ANXIETY IN UNDERGRADUATE RESEARCH METHODS COURSES: ITS NATURE AND IMPLICATIONS

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ABSTRACT

Undergraduate students who are enrolled in research methods courses tend to believe that such courses are overwhelming and that it is almost impossible to get through them. It has been reported that education students, in particular, enter research methods courses with feelings of stress and anxiety, although in most cases, they are not really aware of what research methods are all about. The purpose of this study is to examine the nature of anxiety that undergraduate students experience in a research methods course and explore some of the factors that influence their anxiety levels. The implications of this study are discussed and teaching interventions are suggested to assist students deal with their anxiety.

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ANXIETY IN UNDERGRADUATE RESEARCH METHODS COURSES: ITS NATURE AND IMPLICATIONS

Many undergraduate students in education need to take courses in research methods and/or statistics or some combination of those, as part of their teacher education program. Such courses are important because they typically provide the only formal exposure to educational research concepts and practices received by undergraduate students in their teacher education programs. Undergraduate students suddenly find themselves being introduced to completely new concepts that are often accompanied by mathematically-based ideas. Being confronted with new and challenging material is likely to trigger a number of responses from these students including stress, uncertainty and anxiety. Indeed, recent research on quantitative research methodology and statistics courses shows that college students have difficulties and experience anxiety (Forte, 1995; Hauff & Fogarty, 1996; Murtonen, 2005; Murtonen & Lehtinen, 2003; Onwuegbuzie, & Daley, 1999; Onwuegbuzie & Seaman, 1995; Onwuegbuzie & Wilson, 2003).

The overwhelming majority of studies on the anxiety experienced by students in research methods courses is focused on *statistics anxiety*. Zeidner (1990) defined statistics anxiety as "a performance characterized by extensive worry, intrusive thoughts, mental disorganization, tensions, and physiological arousal…when exposed to statistics content…" (p. 319). However, many research methods courses for undergraduate students do not only include quantitative methods but also qualitative techniques. Therefore, in this paper we want to use the construct of *research methods anxiety* to refer in general to the complex array of emotional reactions which occur when a student encounters research methods in any form and at any level. The usefulness of this construct may be justified at two levels. First, at an epistemological level, the notion of research methods anxiety is a multidimensional construct and is not limited to the distinction between quantitative and qualitative methods. Besides, as Onwuegbuzie et al. (2005) point out, there is a growing attention to the need for introducing a mixed methodological framework for alleviating students' negative feelings. Second, at an experiential level, research methods instructors—at least in the fields of education and the social sciences—often talk about students' overall anxiety for research methods courses and how it influences the ability of students to understand new concepts and apply them in practice (Wilson, 2001). Consequently, we find the construct of research methods anxiety helpful in our effort to understand students' difficulties and find ways to overcome the multiplicity of reasons behind these difficulties.

The purpose of this study is to delve into the notion of research methods anxiety and examine its nature in an undergraduate research methods course. In particular, we are interested in exploring some of the factors that influence the anxiety levels of undergraduate students. We believe that research methods anxiety is an important construct to study; first, because this notion has not been adequately examined, and second, because the results of this study can be beneficial to those who teach mixed research methods in assisting students to reduce their anxiety levels, and in turn, to possibly increase their potential for learning the course materials. This is not to say that the insights offered here constitute an in-depth analysis of the anxiety experienced by undergraduate students in research methods. Far from that, this analysis aims at initiating a series of investigations that begin by identifying those aspects that seem to have an impact on students' anxiety.

Literature Review

It has been reported that education students enter research methods courses with feelings of stress and anxiety, although in most cases, they are not really aware of what research methods are all about (Murtonen & Lehtiner, 2003; Wilson, 2001). Students tend to believe that research methods courses are overwhelming and that it is almost impossible to

get through them. In addition, many students are not even sure why they have to complete such courses and what their usefulness will actually be in their teaching careers (Lodico, Spaulding, & Voegtle, 2004; Pan & Tang, 2004). Such attitudes towards research create concerns among teacher educators since it has been found that anxiety affects learning negatively (Onwuegbuzie & Seaman, 1995). This is also alarming because these attitudes may prevent students from being able to read critically or appreciate research results in their professional careers. Although this claim needs to be substantiated by research, it has been already highlighted by Monahan (1994) who found that education professionals who had completed a research methods course and experienced difficulties and anxiety, were not motivated to engage in research of their own or take additional research courses.

