Race and Research Methods Anxiety in an Undergraduate Sample: The Potential Effects of Self-Perception

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ABSTRACT

This study explores race as a potential predictor of research methods anxiety among a sample of undergraduates. While differences in academic achievement based on race and ethnicity have been well documented, few studies have examined racial differences in anxiety with regard to specific subject matter in undergraduate curricula. This exploratory study analyzes racial differences in research methods anxiety, and explores possible reasons for this disparity. The author also addresses the implications of the findings for classroom interaction techniques that minimize anxiety for all students, but particularly for students of color.

INTRODUCTION

Learning research methods can be difficult for many undergraduates. There is a wealth of research on the anxiety undergraduates feel in statistics courses (e.g., Bui & Alfaro, 2011; Hsiao & Chiang 2011; McKernan, McKay, Atkins, Hawkins, Brown, & Lynn, 2003; Murtonen & Lehtinen 2003; Onwuegbuzie, 1999; Onwuegbuzie, 2004; Onwuegbuzie & Wilson 2003), but significantly fewer studies of research methods anxiety (Papanastasiou, Kosta, Trichas, Nicolaou, & Panagiotou, 2005; Papanastasiou & Zembylas, 2008; Winn, 1995). Research methods, as they are taught in most undergraduate social science departments, incorporate both quantitative and qualitative methods, and thus would seem less susceptible to the lack of confidence many undergraduates feel regarding their mathematical skills, which is a typical cause of anxiety in statistics courses. However, as Papanastasiou and Zembylas (2008) aptly recognized, research methods come with their own anxiety producing material, and this anxiety can generally be attributed to students' lack of prior exposure to the concepts being taught. This is important because anxiety has been shown to interfere with learning (Onwuegbuzie & Seaman, 1995), which may negatively impact students' success in college (Monahan, 1994; as cited in Papanastasiou & Zembylas, 2008).

Research methods anxiety, as defined by Papanastasiou and Zembylas (2008), is a "complex array of emotional reactions" faced by students in research methods classes (p.

156). These authors identified the predictors associated with different levels of research methods anxiety among undergraduates in an education program; however, race was not identified by the authors as one of these predictors. The purpose of the current study is to build on the findings of Papanastasiou and Zembylas (2008) and examine whether or not research methods anxiety among criminal justice undergraduates varies by race. While differences in academic achievement between white and non-white college students have been well documented (e.g., Allen, 1992; Gurin, Dey, Hurtado, & Gurin, 2002; Kugelmass & Ready, 2010; Luzer, 2010), few studies have examined racial differences in anxiety with regard to specific subject matter in undergraduate curricula. By identifying racial disparities with regard to research methods anxiety, the hope is that faculty can eventually implement classroom interaction strategies that alleviate some anxiety and ultimately produce more successful students of color.

Papanastasiou and Zembylas (2008) cite several reasons for research methods anxiety, including student uncertainty about the concepts being taught as well as questions regarding the usefulness of such a course to their future professional life. In fact, Papanastasiou and Zembylas (2008) assert that the very factors identified by Onwuegbuzie and Wilson (2003) as contributing to statistics anxiety can be applied to research methods anxiety as well. These factors fall into the three broad categories of situational factors, dispositional factors, and environmental factors. Onwuegbuzie and Wilson (2003) consider ethnicity to be an environmental factor, noting that the racial and ethnic background of students might contribute to their anxiety surrounding statistics courses. Onwuegbuzie and Wilson's (2003) argument makes intuitive sense as they consider how anxiety for students of color might stem from underachievement in their early school years. However, one could also argue that because research courses cause anxiety for so many students, the anxiety experienced by racial and ethnic minorities in these courses may not be any different than that experienced by white students.

Social science faculty who have taught research methods to undergraduates are aware of the general lack of enthusiasm for the subject matter (see, for example, Campisi & Finn, 2011). Still, because students in most social science programs cannot earn their degrees without completing some type of research sequence, the methods courses are in high demand. The question then becomes whether or not the topic of research methods causes equal levels of anxiety in students regardless of racial and ethnic background, i.e., whether the perceived difficulty and resulting anxiety produced in such a course actually levels the playing field or, alternatively, whether it elucidates racial differences in learning and produces greater levels of anxiety for students of color.

