FL**  
**Naveen Malhotra, Eckerd College, St. Petersburg, FL**  
**Morris Shapero, Eckerd College, St. Petersburg, FL**

## ABSTRACT

Because of their quantitative content, Finance courses are particularly difficult for business majors. Math-related material causes many students to become anxious, which can impede their learning and their performance. Also, students who think they will perform poorly on a task do worse than those who think they will succeed. The difference is the student's self-efficacy. This exploratory study attempted to examine "Finance anxiety" in business students by creating a Finance Anxiety Scale to measure that phenomenon, as well as its relation to the construct of self-efficacy. The objective of this research was to begin examining whether or not the critical message of finance could be made more accessible to students without diluting the necessarily rigorous nature of the discipline. The results and implications of this preliminary study are discussed, as well as essential future research.

## INTRODUCTION

Even though knowledge of finance is considered critical to success in business, studies indicate that many business students have more difficulty with Finance courses than any other business discipline. Literature suggests that this is primarily due to the quantitative nature of Finance. Quantitative material causes many students to become anxious. Anxiety, in turn, is said to impede performance, causing students to fall behind in class and to postpone initiating remedial action. At the same time, reports show that students who think they can perform well on a particular task do better than those who think they will fail. This paper describes an attempt to measure and assess this Finance-course anxiety. Furthermore, it examines the relationship between Finance anxiety and self-efficacy--an individual's confidence in his or her ability to accomplish a task. Finally, the paper discusses the implications of this exploratory study and suggests necessary future research.

## REVIEW OF LITERATURE

Financial performance is considered the chief indicator of the success of organizational decisions and activities (Thompson, Strickland, & Gamble, 2006). As a consequence, a weak understanding of finance could have a very detrimental effect on a businessperson's decision making ability and career prospects. Yet according to the Educational Testing Service (2000), seniors at 388 colleges and universities taking the "Major Field Test in Business II" scored lower on the Finance section than for any other discipline--at the 38th percentile. Studies by individual undergraduate business programs have produced similar findings. Literature indicates that most business students find Finance courses to be particularly difficult and challenging (Balachandran & Skully, 2004), and students with weaker quantitative skills delay taking the required math or statistics courses that are typically prerequisites for Finance. This results in less well prepared and poorer performing students (Marcal & Roberts, 2001). Studies attribute this largely to the quantitative nature of a Finance curriculum (Krishnan, Chenchuramarah, Bathala, Khattacharya, & Ritchey, 1999). That is, mathematics anxiety manifests itself in all quantitatively related environments (Baloglu, 2002).

Math anxiety is defined as "any situation in which an individual experiences anxiety when confronted with mathematics in any way" (Byrd, 1982, p. 38). There is also agreement that anxiety is related to performance (Balachandran & Skully, 2004; Tobias & Everson, 1997), and that anxiety has been shown to have a debilitating effect on learning and achievement (Gaudy & Spielberger, 1971; Tobias, 1980). What is more, this phenomenon is wide spread. In a study of the learning and study characteristics of business students, Sizoo, Malhotra, and Bearson (2002) found that of the 10 subscales on the Learning & Study Strategies Inventory (LASSI), respondents uniformly scored lower on the Anxiety subscale. That is, whether they were male or female, American or international, adult or traditional-aged business students, anxiety was their greatest obstacle to learning. Furthermore, the anxiety was

primarily math-related anxiety. Research also showed that successful efforts to reduce this anxiety could lead to dramatic improvements in academic success (Bogue, 1993).

According to Baloglu (2002), two major theories address the effects of anxiety: The Cognitive Interference Theory says that high levels of anxiety lead to poor performance (Wine, 1980); while the Deficit Theory assumes the opposite--poor performance leads to increased anxiety (Tobias, 1986). Extensive research by Scituo (1996) supports the Cognitive Interference Theory, stating that “anxiety causes poor performance and not the contrary” (p. 30). Regardless of the particular theory, it is widely believed that math-related anxiety clearly impedes academic performance (Baloglu, 2002).

Some people--when confronted with a quantitative challenge--figure out how to work their way through it, while other people resort to delay and denial (Scott, 2003). Bandura (1986) attributed this behavior to the individual’s self-efficacy--the level of confidence individual's have in their ability to accomplish tasks. Those with high self-efficacy tend to persist in exhibiting new behaviors and, therefore, have greater opportunities for receiving feedback about their acquired skills than those with low self-efficacy. Research shows that self-efficacy was found to be significantly related to academic performance in general (Wood & Locke, 1987), and mathematics performance in particular (Campbell & Hackett, 1986).