In the literature, research methods anxiety has been scarcely examined per se (Papanastasiou et al., 2005; Winn, 1995). Empirical research has mainly focused on the notion of statistics anxiety and the challenges associated with learning statistical concepts. Statistics anxiety has been extensively studied in two major areas—the measurement of and factors contributing to statistics anxiety (Pan & Tang, 2004). Over the last three decades, several statistics anxiety measurement instruments have been developed. A number of theories on statistics anxiety have been proposed focusing primarily on the relationship between statistics anxiety, personal and attitudinal factors, and student performance. According to Onwuegbuzie and Wilson's (2003) review, there are three types of factors that contribute to statistics anxiety: (a) situational factors, such as prior knowledge and experience; (b) dispositional factors, such as self-esteem in engaging in math, statistics of research, and perceived usefulness of these topics; and (c) environmental factors, such as learning style, age, gender and ethnicity.

In particular, situational factors that have been found to be related to statistics anxiety include: prior knowledge, course grade, status of course (i.e. required or elective), major, attitudes towards calculators, and course and instructor evaluation (Onwuegbuzie & Wilson, 2003). Also, a number of studies highlighted that negative prior experiences with mathematics, poor achievement in mathematics and a low sense of mathematical self-efficacy correlated with statistical anxiety (Garfield & Ahlgren, 1988; Onwuegbuzie et al., 1997; Zeidner, 1991), although mathematical anxiety is distinct from statistics anxiety (Onwuegbuzie et al., 1997). Dispositional factors are related to self-concept and level of self-esteem; such factors have been found to be important contributors to statistical anxiety (Onwuegbuzie, 2000a). A number of other dispositional factors that have been linked to statistics anxiety include: perfectionism, academic procrastination, and examination-taking and study coping strategies (Onwuegbuzie & Wilson, 2003). Finally, environmental factors include: learning styles, age, gender, and race (Onwuegbuzie, 1998, 1999) and other cultural factors (Murtoner & Lehtinen, 2003).

It can be argued that Onwuegbuzie and Wilson's (2003) three categories of factors are involved in research methods anxiety in general, regardless of whether statistics are an exclusive component of research methods courses or not. In other words, it may be proposed that research methods anxiety involves dispositional, situational and environmental factors. The interaction of these factors provides a framework for understanding the processes involved in learning research methods. One important assumption, according to the research done so far, is that the anxiety experienced by students is not necessarily due to the students' lack of ability or insufficient skills. Most likely, this anxiety is *multidimensional* (Onwuegbuzie et al., 1997) and seems to be related to the students' perceptions about the rigid and formal nature of research methods, the fear of negative evaluation, students' prior experiences and attitudes, and the students' fear to ask questions that would reveal incompetence to their instructors and peers. For instructors of research methods this is significant, because educators need to be able to identify students with high levels of anxiety and use teaching and learning strategies that alleviate students' negative feelings.

After all, there is a large body of research that has documented the implications of statistics anxiety for students' learning outcomes. The results indicate a consistent negative relationship between statistics anxiety and course performance (Onwuegbuzie & Seaman, 1995; Zanakis & Valenza, 1997; Zeidner, 1991). In fact, statistics anxiety has been found to be the best predictor of achievement in research methodology and statistics courses (Onwuegbuzie & Wilson, 2003). Similarly, it may be assumed that students' anxiety about research methods can have an impact on their learning, for example, on whether they have difficulties in learning or whether they are motivated to learn and use those methods (Murtonen, 2005). Statistics anxiety can have a debilitating effect on course performance (Onwuegbuzie & Seaman, 1995; Onwuegbuzie & Wilson, 2003)—e.g. preventing students from finishing up a course or a degree program—and thus educators need to design course that reduce anxiety levels.

