PREDICTING DISSERTATION METHODOLOGY CHOICE AMONG DOCTORAL

CANDIDATES AT A FAITH-BASED UNIVERSITY

by

Rebecca Lunde

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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APPROVED BY:

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ABSTRACT

Limited research has investigated dissertation methodology choice and the factors that contribute to this choice. Quantitative research is based in mathematics and scientific positivism, and qualitative research is based in constructivism. These underlying philosophical differences posit the question if certain factors predict dissertation methodology choice. Using the theoretical framework of intersectionality and the multi-dimensional identity development model, this predictive, correlational study used archival data to determine if biological sex, ethnicity, age, or religious affiliation predicts dissertation methodology choice. A logistics regression analysis was used to review 398 doctoral dissertations and determine if any of the criterion variables predicted dissertation methodology choice. After analysis, it was determined that none of the criterion variables of biological sex, ethnicity, age, and religious affiliation was statistically significant in predicting dissertation methodology choice.

Keywords: doctoral dissertation, research methodology, quantitative research, qualitative research

Dedication

This dissertation is dedicated to my children, Levi, Ezra, and Selah. You three are the greatest joys in my life, and I want you to know that you can do anything and be anything with God by your side. "The Lord is my light and my salvation – whom shall I fear?" Psalm 27:1

Acknowledgements

I first want to thank my Lord and Savior, Jesus Christ. Thank you, Jesus, for giving me the strength to keep going when there was really no strength left in me, and thank you for giving me the opportunity to be able to complete this degree.

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List of Abbreviations

Banner INB (Internet Native Banner)

Doctor of Education (EdD)

Institutional Review Board (IRB)

National Postsecondary Student Aid Study (NPSAS)

CHAPTER ONE: INTRODUCTION

Overview

There are only a few studies that examine dissertation methodology choice, and the ones that do indicate that various factors influence the choice of methodology (Buchanan & Bryman, 2007; Plowman & Smith, 2011). The purpose of this study was to examine some of these factors and determine which ones could influence dissertation methodology choice. Chapter One will discuss the background related to dissertation methodology choice of doctoral candidates based on their biological sex, ethnicity, age, and religious affiliation. The problem statement will be discussed, including recommended research from previous studies. The purpose of this study will be discussed, as well as the significance of the current study. Finally, the research questions will be introduced, and definitions pertinent to this study will be given.

Background

The dissertation is a consistent capstone product among doctoral programs in many disciplines (Boote & Beile, 2005), with two main methodological choices: quantitative and qualitative. These two methodologies are fundamentally different, and there is little research that discusses the differences between the two and the variables that affect the choice between them. The fundamental differences between these two methodologies stem from the core of their philosophical assumptions (Guba, 1990). Quantitative research is based in positivism and focuses on empirical observation and scientific study (Sale, Lohfeld, & Brazil, 2002). In quantitative research, the researcher studies a phenomenon objectively, sample sizes are larger than in qualitative studies, and structured protocols and randomization are emphasized (Sale et al., 2002). In contrast, qualitative research is structured differently both in methodology and in philosophical assumptions. Qualitative research is based in interpretivism and constructivism,

which is much different than positivism. Qualitative researchers have a goal of relying on participants' views, meanings, and experiences (Creswell, 2013). In a constructivist paradigm, it is believed that "multiple realities are constructed through our lived experiences and interactions with others" (Creswell, 2013, p. 36). Qualitative research methods involve in-depth interviews, focus groups, observations, and document reviews with a much smaller sample size than that of quantitative research. Quantitative research, based in the positivist paradigm, is based on empirical studies and is common in hard science fields while qualitative research, centered in the constructivism paradigm, is more commonly used in the social sciences (Sale et al., 2002). Though quantitative research has been a more traditionally used methodology, qualitative research has risen in popularity.

The number of qualitative studies has risen dramatically in the past 30 years (Rone, 1998). In addition, more females are graduating with doctoral degrees than ever (U.S. Department of Education, National Center for Education Statistics, 2015; Nelson & Coorough, 1994). Qualitative research embodies more traditionally feminine characteristics in its research and analysis methods, such as interpersonal relationships (Creswell, 2013; Lincoln & Guba, 1985). Thus, one could surmise that qualitative research has increased in part because of the higher percentages of women completing doctoral degrees. Quantitative research, in contrast, embodies more mathematical and traditional, scientific experimental research (Sale et al., 2002). Research has indicated that women have higher levels of mathematics anxiety and pursue advanced degrees in mathematical fields at a much lower percentage than men (Cheryan, 2012; Nelson & Brammer, 2008).

Research has also indicated that both ethnicity and age has an impact on math anxiety, science and math attitudes, and math performance (Bell, 2003; Bui & Alfaro, 2011; Lockhead,

Thorpe, Brooks-Gunn, Casserly, & McAloon 1985; Onwuegbuzie & Wilson, 2003; Upadyaya & Eccles, 2014; Wilson & Milson, 1993). Students of ethnic minority groups experience stereotype threat in regards to mathematics and science, and studies have shown that individuals in these groups are hesitant to go into mathematics and science areas of study for fear of reinforcing these stereotypes (Aronson, Friend, & Good, 2002; Shelton & Richeson, 2005).

Research has indicated that mathematics anxiety increases with age, attitudes toward mathematics and science decrease with age, and age is the most significant predictor of attrition in undergraduate and graduate programs (Bean & Metzner, 1985; Bell, 2003; Bui & Alfaro, 2011; Jones & Watson, 1990; Lockhead et al., 1985; Onwuegbuzie & Wilson, 2003; Upadyaya & Eccles, 2014; Wilson & Milson, 1993). Age is also a defining factor in the determination of a student as traditional or non-traditional (U.S. Department of Education, National Center for Education Statistics, 2016a). Because research indicates that older, non-traditional students may face higher mathematics anxiety and lower performance in mathematics and science, it is important to understand their dissertation methodology choice.

To complicate the issue of methodology choice, the salience of religious affiliation may also influence the choice of dissertation methodology. For people of religious faith, embracing modern science in its entirety can be difficult. Cho (2012) described the difficulties of clashing worldviews. Scientific inquiry is based in positivism, which is the claim that empirical observations are considered true, which is in contrast to the theistic metaphysical beliefs of those of religious faith. Science, and more specifically, positivism, rejects any metaphysical conclusions that anything other than what can be seen exists. This rejects the existence of a superior being and directly contradicts the worldview of those with religious faith. Researchers have found that there is a negative correlation between attitudes toward science and attitudes

toward religion (Astley & Francis, 2010), and in a study conducted by Francis and Greer (1999),

it was found that 62% of students agreed that there is a fundamental conflict between scientific

and religious claims. As discussed previously, quantitative methodologies are based in

positivism and scientific study (Creswell, 2013; Sale et al., 2002). Keele (2012) described

quantitative research as based in "hard science." These philosophical differences between

science, and thus, quantitative research methods and religious faith, could cause people of

religious affiliation to reject quantitative research methods in favor of qualitative methods that

encompass a more subjective analysis to embrace their differences in perspective and

philosophy. These philosophical differences may influence an individual's choice in

methodology, and the theory of intersectionality supports this because of the variety of factors

that influence and interact together to form one's identity (Davis, 2008). The concept of

intersectionality, which is drawn from critical theory, specifically considers the interactions of

categories of differences in individual lives. This can include sex, ethnicity, and other categories

of difference, which, for the purpose of this study, also includes religion and age (Davis, 2008).

　　　In summary, there are fundamental differences in qualitative and quantitative research

methodologies. Because of the positivist worldview foundation and the mathematical and

scientific approach of quantitative research and the relational, constructivist approach of

qualitative research, researchers that choose one methodology over another could have

similarities. Research has indicated that women are more relational, have higher mathematics

anxiety, and pursue scientific and mathematical careers less than their male counterparts

(Cheryan, 2012; Nelson & Brammer, 2008). Research has also shown that there are differences

between ethnic groups in mathematics performance and attitudes and that statistics anxiety is

higher in non-traditional, older students (Bean & Metzner, 1985; Bell, 2003; Bui & Alfaro, 2011;

Jones & Watson, 1990; Lockhead et al., 1985; Onwuegbuzie & Wilson, 2003; Upadyaya and

Eccles, 2014; Wilson & Milson, 1993). Finally, individuals who have a religious affiliation have

a fundamental difference in worldview from the positivist worldview held by most of the

scientific community (Astley & Francis, 2010; Sale et al., 2010). These variables, biological sex,

ethnicity, age, and religious affiliation, should be examined for how they correlate with

dissertation methodology type.

Problem Statement

There is very little research regarding the choice between a quantitative or qualitative

research methodology. In each methodology, which is rooted in differing philosophical

assumptions and involves very different data collection methods and analysis procedures, it is

unknown through current research if there are predictors for those who choose to pursue each

methodology (Creswell, 2013; Sale et al., 2002). Feminist research has indicated that the

positivist assumptions in quantitative research do not align with the female identity (Stanley &

Wise, 1983), and other research has indicated that women have higher levels of mathematics

anxiety, which could indicate that women are more likely to choose qualitative research

(Cheryan, 2012; Nelson & Brammer, 2008). Individuals of African American or Hispanic

ethnicities may also be more likely to choose qualitative research, because various studies have

shown a higher level of mathematics anxiety and lower levels of mathematics performance (Bell,

2003; Bui & Alfaro, 2011; Lockhead et al., 1985; Onwuegbuzie & Wilson, 2003; Upadyaya and

Eccles, 2014; Wilson & Milson, 1993). Non-traditional students, or students older than the

average graduate student, also may chose the qualitative methodology more often based on their

statistics anxiety and attitudes towards mathematics and science (Bean & Metzner, 1985; Bell,

2003; Bui & Alfaro, 2011; Jones & Watson, 1990; Lockhead et al., 1985; Onwuegbuzie &

Wilson, 2003; Upadyaya and Eccles, 2014; Wilson & Milson, 1993), and there are worldview

conflicts between research based in positivism and a religious affiliation (Astley & Francis,

2010; Greer, 1990; Sale et al., 2002). According to Plowman and Smith (2011), there is not

enough literature regarding dissertation methodology choice between men and women and other

groups and why individuals pursue one type of research over the other. The current research

sought to add to the body of research and determined if there were differences between the

choice of dissertation methodology among men and women as well as the role that ethnicity, age,

and religious affiliation played on a doctoral candidate's methodology choice (Borders, Wester,

Fickling, & Adamson, 2015; Goodrich, Shin, & Smith, 2011; Plowman & Smith, 2011). The

problem is that there are few or no studies that examine the relationship between dissertation

methodology choice within the context of biological sex, ethnicity, age, and religious affiliation.

Purpose Statement

The purpose of this archival, predictive correlational study is to examine the effect of

biological sex, ethnicity, age, and religious affiliation on dissertation methodology choice among

doctoral candidates in the School of Education at a faith-based university. The criterion variable

is *dissertation methodology* (quantitative or qualitative). *Dissertation methodology* is defined as

the philosophical underpinnings of a chosen research method, referred to as qualitative or

quantitative (Creswell, 2013). *Quantitative research* is defined as a systematic and objective

method of research that utilizes numerical data to describe variables, observe relationships

among variables, or determine cause and effect relationships between variables (Burns & Grove,

2005), and *qualitative research* is defined as using an interpretive approach to study phenomena

in their natural settings and "attempting to make sense of, or interpret phenomena in terms of the

meanings people bring to them" (Denzin & Lincoln, 1994, p. 2).

The predictor variables are the candidate's biological sex (male or female), ethnicity, age, and religious affiliation. *Biological sex* is defined as male or female (American Psychological Association, 2011) as self-reported on each candidate's university records. *Ethnicity* is defined as "the social group a person belongs to, and either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race" (Bhopal, 2004, p. 443). *Age* is defined as the age of the candidate in years old at the time of the dissertation defense. Religious affiliation is defined as "an organized system of practices and beliefs in which people engage" (Mohr, 2006, p. 174). A candidate's religious affiliation will be measured through their self-reported religious affiliation in their application to the university.

Significance of the Study

This study is significant to the topic of dissertation methodology choice in relation to sex, ethnicity, age, and religious affiliation. There are few, if any, studies that focus on dissertation methodology choice in the context of gender and religious affiliation, and there is a need for research that focuses on the intersecting nature of identity and the effect on the identity of women (Jones, 1997). Not only will this study provide insight into dissertation methodology choice for both men and women, but it can also deepen the understanding of ethnicity, age, and religious affiliation in the math and science fields.

This study is significant to the population of doctoral candidates and specifically, Doctor of Education (EdD) candidates in faith-based universities. As the number of qualitative dissertation methodologies have continued to increase since 1980 (Randolph et al., 2010), the understanding of student methodology choice is more relevant to universities. This study will provide insight into biological sex differences among dissertation methodology choice as well as

any differences in dissertation methodology choice among those of various ethnicities, traditional and non-traditional-aged students, and students of religious affiliation. Furthermore, because this study will be conducted at a religious institution, this study may also add to the body of knowledge regarding individuals of religious affiliation who may be hesitant to participate in science (Cho, 2012; Michael, 2015). Flynn, Chasek, Harper, Murphy, and Jorgensen (2012) described the importance of the dissertation process in doctoral programs, noting that it is "an invaluable evaluative tool that encourages students to become active and self-directed in their learning, allowing for new insights into a field" (p. 242), but they also noted the high attrition rates and difficulties students have completing this hurdle. Given the importance of the dissertation in most doctoral programs, the relatively few studies about the dissertation is problematic. This study will add to the body of research regarding dissertation methodologies, and it will provide universities with better understanding of how to support students, especially females, those in an ethnic minority group, non-traditional aged students, and students of religious affiliation to choose a methodology best suited for the nature of their research problem and their goals rather than stereotypes and perception of research design masculinity or femininity (Plowman & Smith, 2011).