Still, Finance (like mathematics) is a difficult, challenging course of study. Neither the student nor the discipline would be well served by diluting the course content or by consuming valuable course time with peripheral activities and exercises. At the same time, student-anxiety impairs performance in the Finance classroom, and neither the student nor the discipline is well served if the content cannot be made more accessible.

Research shows that there are strategies available to both enhance self-efficacy (Eisenberger, Conti-D’Antonio, Bertrando, 2000) and to ameliorate math-related anxiety (Tobias, 1995). These strategies may be useful for Finance students, faculty, mentors, and advisors. To explore this issue more closely, the authors developed a measure of Finance anxiety and correlated its results to those of established self-efficacy measures. The next section describes that process. The results and implications are discussed later in the paper.

## METHODOLOGY

To measure Finance anxiety, the authors used Alexander and Martray’s (1989) 25-item Revised Mathematics Anxiety Rating Scale (RMARS) as a template. The RMARS has been widely used in academic research, rigorously tested, and found to be psychometrically sound. Also, its construct applies to the Finance discipline and is designed to facilitate remedial action. Self-efficacy was measured by a 17-item general self-efficacy scale (Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, &. Rogers, 1982). See the “Finance Anxiety Questionnaire” in Appendix 1.

Participants of this exploratory study were a "convenience sample" of students easily accessible to the authors. Neither the institutions nor the students were selected randomly. As a consequence, the results cannot be generalized beyond the sample itself. Still, exploratory research is useful in clarifying and defining the nature of a problem or opportunity (Zikmund, 2006). The “Finance Anxiety Questionnaire” was distributed to 510 current or recent Finance students. The questionnaires were passed out toward the end of the semester, but not on the day of an examination (to avoid situational anxiety): 501 usable questionnaires were returned. Respondents were distributed as shown in Table 1:

Table 1. Sample Participants

Student Subgroups	Gender		Total
	Male	Female	
Undergraduate, under 25	220	142	362
Undergraduate, 25 & over	35	52	87
Graduate student (MBA)	34	18	52
Total	289	212	501

## ANALYSIS AND PRESENTATION OF FINDINGS

### Estimates of Reliability

Using the methodology employed by Alexander and Martray (1989) in developing, and Baloglu (2002) in evaluating the Revised Math Anxiety Rating Scale--the template-instrument for this research--the 25-item Finance Anxiety Scale (FAS) was divided into three subscales: Test Anxiety (questions 11 through 25 on Appendix 1), Numeric Anxiety (questions 26-30), and Course Anxiety (questions 31-35). To determine whether the 15-items that were summed to create the Test Anxiety score formed a reliable scale, Cronbach's alpha was computed (Table 2). The alpha of the 15-items was .929, which is very high according to Leech, Barrett, and Morgan (2005). While this result indicates the items form a scale of good internal consistency, it also suggests that the items are repetitious or that there are more items in the scale than is really necessary for a reliable measure of the concept. Similarly, the alphas for the 5-item Numeric Task Anxiety scale (.907), and the 5-item Course Anxiety scale (.848) indicate good internal consistency. In addition, the alpha for the total 25-item Finance Anxiety Scale was .934, reflecting good reliability and some repetition in the items. The alpha of the 17-item Self-Efficacy Scale (SES) was .831, reflecting a high level of internal consistency and strongly supporting the reliability of the measure. An analysis of these findings will be discussed later.

Table 2. Estimates of Reliability

Scale/Subscales	Items	Cronbach's Alpha
Finance Anxiety	25	0.934
Test Anxiety	15	0.929
Numeric Task Anxiety	5	0.907
Course Anxiety	5	0.848
Self-Efficacy	17	0.831

### Estimates of Validity

Principal axis factor analysis with varimax rotation was conducted to assess the underlying structure for the 25-items of the Finance Anxiety Scale. Three factors were requested based on the fact that the items were designed to index three constructs: Test Anxiety, Numeric Anxiety, and Course Anxiety. After rotation, the first factor accounted for 24.1% of the variance, the second factor accounted for 16.9%, and the third factor accounted for 16.4%, for a total of 57.4%.