There have been a few reports focusing on students' research methods anxiety—although it is not named as such. In a series of studies performed by Wilson and his colleagues (Wilson 1998; Wilson & Onwuegbuzie, 2001), it has been found that the main factors that contributed to the increase of graduate students' anxiety in a research methods course were those of the amount of work required, the amount of material covered, test taking, difficulty of the material covered in class, as well as preparing individual research projects. It would be interesting to examine whether similar factors are related to undergraduate students who are younger in age. It is possible that undergraduate students will have even higher levels of anxiety than graduate students for two reasons. First, because the higher number of years of education tends to decrease the anxiety of students; second, it is likely that it is more difficult for undergraduate students to see the value of research especially if they enroll in such a course early in their studies.

Finally, there are several implications from previous research on statistics anxiety in relation to teaching and learning strategies that can alleviate anxiety. For example, Gal and Ginsburg (1994) emphasized that in order to make statistics less threatening and more effective, attention should be focused on students' beliefs and attitudes. Other researchers report specific strategies that help reduce students' anxiety levels; these strategies include: encouraging students, using humor, teaching gimmicks, helping students to understand the course objectives, administering open book exams, using performance assessments, using effective teaching style, provide extensive feedback, addressing ways to relieve anxiety, applying statistics to real world examples, and assigning students to work in groups (Onwuegbuzie & Wilson, 2003).

In general, our own work builds on previous literature related to statistics anxiety and aims to identify the main factors that contribute to undergraduate students' research anxiety. In this way we will create possibilities to understand research anxiety and relevant attitudes and to ground ideas about course improvements. Given that little attention has been placed on mixed methodology courses, the present paper introduces some insights into students' anxiety levels within a curricular framework that is just beginning to gain more attention in the literature (Onwuegbuzie et al., 2005). The ideas discussed here can help researchers to address research anxiety at the undergraduate level in a more comprehensive manner, rather than drawing boundaries around quantitative and qualitative methodologies.

Research Methods

The research questions that will be examined in this study are the following:

1) What are the levels of anxiety experienced by undergraduate students enrolled in a research methods class?
2) What is the relationship between research methods anxiety and other anxiety types and attitudes towards research?

3) What variables can explain and predict the anxiety levels of these students?
4) How does the students' anxiety affect their achievement in the course?

Participants

The sample in this study includes 472 students who had completed a research methods course at the University of Cyprus. The students who had taken part in the study were all undergraduates that came from the field of education. The data were gathered between the fall of 2002 and the spring of 2005. More specifically, all undergraduate students who were enrolled in the required research methods course were requested to respond to a questionnaire on the last day of their class. Therefore, only the students who were absent on the last day of class did not respond to this questionnaire. For validity purposes, it was not possible to administer the questionnaire at the beginning of the semester. Although this had been attempted, the researchers eventually realized that the students were not familiar with the content that would be covered in research courses that would enable them to respond to the questionnaire appropriately. The majority of the students in the sample were female (87.3%), while the remaining students were male. This is due to the fact that the majority of the students enrolled in the field of education in Cyprus are females. Since this course is not offered to other academic majors that have a larger percentage of male students, it was not possible to gather more data from males.

In order to enter the University of Cyprus, the students have to take the fiercely competitive entrance examination at the end of their high school studies. Among the majors that are offered at the University of Cyprus, the elementary and kindergarten majors are the most competitive majors (Zembylas & Papanastasiou, 2005); only 150 students (out of the approximately 3,000 applications) are accepted each year. Consequently, the students who are accepted and enroll in the field of education are among the highest achieving students in the University entrance examinations (along with the field of Medicine). Therefore, the students who have been used in this sample are overall high achievers.

Description of the Course

The research methods course that the students were enrolled in, was designed to help students become critical readers of research as well as prepare them to undertake a research project related to educational issues. The course covers an overview of the various types of quantitative research designs, which include experimental and quasi-experimental research designs, correlational studies, as well as research methods that are more qualitative in nature such as how to conduct interviews and observations and analyze documents. This course also engages students in understanding the stages of research design, that is, the components of conceptualizing and defining a research problem, conducting literature reviews, collecting and analyzing data (quantitative and qualitative), as well as writing and interpreting results (Papanastasiou, 2005). Finally, the students in this course are required to design, execute and complete a group research project on a topic of their choice that is related to an educational issue.