Research Question

RQ1: To what extent can the biological sex, ethnicity, age, and religious affiliation of a doctoral candidate attending a faith-based university predict the choice of dissertation method (quantitative or qualitative)?

Definitions

1. *Candidate* – A doctoral candidate is a student in a doctoral program who has completed all of the requirements for the doctoral degree except the dissertation. Usually, the

student becomes a doctoral candidate after he or she has completed all of the coursework required for the program and has passed the comprehensive exam (Kuther, n.d.).

2. *Dissertation methodology* – Dissertation methodology is defined as the philosophical underpinnings of a chosen research method, referred to as qualitative, quantitative, or mixed methods research (Creswell, 2013).

3. *Ethnicity* - Ethnicity is defined as "the social group a person belongs to, and either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race" (Bhopal, 2004, p. 443).

4. *Ethnic minority group* – Ethnic minority group refers to the non-white population (Bhopal, 2004).

5. *Non-traditional student* – A non-traditional student is characterized by various factors, but most often age is the defining characteristic for this population of students; a student who is above the average age for the degree program (U.S. Department of Education, National Center for Education Statistics, 2016a).

6. *Quantitative research* – Quantitative research is a systematic and objective method of research that utilizes numerical data to describe variables, observe relationships among variables, or determine cause and effect relationships between variables (Burns & Grove, 2005).

7. *Qualitative research* – Qualitative research is "multimethod in its focus, involving an interpretive, naturalistic approach to its subject matter…qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 1994, p. 2).

8. *Religious affiliation* – Religious affiliation is "an organized system of practices and beliefs in which people engage … a platform for the expression of spirituality" (Mohr 2006, p. 174).

9. *Sex* – Sex refers to "a person's biological status and is typically categorized as male, female, or intersex" (American Psychological Association, 2011, para 1).

10. *Stereotype* – A stereotype is defined as "beliefs about the characteristics, attributes, and behaviors of members of certain groups" (Hilton & Von Hippel, 1996, p. 240)

CHAPTER TWO: LITERATURE REVIEW

Overview

Chapter Two will discuss the theoretical framework for this study and the related research. Quantitative and qualitative methodologies will be overviewed, including the data collection and analysis methods and the philosophical underpinnings of each. Research related to biological sex, ethnicity, age, and religious affiliation will be discussed in the context of mathematics anxiety, attitudes, and performance. Stereotypes that inhibit the pursuance of mathematics and scientific careers and college majors will also be examined.

Theoretical Framework

The theoretical framework guiding this study comes from two different theories: Crenshaw's (1989) intersectionality theory and Jones and McEwen's (2000) multidimensional identity model.

Intersectionality

The concept of intersectionality, which is drawn from critical theory, specifically considers the interactions of categories of differences in individual lives. This can include, gender, race, and other categories of difference, which, for the purpose of this study, includes religion (Davis, 2008). Crenshaw (1989) was the first to define intersectionality and apply it to dimensions of identity that are more than the sum of each part. Crenshaw (1989) specifically studied African American women and stated, "because the intersectional experience is greater than the sum of racism and sexism, any analysis that does not take intersectionality into account cannot sufficiently address the particular manner in which Black women are subordinated" (p. 140). Identities are formed in relation to one another, and the process of merging various identities is transformative. This merge produces an entirely new sense of self; it is not just an

intersection of identities. Shields (2008) defined intersectionality as "social identities which serve as organizing features of social relations, mutually constitute, reinforce, and naturalize one another" (p. 302). Similarly, Collins (1998) defined intersectionality as "rather than examining gender, race, class, and nation as distinctive social hierarchies, intersectionality examines how they mutually construct one another" (p. 62). Dimensions of identity, such as gender, religion, and race are not independent additions that add up to an identity, but they are interdependent on each other (Bowleg, 2008; Warner, 2008).

The concept of intersectionality is the framework for identity studies that focus on multiple dimensions of identity. This framework differs from the traditional view of identity, such as Erikson's original identity theory (Erikson, 1968), in that aspects of identities are experienced simultaneously rather than hierarchically (McCann & Kim, 2002). The focus of these aspects of identity is how they interconnect rather than just their similarities and differences (McCann & Kim, 2002). The framework of intersectionality is based in social constructivism, which maintains that aspects of identity are constructed from aspects of social, historical, political, and cultural factors (Omi & Winant, 1994). Intersectionality supports a social identity, or an identity that is formed through social interactions and cultural factors (Shields, 2008). Multiple dimensions of identity, such as gender, race, religion, socioeconomic status, and nationality are complex social processes that intersect with each other rather than exist independently (Bowleg, 2008). Ken (2008) described intersectionality using a metaphor of baking. Dimensions of identity, such as race, religion, and gender, are like ingredients to make cookies, like sugar, flour, butter, and eggs. First, one must mix them together to make dough and then cook them. In the final product, the cookie, one cannot tell each ingredient apart in the cookie. Similarly, each dimension of identity is dynamic and has an interdependence on each

other. Bowleg (2008) emphasized that Identity ABC ≠ Identity A + Identity B + Identity C.

Rather, these dimensions are interactive and could produce many combinations (Arifeen &

Gatrell, 2013). Intersectionality is a framework often used in research when analyzing identity

and differences, especially regarding race, class, and gender (Wadsworth, 2011). This

intersectionality approach, in the context of this study, will provide the framework for examining

the predictor variables of sex, ethnicity, age, and religious affiliation. As Cole (2009) discussed,

each of these dimensions of identity (such as sex, ethnicity, age, and religious affiliation) are not

separate and independent, but yet each is contingent on the experience and meaning of each of

the others. Because this study involves the examining of ethnicity and gender, along with age

and religion, intersectionality is an appropriate framework (Cole, 2009, Else-Quest, Mineo, &

Higgins, 2013).

　　　　Within the intersectionality framework, Acker (1990) developed the theory of gendered

organizations. Ackers defined a gendered organization or analytic unit as one that "advantage

and disadvantage, exploitation and control, action and emotion, meaning and identity, are

patterned through and in terms of a distinction between male and female, masculine and

feminine" (p. 146). Basically, Acker (1990) postulated that organizations are built upon

assumptions about gender, and thus, they produce gender inequalities. In the theory of gendered

organizations, Acker (2006) determined that the most prominent dimensions of identity along

with gender are race and class. In relation to this study, research has indicated that religious

organizations are largely gendered as masculine (Adams, 2007; Manville, 1997).

Multidimensional Identity Model

　　　　According to feminist theory, gender shapes the human consciousness (Creswell, 2013).

Jones and McEwen (2000) posited that most developmental models and research of identity only

addressed single dimensions of identity. The concept of intersectionality specifically considers the interactions of categories of differences in individual lives. This can include gender, race, and other categories of difference, which, for the purpose of this study, also includes age and religious affiliation of doctoral students (Davis, 2008). According to feminist theory, gender shapes the human consciousness (Creswell, 2013). Reynolds and Pope (1991) related gender in terms of identity in their multidimensional identity model. Identities are formed in relation to one another, and the process of merging various identities is transformative. This merge produces an entirely new sense of self; it is not just an intersection of identities.

Jones and McEwen (2000) proposed a model of multiple identities through a grounded theory study examining the complexity of identity and the identity development of multiple dimensions of identity. Through this research, they developed a conceptual model of multiple dimensions of identity. The basis for their research is in the theoretical discussions of Deaux (1976), who conceptually determined that identity is both defined internally by self and externally by others at the same time. The model that Jones and McEwen (2000) developed was the first model to suggest a process in which multiple identities are "developed and negotiated" (p. 406). In their research, Jones and McEwen (2000) found that there is one core category in the center of one's identity that is considered the core sense of self, or the inner identity, that also has multiple intersecting dimensions. The core sense of self is an "inside identity" (Jones & McEwen, 2000, p. 408) that is not as susceptible to outside influences as other aspects of identity, and it is difficult to label for each individual. Labels lack complexity and personal relevancy and cannot fully describe one's inner sense of self. The multiple dimensions that surround the inner core are externally defined dimensions, such as gender, race, culture, age, and religion. These dimensions have varying degrees of salience between individuals. For example,

Jones and McEwen (2000) found that race is not very salient for white women, but it is very salient for black women. All of these dimensions of identity intersect with the core and other dimensions in one's identity, thus illustrating the concept of intersectionality. It is important to note the influences of "sociocultural conditions, family background, and current experiences" (Jones & McEwen, 2000, p. 410) in determining the salience of individual dimensions of identity. Additionally, Jones and McEwen (2000) found that for many dimensions of identity, such as gender, "the description of what being female meant to them was quickly connected with other dimensions (e.g., Jewish woman, black woman, lesbian, Indian woman)" (p. 410). This further demonstrates the intersectionality of multiple dimensions of identity and the establishment of identity as a fluid, complex process.

Jones and McEwen (2000) developed the model of multiple dimensions of identity to conceptualize the intersecting circles of identity that surround the core sense of self. This model demonstrates that "no one dimension may be understood singularly; it can be understood only in relation to other dimensions" (p. 410), thus providing a framework for the concept of multiple dimensions of identity. It is important to note that Jones and McEwen (2000) also provided the first model to include the importance of various degrees of salience in an individual's dimensions of identity. The salience is indicated by the relation of the dots in each circle (representing each dimension of identity) to the core sense of self. The closer the dot to the core, the more salient that dimension is to the individual. For example, if religion is particularly important to an individual's identity, the salience dot would be located close to the core. This illustrates that "various identity dimensions are present in each individual, yet experienced in different ways as more or less salient" (p. 410). As previously mentioned, degree of salience is influenced by sociocultural conditions, family background, and personal experiences (Jones & McEwen, 2000).

In relation to this research, salience of identity traits, specifically in regards to gender, ethnicity, age, and religious affiliation, are necessary to determine what aspects of identity influences decision making. For example, when ethnicity or religious affiliation is a more salient identity dimension, according to Jones and McEwen (2000), it would be located closer to the core of one's identity, and thus, would have an impact on the decision making of the individual, such as dissertation methodology choice.

<div align="center">**Related Research**</div>

Dissertation Methodologies

The dissertation is a fairly consistent product among doctoral programs both in the US and internationally (Boote & Belie, 2005; Tronsgard, 1963); however, there is very little research regarding the dissertation products in doctoral programs, especially in the field of education (Boote & Belie, 2005). There are two main methodological choices in research: quantitative or qualitative. These two methodologies are fundamentally different in their philosophical paradigms, language, and data collection methods. Both quantitative and qualitative research are based on a different paradigm. A paradigm is a set of assumptions. These assumptions are related to reality (ontology), knowledge of reality (epistemology), and how to know that reality (methodology) (Guba, 1990). Quantitative research is based on positivism (Sale et al., 2002). Positivism emphasizes empirical observation and scientific study (Creswell, 2013), and Sale et al. (2002) described it as "all phenomena can be reduced to empirical indicators which represent truth" (p. 44). Ontologically in quantitative research, there is only one truth: the objective reality. In quantitative research, it is the researcher's job to study a phenomenon objectively and without influencing it or being influenced by it (Sale et al., 2002). Research techniques for quantitative research are much different than in qualitative research, as methods are used to

ensure that the researcher's bias is not a factor in the analyzation of data. Structured protocols, blinding, randomization, and questionnaires with limited response choices are used in quantitative research, and sample sizes are much larger than in qualitative studies to ensure that samples are representative of target populations (Sale et al., 2002).

Qualitative research, in contrast, is structured much differently both methodologically and philosophically. The qualitative paradigm is based in interpretivism and constructivism (Creswell, 2013; Lincoln & Guba, 1985). In a constructivist paradigm, "individuals seek understanding of the world in which they live and work" (Creswell, 2013, p. 24). The goal of the research in this paradigm is to "rely as much as possible on the participants' views of the situation" (Creswell, 2013, p. 25). These experiences generally are formed through participants' interactions with others. The view of reality in constructivism, or the ontological assumption, is that "multiple realities are constructed through our lived experiences and interactions with others" (Creswell, 2013, p. 36). Epistemologically, qualitative researchers generally assume that "reality is co-constructed between the researcher and the researched and shaped by individual experiences" (Creswell, 2013, p. 36). The paradigm of interpretivism largely opposes the positivism of quantitative research; its basis is that reality is socially constructed and only found through shared meanings, experiences, and language. In the interpretivist framework, the goal of research is understanding, which is in contrast to the goal of research in positivism, which is generally an objective explanation or prediction (Creswell, 2013; Lincoln & Guba, 1985).

Borders et al. (2015) studied qualitative and quantitative dissertation methodologies in counseling programs. They found that the majority of qualitative dissertations included grounded theory, phenomenology, and case study methods and the majority of quantitative dissertations included experimental, quasi-experimental, survey, correlational, descriptive, and

instrument development methods. As described by Hoepfl (1997), quantitative researchers aim to find causal determination, prediction, and generalization of findings. In contrast, qualitative researchers aim to find illumination, understanding, and extrapolation. These aims are very different and result in vastly different knowledge gained from their respective research.