### Correlation Analysis

A correlation analysis was conducted to determine if certain demographic or performance characteristics were significantly related to the measures of Finance anxiety or self-efficacy being used, or whether or not the FAS was significantly related to the SES. Research cited in the Review of Literature suggests that math anxiety and self-efficacy would have a significant inverse relationship. The same could be inferred for the two scales under examination.

Indeed, the Pearson Correlation Coefficient for the FAS and the SES was a significant, negative relationship:  $r_s(464) = -.2211, p=.000$  (2-tailed). But an closer examination in Table 3 shows that the relationships for the Student Subgroups, while negative, was not significant for Undergrads 25-years of age and Over. Since the literature cited above indicates that subgroups of college students have different learning characteristics (Sizoo et al., 2002), and that different remedies are designed for high math anxiety vs. low self-efficacy, the authors examined this relationship further.

Table 3. Correlation of Finance Anxiety and Self-Efficacy

Under 25	338	-0.206	**	0.000
25 & Over	87	-0.151		0.158
Graduate	47	-0.386	**	0.000
Total	472	-0.218	**	0.000
	**	p < 0.010 (2-tailed)		

### Comparison of Means: Finance Anxiety to Self-Efficacy

Analysis of variance was conducted on each scale for paired subgroups. Table 4a shows that none of the three subgroups had significantly different FAS mean scores when compared to each other. However, Table 4b shows that Undergrads-Under 25 had significantly lower SES means than either Undergrads-25 & Over or Graduate MBA students. The difference for the Over 25 or Grad students was not significant. To examine the FAS-SES relationship even further, the authors employed the median-split procedure.

Table 4a Comparison of Means for Finance Anxiety

Subgroup	N	Mean	Std. Dev.	F-Value	Sig. F
Under 25	339	2.927	0.861		
vs. 25 & Over	87	2.862	0.934	0.391	0.532
Under 25	339	2.927	0.861		
vs. Grad	45	2.741	0.86	1.862	0.172
25 & Over	87	2.862	0.934		
vs. Grad	45	2.741	0.846	0.53	0.468

Table 4b. Comparison of Means for Self-Efficacy

Subgroup	N	Mean	Std. Dev.	F-Value	Sig. F
Under 25	360	4.551	0.656		
vs. 25 & Over	87	4.913	0.511	23.556	0.001 **
Under 25	360	4.551	0.656		
vs. Grad	52	4.977	0.541	19.946	0.001 **
25 & Over	87	4.913	0.511		
vs. Grad	52	4.977	0.541	0.494	0.484
	**	p<0.01 (2-tailed)			

### Determining "High" vs. "Low" Finance Anxiety and Self-Efficacy

The median-split procedure--widely used in social psychology research to identify how certain groups relate to a particular measure (Harrison, Chadwick, & Scales, 1996)--was employed to ascertain which students would be considered to have a "high" score for FAS or SES, and which would have a "low" score. For this study, students scoring above the median FAS for the total sample (2.84) were considered to have "high finance anxiety." Those scoring below the median, "low finance anxiety." Table 5a reveals that the Undergrad-Under 25 students leaned toward "high" anxiety--52.5% vs. 47.5%. Undergrads 25 & Over had FAS scores that also leaned toward

"high" finance anxiety (51.7% above the median and 48.3% below), while Grad students leaned toward "low" anxiety (46.7% above and 53.3% below).

For the SES (Table 5b), the median split of 4.71 for the total sample had Under-25 students scoring low (46.2% with "high" score vs. 53.8% with "low" scores), compared to 25 & Over students (67.4% "high" and 32.6% "low"), and Grad students (75% "high" and 25% "low"). This suggests that for this sample, self-efficacy is a very significant issue for the Under-25 subgroup

Table 5a. Median-Split Results for Finance Anxiety

Subgroup	Number / Percent	Above ("High") Median	Below ("Low") Median	Total
Under 25	N	178	161	339
	%	52.5%	47.5%	100.0%
25 & Over	N	45	42	87
	%	51.7%	48.3%	100.0%
Graduate	N	21	24	45
	%	46.7%	53.3%	100.0%
Total	N	244	227	471
	%	51.7%	48.2%	100.0%