Instruments

Two questionnaires were administered to the students for the purpose of this study. The *Attitudes Toward Research* (ATR) scale (Papanastasiou, 2005), as well as the *Adult Manifest Anxiety Scale-College Version* (AMAS-C) (Reynolds, Richmond & Lowe, 2003).

Attitudes Toward Research (ATR) scale

The *Attitudes Toward Research* (ATR) scale consists of 32 items measured on a 7-point Likert scale. A value of 1 indicates a response of 'strongly disagree', while a value of 7

corresponds to ‘strongly agree’. The items in the ATR can be subdivided into five subscales: usefulness of research in the students’ profession; research anxiety; positive attitudes towards research; relevance of research in the students’ personal lives; and research difficulty. The research usefulness subscale included questions such as ‘research is useful for my career’ and ‘research is connected to my field of study’. The second subscale, that of research anxiety, included questions such as ‘research makes me nervous’ and ‘research is stressful’. The third subscale, that of positive attitudes toward research, included questions such as ‘I love research’ and ‘I enjoy research’. The fourth subscale, that of relevance to life, included questions such as ‘I use research in my daily life’ and ‘Research oriented thinking plays an important role in everyday life’. Finally, the last subscale, that of research difficulty, included items such as ‘I have trouble with arithmetic’ and ‘I find it difficult to understand the concepts of research’.

The Cronbach’s alpha reliability estimates of the subscales were adequate towards high. The Coefficient alpha reliability for the research usefulness in the profession factor which included 9 items was .912; the reliability for the research anxiety factor which included 8 items equaled .932; the reliability for the positive attitudes toward research factor equaled .924 (8 items). The reliability of the life relevancy factor that included 4 items equaled .713, while the reliability for the research difficulty factor equaled .701 (3 items). The reliability of the whole scale was very high, and equaled 0.939.

AMAS-C scale

In addition to the ATR the Adult Manifest Anxiety Scale-College Version (AMAS-C) (Reynolds, Richmond & Lowe, 2003) was also administered to a subgroup of 95 students in order to measure their trait anxiety levels. The AMAS-C is a 49-item self-report measure designed to assess chronic, manifest anxiety in the college student population. The students had to respond to the AMAS-C on a nominal true/false scale. The construct validity of the scale that was obtained through a factor analysis revealed four subscales: worry anxiety; physiological anxiety; test anxiety; social anxiety. In addition there was a lie scale. According to Lowe (2001), the internal consistency reliability estimate of the AMAS-C is .91 for the AMAS-C Total Anxiety scale scores. Internal consistency reliability estimates for the four anxiety subscale scores ranged from .75 to .87. The Lie scale scores had an internal consistency reliability estimate of .70.

Results

The results of this analysis will first describe the anxiety levels of the students towards research methods, and then will relate these levels to students’ attitudes on other issues, their achievement in the research methods course, and their gender.

Anxiety and Other Attitudes

The factor of research anxiety was comprised of eight items which were all recoded so that higher responses on each item would represent more positive attitudes and thus less anxiety. Overall, the students’ responses to all eight items on the research anxiety subscale were quite similar since their average responses ranged from 3.01 to 3.72 on a 7-point scale. This is further reflected by the very high internal consistency of this scale which equaled 0.93. This was also the subscale that had the highest level of reliability compared to the other ATR subscales. The item on which the students responded to with the lowest score was ‘Research makes me anxious’, while the item on which the students responded with the highest score was ‘Research scares me’ (see Table 1).

Table 1. Research anxiety items

	Mean	SD
Research scares me. *	3.72	1.79
Research makes me nervous. *	3.72	1.79
Research is complicated. *	3.37	1.55
I feel insecure concerning the analysis of research data. *	3.35	1.67
Research is difficult. *	3.33	1.59
Research is stressful. *	3.29	1.77
Research is a complex subject. *	3.15	1.52
Research makes me anxious. *	3.01	1.65

(*) indicates that the items have been recoded

In order to examine the student's attitudes in perspective, the average scores of the students on the five ATR subscales are presented below (see Table 2). What can be seen is that the factor on which the students responded in the most negative manner was that of their anxiety towards research, since they had the lowest score on this factor (3.60). However, the students were not as affected by the difficulty of the course since this is the factor that the students responded to with the highest score (5.06), indicating that the students did not consider the course to be very difficult. The students also responded to the 'usefulness for the profession' subscale with higher scores, indicating that they recognized the usefulness of this course.