There seem to be at least two directly oppositional arguments regarding the role of race with regard to research methods anxiety. One could argue that research methods classes, with a focus on objective measurement of scientific phenomena, may be more "color-blind" than other required classes. Racial and ethnic minorities might be more apt to notice the differences in their backgrounds and skin color in classes where issues of diversity and individual background are the central points of discussion (Cho, 2011). Assuming that anxiety can be attributed to students' self-reflection and concern about how they are perceived by others (see, for example, Felson, 1985), perceptions that are more likely to rise to the surface in substantive rather than technical discussions, one might argue that research methods classes would produce no more anxiety in students of color than in white students.

However, the pre-college educational background of students, which typically varies by race, may produce disparity in anxiety levels for undergraduate work in general, and for more difficult classes such as research methods in particular. In short, the difficulties encountered by racial and ethnic minorities with regard to college may be exacerbated in more difficult courses. Preparation for college tends to be more easily provided in

white middle class families than in families of color, especially those families of color that reside in more disadvantaged neighborhoods. Buchman, Condron and Roscigno (2010) discuss the concept of "shadow education," a means by which more advantaged parents seek to pass their privileged status along to their children by helping them prepare for college entrance exams. Students of color, often from more economically disadvantaged neighborhoods, and often first generation college students, may not feel as prepared for college as their white classmates, and this might translate into anxiety in all courses. One might also theorize that there would be a positive relationship between course difficulty and student anxiety, suggesting that anxiety would be most pronounced in courses such as research methods.

For these reasons, the current exploratory study examines the relative importance of racial differences with regard to research methods anxiety; in short, this exploratory study analyzes the role of race in the level of self-reported anxiety about research methods among criminal justice undergraduates at a large Midwestern university.

For the purposes of this study, the research question posed is: *To what extent does undergraduate student race predict levels of anxiety regarding research methods classes?*

METHODS

SAMPLE

The author surveyed a convenience sample of students at the beginning of class on the first day of either the introductory or intermediate research methods class over three semesters.[1] The author specifically requested that the survey be distributed prior to the students receiving the syllabus or any other course materials that might produce anxiety so that knowledge of variable course components (e.g., number of exams, final papers, oral presentations, etc.) would not affect student responses.[2]

In total, the survey was distributed to 369 students in 17 different classes, 5 of which were online and 12 of which were in person classes. The two types of classes surveyed were introductory research methods and research seminar. The introductory course exposes students to research methods by requiring them to read empirical studies, and is designed to prepare them for the more advanced research seminar course which focuses on designing both quantitative and qualitative research studies. Response rates for the in person classes was 100%; for the online classes, response rates were significantly lower at 66%. The overall response rate for the survey was 91%.

DESCRIPTIVE STATISTICS

Table 1 displays demographic characteristics of the sample. Of the 336 completed surveys, all but one student answered the gender question. Of those 335 students, 206 (61.5%) were male and 129 (38.5%) were female. All but two students answered the race question, and consistent with the students of the university in question, approximately 30% were students of color. Nearly half the students had taken more than five courses already at this university, indicating that the semester in which they were being surveyed was not their first, and over three-quarters had taken at least 11 courses somewhere else. This is typical of this university as many of the students transfer into the four year program after completing two years at a community college, often having already earned an Associate's Degree. The last two questions were asked only of those students in the online classes, to determine how many prior online classes they had taken and how comfortable they were with online learning. About half of the online students surveyed had taken at least two other online courses, and three quarters of the online students felt reasonably confident about their ability to learn in an online environment.

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[1] This research was approved by the Human Subjects Review Board of the author's university.
[2] It was easier to ensure that students in the in-person classes completed the surveys on the first day of class. In the online classes, students could have completed the survey at any time over a two week period, but most completed it during the first few days.

Table 1
Demographics of Sample

Age (n=336)		
	25 or younger	195 (58%)
	26 or older	141 (42%)
Gender (n=335)		
	Male	206 (61.5%)
	Female	129 (38.5%)
Race (n=334)[3]		
	White	234 (70.1%)
	Non-White	100 (29.9%)
Number of Courses Taken at this University (n=322)		
	5 or less	172 (53.4%)
	More than 5	150 (46.6%)
Number of Courses taken at this University (n=325)		
	10 or less	77 (23.7%)
	11 or more	248 (76.3%)
Research class level (n=335)		
	Beginning Research Class	191 (56.8%)
	Intermediate Research Class	145 (43.2%)
Mode of Delivery (n=336)		
	Online	63 (18.8%)
	In-Class	273 (81.3%)
Comfort Level in Online Courses (n=63)		
	Less Confident	15 (23.8%)
	More Confident	48 (76.2%)
Number of Online Courses Completed Prior to this Class (n=63)		
	2 or less	31 (49.2%)
	More than 2	32 (50.8%)