Table 5b. Median-Split Results for Self-Efficacy

Subgroup	Number / Percent	Above ("High") Median	Below ("Low") Median	Total
Under 25	N	166	193	359
	%	46.2%	53.8%	100.0%
25 & Over	N	59	28	87
	%	67.8%	32.2%	100.0%
Graduate	N	39	13	52
	%	75.0%	25.0%	100.0%
Total	N	264	234	498
	%	53.0%	47.0%	100.0%

## DISCUSSION

The results of any exploratory study have to be interpreted with caution. The institutions and individuals participating in this study were selected purely for their availability. As a consequence, the results for this convenience sample cannot be generalized to any larger population. Still, even with its limitations, exploratory research can be useful in defining and clarifying the nature of a problem or opportunity. This study indicates that the Finance Anxiety Scale--using the Revised Mathematics Anxiety Rating Scale as a template--provides a useful measure of anxiety toward the study of Finance. Measures of internal consistency were strong and estimates of validity were satisfactory. Still, the results also suggest that the scale might be improved by simply eliminating some of its weaker items.

### Future Research 1: collect a larger, random sample

A larger, random sample will allow researchers to perform more rigorous analysis of the data. It would also allow analysts to examine the psychometrics of a more parsimonious scale. Recall that in the factor analysis, 15 items on the Test Anxiety subscale, two loaded more strongly on Numeric Anxiety. While questions 12 ("Taking the math section of a college entrance exam") did not load significantly on any factor. These items will be among the likely candidates for elimination.

Also estimates of reliability suggested that items were repetitious, indicating that there were more items in the scale than is really necessary for a reliable measure of the concept. Interestingly, question 12, which did not load on any factor, also had relatively low "Correct Item-Total Correlation" results in reliability analysis, and the alphas increased if the item was deleted from their respective scales. This supports the suggestion that careful deleting of individual items will improve the scale as a whole.

For the sample as a whole, there was strong support for the proposition that FAS and SES would be negatively correlated (Table 3). But for the student subgroups, significance was only reported for the Undergrads, under-25 and the Graduate students. This led to a closer examination of the FAS-SES relationship using ANOVA and median-split analysis (Tables 5 and 5 respectively). It appears that for the Undergrad, under-25 subgroup, feelings of low self-efficacy could be more of an impediment to success in a Finance classroom than feelings of high Finance anxiety. For the Undergrad, 25 & over group, it tended to be the other way around. Faculty familiar with these adult learners confirm that, in general, they have returned to the college with rusty quantitative skills and the attendant math anxiety. On the other hand, they have learned over time (average age = 36) that they can get through challenging situations, hence the high self-efficacy score. These results indicate that any remedies for low self-efficacy, or high Finance anxiety will have to be tailored to the particular student group, if not the individual student.

### **Future Research 2: Conduct separate experiments to test strategies to remedy high Finance anxiety or low self-efficacy.**

The review of literature indicated that there were strategies to enhance low self-efficacy and ameliorate high math anxiety. Obviously, the math anxiety strategies have to be examined for their appropriateness to the Finance classroom. In time, separate pretest post-test experiments could be conducted. One experiment would include a control group experiencing no intervention, and a treatment group experiencing interventions aimed at reducing Finance anxiety. The other experiment's treatment group would include interventions that enhance self-efficacy. Finally, an experiment could include both finance anxiety and self-efficacy interventions. Needless to say, identifying the most effective remedies for each construct could be a very long process. Nevertheless, given the importance of the Finance discipline to businesspeople (in both for-profit and not-for-profit organizations), it seems worthy of examination.

## **SUMMARY**

Business students have considerable difficulty with Finance and literature suggests that it is largely because of the quantitative nature of the discipline. This exploratory study examined this phenomenon of Finance anxiety. A Finance Anxiety Questionnaire was developed which included measures for both Finance Anxiety and Self-Efficacy. Initial results of this exploratory study indicate that further research in this area is worthwhile. The objective of this research would not be to dilute the Finance discipline in any way, but to make its critical message somehow more accessible to its students.

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**Contact Information:**

**Robert Jozkowski**  
**Assistant Professor - Finance**  
**Eckerd College**  
**4200 54<sup>th</sup> Street So.**  
**St. Petersburg, FL 33711**  
**727 864 7541**  
[jozkowrs@eckerd.edu](mailto:jozkowrs@eckerd.edu)