Table 2. Attitudes Toward Research Subscales

	Mean	Standard Deviation	Reliability
Research difficulty	5.06	1.20	0.701
Usefulness for the profession	4.99	1.10	0.912
Relevance to life	4.85	1.03	0.713
Positive attitudes	3.84	1.16	0.924
Research anxiety	3.60	1.36	0.932
Overall attitudes towards research	4.44	0.85	0.938

An attempt was also made to try to predict the anxiety factor from the other ATR subscales (see Table 3). The regression that was performed was significant ($F=62.258$, $p=0.000$) and it explained 45.2% of the variance of the students' research methods anxiety. The three ATR subscales that were significant in predicting the anxiety of the students were those of usefulness of the profession ($\beta=-0.33$, $t=-3.75$, $p=0.000$), positive attitudes ($\beta=0.57$, $t=7.81$, $p=0.000$), and research difficulty ($\beta=0.48$, $t=-8.85$, $p=0.000$). Because of the recoding of the anxiety factor where higher responses indicated lower anxiety, the results can be interpreted as follows; the students who had positive attitudes towards research had lower levels of anxiety. In addition, the students who considered research to be difficult had higher levels of anxiety, while the students who considered research to be useful in their profession also had higher levels of anxiety.

Table 3. Predicting anxiety from the other ATR scales

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Variables	B	Std. Error	Beta		
(Constant)	.033	.374		.087	.931
Usefulness for the profession	-.333	.089	-.255	-3.755	.000
Positive attitudes	.570	.073	.472	7.805	.000

Relevance to life	.118	.081	.086	1.465	.144
Research difficulty	.477	.054	.419	8.852	.000

An attempt was also made to predict the research methods anxiety of the students with the use of the AMAS-C (see Table 4). The aim of this analysis was to determine whether other anxiety factors also influence the students' research methods anxiety. The results of this analysis were significant (F=2.765, p=0.034). However, the only factor that was significant in predicting research methods anxiety was that of test anxiety (β=0.69, t=2.26, p=0.027).

Table 4. Predicting research methods anxiety from the AMAS-C

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.618	.342		7.664	.000
Worry anxiety	-.003	.055	-.010	-.062	.951
Physiological anxiety	-.025	.066	-.067	-.386	.701
Test anxiety	.069	.031	.328	2.262	.027
Social anxiety	.069	.063	.164	1.104	.274

Gender and Anxiety

An ANOVA was also performed to determine whether there were gender differences on the anxiety levels of the students. The ANOVA was significant (F=9.04, p=0.003) with males having lower levels of anxiety compared to females. An examination of Table 5 shows that in all eight questions that comprise the research anxiety factor, males had higher scores, which because of the recoding indicated that they had lower levels of anxiety. The item on which males and females had the highest discrepancy in their responses was that of 'Research scares me', while the item on which the two genders were the most similar in their responses was that of 'Research is difficult', indicating that both genders found their research methods courses about average in difficulty.

Table 5. Gender differences

	Mean		Standard Deviation	
Scale items	male	female	male	female
Research makes me anxious. *	3.90	2.88	1.92	1.57
I feel insecure concerning the analysis of research data.*	4.04	3.24	1.68	1.65
Research scares me. *	4.70	3.59	1.79	1.75
Research is stressful. *	4.12	3.16	1.88	1.72
Research makes me nervous. *	4.53	3.60	1.86	1.75
Research is complicated. *	3.90	3.30	1.65	1.52
Research is difficult. *	3.83	3.25	1.63	1.57
Research is a complex subject. *	3.70	3.07	1.64	1.48

(*) indicates that the items have been recoded

Anxiety and Achievement

In the last series of analyses, a regression was performed to determine whether the grade that the students expected to receive in their research methods course had influenced their levels of anxiety. The regression analysis that was performed was not significant though

(F=2.753, p=0.101). So, there were no significant differences in the anxiety levels of the students regardless of whether the students were expecting to receive high or low grades in their research course.