The fundamental differences in the assumptions between qualitative and quantitative research led to the development of different journals, methods, expertise, and language. Quantitative and qualitative researchers see reality in different ways. In short, quantitative researchers believe that there is an objective reality, separate from the researcher that is to be discovered. In contrast, qualitative researchers believe that reality is constantly changing and is created through individuals' experiences. This reality is subjective and exists through both the researcher and participants (Sale et al., 2002). The positivism paradigm in which quantitative research lends itself to empirical study, which is common in hard science fields, and the constructivist paradigm in qualitative research is more common in social sciences. The choice between each of these methodologies is a complex one with little research examining it. Buchanan and Bryman (2007) discussed how the choice between research methods is "shaped by aims, epistemological concerns, norms of practice…as well as historical, political, ethical, evidential, and personal factors" (p. 483).

In 1973, Wick and Dirkes studied a random sample of dissertations and found that only 7% of dissertations used qualitative or non-numerical data gathering methods. In 1998, Rone determined in his study that qualitative designs were steadily increasing. Nelson and Coorough (1994) analyzed over 10,000 PhD and EdD dissertations and found that although survey research was the most used data-gathering method in EdD dissertations, multivariate statistics was more used in PhD dissertations. The researchers discovered that qualitative research only comprised

3% of the dissertations from 1980 to 1993, but they determined that there was a substantial increase in qualitative methodologies since 1980, and they postulated that it would continue to rise in popularity. Nelson and Coorough did not discuss why they expected the continual rise in popularity of qualitative research, but Alasuutari (2010) suggested that a shift of cultural and political worldviews has caused more interest in subjective human views rather than just empirical, positivist studies. There is little recent research regarding the current proportions of qualitative and quantitative dissertation methodologies or the act of a researcher's choice of research methodology. Strauss and Corbin (1990) suggested to researchers that qualitative research is to be used to better understand a phenomenon where little is known or where there are open-ended research questions. Patton (1990) discussed how the choice of methodology should be situational based on the research question and that both quantitative and qualitative research methods on a topic provide insight that neither could provide alone. There is also little research regarding differences in male and female choice of dissertation methodology.

Sex and Methodologies

Quantitative research is based in mathematics, which is evidenced in the statistical analysis that is used to analyze data in this methodology (Sale et al., 2002). There is an abundance of research that has indicated that women have higher mathematics anxiety, lower mathematics attitudes, and are underrepresented in STEM careers and majors (Bell, 2003; Bui & Alfaro, 2011; Lockhead et al., 1985; Nelson & Brammer, 2008; Onwuegbuzie & Wilson, 2003; Upadyaya and Eccles, 2014; Wilson & Milson, 1993). This research regarding women and their disproportionate attitudes and anxieties of mathematics compared to men could indicate that they are less likely to pursue a quantitative methodology for their dissertation.

Underrepresentation of women in STEM fields. According to Nelson and Brammer

(2008), women are underrepresented in a variety of STEM careers and college majors. There has been progress in the past 30 years, but the underrepresentation in STEM careers and majors remains. For example, women earned 31% of chemistry PhD degrees between 1993 and 2003, but only 21.5% of women were hired for chemistry professor positions. There are similar disproportions in areas of physics, engineering, and mathematics. Ceci, Williams, and Barnett (2009) examined women's underrepresentation in math-intensive fields using meta-analysis. They found that women were more likely than men to prefer careers in fields that are not math-intensive, and they were also more likely to leave math-intensive careers than men. In addition, women who have high math aptitude are more likely to also have a high verbal aptitude, giving them a larger variety of career choices. They also found that women in math-intensive careers with children were penalized in regards to promotion rates. Bridgeman and Lewis (1996) found that men and women earn equal grades in college mathematics classes and that women receive almost half of bachelor's degrees in mathematics, which has doubled since the 1960s. There have also been gains in women earning doctoral degrees in STEM fields. Women earn 24% of PhD degrees in mathematics and computer science, 22.3% of the PhD degrees in engineering, 29.5% of the PhD degrees in physical science, and 50% of the MD degrees in medical science. Overall, women earn 40.6% of PhD degrees in STEM areas, while in 1966, women only obtained 8% of these doctoral degrees (National Science Foundation, 2015a). These numbers indicate that sociocultural factors have an influence in the differences in the generations of doctoral degree-earning women since biology does not change.

Mathematics attitudes. Research has also found that attitudes of math and science are more positive for men than women. Desy, Peterson, and Brockman (2009) discovered that men are more positive about science and mathematics, and the men with positive attitudes received

higher grades in math and science courses. The women in the study indicated that science and

mathematics were not very relevant to their academic success and had less positive attitudes and

grades toward these courses. Women also are less confident in their abilities in mathematics and

science than men are (Eccles & Wigfield, 2002). Fleming and Malone (1983) found that males

had higher science and math attitudes compared to females in kindergarten through 12th grade.

Cvencek, Meltzoff, and Greenwald (2011) discovered that girls start developing negative

mathematics attitudes as early as second grade. Many girls, as reported by Beilock, Gunderson,

Ramierz, and Levine (2010), think that girls are not good at mathematics and continually doubt

their own abilities in mathematics. In addition, many girls are afraid to embarrass themselves in

math classes, so they try to avoid participants in class as much as possible (Beilock et al., 2010).

Other studies have also indicated that this low self-concept and attitudes in regards to

mathematics and science starts when girls are young and is even more evidenced as they reach

adolescence, where gender identity starts to become more important to identity (Eccles &

Wigfield, 2002). A meta-analysis conducted by Weinburgh (1995) also found males to have

more positive attitudes toward math and science than females. Catasmbis (1995) found that

although achievement between males and females in math and science was not significantly

different, males still had higher attitudes toward both subjects. These low attitudes could be

based in gender stereotypes; as teachers and parents have low expectations for females in

mathematics, their attitudes may be lower. Else-Quest et al. (2013) found a strong link between

mathematics and science attitudes and achievement; the lower the attitudes about mathematics

and science, the lower the achievement, and vice versa. Else-Quest et al. (2013) also found that

boys overestimated their mathematics ability while girls underestimated their mathematics

ability.

Mathematics anxiety. Math anxiety is defined as "feelings of tension and anxiety that interfere with the manipulation of mathematical problems in a wide variety of ordinary life and academic situations" (Richardson & Suinn, 1972, p. 551). This debilitating condition can cause feelings of anxiety, panic, fear, distress, difficulty breathing, and the loss of concentration (Cemen, 1987). Mathematics anxiety can lead to a limitation of college majors and even career choices (Trujillo & Hadfield, 1999). Trujillo and Hadfield (1999) interviewed individuals with severe mathematics anxiety to determine the roots of their distress with mathematics and found that negative experiences in math classrooms and with math teachers, a lack of support at home in mathematics, and difficulties in test taking all contribute to mathematics anxiety. This supports other research which indicates that women who have negative experiences with teacher and parental attribution of mathematics ability can contribute to mathematics anxiety and achievement (Cheryan, 2012; Gunderson, Ramirez, Levine, & Beilock, 2012). Studies have indicated that females exhibit more math anxiety in secondary and post-secondary settings, although not in elementary settings (Campbell & Evans, 1997; Malinsky, Ross, Pannells, & McJunkin, 2006). Malinsky et al. (2006) found that females exhibit more math anxiety in secondary and post-secondary settings, although they did not find a difference in elementary settings.

In addition to mathematics anxiety, studies have also indicated that women have higher statistics anxiety than men. Statistics anxiety is directly related to quantitative methodologies, because a quantitative methodology requires statistical analysis. Cruise, Cash, and Bolton (1985) defined statistics anxiety as "the feelings of anxiety encountered when taking a statistics course or doing statistical analyses" (p. 92). Onwuegbuzie (1995) and Zeidner (1991) determined that women experience more statistics anxiety than men. Royce and Rompf (1992)

also found that women have more difficulties in statistics and in quantitative methodologies in general. Zeidner postulated that the reason that women have more statistics anxiety and difficulties is because of their prior experiences in math, including low mathematics self-efficacy, which has been theorized to be a product of gender stereotyping and low mathematics performance.

Mathematics achievement. The differences in mathematics achievement are not easily explained. McGraw, Lubienski, and Strutchens (2006) determined that the mathematics achievement gap between males and females has not diminished in the past 30 years despite the plethora of research and educational initiatives designed to bring gender equality to mathematics. There are studies that differ in regards to sociocultural and biological differences between males and females. Hyde (2005) conducted a meta-analysis using 47 studies and found that males and females are much more alike than unalike, although males had higher mental rotation and mechanical reasoning than females. Entwisle, Alexander, and Olson (1994) found that differences between male and female mathematics test scores increased with age. Sanders and Nelson (2004) discovered similar results; in their study, there were no gender differences in math performance for students at the age of nine, a small difference for students at the age of 13, and a large difference for students at the age of 17. This would support Ceci et al.'s (2009) framework that indicated that contextual influences structure an individual's self, which then influences the individual's motivation, beliefs, and activities. Contextual influences, such as cultural stereotypes, and parental and teacher attributions can lead to a drop of confidence, and thus, a decline in achievement as girls take fewer advanced math and science courses and start to fall behind their male counterparts (Sanders & Nelson, 2004). Grabner, Stern, and Neubauer (2006), in the biological context, found that high intellectual performance and the primary cortical

activation are a result of both previous neural efficiency and experience. This indicates that cultural beliefs and environments will influence motivation and activity for certain things, which then, biologically, provides more intellectual practice and thus, higher abilities. For example, if a male's cultural influences indicate that he should be good at mathematics, he may have a higher motivation to work harder at mathematics. His brain will then become more efficient and experienced at mathematics, which will in turn, allow him a higher intellectual performance in mathematics. Ceci et al.'s (2009) circular framework brings together sociocultural context, motivation, and biology to offer an explanation of the proportional differences in males and females in STEM careers and majors. This may be due to stereotype threat.

Gender stereotyping. Research has indicated that gender stereotypes play a role in the division of labor between males and females. Many occupations are associated with masculine attributes and dominated by males, such as carpentry, and many others are associated with feminine attributes and dominated by females, such as secretarial work. Cejka and Eagly (1999) studied 80 different occupations and the gender-stereotypic attributes of each and found that in professions that were female-dominated, feminine traits were perceived most crucial for success, and in the male-dominated professions, masculine attributes were perceived most crucial for success. In addition, participants indicated that the occupations that required masculine traits for success were perceived as more prestigious. Cejka and Eagly (1999) concluded that "women thus face the daunting reality of a social structure in which high wages and prestige are associated with occupations that are thought to require masculine personal characteristics" (p. 422).

Stout, Dasgupta, Hunsinger, and McManus (2011) empirically tested the effect of gender stereotyping on women's choice of a STEM career. According to the National Science

Foundation (2015b), only 34% of professors in STEM departments at four-year universities are female, which does not provide female STEM students with enough positive, same-sex role models. Stout et al. postulated that this could be a reason that so many women switch from a STEM major in college; the "skewed gender ratio of STEM experts in academic environments undermines female students' identification with, positive attitudes about, and self-efficacy in STEM and saps their motivation to pursue careers in science, engineering, or technology" (p. 256). As Cheryan (2012) discussed, when STEM environments are stereotyped as masculine, females are less interested. Stout et al. (2011) found that contact with successful females in the field could "inoculate women from applying STEM stereotypes to their own self-concept" (p. 256), providing positive role models that break the gender stereotypes. In the study conducted by Stout et al. (2011), it was found that when women interacted with a female with expertise in math, "they expressed more positive implicit attitudes toward math, showed more implicit identification with math, and increased their effort on a very difficult math test compared with others who interacted with an advanced male peer" (p. 260). However, they also found that women's implicit stereotypes about math did not change even after their interaction with a same-sex role model; even though their self-concept was shielded, the women were still aware of the negative stereotypes relating to math. Stout et al. (2011) also found that female students were less confident about their math performance in advanced mathematics courses when the professor was male compared to if the professor was female.

Cheryan (2012) examined the role of gender stereotyping in the mathematics gender gap. Cheryan found "while doing well in math classes may now be stereotyped as feminine, seeking out math-related careers is still a gender role violation for women" (p. 184). Researchers have determined that there is not a difference in mathematics achievement between male and female

students based on standardized test scores (Hyde, Fennema, & Lamon, 1990), but there are significantly less females who choose to pursue STEM-related majors and careers (National Science Foundation, 2015). In the workforce, women only make up of 25% of the total computer and mathematical sciences profession and 13% of the engineering field (U.S. Department of Labor, 2015). Cheryan (2012) postulated that "math anxiety, math-gender stereotypes, attributions for success and failure in math, and beliefs about math intelligence" (p. 185) is passed from parents and teachers to children from a young age. Barry, Bacon, and Child (1957) also discussed the role that culture plays in defining sex-specific self-concepts and personality attributes. This, according to Cheryan, can contribute to the disproportions in math-related majors and career fields between women and men.