MEASURES

The dependent variables were derived from the research methods anxiety subscale of a larger "Attitudes Toward Research" scale developed by Papanastasiou and Zembylas (2008). The research anxiety subscale consists of eight items, in a modified likert scale format, designed to measure eight unique dimensions of anxiety. The Cronbach's alpha reliability estimate of the research anxiety subscale of eight items was 0.932 (Papanastasiou & Zembylas, 2008). Separate dimensions of anxiety were used in the analysis both individually and also in summation (see the survey in Appendix A for the full research methods anxiety scale).

The independent variables collected for the in person students were gender, race, age, total number of courses taken at this university, and total number of courses taken at another university. Two additional questions were included on the surveys for the online students: level of comfort with online classes, rated on a scale of one to ten with one indicating "least confident" and 10 indicating "most confident," and a question about how many online classes the student had taken previous to this current one.

RESULTS

Table 2 shows the means and standard deviations for each of the anxiety indicators. As did Papanastasiou and Zembylas (2008), this study used seven point scales for each

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[3] Of the non-white students, 42% were black, 33% were Asian, 9% were Hispanic, 3% were Native American, and 13% self-identified as "other," which included descriptions such as "African," "bi-racial," and "multi-racial."

Table 2
Research Anxiety Indicators

Items	Mean	SD
Research scares me.	3.41	1.74
Research makes me nervous.	3.58	1.69
Research is complicated.	4.32	1.57
I feel insecure concerning the analysis of research data.	3.86	1.63
Research is difficult.	4.15	2.20
Research is stressful.	4.67	1.61
Research is a complex subject.	4.47	1.60
Research makes me anxious.	3.95	1.76

of the anxiety indicators, with 1 representing "strongly disagree" and 7 representing "strongly agree" (see Appendix A for the survey on page 154). The means for this sample were nearly all higher than the means for the Papanastasiou and Zembylas sample, indicating that the current students experienced more anxiety than those sampled by the original authors of the scale. For the purpose of bivariate and multivariate analyses, the author merged the anxiety indicators into an overall anxiety scale. The mean anxiety score for this scale was 4.05 out of 7.

BIVARIATE ANALYSIS REGARDING ANXIETY

Point-biserial correlations suggested that both race and gender were significantly correlated with research methods anxiety (see Table 3). T-tests were performed to see if there were any differences between race categorizations with regard to anxiety, and to see whether there were particular indicators of anxiety that were significantly more pronounced for non-whites as compared with white students. As Table 4 shows, the indicators that showed the most significant disparity in anxiety levels between whites and non-whites were "Research scares me," "Research makes me nervous," "I feel insecure concerning the analysis of research data," and "Research is difficult."

MULTIVARIATE ANALYSIS REGARDING ANXIETY

In ordinary least squares regression analysis, as seen in Table 5, after controlling for gender, age, class level, and how many courses students had taken so far at their current university, race negatively and significantly predicted anxiety, $\beta = t(313) = -2.078$, $p < .05$, with non-white students self-reporting significantly more anxiety than white students (see Table 5). Gender also significantly predicted anxiety, $\beta = t(313) = -2.211$, $p < .05$, with women reporting significantly higher levels of anxiety than men. Race also accounted for a significant amount of variance in anxiety, $R^2 = .053$, $F(5, 308) = 3.428$, $p < .01$.

RACE AND RESEARCH METHODS ANXIETY IN ONLINE VS. TRADITIONAL CLASSROOM

Ordinary least squares regression models were also estimated for students in the online classes and those in the traditional classroom (see Table 6 on page 151). While

Table 3
Point-Biserial Correlations of Race and Gender with Anxiety

Race (Nonwhite = 0; White = 1)	-.135*
Gender (Male = 0; Female = 1)	.119*
*Correlations significant at p<.05.	