However, an additional regression was performed to determine whether the five ATR factors could help predict the student's final grade in the course. The analysis was significant (F=6.56, p=0.000), while the percentage of variance explained equaled R^2=0.102. The factors that were significant in predicting achievement were those of usefulness of the profession and anxiety (see Table 6). More specifically, the students who were considered the course to be useful to their profession, as well as the students who had low levels of anxiety had higher grades in their research methods course.

Table 6. Predicting the research methods course grade

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.840	.451		15.183	.000
Usefulness for the profession	.387	.109	.318	3.546	.000
Anxiety	-.177	.070	-.190	-2.520	.012
Positive attitudes	.075	.096	.066	.774	.439
Relevance to life	-.128	.097	-.101	-1.319	.188
Research difficulty	.066	.073	.062	.901	.368

In order to examine this relationship further, the anxiety levels of the students were correlated with the students' scores on the midterm and final examinations in the course (see Table 7). The interesting result from this analysis showed that with the exception of the factor of 'usefulness for the profession', the student's attitudes were not correlated with their midterm grades, although they were significantly correlated with their grade on the final examination. All of these relationships were positive, indicating that students with higher levels of anxiety factors also had higher grades on their final examination.

Table 7. Correlation of midterm and final examination grades with ATR scales

	MIDTERM GRADE	FINAL GRADE	f1useprofess	f2anxiety	f3attitud	f4relevlife
mid MIDTERM GRADE	1					
fin FINAL GRADE	.563(**)	1				
Usefulness for the profession	.195(**)	.212(**)	1			
Anxiety	.027	.292(**)	.170(**)	1		
Positive attitudes	.104	.263(**)	.672(**)	.516(**)	1	
Relevance to life	.104	.137(*)	.669(**)	.234(**)	.507(**)	1
Research difficulty	.043	.278(**)	.168(**)	.587(**)	.398(**)	.226(**)

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Discussion and Implications

For more than thirty years, the prevalence of research attention has been mainly on the notion of statistics anxiety. Recognizing the importance of paying attention to research holistically, the results of this study suggest the need to pay more attention to the development of research (and consequently the anxiety associated with it) as an integrated whole (see also Murtonen & Lehtinen, 2003). Few studies examined students' anxiety levels in learning research methods. The findings of this study confirm some of the results of earlier research on statistical anxiety; in addition, this study contributes to understanding students' anxiety about learning research methods and suggests possible teaching and learning strategies that could be potentially helpful in reducing students' anxiety and to assist them learn research methods effectively.

In general, the findings of this study highlight the following issues. First, the results show that the students who found their research courses easy were more likely to have lower levels of anxiety. In other words, self-perceptions that were positively related to the research course seemed to influence the level of anxiety, just like Onwuegbuzie (2000a) found in a previous study. This implies that it is extremely important to help students overcome any difficulties during the course (see next section). At the same time, however, the grades that students were expecting to earn in such courses did not predict students' anxiety. This indicates that students' anxiety was influenced by other factors, one of which might be the amount of trait anxiety experienced by all students, regardless of the situations that they were in. Such situational factors have also been found in previous research on statistics anxiety (Onwuegbuzie & Wilson, 2000). Future investigations should try to determine whether self-perceptions and research anxiety are causally related. Unfortunately, it is beyond the scope of this investigation to determine whether high levels of research anxiety worsen students' self perceptions and vice versa. It is more likely that Onwuegbuzie (2000a) is right to point out that there is a bidirectional relationship between research anxiety and self-perception.

A second result of this study is that students who considered research to be important for their profession had higher levels of anxiety. This may be explained in that students who saw the usefulness and importance of such a course ended up being more frustrated when dealing with such issues, which could in turn increase their anxiety levels. This assumption is something that certainly needs more investigation in the future.