As Cheryan (2012) postulated, math anxiety and self-concept can be passed from parents and teachers at a young age. The gender gap in mathematics achievement between boys and girls has closed according to recent research (Hyde, 2005), but there are still significantly more males than females who take advanced math courses and pursue mathematics-related careers. Gunderson et al. (2012) sought to determine a reason for this disconnect, and they found that girls have more negative math attitudes, higher levels of mathematics anxiety, and a lower self-concept in mathematics. Many studies have investigated the impact of parents' and teachers' math attitudes and gender stereotypes on children's math anxiety and self-concept. It has been found that adults' gender stereotypes regarding math does influence their expectations and attributions for children's math achievement. These expectations then affect children's attitudes, self-concept, and anxieties (Eccles & Jacobs, 1986; Eccles, Jacobs, & Harold, 1990; Jacobs & Eccles, 1992; Gunderson et al., 2012; Midgley, Feldlaufer, & Eccles, 1989). Gunderson et al. (2012) found that these negative math attitudes formed at an early age from parental and teacher

expectations, attitudes, and stereotypes "sets the stage for lifelong behavioral and attitudinal patterns, such as math anxiety and math avoidance, which can eventually lead to lower levels of STEM course-taking and career choices among women versus men" (p. 154). Jacobs (1991) even found that parents' beliefs about their child's math ability is a stronger predictor of the child's self-perception of ability in mathematics than even the child's own past mathematics achievement. Jacobs (1991) also found that parents who hold strong gender stereotypes apply these gender stereotypes to their own children, including stereotyping their mathematics ability according to gender despite the child's achievement in mathematics. Fennema, Peterson, Carpenter, and Lubinski (1990) found that teachers attribute boys' mathematics achievement to ability, while they attribute girls' mathematics achievement to effort. Dweck (2006) concurred with this finding, and labeled these two different mindsets as a "growth mindset" and a "fixed mindset." Dweck also found that not only do teachers attribute boys' mathematics achievement to ability and girls' mathematics achievement to hard work, but also girls now have this mindset as well. Girls are more likely to give up when challenged in math because they do not believe they are good at math. Dweck considers this a fixed mindset in that they cannot get better or ever be good at math. A growth mindset, in contrast, is a mindset that hard work can build confidence and mathematics ability. Attribution of academic achievement, especially in mathematics, seems to follow the pattern that parents rate mathematical ability higher for boys even when no differences in performance exist between girls and boys (Hess et al., 1986; Parsons, Adler, Kaczala, & Meece, 1982). Lummis and Stevenson (1990) also studied parental attribution, and they found that mothers rated girls higher in reading and boys higher in mathematics, regardless of performance. These parental and teacher gender attitudes towards mathematics achievement and ability can provide a gender-stereotyped foundation for children

that follows them into adulthood and affects their self-concept, attitudes, and choices related to mathematics courses and careers.

Steele, James, and Barnett (2002) studied undergraduate women in math, science, and engineering majors. They postulated that women in these majors, which are male-dominated, may switch into female-dominated majors in order to avoid the threat of negative gender stereotypes. Steele et al. found that women perceived higher levels of sex discrimination than men in science, math, and engineering majors. Women also reported that they were threatened by negative gender stereotypes, specifically that they were not as capable in math, science, and engineering. Surprisingly, Steele et al. found that this was not the case with men in female-dominated majors; they did not feel any negative gender stereotypes or discrimination.

Kawakami, Young, and Dovidio (2002) found that individuals' schemas include not just traits and stereotypes, but also behavioral representations of social categories. These behavioral representations can appear automatically and without conscious awareness. This is considered the ideomotor perspective, which also explains the human tendency to imitate others (Dijksterhuis & Bargh, 2001). Steele and Ambady (2006) took this perspective and studied how when women were reminded of a stereotyped identity, the reminder of their "gender identity would lead to the expression of more stereotype-consistent attitudes towards math (negatively stereotyped) and arts (positively stereotyped)" (p. 429). The results indicated that the personal attitudes of women are influenced by a reminder of their gender identity; women who were reminded of their gender identity had a greater preference for art than mathematics (Steele & Ambady, 2006).

Clance and Imes (1978) discovered the imposter phenomenon, which is "an internal experience of intellectual phoniness which appears to be particularly prevalent and intense

among a select sample of high achieving women" (p. 241) where women who experience the

phenomenon "persist in believing that they are really not bright and have fooled anyone who

thinks otherwise" (p. 241). Women who experience the imposter phenomenon insist that they

are not intelligent and believe that they have fooled anyone who believes that they are. They

insist that their good grades, high test scores, or acceptance into elite programs are due to luck,

bad judgment of admissions personnel or professors, or misgrading. They are constantly afraid

that they will fail or that their "secret" will be discovered, so they are extremely diligent and

hardworking in their schoolwork or use charm and flattery to win approval of professors. In

relation to STEM, Stout et al. (2011) discussed how this phenomenon can be exacerbated in

women in STEM majors and careers due to the gender stereotypes in these fields. As previously

mentioned, there are no significant differences in standardized test scores in STEM subjects

between genders (Hyde et al., 1990), but the disparity of females that enter into STEM majors or

careers may be related to the gender differences in expected performance outcomes in these areas

related to the imposter phenomenon. Deaux (1977) determined that in women, there is a much

lower expectancy of their ability than in men. When women score high on a test or do well in a

task, they are more likely to attribute this to a temporary cause (e.g. luck or effort), while men

are more likely to attribute the success to their own ability. In addition, women attribute failure

to their own lack of ability, while men attribute failure to a temporary cause such as luck.

Broverman, Vogel, Broverman, Clarkson, and Rosenkrantz (1972) claimed that these lower

expectancies for women was due to a self-stereotype derived from societal gender stereotypes

that women are less competent than men. Clance and Imes (1978) found even repeated

successes were not enough to break the cycle of persistent fears of failure and the discounting of

women's doubt of their own abilities. In regards to this topic of choosing quantitative or

qualitative research methodologies, it could be determined that women may be hesitant to choose a math-related methodology due to doubt of their abilities in this area despite their repeated successes in a doctoral program.

Women may be hesitant to choose a quantitative research methodology, a scientific, mathematical approach, because of negative gender stereotypes. As Eccles (1987) stated, individuals value tasks that are harmonious with their gender roles. Qualitative research has been called more compatible to the female experience and gender roles, which may indicate that women are more likely to choose this methodology. Because quantitative research is more mathematical and scientific, women may choose a qualitative dissertation methodology in order to avoid the threat of negative gender stereotypes because qualitative research is based in psychology, a field with less gender stereotypes (Cheryan, 2012).

Feminist perspectives of methodology. The differences in assumptions between quantitative and qualitative methodologies has been discussed in context of gender. Some feminist researchers have criticized and even rejected quantitative methodology, claiming that its objectivity and positivist assumptions ignores women's voices and is an inaccurate measure of social knowledge (Stanley & Wise, 1993; Wilson, 2011). Certain feminist researchers have criticized various quantitative methods of data collection, such as Graham's (1983) argument that survey research treats all individuals as equals and thus, does not accurately reflect society. Roberts (1981) claimed that women prefer not to use quantitative research methods because these methods do not reveal the intricacy of women's experiences. In contrast, qualitative data collection techniques, such as the semi-structured interview, gives participants a voice and involves them in the research. In qualitative research, the researchers are more concerned with validity than objectivity (Westmarland, 2001). Westmarland (2001) even stated that quantitative

research is associated with words such as positivism, scientific, objectivity, statistics, and masculinity. Qualitative research, however, according to Westmarland, is associated with words such as interpretivism, non-scientific, subjectivity, and femininity. In published journal studies, Plowman and Smith (2011) found that women were overrepresented as authors of qualitative studies.

As discussed, feminist researchers criticize and reject some quantitative methodologies due to the lack of voice and female perspectives (Graham, 1983; Roberts, 1981). Qualitative research, in contrast, focuses on individuals' lived experiences and perspectives (Creswell, 2013). Gilligan (1982), one of the first theorists to focus on specifically women's identities, focused on how women define themselves in terms of relationships and connections in contrast to men, who, according to Gilligan, define themselves in terms of separation and achievement. Gilligan's (1982) description of the differences in how men and women define themselves could translate into the differences between methodologies; qualitative studies focus on connections, perspectives, and personal relationships (Creswell, 2013) while quantitative studies focus more on objectivity (Stanley & Wise, 1993).

Sex and methodology choice. There is very little research regarding dissertation methodology choice. One study by Randolph et al. (2010) used content analysis to analyze the dissertations and theses completed at Mercer University's School of Education from the years 1985-2010. They found that the number of male authors increased over time and that the number of dissertations and theses utilizing qualitative methodologies increased. However, this study did not look at gender differences between methodologies. Nelson and Coorough (1994) found that the number of women publishing dissertations has increased significantly. Women published less than 1% of dissertations in 1950, but by 1990, women published 49% of all

dissertations. Although Nelson and Coorough did study research methods, they did not differentiate methodology choice based on gender. In their longitudinal study, they found that qualitative research did not comprise a high percentage of all dissertations, but they noted that since 1980, there has been a substantial increase in qualitative research. They postulated in 1994 that qualitative research would continue to increase dramatically. Plowman and Smith (2011) found that in four different scholarly journals, women publish more qualitative studies than men and men publish more quantitative studies than women. This phenomenon could be due to women and their attitudes toward science and math.

Ethnicity and Methodologies

Just like women, ethnic minorities may also avoid quantitative dissertations. Research has indicated that individuals of several ethnic minorities experience stereotype threat in regards to mathematics, similar to that of women (Hughes, Gleason, & Zhang, 2005). In addition, African American and Hispanic individuals have higher mathematics anxiety, lower mathematics performance, and lower science and mathematics attitudes than Caucasians or Asians (Bell, 2003; Bui & Alfaro, 2011; Lockhead et al., 1985; Onwuegbuzie & Wilson, 2003; Upadyaya and Eccles, 2014; Wilson & Milson, 1993). Because quantitative research is based in mathematics and positivism (Sale et al., 2002), this may indicate that those in ethnic minorities may be more likely to choose qualitative methodologies rather than quantitative.

Wolniak (2016) found that Caucasian and Asian students are overrepresented in STEM majors while individuals of other ethnicities are underrepresented. Tobias (1976) discussed how both women and African American males tend to avoid math and science majors and fields due to the perception that they are more suited for white men. Stereotypes regarding mathematics and science and ethnicities tend to be that Caucasians and Asians have high abilities in

mathematics and science and that African Americans and Latinos have a lower intelligence and motivation in these areas (Hudley & Graham, 2002). Cvencek et al. (2011) and Pinel (1999) also found that gender and ethnic stereotypes is directly related to mathematics and science self-concept and attitudes, which would indicate that both Latinos and African Americans are at risk due to their ethnic stereotypes of low ability in mathematics and science. Wenner (2003) discovered that children perceive scientists as white men, which is further evidence toward both an ethnic and gender stereotype.

Research has also indicated that mathematics performance is different among ethnic groups. Lockhead et al. (1985) conducted a meta-analysis of multiple studies and found that Asian American students had higher mathematics performance than Caucasian students, both Asian American and Caucasian students had higher mathematics performance than Hispanic students, and all three of the groups had higher mathematics performances than African American students. Grigg, Donahue, and Dion (2007) examined mathematics assessments and found that Asian Americans scored highest, followed by Caucasian students. African American students and Latino students scored the lowest on these mathematics exams. Gross (1988) found that as students got older, African American and Hispanic students found science and mathematics less enjoyable than their Caucasian and Asian American counterparts. As parental support and perceptions of science and mathematics were found to be a significant factor in female math attitudes (Fennema et al., 1990), they have also found to be significant for those in minority ethnic groups. Eccles (1993) discussed how parents' own biases form impressions of their child's ability. Entwisle and Alexander (1988) discovered parental support is the most influential variable in regards to academic self-concept. The parental expectations for mathematics performance in minority ethnicities is a significant factor that can inhibit attitudes

and self-concept and increase anxiety in both mathematics and science. Hall, Davis, Bolen, and Chia (1999) found a negative correlation between parental levels of mathematics anxiety and their child's math performance. They also discovered a positive correlation between a child's mathematics scores and the most advanced mathematics courses completed by the parents. They determined that parental attitudes toward mathematics is a significant factor for mathematics performance. McGraw et al. (2006) confirmed that there is an achievement gap between Caucasian students and students in ethnic minority groups, but also found that a gender gap in mathematics achievement, which is evident in all other ethnic groups, does not exist among African Americans. In other words, the mathematics achievement between African American males and females is not significantly different, although both male and female African Americans have lower mathematics achievement than Caucasian students.

Hughes et al. (2005) found that teachers have an intrinsic bias in regards to academic achievement in different ethnic groups. They discovered that teachers were more likely to attribute problem behavior to situational factors in Caucasian students but attributed problem behavior in African American and Hispanic students to factors such as personality and motivation, which are child-related factors. Other studies have also found that teachers do not accurately rate academic ability in students of minority ethnicities, and students of minority ethnicities are underrepresented in gifted education identification and programs (Murray, 1996). In Upadyaya and Eccles (2014)'s study that tested the predictor variables of gender, age, teacher expectations, and ethnicity in mathematics interest, they found that each of the variables was significant in predicting mathematics interest in students. Caucasian students had a significantly higher interest in mathematics than students in minority ethnicities. In addition, teacher expectations "positively predicted teachers' beliefs regarding children's effort, abilities, and

performance in math, and math importance to children" (Upadyaya & Eccles, 2014, p. 412).