Table 4

T-tests for Differences by Race for Anxiety Scale and for Each Individual Anxiety Indicator

Anxiety Indicator	Mean (S.D.)	t	*df*	Sig. (2-tailed)
Research Anxiety scale	Non-white=4.33 (1.45) White=3.93 (1.33)	2.468	326	.014
Research scares me.	Non-white=3.83 (1.75) White=3.23 (1.71)	2.933	332	.004
Research makes me nervous.	Non-white=3.95 (1.68) White=3.42 (1.68)	2.619	332	.009
Research is complicated.	Non-white=4.48 (1.45) White=4.25 (1.61)	1.237	331	.217
I feel insecure concerning the analysis of research data.	Non-white=4.23 (1.69) White=3.70 (1.58)	2.767	331	.006
Research is difficult.	Non-white=4.55 (3.28) White=3.96 (1.50)	2.251	332	.025
Research is stressful.	Non-white=4.82 (1.72) White=4.59 (1.56)	1.161	331	.247
Research is a complex subject.	Non-white=4.64 (1.58) White=4.40 (1.61)	1.236	329	.217
Research makes me anxious.	Non-white=4.24 (1.86) White=3.84 (1.72)	1.914	323	.056

race still significantly predicted research methods anxiety, these models actually showed white students to be more anxious in online classes $\beta = t(59) = 2.128$, p<.05 and non-white students to be more anxious in traditional classrooms $\beta = t(253) = -3.552$, p<.001. Gender effects actually disappeared in the online only model, but increased in both strength and significance in the traditional classroom only model $\beta = t(253) = 2.788$, p<.01. Race also accounted for a significant amount of variance in anxiety in the traditional classroom only model $R^2 = .095$, $F(5, 248) = 5.225$, $p < .001$, but not in the online model.

DISCUSSION

While this study is exploratory, it does provide preliminary support for the idea that students of color are significantly more anxious in research methods courses than are their white classmates. Results of multivariate analysis suggest that students of color and women are indeed more anxious in research methods classes. Although there are arguably a number of possible explanations for this disparity, most beyond the scope of this study, these results provide preliminary support for the idea that a higher level

Table 5

Ordinary Least Squares Regression Coefficients and Standard Errors Predicting Overall Anxiety Scores

	Unstandarized Beta	Std. Error	Standardized Beta	95% Confidence Intervals for B	
				Lower Bound	Upper Bound
Race	-.351	.169	-.116*	-.683	-.019
Gender	.349	.158	.123*	.038	.660
Age	-.082	.157	-.029	-.391	.226
Class level	.356	.209	.127	-.391	.454
Number of courses at this university	.047	.207	.017	-.056	.767

*Significant at p<.05

of research methods anxiety for non-whites may be related to their self-perceptions and evaluations of their own abilities as compared with those of their white classmates.

One might consider whether differences may be attributed to the impostor phenomenon (Clance & Immes, 1978), whereby pride in the achievements associated with college education are counterbalanced with self-doubt for students of color, many of whom are first generation college students. The difficulty of research methods classes might threaten to expose minority students' perceived lack of understanding of more difficult topics, especially those as unfamiliar as topics taught in a research methods class. It is possible that anxiety is more pronounced when students lack a specific skill set such as methodological literacy due to generations of systematic discrimination in education. In short, the impostor phenomenon may serve as more of a symptom than a cause, as many students of color are not properly prepared for college, which seems to be the bigger issue. Regardless, the findings of this study highlight the need for future research on this topic, with particular attention to the reasons that non-white students may exhibit higher levels of anxiety than their white classmates in difficult courses.

The concept of self-doubt is in fact supported by the bivariate analysis of individual anxiety indicators presented in Table 5. The anxiety indicators most closely associated with race were generally those that suggested self-reflection (i.e., fear, nervousness, insecurity) rather than those that suggested complexity of research subject matter. Self-reflective non-white students may feel inferior to their white classmates in general, and the results of this study suggest that that feeling of inferiority may in fact be heightened in rigorous research methods courses. Not only is the playing field in research methods courses not level, but it is perhaps more uneven than in other courses. Difficulty may cause insecurity, which may in turn cause more difficulty, for students of color who already struggle with the demands of undergraduate education. In short, self-reflection and concern about how one is perceived by others (e.g., Felson, 1985) may play a part in explaining these findings.