A puzzling result of the study though was that the students who had low levels of test anxiety had high levels of research methods anxiety. This negative relationship might be due to the fact that a large portion of the grading in this course was based on the actual implementation of a research study. Although tests were administered in the course, they were not the only component that played a role in the grading of the students. Thus the negative correlation between test anxiety and research methods anxiety might be due to the fact that the research methods anxiety could have been mostly based on the students' feelings about the actual process of completing a research study. Students' attitudes toward test-based examination and performance-based assessment (projects, tasks, assignments or investigations) has been also tackled by Onwuegbuzie (2000b) who found that examinations that are untimed and in which supporting material is allowed are regarded by the majority of students as inducing the least amount of anxiety.

Finally, our study has also found that gender played a role on students' attitudes since males experienced lower levels of anxiety compared to females. Although the gender composition of the present sample appears to reflect that of most educational research courses (Onwuegbuzie, Bailey & Daley, 1999), the fact that participants were predominantly female is a limitation of the present study (see also, Onwuegbuzie, 2000a). Certainly, the inclusion of more male students would facilitate the generalizability of the findings; however, our findings agree with a previous study on the attitudes of female students for research methods (Wilson, 1998).

Another limitation in this study is that students' views on research methods were measured with single items, which can cause problems with respect to reliability of the data (see also Murtonen, 2005). Students views, conceptions and attitudes towards research methods should be further investigated using other data sources as well (e.g. interviews) to obtain a richer understanding of research anxiety. At this time, this study can serve only as an exploratory point of departure for further studies.

Implications for the Design of Research Methods Courses

Teaching research methods to undergraduate students in education is not an easy task. Despite the best intentions of instructors, research methods courses may cultivate anxiety among students. In accord with other studies that have taken place at the graduate level, the present study has also found that undergraduate students tend to experience anxiety when they take a research methods course. These findings shed more light on the impact of undergraduate student perceptions about research methods on their levels of anxiety, and may have some useful implications for research methods instruction. Some of these implications are discussed below.

First, some of these factors associated with research anxiety can be tackled in the classroom. For example, it is important for instructors to be aware of students' anxiety, and make efforts to address it early on in the course. The instructors need to be sensitive to students' concerns and attentive to their worries as soon as they make their appearance in the course. Encouragement from instructor and flexibility (Wilson & Onwuegbuzie, 2001), humorous teaching style (Forte, 1995; Wilson, 1998), and addressing the anxiety and providing coping strategies to students (Wilson, 1998) were suggested in the literature for reducing statistics anxiety.

Second, the structure of the course and the classroom environment should be supportive of learning. Research methods courses may be structured in such a way as to include activities designed to target the roots of students' anxiety (e.g. the creation of support groups to work on assigned projects; the use of performance assessment strategies instead only of tests). It is important to help students understand what is being taught, and what the usefulness and importance of such a course is. Thus, for example, providing practical application, real-life stories and case examples may be helpful in reducing research anxiety (Pan & Tang, 2004; Wilson, 1998). By doing so, the students might become more patient with the course materials, and might make further efforts to comprehend what is being taught. Research methods courses must emphasize "connections to the learner's knowledge that make the transition to new knowledge both safer and more meaningful" (Wilensky, 1997, p. 178).

Finally, research courses need to re-thought and re-designed to help students see the connections with other courses, and to combine a variety research epistemologies to enhance students' insights into the research process (Murtonen & Lehtinen, 2003). By getting students to understand research holistically and see its importance in relation to the real world, we may be able to decrease their anxiety levels. By emphasizing the multidimensionality and complexity of the research process, research instructors will be able to link research methods and research questions—something that is missing from many current research courses (Onwuegbuzie et al., 2005).

A systematic and comprehensive research agenda examining research methods anxiety and intervention methods to deal with it clearly needs to be expanded. Additional investigations of the interaction of anxiety with research methods courses, and particularly the gender factor, are essential. For example, replications of this study, with graduate and undergraduate students would be especially desirable. This could provide more detailed guidance to instructors of research methods courses to structure their graduate and

undergraduate courses accordingly. Finally, specific intervention methods to alleviate anxiety can be designed, carried out and evaluated in the future.

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