These results indicate not only that students of minority ethnicities have a lower interest in

mathematics, but also that the biases in teacher expectations and attitudes in students of minority

ethnicities does affect their mathematics attitudes and development of interest in mathematics

fields. Conversely, Riegle-Crubm, Moore, and Ramos-Wada (2010) found that the intrinsic

aspiration of careers in mathematics and science between Caucasian, African American, and

Hispanic adolescents was not significantly different, although the achievement gap in these

subject areas was very large between Caucasian students and those of ethnic minorities.

It is important to note that there is the possibility that in conjunction with ethnicity, socio-

economic status may also factor into the differences between mathematics and science

achievement, attitudes, and anxiety. Some scholars have noted that these two dimensions

directly affect each other, considering many of those students in ethnic minorities are also of a

lower socioeconomic status per capita than their Cacausian and Asian-American counterparts.

Thus, many researchers have encouraged individuals to keep in mind the socio-economic

differences between ethnic groups (Campbell, 1991; Leder, 1992).

As discussed earlier in the context of gender, stereotype threat also affects individuals of

underrepresented ethnicities in the STEM field. The individuals experiencing stereotype threat

may have a fear that they will confirm a negative stereotype regarding the intelligence of those of

their ethnicity (Aronson et al., 2002). Individuals of minority ethnicities also can be afraid of

being socially rejected in academic areas where they are underrepresented, such as STEM majors

and careers (Shelton & Richeson, 2005). To further complicate the issue, age may also play a

role in mathematics anxiety and attitudes.

Age and Methodologies

Older students tend to have higher mathematics anxiety and lower attitudes towards mathematics and science compared to their younger, traditional-student counterparts (Bean & Metzner, 1985; Bell, 2003; Bui & Alfaro, 2011; Jones & Watson, 1990; Lockhead et al., 1985; Onwuegbuzie & Wilson, 2003; Upadyaya and Eccles, 2014; Wilson & Milson, 1993). Because the essence of quantitative research is mathematics and scientific positivism, this may indicate that older, non-traditional students may tend to choose qualitative researcher over quantitative research.

The average age of a traditional graduate student is 33 years old. However, the National Postsecondary Student Aid Study (NPSAS) found that the EdD degree had the highest average age (42.3 years old) of any graduate program (U.S. Department of Education, 2010). Many factors contribute to this higher average age of EdD students, such as the number of online programs or blended programs that allow students to have the flexibility to complete a degree program along with continuing their career and caring for their family. Non-traditional students are characterized by various factors, but most often age is the defining characteristic for this population of students. The National Center for Education Statistics (2016a) described a non-traditional student as a student who is above the average age for the degree program.

Bui and Alfaro (2011) discovered that both statistics anxiety and attitudes toward science differed by age. Bell (2003) also found that older, non-traditional students had higher statistics anxiety than traditional students, although they did find that younger, traditional students had more negative attitudes toward science. Baloglu (2003) had similar results in a study regarding statistics anxiety. Baloglu found that older students had significantly higher statistics anxiety than younger students, but that older students had more positive attitudes toward statistics than

younger students. Baloglu explained this by suggesting that older students have more anxiety surrounding statistics, but they recognize the value and usefulness of statistics. In contrast, younger students do not experience anxiety when taking statistics courses, but they do not see the value in understanding statistics. However, other studies have indicated that older, non-traditional students have more negative attitudes toward science, especially non-traditional female students (Bell, 2003; Onwuegbuzie & Wilson, 2003; Wilson & Milson, 1993), so the relationship between age of student and attitudes toward science is unclear and contradictory in the literature. Both Sorge (2007) and Fleming and Malone (1983) found that science attitudes drop significantly with age, and although their study examined younger students in grades kindergarten through 12th, this has implications for collegiate programs, as well. In regards to mathematics, studies have indicated that older, non-traditional students exhibit more math anxiety than traditional students (Malinsky et al., 2006; Royce & Rompf, 1992; Woodard, 2004). Elliott (1990) found in a study of traditional and non-traditional undergraduate students that for female non-traditional students, attribution was the most significant predictor of mathematics achievement. Simply stated, if these older, female students attributed mathematics success to luck, they did not achieve as well in mathematics courses. However, if these students attributed mathematics success to hard work and intelligence, they were more likely to have a higher mathematics achievement score.

Much research has determined that age is a significant factor in attrition in graduate and post-graduate programs (Bean & Metzner, 1985; Jones & Watson, 1990). Bean and Metzner (1985), in fact, identified age as the most significant predictor of attrition. Because of the risk factors of these non-traditional students in conjunction with higher math anxiety and science and math attitudes, it is important to understand the choices that they make in regards to dissertation

methodology. Finally, just as sex, ethnicity, and age could influence dissertation methodology choice because of attitudes toward math and science, religious affiliation may also play a part in this choice due to similar tensions.

Religion and Methodologies

Quantitative research is based in positivism, which emphasizes empirical observation and scientific study (Creswell, 2013). The positivist approach is grounded in objective reasoning and empirical indicators to represent truth (Sale et al., 2002). This is in direct conflict to theistic worldviews such as those held by individuals who are affiliated with a religion. The worldview conflicts between positivism and a religious affiliation (Astley & Francis, 2010; Greer, 1990; Sale et al., 2002) could indicate that individuals who are affiliated with a religion may be more likely to reject the quantitative methodology, which is based in scientific positivism.

Cho (2012) described the difficulties of embracing modern science for people of faith. As previously discussed, both quantitative research and scientific inquiry is based in positivism. This can create a conflict of worldviews. Specifically, Cho discussed the difficulties of those in the Buddhist faith embracing scientific positivism, but the same arguments could be used for other faiths, as well. Religious individuals find truth in the writings and teachings of their religion, such as the Bible for Christians, the Torah for Jews, and the Quran for Muslims. Although the usefulness of science is accepted in most religions, "the metaphysical conclusions many draw from it such as the assertion that only matter exists" (Cho, 2012, p. 541) are rejected. In addition, cosmological views, or the beliefs about of the history of the universe, cause a conflict between the scientific and religious communities (Hanley, 2008). Many scientists claim that there are "no supernatural phenomena, such as the spiritual realm beyond the physical world" (Taber, Billingsley, Riga, & Newdick, 2011, p. 1001), which provides a direct conflict

with the belief in God, the very foundation of religious faith. These philosophical differences could cause tensions between scientific endeavors and the individual's worldview.

The way that faith-based schools address culture can impact attitudes toward mathematics and science. A study by Van Brummelen and Koole (2012) examined Christian high schools and their curriculum in regards to cultural awareness and engagement. They found that in most subjects, Christian schools integrated societal and ethical issues to encourage students to shape their worldview and understanding of culture. The researchers even found that 80% of students in these Christian schools made career goals based on "vocations in which they hope to make a difference for God and/or society around them" (p. 49). However, the researchers discussed disappointment that culture was not discussed in the context of mathematics courses. Van Brummelen and Koole (2012) stated, "we were disappointed that mathematics...generally remained under the radar with respect to awareness of culture. For instance, mathematics teachers did little with statistics, an area with many societal implications" (p. 57). This could indicate to students that mathematics, and in particular statistics, is not as important of an endeavor as other subject or career areas.

Although the purpose of this study is to examine mathematical aspects of the quantitative dissertation methodology in the context of biological sex, ethnicity, age, and religion, because the quantitative methodology is considered the more traditional, scientific methodology rooted in positivism (Sale et al., 2002), examining the tension between science, sex, ethnicity, age, and religion is necessary. There is much research about the tensions between religion and science. Although there are certainly scientists that have a committed religious faith (Polkinghorne, 2008), the majority of scientists have the perspective that "science inherently excludes the possibility of anything supernatural, such as God" (Taber et al., 2011, p. 1001). Dawkins, a

popular evolutionary biologist, is vocal about his negative views of religion and the disparity

between religion and science. He called the views of those who are religious "puny, pathetic,

and small-minded" (Dawkins, 1998, p. 312). Cray, Dawkins, and Collins (2006) called the

perceptions between science and religion as inherently in conflict. These attitudes toward those

of religious faith in science fields can impact people of faith to choose a career or major more

conducive to their beliefs. Francis and Greer (1999) found that 62% of students agreed that there

is a fundamental conflict between scientific and religious claims. Astley and Francis (2010)

found a negative correlation between attitudes towards science and attitudes towards religion.

Taber et al. (2011) found in a qualitative study that students believe that there are contradictions

between religion and science, and that at many times, one has to choose between religion and

science based on context. Although Taber et al. found that some students believed that science

supported their faith, many students either compartmentalized science and religion or choose

between the two, noting that either they should "stick to their religion" or that they decided to

choose science over their religion. Some participants even went as far as to say that they felt that

they had to "pick a side" between religion and science, indicating that even younger students as

examined in Taber et al.'s (2011) study recognize the conflicts and contradictions between

religion and science.

Summary

In summary, Chapter Two included a discussion of the theoretical underpinnings of this

study, intersectionality and the multi-dimensional identity development model. It was

determined that there are fundamental differences in qualitative and quantitative research

methodologies, both in the philosophical underpinnings and in the data collection methods and

analyses. Because of these fundamental differences, the relationships between the choice of

methodology and biological sex, ethnicity, age, and religious affiliation was examined based on research regarding these groups and mathematics anxiety, mathematics performance, stereotypes, and mathematics and science attitudes.

CHAPTER THREE: METHODS

Overview

The purpose of this predictive correlational study was to examine if the variables of biological sex, ethnicity, age, and religious affiliation, predict the choice of a quantitative or qualitative dissertation methodology. Logistic regression was used to examine the relationship between the predictor variables (biological sex, ethnicity, age, and religious affiliation) and the criterion variable, dissertation methodology choice (quantitative or qualitative). Chapter Three will include a discussion of the study's design, research questions and hypotheses, participants and setting, procedures, and data analysis.

Design

The research design that was utilized in this study was a predictive correlational design. Correlation studies are used for two purposes. They are used to "(1) explore causal relationships between variables and (2) to predict scores on one variable from research participants' scores on other variables" (Gall, Gall, & Borg, 2007, p. 337). Correlational designs allow researchers to analyze the relationships between multiple variables, including how these variables both individually and in combination affect behavior (Gall et al., 2007). In this study, a predictive correlation design was utilized to predict dissertation methodology choice based on biological sex, ethnicity, age, and religious affiliation.

In this study, variables were not manipulated and are referred to as either predictor or criterion variables. The predictor variables were biological sex, ethnicity, age, and religious affiliation, and the criterion variable was dissertation methodology choice (quantitative or qualitative). Because a predictive correlational design is a research technique that involves determining "the extent to which a criterion behavior pattern can be predicted" (Gall et al., 2007,

p. 342), the design was appropriate for this study, which sought to determine to what extent dissertation methodology choice can be predicted based on biological sex, ethnicity, age, and religious affiliation. This design was appropriate because the predictor variables (biological sex, ethnicity, age, and religious affiliation) were measured before the criterion variable (dissertation methodology choice), which is necessary in predictive correlational designs (Gall et al., 2007).

Research Question

RQ1: To what extent can the biological sex, ethnicity, age, and religious affiliation of a doctoral candidate attending a faith-based university predict the choice of dissertation method (quantitative or qualitative)?

Null Hypothesis

$H_0 1$: There is no statistically significant relationship between the criterion variable (dissertation methodology) and the combination of predictor variables (biological sex, ethnicity, age, and religious affiliation) for doctoral candidates attending a faith-based university.

Participants and Setting

The participants in this archival study were doctoral candidates who graduated from a large, private faith-based university in the southeast with an EdD degree and produced a dissertation from the School of Education. The EdD degree at this university is a blended program, offering both online and residential doctoral courses. The setting for this study, a private university in central Virginia, is a faith-based university that is accredited through the Southern Association of Colleges and Schools for its doctoral degree.

Considering the university setting is a faith-based, faith-based institution, it could be assumed that students at this university are affiliate with a religion. However, this cannot be assumed. In Uecker's (2008) study, it was found that students at faith-based schools are more

likely than students at secular schools to believe that religious faith is important in daily life, but it determined that not all students at faith-based schools identify as affiliated with a religion. Although religious schools do reinforce religious faith, religious schooling is not a definitive predictor of religious faith or affiliation (Uecker, 2008). In this study, if the dissertation author indicated his or her religious affiliation on the application to the university, this is an assumption that religious faith is a salient identity role, which is supported by Jones and McEwen's (2000) multi-dimensional identity theory. Although doctoral candidates who did not indicate their religion on their university application still may have a religious affiliation, if they did not indicate their religion on their university application, it will not be considered a salient identity trait for the purposes of this study (Jones & McEwen, 2000).

There were 590 dissertations that were written by EdD candidates at this university between the years of 2012- 2016 as determined by the records of the School of Education. In 2011, a new system was implemented for dissertation candidates in which a research consultant was assigned to each candidate to review his or her methodology and analysis to ensure he or she met the university requirements. Each completed dissertation is uploaded in the university's student and faculty publication database, Digital Commons; however, there are a few candidates who opt not to include their dissertation in the Digital commons database. Digital Commons houses scholarly journals that faculty and students edit, works from the university faculty, and student theses and dissertations. The dissertations accepted by the university's School of Education are traditional in nature and consist of five chapters, including Introduction, Literature Review, Methods, Results, and Conclusion. Both qualitative and quantitative methods are accepted for the dissertation requirement, and the School of Education's Dissertation Handbook states that for quantitative studies, a candidate can choose experimental, quasi-experimental,

causal-comparative, and correlational designs. For qualitative studies, a candidate can choose phenomenological, grounded theory, case study, historical, and ethnographic designs. Any other research designs require special permission from the administration of the program.