The self-reflection argument is further reinforced by the results of the models which estimated online classes and in-person classes separately. The fact that self-reported anxiety levels were higher for both non-whites and women in the research methods classes delivered in the traditional face-to-face classroom, as compared with the online environment, suggests that students may feel more confident about their abilities when

Table 6

Ordinary Least Squares Regression Coefficients and Standard Errors Predicting Overall Anxiety Scores

		Unstandarized Beta	Std. Error	Standardized Beta	95% Confidence Intervals for B	
					Lower Bound	Upper Bound
Online Classes:	Race	.958	.450	.274*	.055	1.861
	Gender	.133	.719	.047	-.606	.872
	Age	-.529	.382	-.176	-1.296	.238
	Class level	.409	.425	.150	-.444	1.262
	Number of courses at this university	.639	.514	.196	-.391	1.669
In-Person Classes:	Race	-.650	.183	-.220***	-1.011	-.290
	Gender	.482	.173	.170**	.141	.822
	Age	-.275	.182	-.093	-.635	.083
	Class level	.197	.235	.071	-.266	.661
	Number of courses at this university	.223	.233	.080	-.237	.682

*Significant at p<.05; **Significant at p<.01; ***Significant at p<.001

they can be more anonymous or, at the very least, distant, rather than see themselves directly in relation to their white, male classmates.

As already noted, this research should be considered preliminary and exploratory. It does, however, raise some interesting questions regarding students of color and anxiety, particularly with regard to research courses. Future research should measure self-perceptions in an attempt to test the impostor phenomenon or other social psychological theories which might explain the relationship between race, self-reflection, and anxiety regarding academic performance in the most rigorous courses.

IMPLICATIONS FOR CLASSROOM INTERACTION STRATEGIES

This research suggests that faculty who teach research methods courses should at the very least be sensitive to potential differences in anxiety levels based on race and ethnicity. It goes without saying that most faculty aim to create a classroom climate where all students feel their contributions are regarded as meaningful and important; the more that faculty can strive to create such a classroom climate the more they may help alleviate anxiety for all students, and particularly for students of color. Ultimately, the goal for faculty is to produce a learning environment in which all students feel engaged and see the possibility to be successful.

In research methods courses, the creation of such a learning environment may require faculty to design class activities which draw on students' strengths and experiences as they develop research projects of interest. For example, faculty might ask each student to contribute something unique to a class research project, celebrating even small contributions to bolster the confidence of those who may be less sure of their research skills. If students work in small groups to design a research study, faculty must ensure that all students are asked to contribute and that all contributions are included in the group's output.

Faculty should also strive to identify and reach out to students who appear to be struggling early on in research methods classes. While this may be more difficult in larger classes, objective assessments (e.g., examinations) can yield some information worth pursuing. Faculty might consider requesting one-on-one meetings with students who may need some extra encouragement in difficult courses. Simply knowing that a faculty member is invested in a student's success may go a long way to relieve anxiety about course material. ∎

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APPENDIX A
Research Methods Anxiety Survey

The following is an anonymous survey, developed by Deborah Eckberg, Ph.D. regarding anxiety and research methods courses. It should take you 5-10 minutes to complete, and is completely voluntary. Please do not mark your name or other identifying information on the survey. Thank you in advance for your participation.

1. On a scale of 1-7, with 1 being "strongly disagree" and 7 being "strongly agree," please rate your response to each of the following statements. Place an "X" in the box that most closely corresponds with your feelings about the statement.

Attitudes Toward Research*	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
a. Research scares me.							
b. Research makes me nervous.							
c. Research is complicated.							
d. I feel insecure concerning the analysis of research data.							
e. Research is difficult.							
f. Research is stressful.							
g. Research is a complex subject.							
h. Research makes me anxious.							

*These 8 items were taken from a subscale of the Attitudes Toward Research scale (Papanastasiou, 2005).

2. What is your gender?
   a. Male
   b. Female

3. What most closely describes your race/ethnicity?
   a. White
   b. African-American/Black
   c. Asian
   d. Native American
   e. Hispanic
   f. Other_____

4. How old are you?
   a. 18-20
   b. 21-25
   c. 26-30
   d. 31-35
   e. 36-40
   f. Over 40

5. What is the approximate total number of courses (online or classroom) you have taken at Metropolitan State University?
   a. 0-2
   b. 3-5
   c. 6-10
   d. 11-15
   e. More than 15

6. What is the approximate total number of courses (online or classroom) you have taken at a different college or university, other than Metropolitan State?
   a. 0-2
   b. 3-5
   c. 6-10
   d. 11-15
   e. More than 15

7. If you are taking this course online, please circle your level of comfort with online learning on a scale of 1 to 10, with 1 being the least confident, and 10 being the most confident.

   1   2   3   4   5   6   7   8   9   10

8. How many online classes have you taken prior to this one? (This question refers to prior classes conducted entirely online – not hybrid).
   a. 0
   b. 1-2
   c. 3-5
   d. 6-9
   e. 10+