A sample of 388 dissertations were used in this study from the years 2012-2016 after two cases were removed due to incomplete data. There were 199 quantitative dissertations and 189 qualitative dissertations included in the sample. According to Tabachnick and Fidell (2012), testing multiple correlations requires a sample size of at least $50 + 8m$ where m is the number of predictor variables. In this study, there were four predictor variables (biological sex, ethnicity, age, and religious affiliation), so the minimum number of cases is $50 + 32$, or 82. The sample size of 388 exceeds this minimum sample size for multiple correlations. Systematic random sample was used to select the dissertations. The researcher used the Microsoft Excel list of all dissertation candidates who graduated each year obtained from the university's School of Education administration. Using this list, the researcher randomly selected 40 quantitative and 40 qualitative dissertations by assigning a coded number to each candidate that completed his or her dissertation in 2012. The researcher used the random number function in Excel to place a random number next to each name. The researcher then cut and pasted the random numbers into a column and sorted the random number column in ascending order. The researcher looked up each student's dissertation from the university's Digital Commons website, opened the dissertation, and determined if the dissertation was quantitative or qualitative and recorded this on the Excel spreadsheet. The researcher continued this process until 40 quantitative dissertations and 40 qualitative dissertations were identified for the year. This process was used to identify the sample for each year from 2012-2016. The researcher aimed for a total sample size of 400, or 80 dissertations from each of the five years. However, in the year 2013, only 30

quantitative dissertations were written, and thus, the sample included 10 less qualitative

dissertations than expected.

Quantitative Sample

The quantitative dissertations (a total of 199) consisted of eight true experimental

designs, 38 quasi-experimental designs, 71 causal-comparative designs, 75 correlational designs

and three other designs. The average length of the quantitative dissertations used in this study

was 136 pages, from title page to the end of the appendices. There were 40 quantitative

dissertations included in the sample for the year 2012, 40 included in the year 2013, 39 included

in the year 2014, 40 included in the year 2015, and 40 included in the year 2016.

There were 67 quantitative dissertations written by male candidates and 132 quantitative

dissertations written by female candidates. There were 23 African American candidates, 143

Caucasian candidates, three Asian candidates, two Hispanic candidates, and three American

Indian candidates in regards to ethnicity that produced a dissertation with a quantitative

methodology. There were 104 traditional candidates (aged 42 or younger at the time of

dissertation defense) who produced a dissertation with a quantitative methodology and 95 non-

traditional candidates (over the age of 42 at the time of dissertation defense) who produced a

dissertation with a quantitative methodology. There were 98 candidates who indicated a

religious affiliation and 101 candidates who indicated they were not affiliated with a religion

(students who either indicated "None" as their religion or opted to not answer their religious

affiliation) who produced a dissertation with a quantitative methodology.

Qualitative Sample

The qualitative dissertations consisted of 117 phenomenology designs, 53 case study

designs, 11 grounded theory designs, two ethnography designs, and one other design. The

average length of the qualitative dissertations used in this study was 202 pages. There were 40 qualitative dissertations included in the sample for the year 2012, 30 included in the year 2013, 40 included in the year 2014, 40 included in the year 2015, and 40 included in the year 2016.

There were 64 qualitative dissertations written by male candidates and 125 qualitative dissertations written by female candidates. There were 15 African American candidates, 143 Caucasian candidates, one Asian candidate, six Hispanic candidates, and three American Indian candidates in regards to ethnicity that produced a dissertation with a qualitative methodology. There were 86 traditional candidates (aged 42 or younger at the time of dissertation defense) who produced a dissertation with a qualitative methodology and 103 non-traditional candidates (over the age of 42 at the time of dissertation defense) who produced a dissertation with a qualitative methodology. There were 89 candidates who indicated a religious affiliation and 100 candidates who indicated they were not affiliated with a religion who produced a dissertation with a qualitative methodology.

Instrumentation

Archival data was used for this study. Permission to use the data from the university's database for this research was requested from the Dean of the School of Education, and permission was granted before the researcher collected the data. After approval from the Dean of the School of Education, the researcher requested approval from the Institutional Review Board (IRB), and the request was approved.

Banner INB

The university's database is called Banner INB (Internet Native Banner). This database is hosted on the university's network and uses online forms to both enter and search information in the database. Employees from various departments at the university enter student information.

First, admissions counselors enter demographic information about students as they apply for the university. Throughout a student's program, academic advisors, financial aid employees, and employees of the registrar's office enter information in a student's profile. The student's profile includes his or her birthdate, ethnicity, religious affiliation, contact information, and grades from courses they have taken. Any university employee has access to view a student's information in this database, although staff members are not permitted to access student information unless they have a legitimate reason. In this study, archival data was obtained from two sources. Banner INB was the first, and the second was the university library's Digital Commons database.

Digital Commons

Digital Commons, a publication database, houses faculty- and student-edited scholarly journals, works from university faculty, and student theses and dissertations. Digital Commons is hosted on the university library's website, and it is maintained by the library's staff. Once a candidate successfully defends his or her dissertation and the committee has approved the final manuscript, the candidate is required to send the final dissertation to the library's staff for publication in Digital Commons. The library staff reviews the dissertation for copyright purposes and uploads the dissertation as a .PDF into the Digital Commons database. Digital Commons can be accessed on the university library's webpage and can be searched by name, keyword, or by discipline.

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Procedures

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Before data collection, the researcher requested and obtained Institutional Review Board (IRB) approval. The researcher used the Microsoft Excel list of all dissertation candidates who graduated each year obtained from the university's School of Education. Using this list, the researcher randomly selected 40 quantitative and 40 qualitative dissertations by assigning a

coded number to each candidate that completed his or her dissertation in 2012. The researcher used the random number function in Excel to place a random number next to each name. The researcher then cut and pasted the random numbers into a column and sort the random number column in ascending order. The researcher looked up each student's dissertation from the university's Digital Commons database, opened the dissertation, and determined if the dissertation was quantitative or qualitative and recorded this in a Microsoft Excel document. In order to determine the methodology of each dissertation, the researcher used Digital Commons. First, the researcher typed the candidate's name in the search bar. Then, the researcher opened the dissertation, confirmed the name matched the correct candidate on the Excel sheet, determined that the year of publication of the dissertation and the year of dissertation defense matched, and viewed the abstract of the dissertation. The researcher first looked to see if the words "quantitative" or "qualitative" appeared in the abstract. If either "quantitative" or "qualitative" appeared in the abstract, the researcher categorized the dissertation in a column on the excel sheet with a "0" for quantitative and a "1" for qualitative. If neither of the words "quantitative" or "qualitative" appeared in the abstract of the dissertation, the researcher looked for the terms "statistical method" or "non-statistical method." If "statistical method" was used, the researcher categorized the dissertation as quantitative. If "non-statistical method" was used, the researcher categorized the dissertation as qualitative. If neither of the phrases "statistical method" nor "non-statistical method" were used in the abstract, the researcher looked for the words "experimental," "quasi-experimental," "causal-comparative," or "correlational." If any of these words were used in the abstract, the researcher categorized the dissertation as quantitative. If these words are not mentioned in the abstract, the researcher looked for the words "phenomenology," "grounded theory," "case study," "historical," or "ethnographic." If any of

these words were used in the abstract, the researcher categorized the dissertation as qualitative. If none of these key words were found in the abstract of the dissertation, the researcher scrolled to the methodology chapter, Chapter Three, to determine if statistical analysis was used as the main form of data analysis. If statistical analysis was used as the main form of data analysis, the dissertation was categorized as quantitative. If the main form of data collection and analysis was interviews, observations, or focus groups, the dissertation was categorized as qualitative. While viewing each dissertation, the researcher also noted the page length of the dissertation on a column in Microsoft Excel as well as the specific methodology (experimental, quasi-experimental, causal-comparative, correlational, phenomenology, grounded theory, case study, historical, or ethnographic).

The researcher continued this process until 40 quantitative dissertations and 40 qualitative dissertations were identified for the year. Once all the data was collected for that year (40 quantitative and 40 qualitative), the researcher then keyed in each candidate's student identification number, which was obtained from a list of all candidates who completed dissertations from the School of Education, into Banner INB. The researcher then recorded the candidate's sex, ethnicity, age, and religious affiliation in an Excel sheet. Finally, this process continued for each year beginning in 2012 to 2016.

Biological sex was determined based on the candidate's self-reported sex, male or female, listed on the candidate's profile in the university's administrative database. Ethnicity was also determined based on the candidate's self-reported ethnicity listed on the candidate's profile in the university's administrative database. The candidate's age was determined by the birthdate listed on the university's administrative database and subtracting it from the year the candidate's dissertation was defended. If a candidate was 42 years old or under, he or she was

categorized as a traditional student. If a candidate was 43 years old or over, he or she was categorized as a non-traditional student.

Data Analysis

Descriptive statistics were calculated for each of the variables (biological sex, ethnicity age, and religious affiliation) using SPSS 23.0. The descriptive statistics included the frequency count for each category (biological sex, ethnicity age, and religious affiliation).

Predictor Variables

The first predictor variable was biological sex of the dissertation candidate. This variable is dichotomous (male or female) and was determined based on the self-report of candidate when applying to the university. This variable was coded as "0" and "1" for female and male, respectively.

The second predictor variable was the age of the dissertation candidate in years old. This variable is a categorical variable that indicates if a candidate was a traditional or non-traditional student based on his or her age at the time of dissertation defense. This was determined by subtracting the year of the candidate's birth from the year of dissertation defense. The National Center for Education Statistics (2015) defined a non-traditional student as a student above the average age of the program. Thus, any student aged 43 and higher was categorized as a non-traditional student, and any student with an age under 43 was categorized as a traditional student. This variable was coded as "0" and "1" for non-traditional student and traditional student, respectively.

The third predictor variable was the ethnicity of the dissertation candidate. This variable is nominal and was determined based on the self-report of the candidate when applying to the university. This variable was coded as "0," "1," "2," "3", "4," and "5,"" for Caucasian, African-

American, Hispanic, Asian, American Indian, and Not specified, respectively.

The fourth predictor variable was the religious affiliation of the dissertation candidate. This variable is nominal and was determined based on the self-report of the candidate when applying to the university. This variable was coded as "0", and "1" for none and identified with a faith, respectively. Because there are such a large variety of religious denominations, the researcher did not differentiate between the type of religious affiliation. The main preposition in the difference between methodological choices is the worldview differences between individuals who have a religious affiliation and the scientific community. The positivist worldview is in direct conflict with the worldview of those of religious affiliation, and thus, for the purposes of this study, all religious affiliations were included as one group.

Criterion Variable

The criterion variable was dissertation methodology choice. This was defined dichotomously as either "quantitative" or "qualitative" and coded with "0" for a quantitative dissertation and "1" for a qualitative dissertation. No candidates in the sample completed a mixed methods dissertation. A quantitative method is defined as a systematic and objective method of research that utilizes numerical data to describe variables, observe relationships among variables, or determine cause and effect relationships between variables (Burns & Grove, 2005). A qualitative method is defined as a method that is "multimethod in its focus, involving an interpretive, naturalistic approach to its subject matter…qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 1994, p. 2).

A logistic regression analysis was used to test the null hypothesis. A Wald ratio was reported for the logistic regression model. Cox and Snell's and Nagelkerke's statistics were used

to measure the strength of the model. Logistic regression was used because the criterion variable is categorical and dichotomous (Gall et al., 2007). This analysis examined if the predictor variables (biological sex, ethnicity, age, and religious affiliation) can demonstrate a propensity toward dissertation methodology choice. A logistic regression analysis is a multivariate correlational statistic that is used for "determining the correlation between a dichotomous criterion variable and a set of predictor variables" (Gall et al., 2007, p. 354). Because the criterion variable, dissertation methodology choice, was both categorical and dichotomous (quantitative or qualitative), a logistic regression analysis was appropriate. Logistic regression has a few assumptions. First, there should be an absence of multicollinearity between the predictor variables. However, since the predictor variables were all categorical, this assumption was not applicable for this study. In order for logistic regression to be robust, there must not be less than five frequencies for any of the predictor variable categories. As Tabachnick and Fidell (2012) suggested, the "Other" category was removed from the ethnicity variable, as there were no individuals who indicated "Other" as their ethnicity.

In addition to the logistic regression analysis, which determined the correlation between the criterion variable (dissertation methodology choice) and the predictor variables (biological sex, ethnicity, age, and religious affiliation), odd ratios were also calculated to determine the chance that each of the predictor variables had on predicting the methodology chosen.

Summary

In Chapter Three, the predictive correlational design was discussed. The research question and null hypothesis were listed, and the participants and setting, 388 doctoral candidates at a southeastern university, were described. The instrumentation, which included Banner INB and the Digital Commons database, was explained. The procedures of the study was also

described, including how the sample was selected and how the information for each dissertation was obtained. Finally, the data analysis was described, including the binary logistics regression and the predictor and criterion variables.

CHAPTER FOUR: FINDINGS

Overview

In Chapter Four, the descriptive statistics will be discussed, as well as the data screening procedures and the assumptions for logistics regression analysis. The results for the null hypothesis will be presented, including the logistics regression results and the Chi square and odds ratios for each predictor variable of biological sex, ethnicity, age, and religious affiliation.

Research Question

RQ1: To what extent can the biological sex, ethnicity, age, and religious affiliation of a doctoral candidate attending a faith-based university predict the choice of dissertation methodology (quantitative or qualitative)?

Null Hypothesis

H₀1: There is no statistically significant relationship between the criterion variable (dissertation methodology) and the combination of predictor variables (biological sex, ethnicity, age, and religious affiliation) for a doctoral candidate attending a faith-based university.

Descriptive Statistics

Data were analyzed for the criterion variable, dissertation methodology choice (quantitative or qualitative), and the results can be viewed in Table 1. After two cases were removed due to incomplete data, the sample included 388 dissertations. There were 199 quantitative dissertations and 189 qualitative dissertations included in the study. There were 257 female students in the sample and 131 male students. There were 286 Caucasian students, 38 African American students, eight Hispanic students, four Asian students, six American Indian students, and 46 students with no ethnicity specified. There were 198 non-traditional aged dissertation authors, which were students aged 43 or older at the time of dissertation defense.

There were 190 traditional-aged dissertation authors, which were students below the age of 43 at the time of dissertation defense. There were 187 students who identified with a religion and 201 who did not identify with a faith. The average page length for a dissertation of either methodology was 168 pages.

In the quantitative dissertation group, there were 199 quantitative dissertations included in the sample. Within the quantitative dissertation authors, there were 132 female candidates and 67 male candidates. There were 143 Caucasian, 23 African American, two Hispanic, three Asian, three American Indian, and 25 ethnicity not specified quantitation dissertation authors. There were 95 non-traditional aged dissertation candidates and 104 traditional-aged quantitative dissertation authors. There were 101 candidates who did not identify with a religion and 98 who did identify with a religion. There were 71 students who used a causal comparative research method, 75 who used a correlational research method, two who used a descriptive research method, eight who used an experimental research method, two who used an instrument development method, 38 who used a quasi-experimental research method, and three who used an "other" research method. These three methods that were categorized as "other" included a corpus analysis, a single subject study, and a survey research study.

In the qualitative dissertation group, there were 189 qualitative dissertations included in the sample. Within the qualitative dissertation authors, there were 125 female candidates and 64 male candidates. There were 143 Caucasian, 15 African American, six Hispanic, one Asian, three American Indian, and 21 ethnicity not specified qualitative dissertation authors. There were 103 non-traditional aged dissertation students and 86 traditional-aged qualitative dissertation authors. There were 100 students who did not identify with a religion and 89 who did identify with a religion. Within the qualitative methodology, there were 53 students who

used a case study research method, four students who used a content analysis research method, one student who used a descriptive research method, two students who used an ethnography research method, 11 students who used a grounded theory research method, 117 students who used a phenomenology research method, and one student who used an "other" research method. The "other" method was a heuristic inquiry research method.

Table 1

Frequencies for Predictor Variables for Dissertation Methodology

Predictor Variable	Quant. Diss. ($n = 199$)	Qual. Diss. ($n = 189$)
Biological sex		
Female	132	125
Male	67	64
Ethnicity		
Caucasian	143	143
Af. American	23	15
Hispanic	2	6
Asian	3	1
Am. Indian	3	3
Not specified	25	21
Age		
Non-traditional	95	103
Traditional	104	86
Religious affiliation		
No rel. aff.	101	100
Rel. aff.	98	89

Notes. Af. American = African American, Quant. Diss. = Quantitative Dissertation, Qual. Diss. = Qualitative Dissertation, Rel. aff. = Religious affiliation.

Results

Data Screening

The researcher conducted data screening on each of the predictor variables (biological sex, ethnicity, age, and religious affiliation) to look for any data inconsistencies by sorting the data for each variable and examining for inconsistencies. Two dissertations were removed from

the sample due to incomplete data: one qualitative dissertation and one quantitative dissertation. After thorough data screening, the researcher identified a data error in coding one data point and corrected the inconsistency. The researcher did not identify any other data errors or inconsistencies. After the two cases were removed, the resulting sample size was 388.

Assumptions

According to Warner (2008), there are four assumptions required for logistics regression. First, the criterion variable must be dichotomous; the criterion variable in this study is dissertation methodology, which is dichotomous with the two options of quantitative or qualitative. Second, there must be an absence of multicollinearity among the predictor variables. However, since each of the predictor variables in this study was categorical, multicollinearity could not be determined and thus, is not applicable to this study. Third, Warner (2008) stated that the model must be specified and include all relevant variables and no irrelevant variables. After an exhaustive literature review, the researcher chose the predictor variables of biological sex, ethnicity, age, and religious affiliation. Based on the literature review, these variables are relevant and no other relevant variables could be added to the model. Fourth, Warner (2008) stated that the "categories on the outcome variable are assumed to be exhaustive and mutually exclusive" (p. 932). Each dissertation was either quantitative or qualitative; no dissertations were considered both quantitative and qualitative. When a dissertation was considered one methodology, it was impossible to be considered the other methodology. In this study, all assumptions required by Warner (2008) were met. Warner (2008) also noted that a binary logistics regression does not perform well when many groups have frequencies less than five. In this study, it should be noted that there were only four candidates with an Asian ethnicity, which is less than the recommended five. However, this was the only group with a frequency less than

five; there were not many groups with a frequency less than five as cautioned by Warner (2008). In addition, Vittinghoff and McCulloch (2006) found that groups with low frequencies are acceptable provided that the model is stable. They recommended that the frequency count assumption for predictor variables be relaxed in logistic regression analysis. In this study, the model was stable, and thus, the group of candidates with an Asian ethnicity remained in the model.

Results for Null Hypothesis

A binary logistic regression analysis was used to test the relationship between the predictor variables (biological sex, ethnicity, age, and religious affiliation) and the criterion variable (dissertation methodology) at a 95% confidence level. The categorical variables were dummy-coded. Dissertation methodology was coded as "0" for quantitative and "1" for qualitative. Biological sex was coded as "0" for female and "1" for male. Ethnicity was coded as "0," "1," "2," "3", "4," and "5," for Caucasian, African-American, Hispanic, Asian, American Indian, and Not specified, respectively. Age was coded as "0" for traditional students and "1" for non-traditional students. According to the U.S. Department of Education (2008), the average age of a student in an EdD program is 42.3 years old. The National Center for Education Statistics (2015) defined a non-traditional student as a student above the average age of the program. Thus, any student aged 43 and older and above was categorized as a non-traditional student, and any student with an age under 42 and younger was categorized as a traditional student. Religious affiliation was coded as "0" and "1" for none and identified with a faith, respectively.

The results of the binary logistic regression were not statistically significant, $\chi^2(8) = 6.34$, $p = .61$. The model was extremely weak according to Cox and Snell's ($R^2 = .016$) and

Nagelkerke's ($R^2 = .022$) (see Table 2). The model did not hold, and there was no statistically

significant, predictive relationship between dissertation methodology choice (quantitative or

qualitative) and the predictor variables (biological sex, ethnicity, age, religious affiliation).

Thus, the researcher failed to reject the null hypothesis.

Table 2

Logistic Regression Model Analysis

χ^2	p	Cox & Snell R^2	Nagelkerke's R^2
6.34	.61	.016	.022

The researcher further investigated each predictor variable. For the variable of biological

sex, the Wald ratio was not statistically significant, $\chi^2(1) = .01$, $p = .91$. This result indicated

that dissertation methodology choice between males and females was not statistically significant.

The odds ratio for biological sex was 1.03 indicating that females were 1.03 times more likely to

choose a quantitative methodology than males. However, this relationship was too small to be

considered statistically significant, as indicated by the Wald statistic.

The researcher also investigated the predictor variable of ethnicity. Overall, the predictor

variable of ethnicity was not statistically significant, $\chi^2(5) = 3.97$, $p = .55$. In addition, none of

the Wald ratios for any ethnic groups were statistically significant. For students with a

Caucasian ethnicity, the Wald ratio was not statistically significant, $\chi^2(1) = .96$, $p = .33$. The

odds ratio for Caucasian students was .69, indicating that Caucasian students were .69 times

more likely to choose a quantitative methodology. For students with an African American

ethnicity, the Wald ratio was not statistically significant, $\chi^2(1) = .35$, $p = .56$. The odds ratio for

African American students was 1.21, indicating that African American students were 1.21 times

more likely to choose a quantitative methodology. For students with a Hispanic ethnicity, the Wald ratio was not significant, $\chi^2(1) = .188$, $p = .67$. The odds ratio for Hispanic students was .821, indicating that Hispanic students were .821 times more likely to choose a quantitative methodology. For students with an Asian ethnicity, the Wald ratio was not significant, $\chi^2(1) = 2.16$, $p = .14$. The odds ratio for Asian students was 3.59, indicating that Asian students were 3.59 times more likely to choose a quantitative methodology. For students with an American Indian ethnicity, the Wald ratio was also not significant, $\chi^2(1) = .43$, $p = .51$. The odds ratio for American Indian students was .46, indicating that American Indian students were .46 times more likely to choose a quantitative methodology. Finally, for students who did not specify their ethnicity, the Wald ratio was also not significant, $\chi^2(1) = .03$, $p = .855$. The odds ratio for students who did not specify their ethnicity was 1.17, indicating that students that did not specify their ethnicity were 1.17 times more likely to choose a quantitative methodology.

The researcher also examined age. For the variable of age, the Wald ratio was not statistically significant, $\chi^2(1) = 1.24$, $p = .27$. This result indicates that there was no significant relationship in dissertation methodology choice between traditional students (42 and younger) and non-traditional students (age 43 and older). The odds ratio for age was 1.26, indicating that traditional students were 1.26 times more likely to choose a quantitative methodology than non-traditional students. However, this relationship was too small to be considered statistically significant, as indicated by the Wald statistic.

Finally, the researcher investigated religious affiliation. For the variable of religious affiliation, the Wald ratio was not statistically significant, $\chi^2(1) = .17$, $p = .68$. This result indicates that there was no significant difference in dissertation methodology choice between students who are affiliated with a religious and those who are not affiliated with a religion. The

odds ratio for religious affiliation was 1.09, indicating that students with no religious affiliation were 1.09 times more likely to choose a quantitative methodology than students with a religious affiliation. However, this difference was too small to be considered statistically significant, as indicated by the Wald statistic.

Table 3

Summary of Logistic Regression Analysis Predicting Dissertation Methodology

Predictor Variable	*B*	*SE*	OR	Wald statistic	*p*	*df*
Biological sex	.03	.22	1.03	.01	.91	1
Ethnicity				3.97	.55	5
Caucasian	-.37	.38	.69	.96	.33	1
Af. American	1.9	.33	1.21	.35	.56	1
Hispanic	-.20	.45	.82	.19	.67	1
Asian	1.28	.87	3.59	2.16	.14	1
Am. Indian	-.78	1.20	.46	.43	.51	1
Not specified	.16	.87	1.17	.03	.86	1
Age	.23	.21	1.26	1.24	.27	1
Religious affiliation	.09	.21	.68	.17	.68	1

Summary

Chapter Four provided a summary of the data collected and the procedures that were used for analyzing the data. The data consisted of the dissertation methodology and the biological sex, ethnicity, age, and religious affiliation of the dissertation author. The descriptive statistics were reported as well as the results from the logistics regression analysis. The statistical analysis found that the predictor variables of biological sex, ethnicity, age, and religious affiliation were not statistically significant predictors of dissertation methodology, and the researcher failed to

reject the null hypothesis. Chapter Five will discuss these statistical findings in relation to the

related research and the implications of these results.

CHAPTER FIVE: CONCLUSIONS

Overview

Chapter Five will discuss the results of the statistical analysis and the implications of those results in light of related research. In addition, limitations of the study will be examined and suggestions for future research will be recommended.

Discussion

The purpose of this archival, predictive correlational study was to examine the effect of biological sex, ethnicity, age, and religious affiliation on dissertation methodology choice among doctoral candidates in the School of Education at a faith-based university. The criterion variable was *dissertation methodology* (quantitative or qualitative). *Quantitative research* is defined as a systematic and objective method of research that utilizes numerical data to describe variables, observe relationships among variables, or determine cause and effect relationships between variables (Burns & Grove, 2005), and *qualitative research* is defined as using an interpretive approach to study phenomena in their natural settings and "attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 1994, p. 2).

The predictor variables were the candidate's biological sex (male or female), ethnicity, age, and religious affiliation. *Biological sex* was defined as male or female (American Psychological Association, 2011) as self-reported on each candidate's university records. *Ethnicity* was defined as "the social group a person belongs to, and either identifies with or is identified with by others, as a result of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race" (Bhopal, 2004, p. 443). *Age* was defined as the age of the candidate in years old at the time of the dissertation

defense. Religious affiliation is defined as "an organized system of practices and beliefs in which people engage" (Mohr, 2006, p. 174). A candidate's religious affiliation was measured through their self-reported religious affiliation in their application to the university.

Biological Sex and Methodology Choice

Research suggests that qualitative research embodies more feminine characteristics such as a focus on interpersonal relationships and an underlying constructivist approach (Creswell, 2013; Lincoln & Guba, 1985), but research has also indicated that women are over-represented as authors of qualitative studies (Plowman & Smith, 2011). Plowman and Smith (2011) studied published research journal studies, not dissertations, and although their study was published in 2011, the data they collected was from a 22-year period from 1986-2008. In this study, when looking at candidates' dissertations, males and females were equally as likely to conduct a quantitative or qualitative study. This was in contradiction to Plowman and Smith's (2011) findings. This may be explained due to an overall increase in qualitative research within recent years and because women may be more willing to overcome any math anxiety.

As Rone (1998) indicated, qualitative research has been steadily increasing since 1980, quickly becoming a research method used as much as the more traditional quantitative method, especially in the social science and education fields. Because this study collected data from 2012-2016, it includes much more recent data. This research was also collected from only EdD doctoral candidates, which is one of the fields where qualitative research is most popular (Rone, 1998). It is possible that qualitative research is continuing to rise in popularity and is becoming a more often used methodology for males as well as females.

Regarding math anxiety and women, a dissertation is usually divided into five chapters: introduction, literature review, methods, analysis, and discussion. Even though a quantitative

methodology is based in a positivist philosophical approach (Sale et al., 2002) which differs from the qualitative constructivist approach (Creswell, 2013), three of the five chapters of the dissertation are structured and written the same in both qualitative and qualitative studies (Bloomberg & Volpe, 2015). Although research has shown that women have higher levels of math anxiety than men and pursue degrees in mathematical fields at a much lower percentage than men (Cheryan, 2012; Nelson & Brammer, 2008), because the quantitative dissertation only includes math-related concepts in two of the five chapters, women may be more willing to overcome any math anxiety for just two chapters of a dissertation than they would be for a career or advanced degree in a math-related field.

Ethnicity and Methodology Choice

In this study, ethnicity was not found to be a statistically significant predictor of dissertation methodology choice. Although previous research has found that several ethnic minorities experience more stereotype threat, higher mathematics anxiety, and lower mathematics attitudes than Caucasians or Asians (Bell, 2003; Bui & Alfaro, 2011; Lockhead et al., 1985; Onwuegbuzie & Wilson, 2003; Upadyaya & Eccles, 2014; Wilson & Milson, 1993), this study did not find that this translated into more qualitative dissertation methodologies for candidates of any specific ethnic minority. Previous research has also indicated that individuals of an ethnic minority tend to avoid math and science majors (Tobias, 1976). However, much of the research in this area is outdated, and although avoidance of careers and major areas of study in the mathematics field is documented in prior research, in this study, individuals of some ethnic minorities were just as likely to complete quantitative dissertations as individuals of Caucasian descent. This could be an indication of the mathematics anxiety, achievement, and attitudes gap

closing, or it could be indicative that these candidates were able to overcome their anxiety regarding the two chapters of the dissertation related to mathematics.

Age and Methodology Choice

Although statistics anxiety is higher in older, non-traditional students compared to traditional students (Baloglu, 2003), in this study non-traditional students were just as likely to choose a quantitative dissertation methodology as traditional students. In Baloglu's study, it was found that older students had higher statistics anxiety than younger students, but older students had more positive attitudes towards statistics than younger students. Baloglu noted that older students recognized the value and usefulness of statistics. Even though the non-traditional students' statistics anxiety may have been higher based on previous research, there was not a statistically significant relationship between their methodology choice and age. As previously mentioned, two of the five dissertation chapters includes statistical analyses in a quantitative dissertation. It could be that non-traditional students understand the value of statistics and the quantitative methodology and persist through any statistics anxiety in the chapters in the dissertation that require statistics.

Religion and Methodology Choice

In this study, religious affiliation was not found to be a statistically significant predictor of dissertation methodology choice. Even though quantitative methodologies are based in positivism, which conflicts with the worldview of most religions, candidates at this university with a religious affiliation were not less likely to choose a quantitative dissertation methodology. It could be that using a positivist approach in a dissertation could be separate from an individual's personal worldview. As Taber et al. (2011) found, some students believe that science, which is both positivist and focused on empirical and quantitative studies, supports their

faith. Taber et al. (2011) also found that many students compartmentalize science and religion. This could be the case for the candidates in this study; the choice of a quantitative methodology that is based in positivism is compartmentalized from their religious affiliation. Thus, their positivist, quantitative study is unrelated to and compartmentalized from their religion and personal, theistic worldview. In this study candidates who identified with a religious affiliation were just as likely to choose a quantitative dissertation methodology as those who did not.

Overrepresentation of Females

One finding in this study was the much higher number of females completing the EdD program at this university compared to males. There were 257 females and 131 males in the random sample, indicating that the number of females in the EdD completing a dissertation almost doubled the number of males in the program in the years 2012-2016. Although this is a particularly large gender gap, there is evidence in research that women now represent the majority of college students. According to the National Center for Educational Statistics (2016b), in 2016, there were 11.7 million females attending college and only 8.8 million males. This is a gender-gap reversal from the 1970s, where approximately 58% of all college students were male (Bae, Choy, Geddes, Sable, & Snyder, 2000). Human capital theory explains how education is based on investment. Basically, individuals risk a short-term loss of resources, which is indicative of the choice to complete a graduate degree, for a long-term gain (Russell, 2013). Although there are various gains in completing a doctoral degree, including intrinsic gains, a prominent motivation to complete a post-graduate degree is the economic gain based on a higher salary and more prominent occupational position. Despite the reverse gender gap in higher education and that there are more women who persist in higher education degrees and enroll in graduate school than men, there is still a significant pay gap between men in women in

the United States. In 2015, men were paid 20% more than women (American Association of University Women [AAUW], 2016). Although this gap has narrowed, at the current rate, women will not reach pay equity with men until 2059 (AAUW, 2016). Some scholars have suggested that the overrepresentation of women in higher education is partially due to their need of higher labor-market opportunities (DiPrete & Buchmann, 2006). Because men are already paid more in the labor market, women find it necessary to invest in their education in order to obtain job opportunities at a higher level.

     Because this research only involved EdD candidates, women could also be overrepresented in the EdD program because of the higher number of women in the education field. Women make up 76% of teachers (U.S. Department of Education, National Center for Education Statistics) and 65% of public, K-12 school principals (Bureau of Labor Statistics, U.S. Department of Labor, 2016). According to Perry (2013), women completed 68% of education doctoral degrees. Women also completed 52% of all doctoral degrees in 2012; thus, women are completing more doctoral degrees then men both overall and in the education field (Perry, 2013). The percentage of women completing education doctoral degrees compared to men (68%) is higher than the percentage of women who are K-12 school administrators, but lower than the percentage of women who are employed as K-12 teachers (76%). Although this study found a higher number of women completing the EdD program, more research is needed to determine why women have shifted to completing doctoral degrees at a higher rate than men; in the 1990s, women completed approximately 49% of all education doctoral degrees (Nelson & Coorough, 1994), which is significantly less than the current 68% (Perry, 2013).

Rise of Qualitative Research

The results of this study indicated that the use of qualitative research may be on the rise, just as previous studies have suggested (Nelson & Coorough, 1994). Except for the year 2013, where there were only 30 qualitative studies completed compared to 40 quantitative studies, the number of qualitative studies completed was approximately the same as the number of quantitative studies in this sample. In 1973, only 7% of dissertations utilized a qualitative methodology (Wick & Dirkes, 1973), and other researchers found in 1980-1993, as low as only 3% of dissertations used qualitative research (Nelson & Coorough, 1994). In a study conducted by using a sample of EdD dissertations from 1998-2002, Kontorski and Stegman (2002) found that 28.87% of the EdD dissertations were qualitative, and similarly, Benson, Chik, Gao, Huang, and Wang (2009) found that 22% of articles published in education journals were qualitative in design between the years 1997 and 2006. Rone (1998) found in 1998 that qualitative methodologies were increasing and expected them to continue to increase in popularity. Flinders and Richardson (2002) suggested that qualitative research grew so quickly in the 1990s and early 21st century that "it is difficult to find a more prominent trend in the field of education" (p. 1159). As Alasuutari (2010) suggested, a shift in cultural and political worldviews may be a reason that qualitative research has risen in popularity; the postmodern culture shift has caused more interest in subjective human views, or verbal data, as described by Flinders and Richardson (2002), rather than just empirical, positivist studies using numerical data.

Implications

This research contributes to the knowledge base of methodology choice. Plowman and Smith (2011) provided a study that looked in-depth at the methodology choices of males and females in various professional journals. Although this study contradicts the results of that

study, it answers the call for additional research in this area. This study is also the first known study that examines the combination of biological sex, ethnicity, age, and religious affiliation in the context of methodology choice. Although much research has examined these variables in regards to mathematics anxiety, attitudes, and achievement, this study is unique that it examines the combination of these variables in the context of dissertation methodology choice. Using intersectionality as a framework, this study considers the interactions of these dimensions of identity and the relationship that they have on methodology choice. Research that studies intersectionality in relationship to methodology choice is lacking, and this study adds to the knowledge base of intersectionality and the dimensions of identity that affect choices of individuals.

 As Flynn et al. (2012) discussed, the dissertation process is extremely important in doctoral programs. The dissertation allows candidates to become self-directed learners, develops candidates into researchers, and allows for new developments in various fields of study. As Flynn et al. (2012) also noted, the dissertation phase of a doctoral program is where candidates are most at risk of dropping out of the program. The lack of research in the dissertation is problematic, especially considering the importance of the dissertation in doctoral programs. This study adds to the knowledge base of the dissertation process and provides a starting point for other areas that need more research.

The finding of high number of females in EdD programs has implications for higher education. This higher-education gender gap reversal has several implications for higher education administration and researchers. The motivation of applicants to EdD programs should be examined to determine how to recruit both males and females into EdD programs. As Bae et al. (2000) discussed, the gains of women in education should be celebrated, including their

higher rates of persistence, application, and achievement in higher education, but higher education administration should make it a priority for their programs to attract both men and women and assist both men and women to succeed while completing these programs.

Limitations

All of the doctoral candidates in this study were from one university. As Kitch and Fonow (2012) found in their study, some schools have a tendency to have a "signature" methodology. In this particular university's EdD program, the most popular methodology was a qualitative phenomenology with 117 dissertations in this study's sample produced utilizing this methodology. Since this study only examined one university's EdD program, it is possible that in this particular university, one methodology may be more encouraged than the other, which would skew the results of this study. Thus, the results of this study may not be generalizable to all EdD programs.

Not all students in this study indicated a religious affiliation. Upon application to the university, students filled out a survey indicating their religious affiliation, and included as options were many different religions, denominations, an "Other" category, and a "None" category. However, many students declined to answer this particular question. The lack of answer of this question could have skewed the sample for religious affiliation in this study. Some students may have felt uncomfortable sharing their affiliation and did not answer, even if they were affiliated with a religion.

Recommendations for Future Research

There are several areas related to this study where future research is recommended. Because this study only examined dissertations from one university, it would be beneficial for similar studies to be conducted at other universities to see if the results are similar. As indicated

by Kitch and Fonow (2012), some universities have a tendency to have a "signature" methodology, where more students gravitate towards a particular methodology based on curriculum and peer support. This could have been a hindrance to this particular study's prediction model.

In addition, the high number of females in this EdD program and in higher education in general is an area that calls for more research. Studies that focus on males in EdD programs would be beneficial for university administration to understand their motivations for entering the program. In addition, studies focusing on females and their motivation for completing an EdD program in the context of human capital theory could investigate whether the underlying economic reasons for the reverse-gender gap. Studies regarding the persistence of both men and women in EdD programs would shed light on if more women than men are applying to EdD programs or if more women than men are persisting through EdD programs. Finally, research regarding the differences in females in males in PhD programs versus EdD programs should be examined, especially in regards to persistence and career aspirations; with the overrepresentation of women in the K-12 teaching field (U.S. Department of Education, National Center for Education Statistics, 2014) but the overrepresentation of men in both K-12 and collegiate administration (Glass, n.d.), research on both the PhD and EdD degrees is needed.

Summary

Chapter Five discussed the findings of the study in regards to the research question and null hypothesis. The null hypothesis was not rejected, and there was no significant relationship between dissertation methodology choice and biological sex, ethnicity, age, and religious affiliation. The finding of more females in the EdD program was overviewed, and the implications, both empirically and practically, was examined. Limitations of the study were

discussed, including that only one university was included in the study and that many students did not indicate their religious affiliation. In addition, recommendations for future research in areas related to this study were suggested.

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Appendix A: IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

December 8, 2016

Rebecca Lunde
IRB Exemption 2721.120816: Biological Sex, Ethnicity, Age, and Religious Affiliation on Predicting Dissertation Methodology Choice among Doctoral Candidates at a Christian University

Dear Rebecca Lunde,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(4), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

> (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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Appendix B: Variable Codes

Table 4

SPSS Variable Codes

Variable	Code
Methodology	
Quantitative	0
Qualitative	1
Biological Sex	
Female	0
Male	1
Ethnicity	
Caucasian	0
African-American	1
Hispanic	2
Asian	3
American Indian	4
Other	5
Not specified	6
Age	
Non-traditional student	0
Traditional student	1
Religious Affiliation	
Not specified	0
Identified with a faith	1
Research design	
Case study	0
Causal comparative	1
Content analysis	2
Correlational	3
Descriptive	4
Ethnography	5
Experimental	6
Grounded Theory	7
Instrument Development	8
Phenomenology	9
Quasi-experimental	10
Other	11